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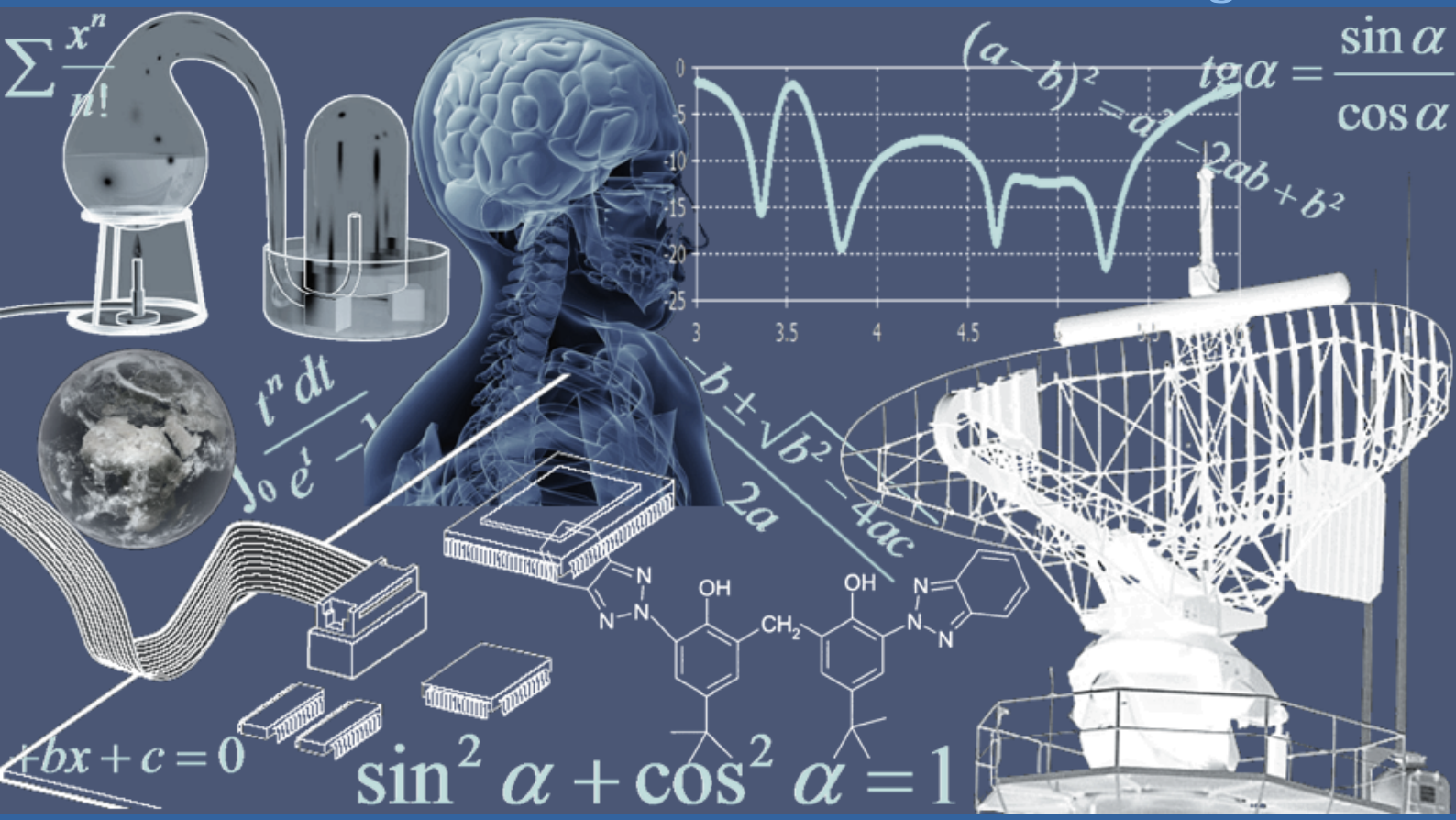

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"Bigger Data" Visualization to Visual Analytics: a path to Innovation. "Happening, definitely! Misleading, possibly?" A review of some examples applicable to IP Discovery

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ABSTRACT: An image is worth a thousand words. This is a common adage which may have to be revisited. The query "Eiffel Tower" yields about 60 million images using Google™ search engine. These words combined with "steel structure" score about 20 000 images.

The power of images is paramount. With about 80 million enforceable patent documents, a large number containing images, one may wonder whether the adapted tools to exploit this image databank are available and used.

Adding three dimensional activation of patent drawings by means of computer aided design would likely return creative amazements with large potential for innovation. In 2010 ideators filed approximately 2 million new patent applications around the world. These patents tend to contain more readily exploitable images.

Combinatorial, associative or intersecting approaches, as illustrated in the introduction, are definitely a major source of inspiration for innovation, moreover disruptive.

What about the "Big Data" necessity? Can the 60-70's technology wonders, such as PCs, Biotech, Mechatronics, further evolve today without the "Big Data" component?

Big data approach is definitely not common in the IP domain; matter of legal fears or lack of adapted tools? The question will anyway probably not slow-up the advent of Big Data in a broad fashion in many areas.

Inclusive innovation, with a goal to serve beyond the development mainstream, encompasses more consumer data therefore Big Data analysis too. Inclusive, open and disruptive innovation modes are pending on good and clear visualization of the trends, initially partly or mostly technological.

This chapter, as part of a series on innovation, attempts to answer some questions related to the above matter and provides insight in the visualization technical status and its potential and direct applicability to IP analysis, and IP discovery in general. Visual analytics, although not developed, are integrated in the horizon of a bigger data analysis bringing additional questions such as:

Beyond the classical synergy -additive- equation, is there a potential for multiplying the ideation outputs?

Furthermore, is there presently too much emphasis engaged on the data itself, rather than the analytical trends and the acumens that can be produced? Are the available tools, such as for extraction, suitable?

KEYWORDS: Innovation - open, disruptive, inclusive -, visualization, Big Data, visual analytics, ideation, trend analysis, neural networks, collaborative, Collaboratory™, adjacent technology analysis, ATA©, IP strategy, semantic analysis, image analysis, artificial intelligence, reverse engineering, confidence, curiosity, combinatorial, biotechnology, energy.

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This assessment is intended to educate and raise awareness of some of the complex issues that surround the intellectual property in the field of knowledge extraction from the about 80 million patent documents available, and to assist in the development of practical skills for

Corresponding Author: Serge Rebouillat

dealing with inventions. It does not seek to provide legal, managerial or technical advice on intellectual property related law as such. For any guidance, legal or any other, seek advice from the appropriate professionals; this study can by no mean substitute for expert legal, technical and managerial advice.
The opinions expressed by the writers in this article do not necessarily represent the viewpoints of the companies the author are employed by.

1 INTRODUCTION

An image is worth a thousand words, is a common adage which may have to be revisited. The words "Eiffel Tower" yield about 60 million images using Google™ Images search engine. These words combined with "steel structure" scores about 20 000 images.

The power of images in our day-to-day activities as well in professional situations, being scientists, engineers, economists, business strategists is dominant. With about 80 million enforceable patent documents, a large number containing images, one may wonder how the professionals cited above cope without adapted tools to exploit this image databank. Adding three dimensional activation of patent drawings by means of computer aided design would likely return creative amazements with large potential for innovation. The growth of patent applications is substantial; in 2010 ideators filed approximately 2 million new patent applications around the world. These patents tend to contain more readily exploitable images.

Combinatorial, associative or intersecting approaches, as illustrated on Fig. 1, both self-explanatory, are definitely a major source of inspiration for innovation, moreover disruptive. Adding questioning, observation, networking and experimenting will complete the stereotypical disruptive innovator profile, as reproduced on Fig. 2 [1] (Dyer et al., 2009). The adjacent technology analysis serving in this particular situation as an evergreen soundboard and a discovery lens, ATA© has been rather abundantly covered by Rebouillat.

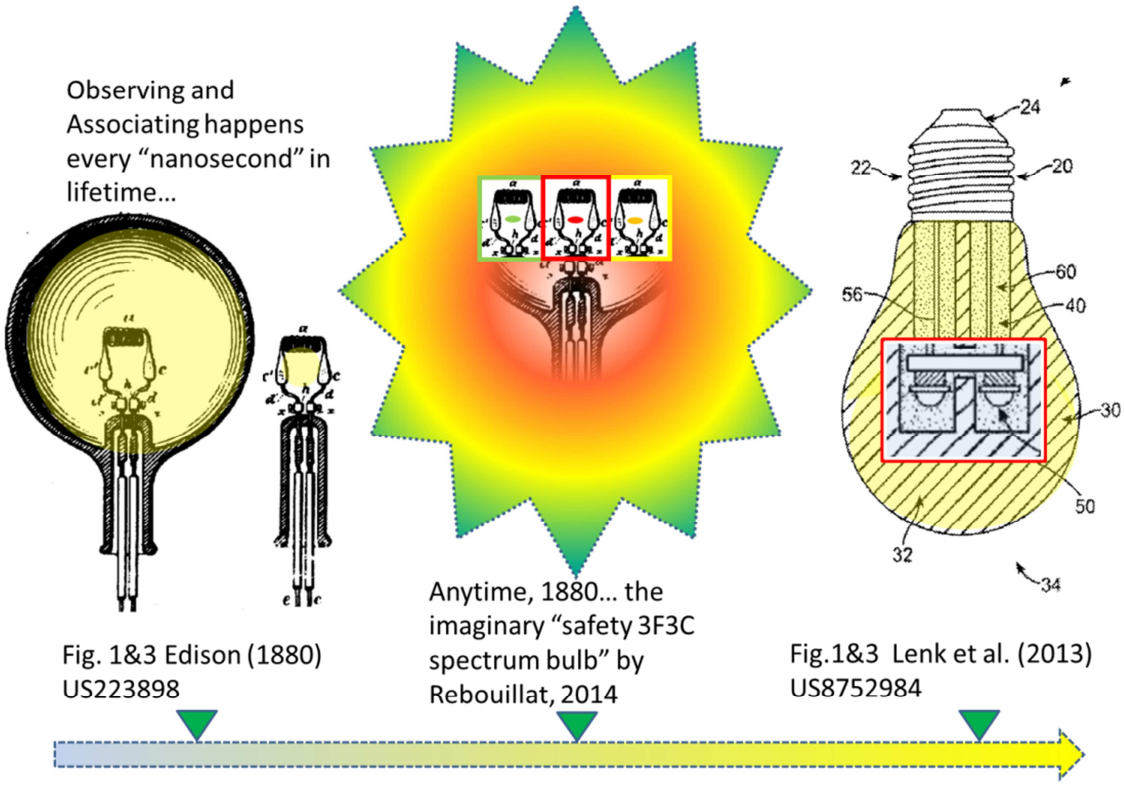

Fig. 1 Combinatorial, associative or intersecting approaches, as illustrated above are part of the Disruptive Innovation Path: from monofilament bulb to multiLED light emitting systems, there are multiple inspiring options simply derived from observation and visualization, i.e. spontaneous "visual analytics".

Also:

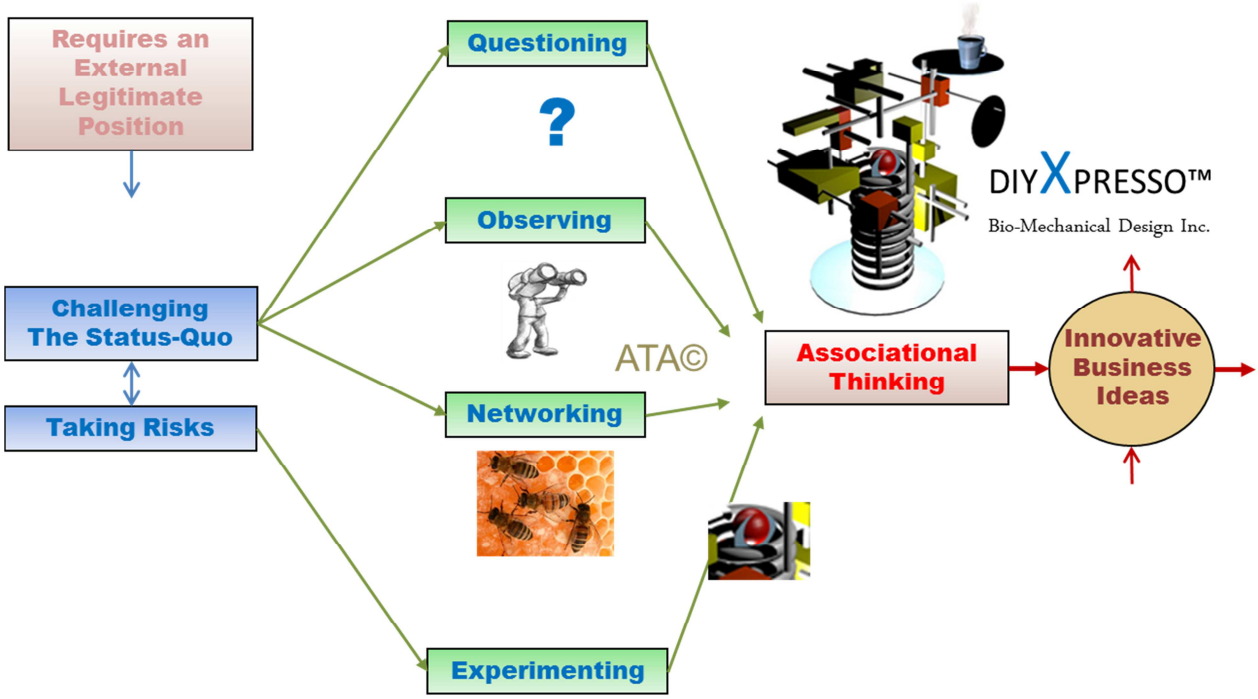

Fig. 2 Adding questioning, observing, networking and experimenting can complete the stereotypical disruptive innovator profile. "Big Data" is revolutionizing the adopted skill requirements.

What about the "Big Data" necessity? Will the disruptive innovator criteria, based on the 60-70's technology wonders, such as PCs, Biotech, Mechatronics[1] apply today without the "Big Data" components? Is this question motivated by provocation or does it spring from farsighted logic?

Big data approach is definitely not common in the IP domain; matter of legal fears or lack of adapted tools? The question will anyway probably not slow-up the advent of Big Data in a broad fashion in many areas.

Inclusive innovation, with a goal to serve beyond the development mainstream, encompasses more social consumer data therefore "Big Data" analysis too. Inclusive, open and disruptive innovation modes are pending on good and clear visualization of the trends, initially partly or mostly technological.

This chapter, as part of a series on innovation, attempts to answer some questions related to the above matter and provides insight in the visualization technical status and its potential and direct applicability to IP analysis and IP discovery in general.

Is there a potential for multiplying the ideation outputs beyond the classical synergy additive equation?

Is there presently too much emphasis engaged on the data itself, rather than the analytical trends and the acumens that can be produced? Are the available tools for extraction suitable? Can Visual Analytics, "the science of analytical reasoning facilitated by visual interactive interfaces", help and when? These are additional questions.

Furthermore and additively:

Part of our economic model relies on innovation processes (Fig. 3) to fuel industrial growth.

[1] *Trademark applied by a company in Japan with the registration number of "46-32714" in 1971.*

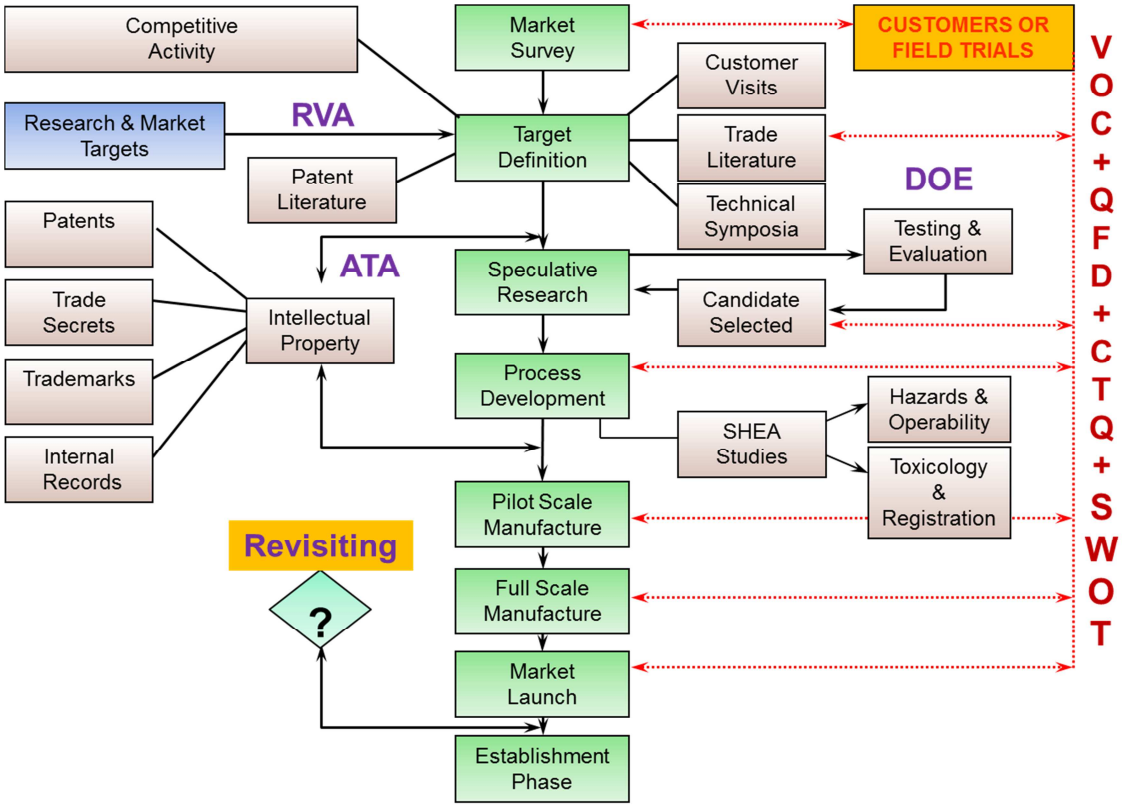

Fig. 3 The Z-Process, above, combines multiple business and technology management processes.

Until recently innovation was restricted to the development of ideas and concepts within firms' environment. However, this model has been challenged during the past decade with the arrival of "open innovation", a "paradigm" suggesting that "firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology" [2] (West & Bogers, 2011). This paradigm generated multiple business models [3] (Rebouillat, 2013) and ideas to make the best of the available material. In parallel to this conceptual revolution, the amount of the data one can access and use to stimulate his creative imagination grew exponentially. Innovation, once restricted to a few creative minds is now an open market. In the intellectual property (IP) domain, the number of granted patents is growing every day following a slope never encountered before. From 2008 to 2010 the World Intellectual Property Organization (WIPO) received about 5,000 new patent applications per day, and design patents in China were more than 500,000 in 2012. It is accompanied by an explosion in the number of scientific productions. In 2010 Medline received about 110 new articles per day. Furthermore, areas such as biology collect and share petabytes of data through public repositories such as the European Bioinformatics Institute or the US National Center for Biotechnology Information [4] (Marx, 2013). This explosion of data leaded to the creation of the "Big Data" concept and its associated real-time decision-making tools. However, Big Data *per se* yield neither meaning nor value. Many innovative opportunities are wasted because we lack the ability to extract and process this large amount of data. New promising solutions are emerging to tackle the associated challenges. One of the most promising domains of research is "visual analytics" where analytical reasoning is facilitated by interactive visual interfaces. This whole new scientific domain promotes collaborative work and human-machine interaction to create the foundation of new innovative paths.

The aim of this paper is also to continue recent works [3], [5], [6] (Rebouillat & M. Lapray, 2014; Rebouillat & D. Lapray, 2014; Rebouillat, 2013) and go further in the understanding of the use of visualization-based data discovery tools in the IP domain.

2 DATA ANALYSIS AND INNOVATION

2.1 OPEN INNOVATION

In the past, companies' strategy would be to accumulate IP to provide design freedom to their employees and to avoid costly litigation.

More precisely and more recently revised to:

1- Maintain Superior Competitive Position
- Minimizing elapsed time from Idea to market
2- Ensure Business Flexibility
- Maintaining and expending the freedom to operate
3- Secure Business Profitability
- Minimizing legal/competition exposure

However, some if not most patents were worth very little and as a result were never used by the business that held them. Ever faster technology cycles and stronger global competition prompted Henry Chesbrough to propose a new paradigm, so called "open innovation" [7] (Chesbrough, 2006). It promotes the use of external ideas in addition to internal ones in order to advance technological growth. In Open Innovation, "IP represents a new class of assets that can deliver additional revenues to the current business model, and also point the way towards entry into new businesses and new business models" [7] (Chesbrough, 2006).

For patent strategy, IP awareness and vigilance is critical: offensive and/or defensive, creating value and/or distributing value. The challenges between creating value opportunities and strictly controlling and distributing value, subtend the business opportunity within its rather fast evolving boundaries [3] (Rebouillat, 2013).

In order to detect the broadest range of possible options for introducing new knowledge/expertise into an organization, it is necessary to process a large amount of data from many different sources. Using data mining technologies the professional has at hand a multitude of possibilities to generate useful information. A huge volume of diversified data is now available and associated tools are being developed to extract precious information [6] (Rebouillat & D. Lapray 2014).

2.2 BIG DATA

The definition of Big Data does not only stand for huge Volume; the novelty also comes from its Velocity and Variety. The "three Vs" of Big Data represent the challenges ahead when one wants to make sense of the available information [8] (Intel, 2013). It is not the aim of this paper to discuss the new questions associated to the exploitation of Big Data such as the dangers for privacy, a putative obsolescence of the scientific method [9] (Anderson, 2008), an evolution of knowledge, outsourcing to distant service provider, etc. The reader can find an excellent summary of all these ideas in a report of the Aspen Institute [10] (Bollier, 2010).

In the context of Big Data the consensus among all professionals is that it can help identify emerging trends, improve business decision making and develop new revenue-making strategies. There are countless opportunities to make scientific research more productive, and to accelerate the process of discovery and innovation. The latter being the key matter of this paper. How can businesses use this novel material to its best in order to boost creativity?

The amount of data to analyze is so immense that traditional tables and charts cannot help the researcher to find relevant patterns of information. The whole field of knowledge extraction and management is in need of new solutions. Mapping technologies seem to carry a lot of potential where the researcher uses different visual formats and its knowledge to detect and interpret interesting correlations. Bill Stensrud, Chairman and CEO of InstantEncore, said, "I believe in the future, the big opportunity is going to be non-human directed efforts to search Big Data, to find what questions can be asked of the data that we haven't even known to ask" [10] (Bollier, 2010). There are many ways to take advantage of the variety of data especially for IP researchers [6] (Rebouillat & D. Lapray 2014). We believe that visual analytics is one area that holds a lot of promises for the IP domain and will be discussed further in the rest of this paper.

3 VISUAL ANALYTICS

3.1 A "HUMAN FRIENDLY" DATA REPRESENTATION

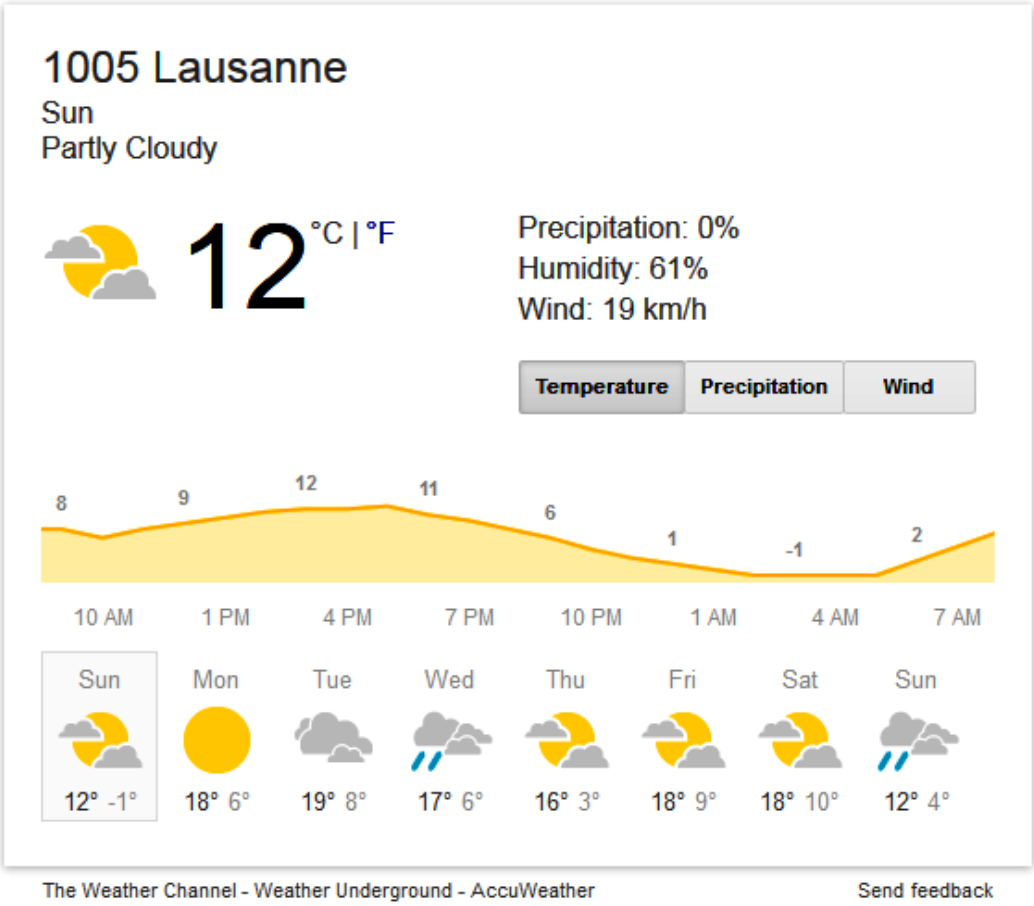

Fig. 4 Visual analytics helps in daily life activities where list of data would not allow grasping relevant information quickly. Here the weather forecast as displayed by Google™ search engine.

Since the birth of digital data we have been used to manipulate data in a non-intuitive way for humans. List of numbers or characters is perfectly understandable by a computer however it is another story for our brain. That situation was manageable when data where sparse and easy to manipulate. Is it still possible considering the volume of information? The researcher cannot easily find relevant information in complex data tables and many discoveries may remain unnoticed. It is becoming crucial to present data in a more "human friendly" way. Visual analytics is changing the way we interact with data. This tool is not new and has been around for a while. Weather forecast data are a perfect example of its use (Fig. 4). It is more than a simple esthetical tool, it's strength lays in the way this technology combines human and electronic data processing abilities [11] (Keim et al., 2010). Human-machine full cooperation is the key to innovation [6] (Rebouillat & D. Lapray 2014). Visual analytics is a scientific field on its own and this is out of this paper's scope to cover all aspects of it (for more information see [11] Keim et al., 2010). The two main areas that will be covered concern the use of visual analytics in the exploration and presentation of data. Both are highly intermingled and used through the whole process. They will be differentiated for clarity reasons. The use of visual representation of data is a fantastic opportunity to promote collaborative work (Fig. 5). It is indeed easy to sit around a map and think of the next step, a mission far more tedious with a table containing thousands of entries. The relative simplicity of these tools and the intuitive way people can navigate through millions of data points make this technology extremely attractive in the innovation process.

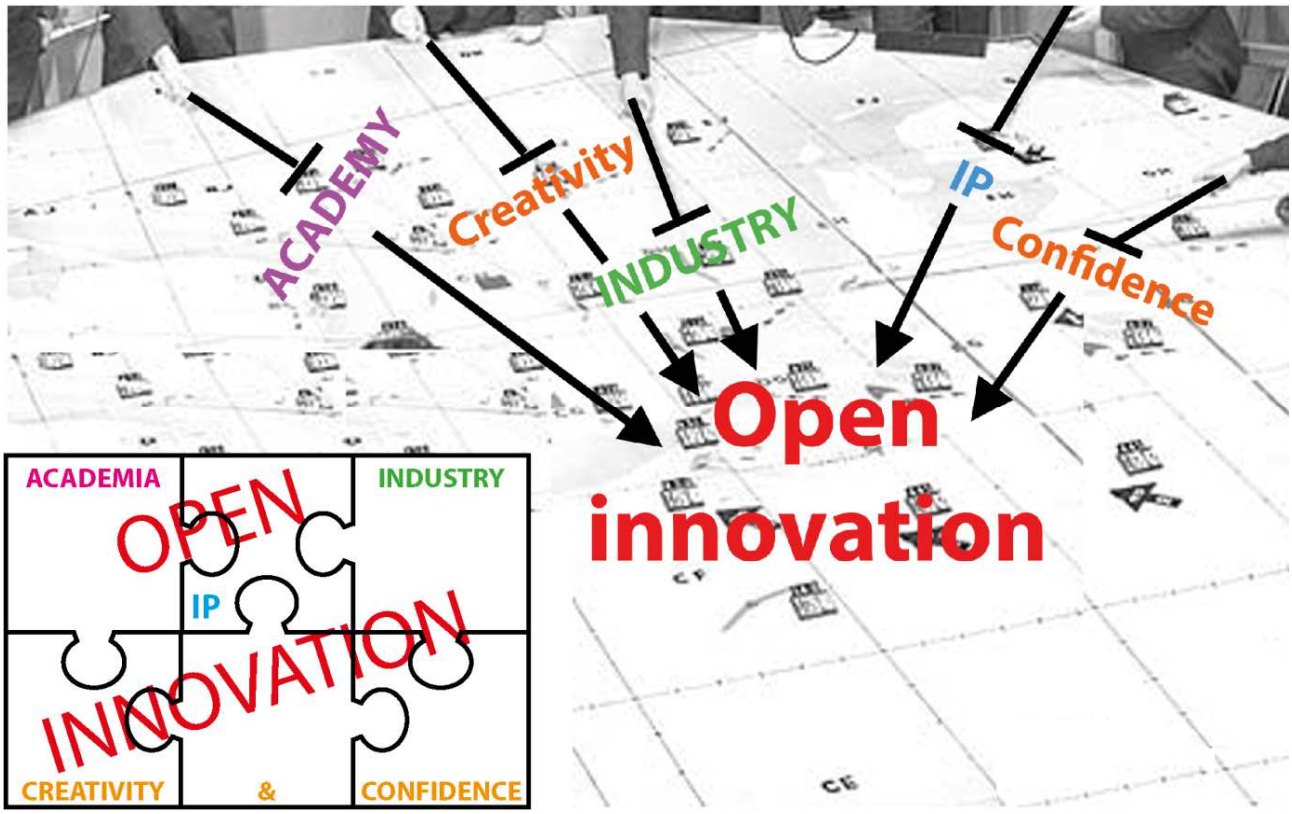

Fig. 5 Visual analytics support innovation through collaborative work
(top right part modified from www.subbrit.org.uk/rsg/sites/h/holmpton/index203.html).

3.2 WE MUST SEE FIRST

Visualization tools give a fast overview of a dataset. The website Gapminder (gapminder.org) is a perfect illustration of the visualization power over lists of data points. Simply download one of their excel files and compare it to the corresponding map. The first thing that is obvious from this exercise is how intuitive it is to use mapping tools. No effort is required to navigate through the data and find relevant information. On the contrary to the table that is far from being understandable and it would take an expert or some time to grasp the meaning of each data point. In the IP domain "patent properties makes patent analysis a field that fits a visual analytics approaches in general quite well, since the problem can neither be solved by human effort alone, nor fully automatically" [12] (Koch, 2012).

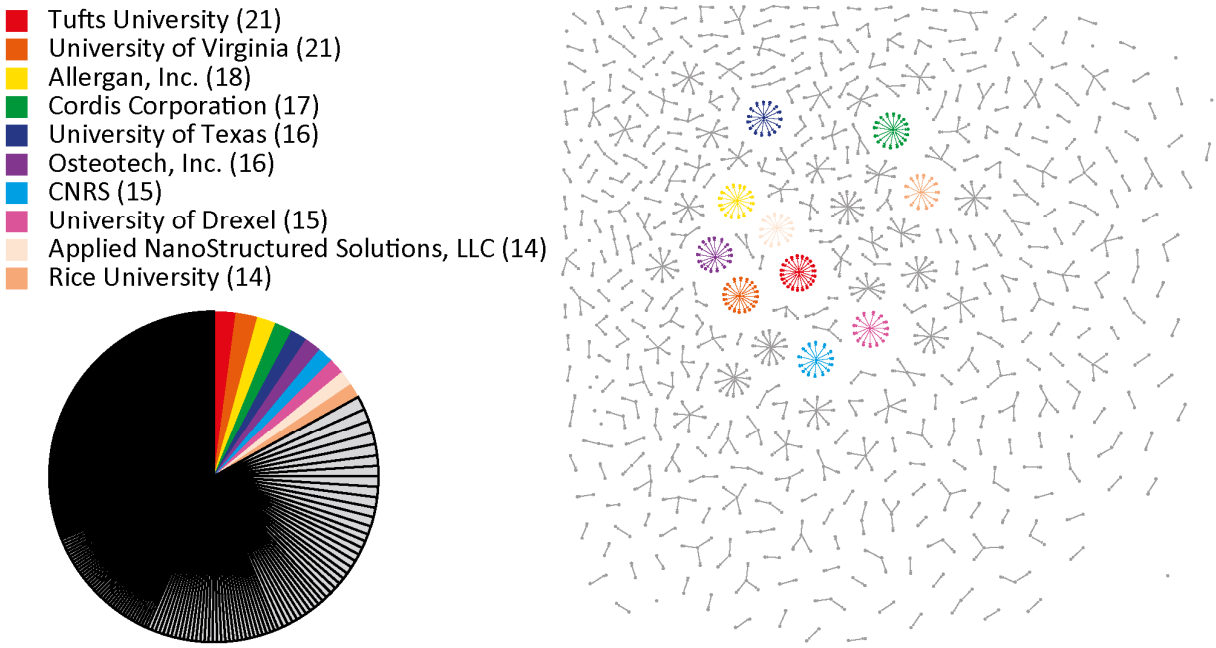

Fig. 6 Assignees/number of patents correlation in the field of natural polymers. Corresponding to 1000 patents in the field of natural polymers retrieved using a semantic search tool (query from [5] Rebouillat & M. Lapray, 2014). Pie-chart plotted in Excel and network plotted using software such as Sci² tool (the shape of each cluster does not carry any particular information and would be different every time the program would run on this data points). The density of each group is correlated to the relative assignee weight.

Figure 6 also illustrates the power of visualization using IP data. It is easy to see that even a simple pie chart, known for its numerous flaws [13] (Few, 2007), provides immediate better understanding of the patent assignees distribution than a list. Furthermore, it does not require any effort from the analyst to instantly see from the network map (right panel, Fig. 6) that there are few main players and the rest of the patents are evenly distributed between many institutions. If the demonstration is already so clear for such easy task, the reader can appreciate the potential of such tools for more complex problems (Fig. 7).

The rest of the review will assess how the IP domain is doing in terms of visualization tools and what the professional can use to ease the whole process.

	Patent titles
1	New fibre containing active elements, process for the preparation thereof and their uses, in particular in packaging
2	Fiber-assembled tissue constructs
3	Hybrid nanofibril matrices for use as tissue engineering devices
4	Immunoneutral silk-fiber-based medical devices
	…
999	PVA hydrogel
1000	Methods of bonding or modifying hydrogels using irradiation
1001	Methods of modifying hydrogels using irradiation

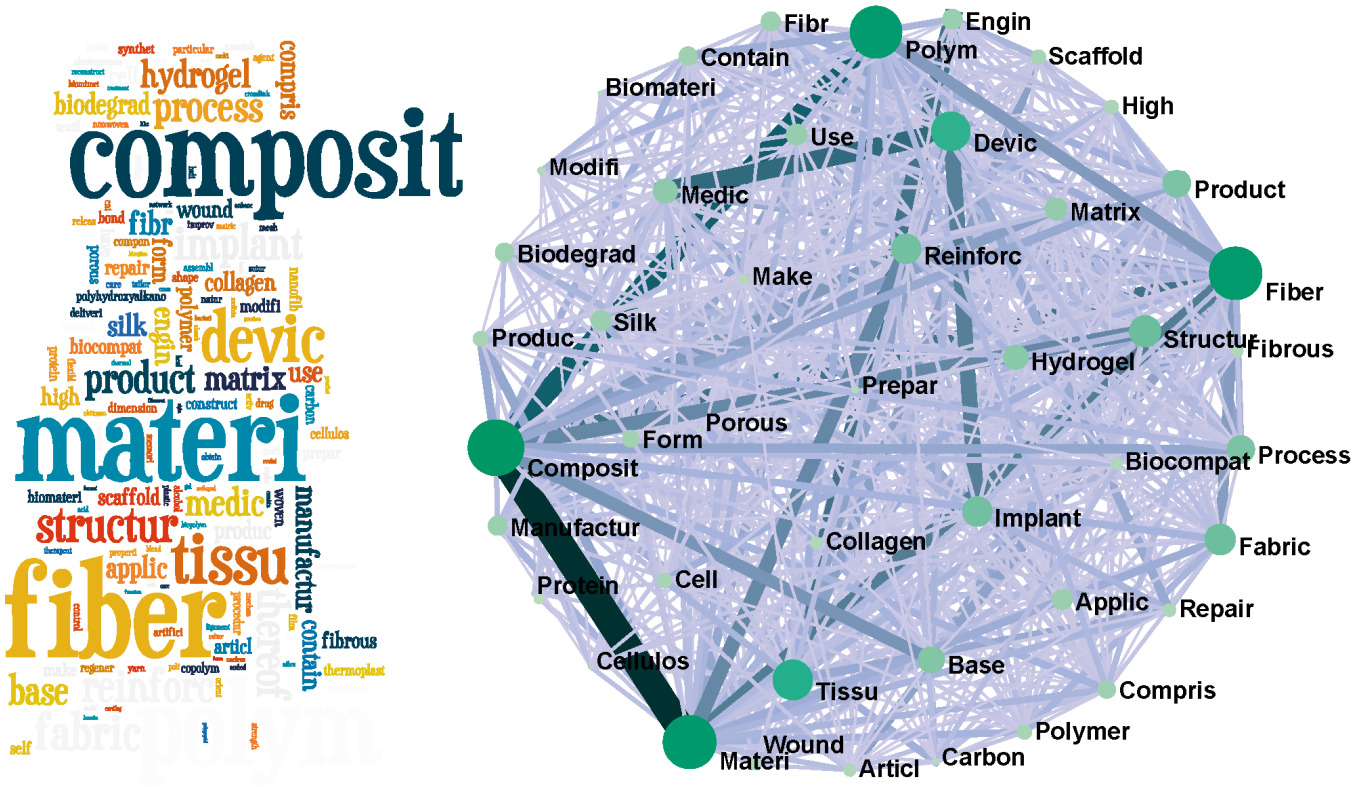

Fig. 7 Words co-occurrence network map. While a list of patent titles (from Fig. 6) does not carry any easily accessible information by itself, extracting and mapping words' weight as well as their relationships (right: directed network and Kamada-Kawai layout) can be of great interest. The shape, distance and placement of each node on the Kamada-Kawai graph layout do not carry any meaningful information (see Fig. 8). This layout has aesthetical benefits like all force-directed ones. It places nodes in a way that all edges are of more or less of equal length and minimizes the number of edge crossings. Here the weight of each node and edge is indicated by the size of each element as well as the darkness of the color. The titles were preprocessed [6] (Rebouillat & D. Lapray 2014) which explains their shorter appearance.

3.2.1 MATERIAL SELECTION, THE FUEL FOR CREATIVITY

Before any interpretation can start, there is an initial need to find the right information that will create the foundation of the whole process [6] (Rebouillat & D. Lapray 2014). The complexity of patent and non-patent literature prevents a straightforward retrieval of all relevant material and leads to tedious research processes. It is well known that in the case of patents, the language used differ between fields and the legal aspect of it adds to the apparent or real confusion pending on the agility and the experience of the operator. Therefore, analyzing patent data requires human expert judgment and cannot be completely automatized. The overwhelming large sets of results ask for new solutions to find relevant material [14] (Koch & Bosch, 2011b). Unfortunately, in the IP domain no application uses the visualization tools at any step of the process. The

retrieval has to be done in a more classic way using conventional Boolean queries or more sophisticated semantic search engines [6] (Rebouillat & D. Lapray, 2014).

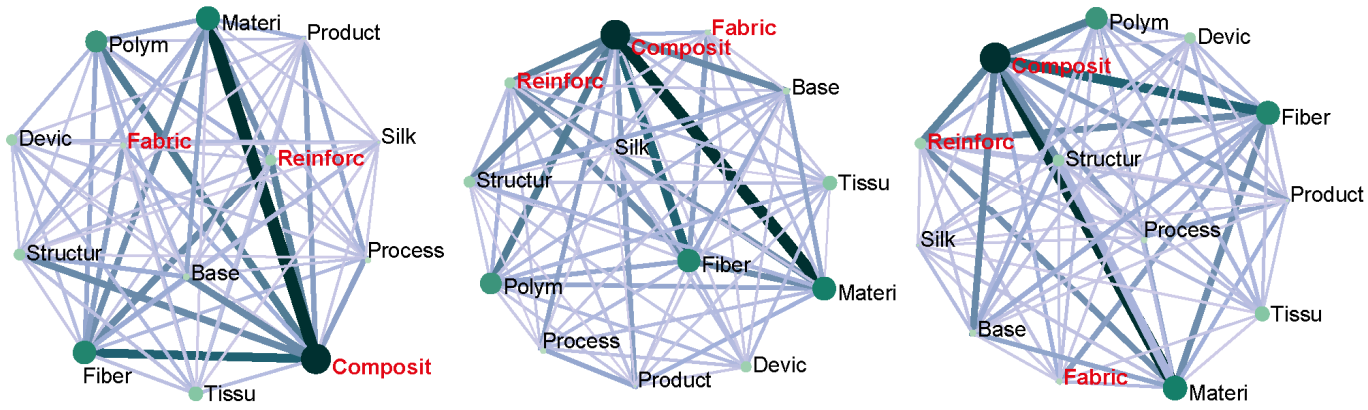

Fig. 8 Aesthetical tricks do not necessary carry relevant information. In this figure the same analysis was applied to the title of 1000 patents in the field of natural polymers. The 13 top nodes are displayed using the Kamada-Kawai layout. The three panels represent the exact same data on which the layout was reinitialized three consecutive times. Note that only the nodes, edges size and color are maintained between these three representations. These are the only relevant information, the rest being purely aesthetical.

3.2.1.1 VISUAL REPRESENTATION OF TEXTUAL QUERIES

The first significant move in the direction of visual query, and patent visualization in general, was initiated by the European project PatExpert (www.patexpert.org) and the development of PatViz [15] (Koch & Bosch, 2011a). This tool includes the possibility to link textual and visual query representation (Fig. 9). This potentially could be a powerful solution to the problem associated with the existing multiple Boolean syntaxes. The idea behind is relatively simple. The visual representation of a query is easier to write with less prior knowledge. Furthermore, the conversion to the different search engine syntaxes and languages would be done without intervention from the user [15] (Koch & Bosch, 2011a). This is unfortunately a pretty complex task and many difficulties stand before the developer.

Textual query:
(''biomimicry'' AND (''natural polymer'' OR energy OR pharma) AND NOT biotechnology)

Visual representation:

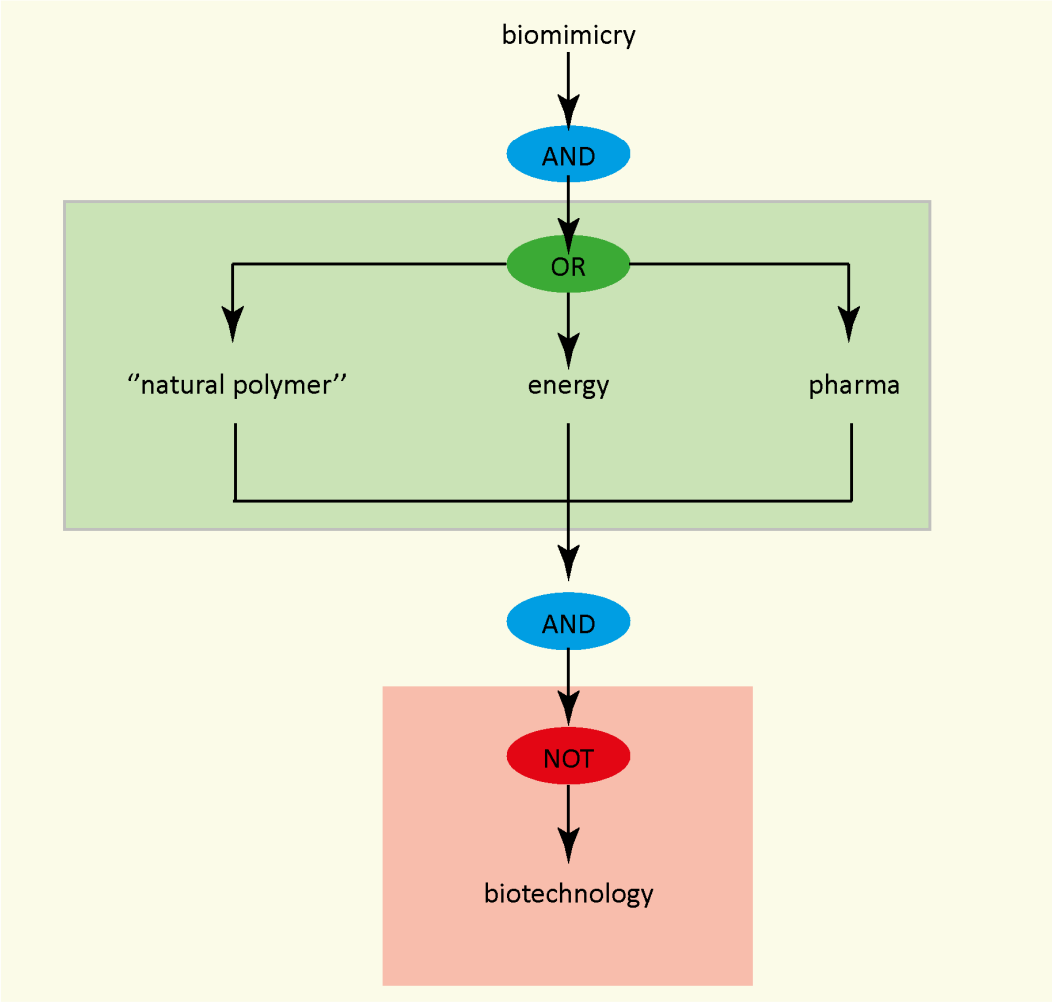

Fig. 9 Visual representation of a textual query. Query to retrieve the documents that contain the term "biomimicry" as well as any of the terms "natural polymer", "energy", or "pharma" but not the term "biotechnology".

Even if the initial query cannot be fully visualized, some software in the IP domain have made small but significant steps in the integration of visual tools in the initial selection of documents. InnovationQ analytics, for example, allows some sort of visualization to finely tune the field associated to an initial textual query. The main request in this case is a patent number or a simple term. The result is displayed on a map and the user can move around to visually modify the initial request. This is one of the strength of visualization, the possibility to cooperate with the system to reach a satisfactory level of confidence in the results. This kind of interactive way to work with the machine will be further explained in chapter 3.2.4.

Images are important part of patents and non-patent literature since they carry a lot of information [6] (Rebouillat & D. Lapray 2014). It is difficult to retrieve them and complex to use as initial. However, inspiration can come from other fields such as computer games. The Microsoft XBOX 360 Kinect sensor is a perfect example of image query and retrieval system. When a player makes a move to catch a ball the program does not analyze the actual gesture of the user. It compares the images taken during movement to a database, associates the query image to the according position and gives the adequate response. It might not be possible in a near future to use such technology in the IP domain due to the poor quality of patent images; however it would be of great interest for the whole field to change the way images are used.

3.2.1.2 FINDING A WAY THROUGH IMPERFECTION

It is not yet possible to use visualization tools at the query level as seen before, but mapping data points can be used afterwards in the process. The professional has two main options. The first one is to use "readymade tools" that propose to carry both the search and the visualization. It is the most convenient although not the most powerful and flexible solution. Without being exhaustive we can name few dominant programs such as Pantros IP (ip.com), Thomson Reuters IP solutions, IHS GoldFire solutions, Orbit IP (Questel-Orbit). These technologies offer interesting tools to retrieve data such as semantic or latent semantic analysis, avoiding some pitfalls associated with keywords retrieval systems [6] (Rebouillat & D. Lapray 2014). However, there visualization tools are limited to traditional charts and histograms. Orbit IP seems to propose more in terms of mapping. These tools are good to extract and save in readable format huge amount of patents that can be further analyzed using more specialized mapping tools. FreePatentOnline or Pubmed also propose solution to save search results in usable formats. Patent office search engines such as the United States Patent and Trademark Office (USPTO) or Esp@cenet from the European Patent Office (EPO) can also save research results for further analysis.

A variety of formats are available to aid data interchange such as CSV (comma-separated values), XML (Extensible Markup Language), Tab-delimited text files (UTF-8), XLS (Microsoft Excel file format) for the most commonly used. These formats allow the exchange between patent search solutions and visualization software such as the Science of Science (Sci^2) tool [16] (Sci2 Team, 2009), Pajek [17] (Batagelj & Mrvar, 2011), NAViGaTOR software (Network Analysis, Visualization and Graphing, Toronto, Canada), Cytoscape [18] (Shannon et al., 2003), Gephi (https://gephi.org/), etc. None of these open source software (for a more complete list of data mining and visualization software see [11] Keim et al., 2010) has been initially developed to work with patent data. One big advantage of visual analytics tools is their compatibility with most data format and with each other.

Before being able to visualize the results of document searches it is necessary to prepare the files for being used by different mapping software. Unfortunately, this cleaning phase can be tedious depending on the source of the retrieved documents. For most of them, it is necessary, for example, to correct assignee names that are very often misspelled. Visualization without this preliminary step would result in an under-representation of some clusters. When one wants to analyze word co-occurrence in titles, for example, passing the data through tokenization, stemming and stop-word removal will reduce the noise. When the data have been prepared, it is relatively easy to use different mapping solutions and facilitates the extraction of meaningful information.

3.2.2 GRAPH LAYOUT AND VISUALIZING ATTRIBUTES, CHOOSE WISELY!

"The adequacy of a visualization technique depends on the type of data to be shown as well as on the task to be accomplished with its help. Accordingly, not all graphical perspectives are well suited to display arbitrary types of information and different methods have to be employed for showing geospatial, temporal, hierarchical, network-based, etc. data." [15] (Koch & Bosch, 2011a). Furthermore, Diverse attributes and visualizations can offer different perspectives on the same data [19] (Pastrello et al., 2013). Many maps are in fact networks represented by a set of nodes, linked to each other with a set of edges [20] (Jurisica Lab, 2011). Depending on what type of network and/or layout is used, the same data points can look drastically different and therefore convey a lot or very little useful information (Fig. 10). It is therefore important, when mapping any kind of information to understand what each layout implies. Some arrangements are random and distances between data point do not carry any information by itself (Fig. 8). This is something to keep in mind when analysis such network and not be carried away on some illusionary interactions (see chapter 4 regarding visualization pitfalls).

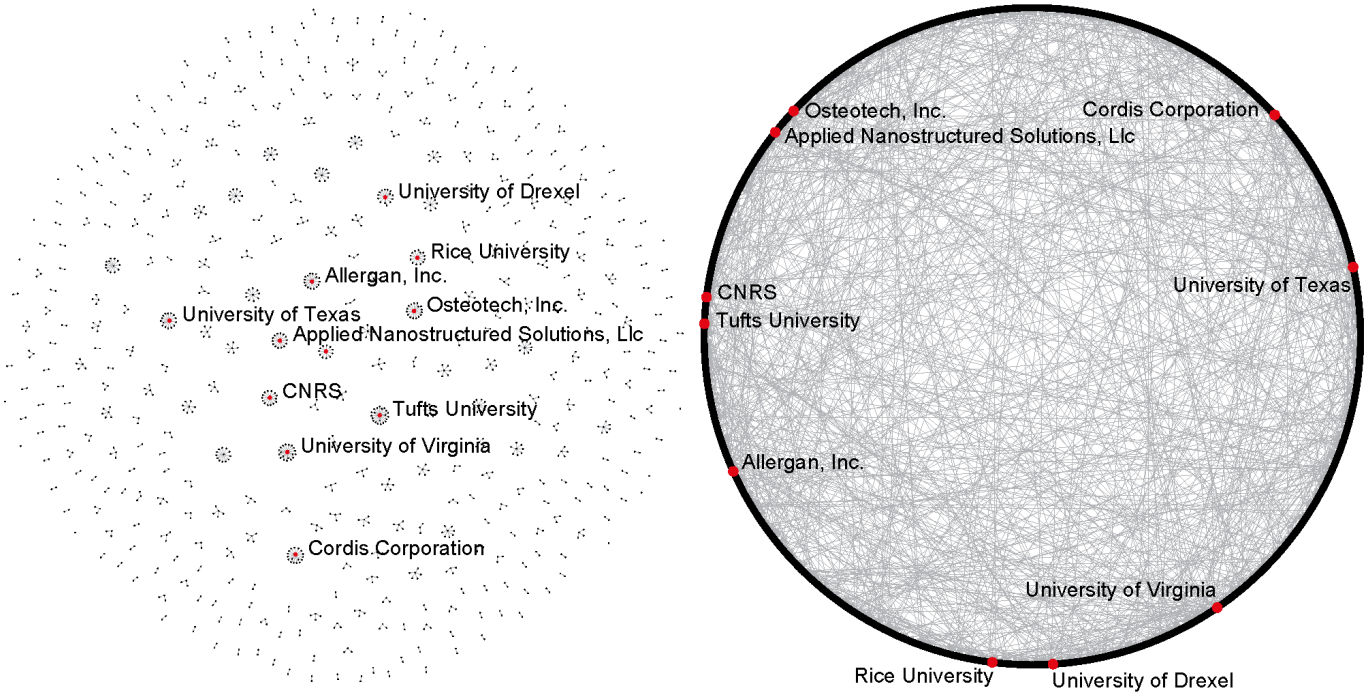

Fig. 10 Map layouts play a critical role. Directed network extraction using suitable visualization tool such as Sci^2. When mapping data (same as Fig. 3) it is important to choose a layout that conveys useful information.

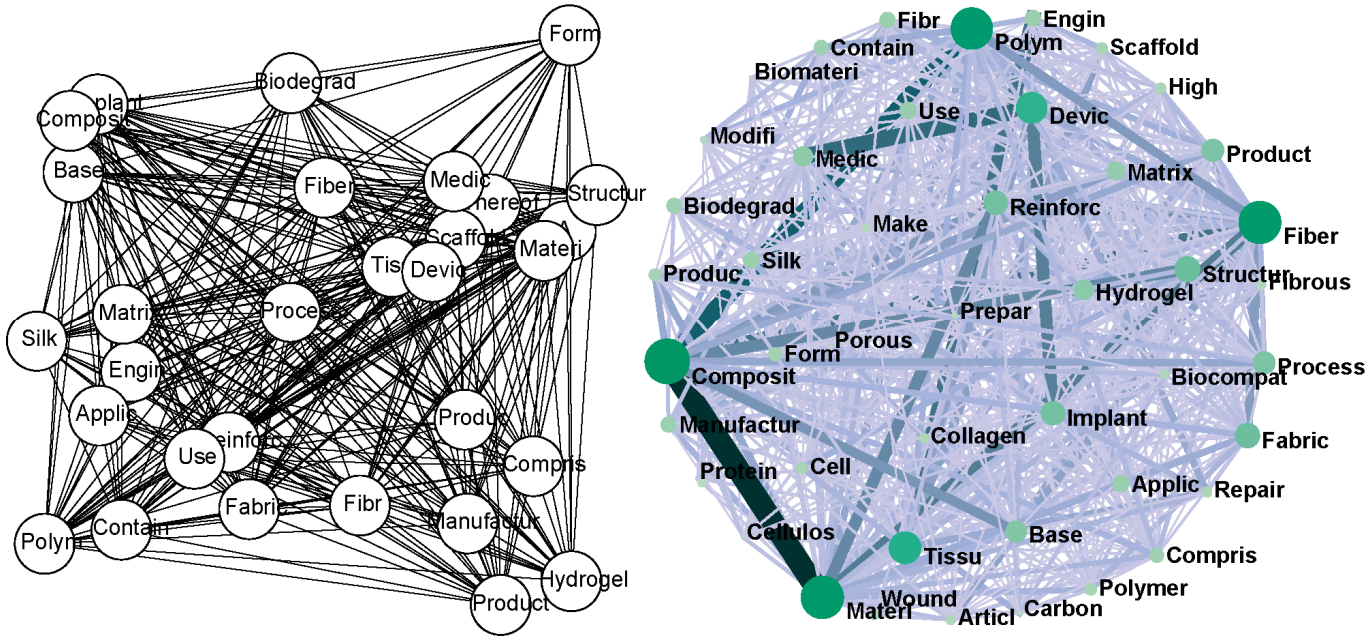

Fig. 11 Nodes and edges attributes are critical in the way a map is being perceived. These two maps represent the same information (from Fig. 7) however nodes and edges attributes are different. On the left panel all nodes and edges share the same attributes whereas on the right panel colour and size of nodes and edges are directly correlated to their respective weights.

The nodes and edges attributes are also of great importance. If we take Fig. 7 words co-occurrence network and we remove weight attributes from nodes and edges as well as color intensity/weight correlation the map loses complete readability (Fig. 11).

These options should therefore be considered seriously when using a mapping tool since the level of flexibility can improve the whole analytic process. It is also important to be able to navigate, select, focus, display, erase, interact with the visualization to explore the data [12] (Koch, 2012).

3.2.3 CLUSTERING VS CLASSIFICATION

When grouping data points together the word "clustering" appears very often. It is important to understand that any cluster of points does not necessary emerge from a "clustering method". There are two main ways to group data points: classification (or supervised method) and clustering (or unsupervised method). Many patent landscape analyses rely on the first method, classification. In this method the different classes are already known and the aim is to know how the data relate to those predefined categories. The International Patent Classification (IPC) co-classification map is a perfect classification illustration. The categories are known before any grouping and the aim is to attach every patent to its respective IPC group (Fig. 13, 14 and 19) [21] (Leydesdorff et al., 2012).

In the case of a clustering algorithm the data are grouped together using unknown initial parameters. Clustering methods try to group data points by finding whether there is some relationship between the objects without predetermined specification how records should be related together. Clustering is more used as an exploratory method [12], [22] (Koch, 2012; Yoon et al., 2013) to discover the unexpected [11] (Keim et al., 2010). For example the IP search tool Pantros IP gives a model of such method with its so called LSA clusters. The algorithm generates semantic clusters based on the documents at hand. These clusters will be different for every set of data presented to the algorithm. Classification and clustering methods have different objectives and use different ways to segment data.

3.2.4 HUMAN-MACHINE INTERACTION

We previously advocated for an increase of artificial intelligence in the IP search domain [6] (Rebouillat & D. Lapray, 2014). However, the experience of professionals acquired through years of data mining cannot be fully replaced by machines. This situation will not change in the near future but tools have to be introduced to help dealing with the quantity and diversity of the available information. The machine can exploit, calculate, clustered, etc., nevertheless so far only human interpretation can spot interesting patterns. A thought-provoking example is the observation made by scientists using Google™ Earth that cows like to align themselves with magnetic fields [23] (Begall et al., 2008). A correlation that machines alone could not have detected (see chapter 4 for the downside of this kind of studies).

Another point of difficulty is the confidence that should bind users and tools especially in the IP domain and it is "very difficult to build trust into mechanisms that cannot be fully controlled" [12] (Koch, 2012). This partly explains why Boolean retrieval systems are still favored over more sophisticated, therefore less transparent, methods. The professional faces a challenge because of the need to retrieve all relevant information. It is necessary to be sure of the retrieved material but it is not possible to control manually all the documents. The development of visualization technologies provides the perfect opportunity for a close human-machine interaction at every step of the process. Combining human and artificial intelligence is, to our opinion, a way to keep control over the course of actions necessary to find relevant data and to build trust. Having continuous visual feedbacks as proposed by PatViz [14] (Koch & Bosch, 2011b) and direct human-machine interaction to reach the optimal result is of great interest for innovation. A better control over the analytical process using continuous visual interactions is also a way to prevent the miss-reading of ready-made results. However, this necessitates great efforts of transparence from companies providing analytical services. The black-box concept cannot sustain in a domain where every step of the search has to be controlled because missing data is a "lost" discovery.

4 I SEE THINGS THAT DO NOT EXIST - THE VISUALIZATION PITFALLS

As mentioned previously, data observation using visual analytics offers endless possibilities to discover the undetected. However, the human brain is an expert in finding correlations between events or data points. Does that mean that what I see and interpret to be correlated really is? Coming back to the cows' alignment to magnetic fields mentioned in the previous chapter. After the first publication, other teams looked at this problem and could not replicate the data [24] (Cressey, 2011). It is not the purpose here to discuss the validity of the method or the quality of the science behind this study; rather to highlight the fact that observation, and in this case visualization, is a tool to handle with great caution.

The danger is to see apparent relationships or proximities that do not actually exist [10] (Bollier, 2010). A good example of such visual trick comes from the London Underground map [25] (Sharif, 2013) that has been shown to distort real distance between points. On this map the Lancaster Gate station and Paddington Station look distant enough to take the metro. In reality these two stations are at walking distance from each other's. When using visual data analysis it is crucial to be sure that what we see does exist and is not an optical illusion. One way to avoid this "dangerous" pitfall is to use several views of the same data. A real relationship should be apparent not only on one map. The integration in PatViz of multiple views in one

panel representing the data at hands makes a lot of sense to not be "tricked" by non-existent data proximities or distances. Backing up visual relationship with actual numbers is also a way to avoid mistakes of interpretation.

5 CASE STUDIES

In order to illustrate the use of visualization tools in the IP domain, patents from three different applications of the biomimicry domain were retrieved. The idea of this paper being to continue the work previously initiated [3], [5], [6] (Rebouillat & M. Lapray, 2014; Rebouillat & D. Lapray, 2014; Rebouillat, 2013). Two main software using semantic technology were used, system P and X (in red and green in the following figures respectively). Three sections of Rebouillat and Lapray review on biomimicking [5] (Rebouillat & M. Lapray, 2014) were used independently to generate the queries. We retrieved around 1000 patents for each selected domain and kept for further analysis (around 6000 documents). Furthermore, patents' information (e.g. document number, IPC, priority date and assignees) were retrieved using only system X for consistency. Documents were saved as csv files and cleaned from mistakes such as assignees misspelling, missing elements or wrongly organized cells. The following maps were made using open source software such as Sci^2 tool, Pajek, Cytoscape, Gephi and VOSViewer.

5.1 NATURAL POLYMERS

5.1.1 PATENTS' TEMPORAL DISTRIBUTION

Files containing the patents, generated from the "natural polymer" section of Rebouillat & M. Lapray, 2014 [5], were imported in the ad hoc tool and temporal bar graph visualizations using priority dates were generated (Fig. 12). The graph shows a divergence in the temporal distribution of the retrieved patents for the period before 2004. In this particular case we choose to assign a similar weight to each patent.

Such information, applied to a larger number of patents, such as 40000, is very important to understand the advent of technology and its disruptive nature. Out of curiosity one has noticed that the patent lists may differ considerably from system X vs. P and still the invention pace and growth rate remains concomitant.

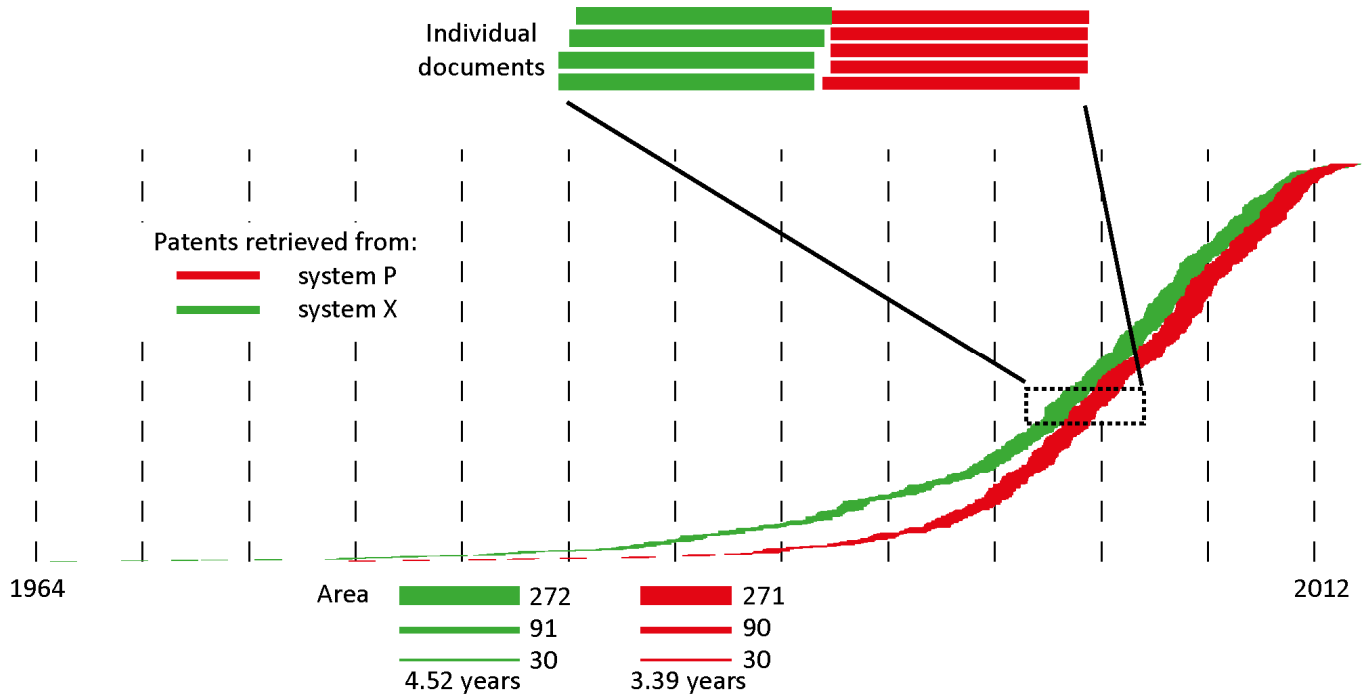

Fig. 12 Patents' temporal distribution retrieved by the two semantic systems. In this graph the size of each document's representation is similar and the number of documents is represented in terms of area. Figure produced with tool capable of cumulative graphing.

5.1.2 IPC CO-CLASSIFICATION ANALYSIS

The csv files previously imported were re-used and directed networks were extracted (IPC and publication number as source and target respectively). The networks were then saved as net files and imported in an ad hoc network analysis and visualization system such as Pajek. Fruchterman-Reingold maps were produced and exported into VOSViewer to create density views (Fig. 13) [21] (Leydesdorff et al., 2012). The Fruchterman-Reingold algorithm belongs to the force-directed ones and the placement of each node is stable when the system reaches equilibrium at minimum energy. As was seen in the temporal graph, the retrieved documents cover different areas highlighted, for example, by the over-representation of the "organic macromolecular…" class of system P compare to system X.

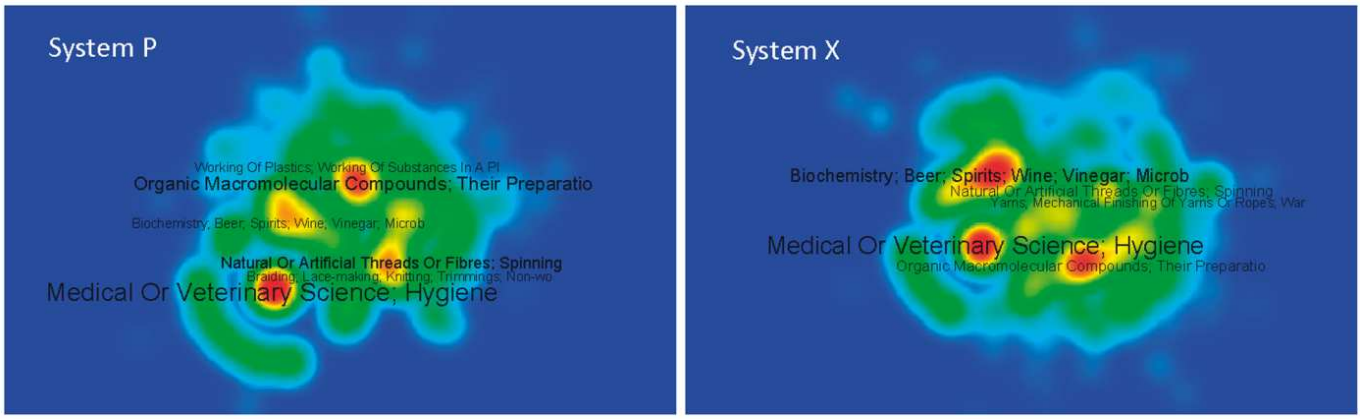

Fig. 13 IPC (3rd digit level) co-classification density views. These maps were generated using VOSViewer or alike.

5.1.3 ASSIGNEES DISTRIBUTION

Directed networks were extracted from the files (assignee and publication number as source and target respectively). Visualizations were then generated with display tools such as the Sci^2 tool or alike (Fig. 14). This layout minimizes edge intersections and randomly assigned edges size, e.g. in these graphs only the density of point carries information. From the 12 main players retrieved by the two systems only 3 were common to both sets but with different weights (highlighted in blue).

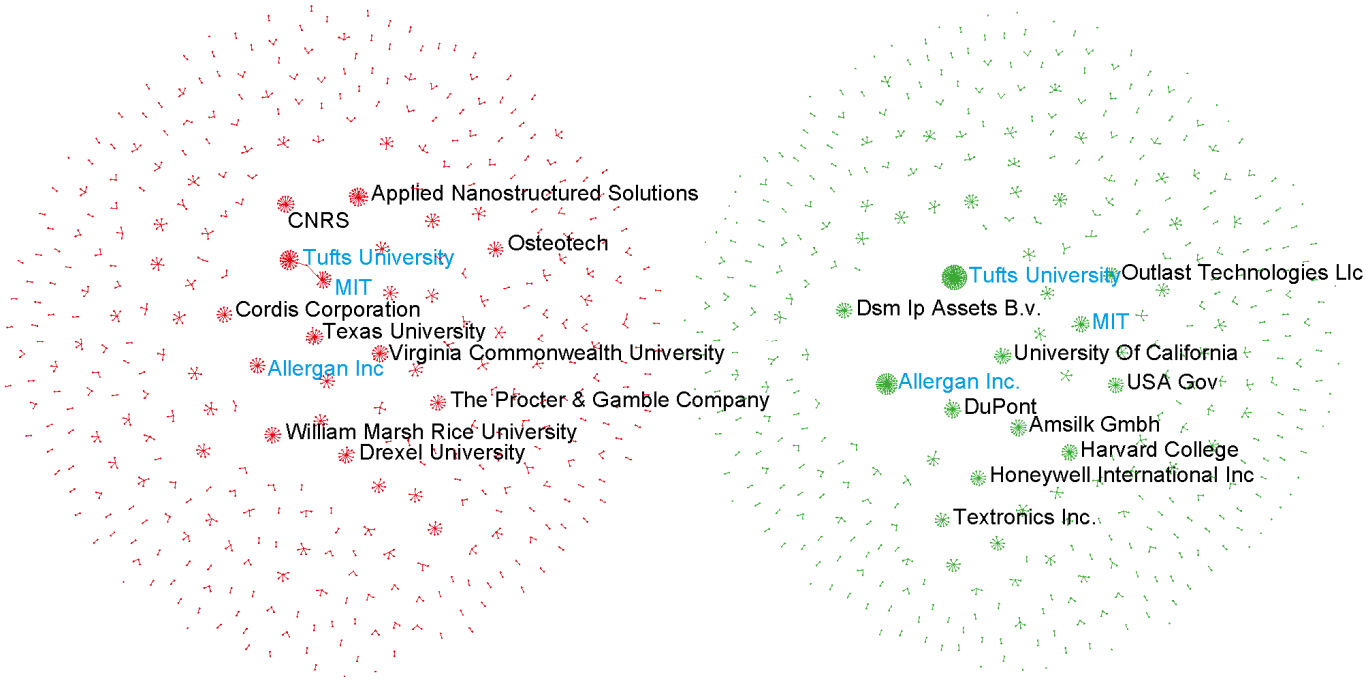

Fig. 14 Assignees distribution in the retrieved patents. The 12 main players are indicated (blue: common to the two systems).

5.2 ENERGY

5.2.1 PATENTS' TEMPORAL DISTRIBUTION

Files containing the patents, generated from the "energy" section of Rebouillat & M. Lapray, 2014 [5], were imported in the ad hoc tool and temporal bar graph visualizations using priority dates were generated (Fig. 15). The graph shows high temporal distribution similarity between the retrieved patents.

Such information, applied to a larger number of patents, such as 40000, is very important to understand the advent of technology and its disruptive nature. Out of curiosity one has noticed that the patent lists may differ considerably from system X (green) vs. P (red) and still the invention pace and growth rate remains concomitant.

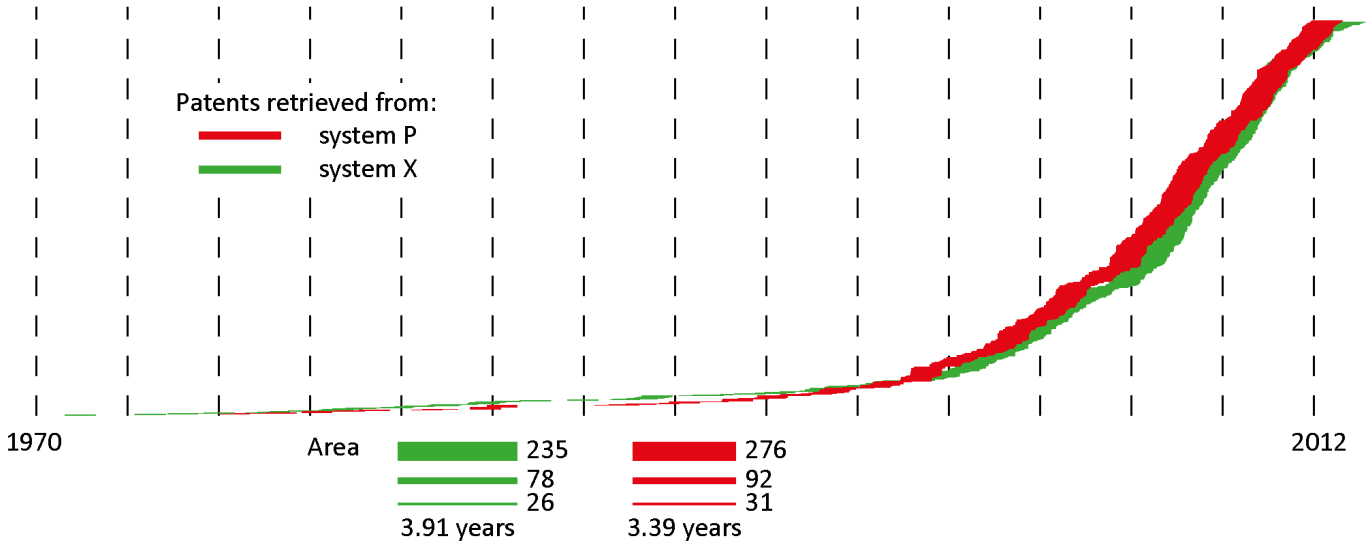

Fig. 15 Patents' temporal distribution for the two semantic systems. Graph produced with tool capable of cumulitative graphing.

5.2.2 IPC CO-CLASSIFICATION ANALYSIS

Directed networks were extracted from the files (IPC and publication number as source and target respectively). Force directed network visualizations were used to map the IPC co-classification (Fig. 16). Nodes were force positioned in order to get a clear picture of the main components of these networks. As any force-directed algorithm the aim is to point in a way that all edges are of more or less of equal length and to minimize the number of edge crossings. As seen with the temporal graph, the retrieved documents cover similar IPC areas.

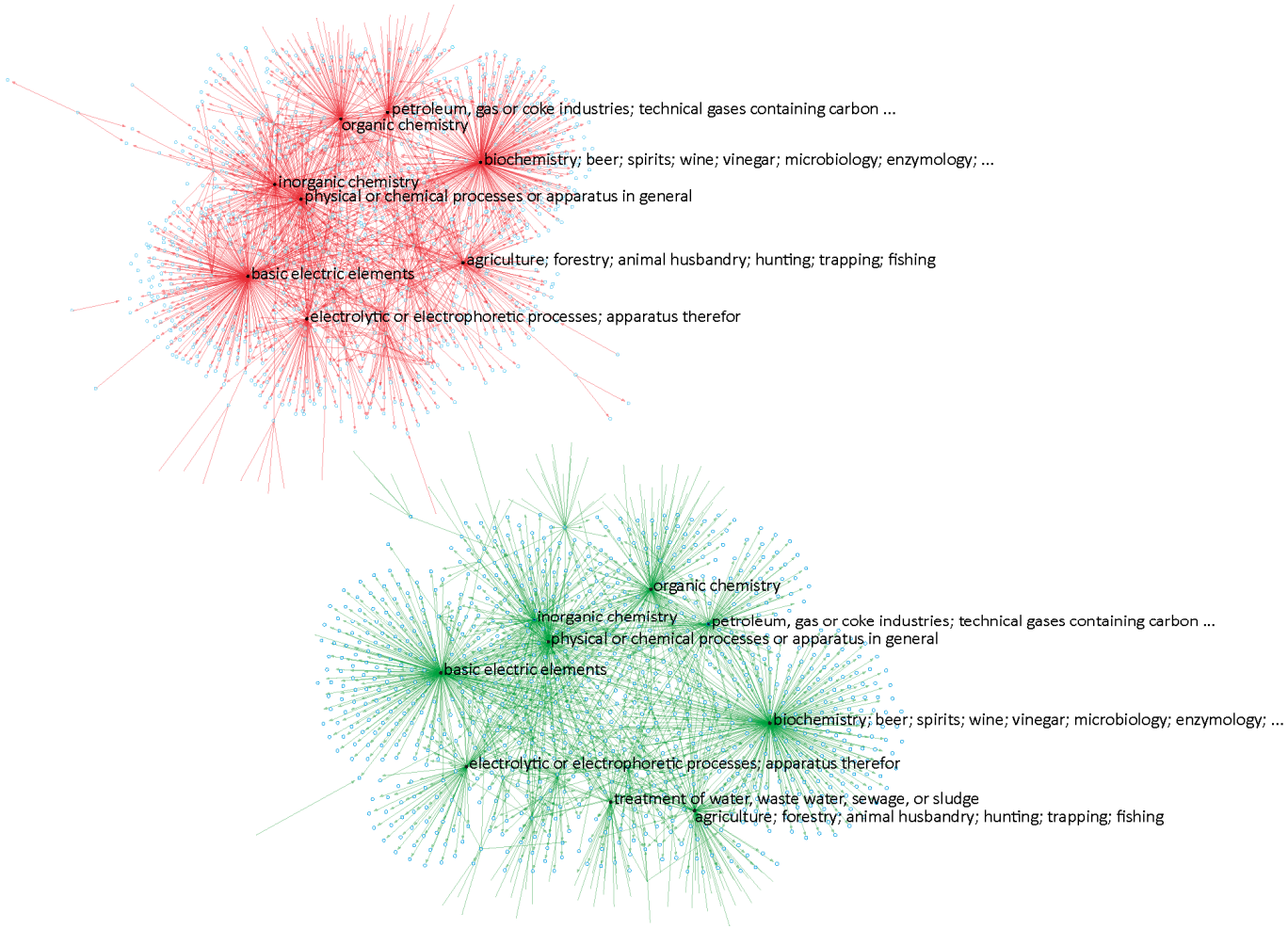

Fig. 16 IPC (3rd digit level) co-classification force directed visualization. Networks generated by ad hoc software such as Sci² tool.

5.2.3 ASSIGNEES DISTRIBUTION

Directed networks were extracted from the files (assignee and publication number as source and target respectively). Visualizations were then generated with display tools such as Cytoscape or alike, using the degree sorted cycle to layout the graph (Fig. 17). Despite the similarity in the covered IPC areas and temporal distribution, there are significant differences regarding the assignees weights.

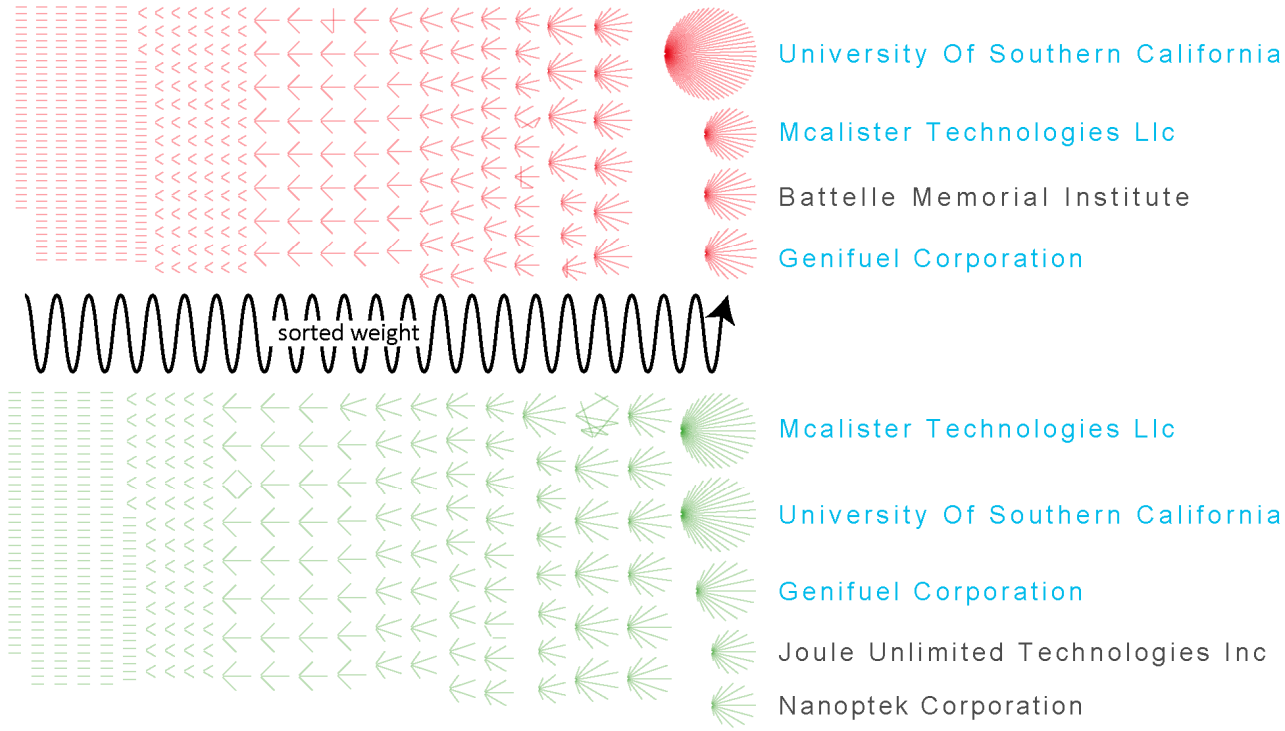

Fig. 17 Assignees distribution in the retrieved patents. The main players are indicated (blue: common to the two systems). Drawing made with graphing software such as Cytoscape or alike.

5.3 PHARMA

5.3.1 PATENTS' TEMPORAL DISTRIBUTION

Files containing the patents, generated from the "pharma" section of Rebouillat & M. Lapray, 2014 [5], were imported in the ad hoc tool and temporal bar graph visualizations using priority dates were created (Fig. 18). The graph shows a high temporal distribution similarity between the retrieved patents.

Such information, applied to a larger number of patents, such as 40000, is very important to understand the advent of technology and its disruptive nature. Out of curiosity one has noticed that the patent lists may differ considerably from system X vs. P and still the invention pace and growth rate remains concomitant.

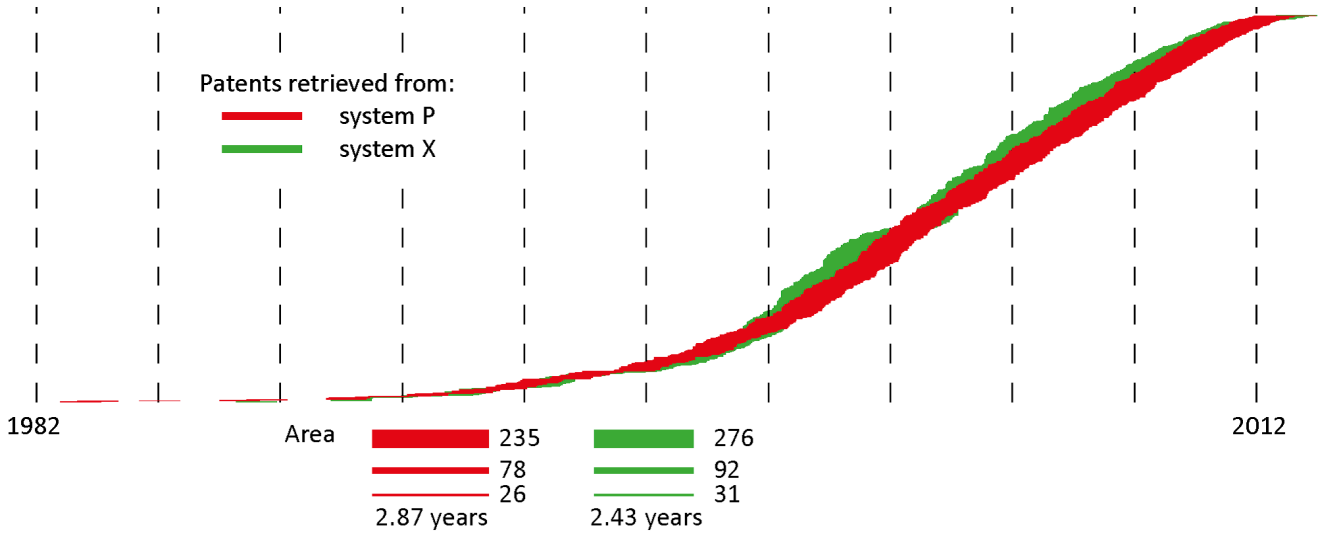

Fig. 18 Temporal distribution of the patents on pharma retrieved from the two semantic systems. Graph produced with tool capable of cumulative graphing.

5.3.2 IPC CO-CLASSIFICATION ANALYSIS

Directed networks were extracted from the files (IPC and publication number as source and target respectively). Suitable layout was used to visualize the IPC co-classification (Fig. 19). The retrieved documents show important differences in the IPC area distribution. For example, the percentage of patents attached to the classification code A61 (medical or veterinary…) represent 55.8 and 68.3 % of system P (red) and X (green) retrieved patents respectively. For the class C12 (Biochemistry, beer…), the difference between the two sets of patents is more important with 30.4 and 63.8 % documents classified in this category for system P and X respectively (percentages retrieved using suitable retrieval tool such as Cytoscape or alike).

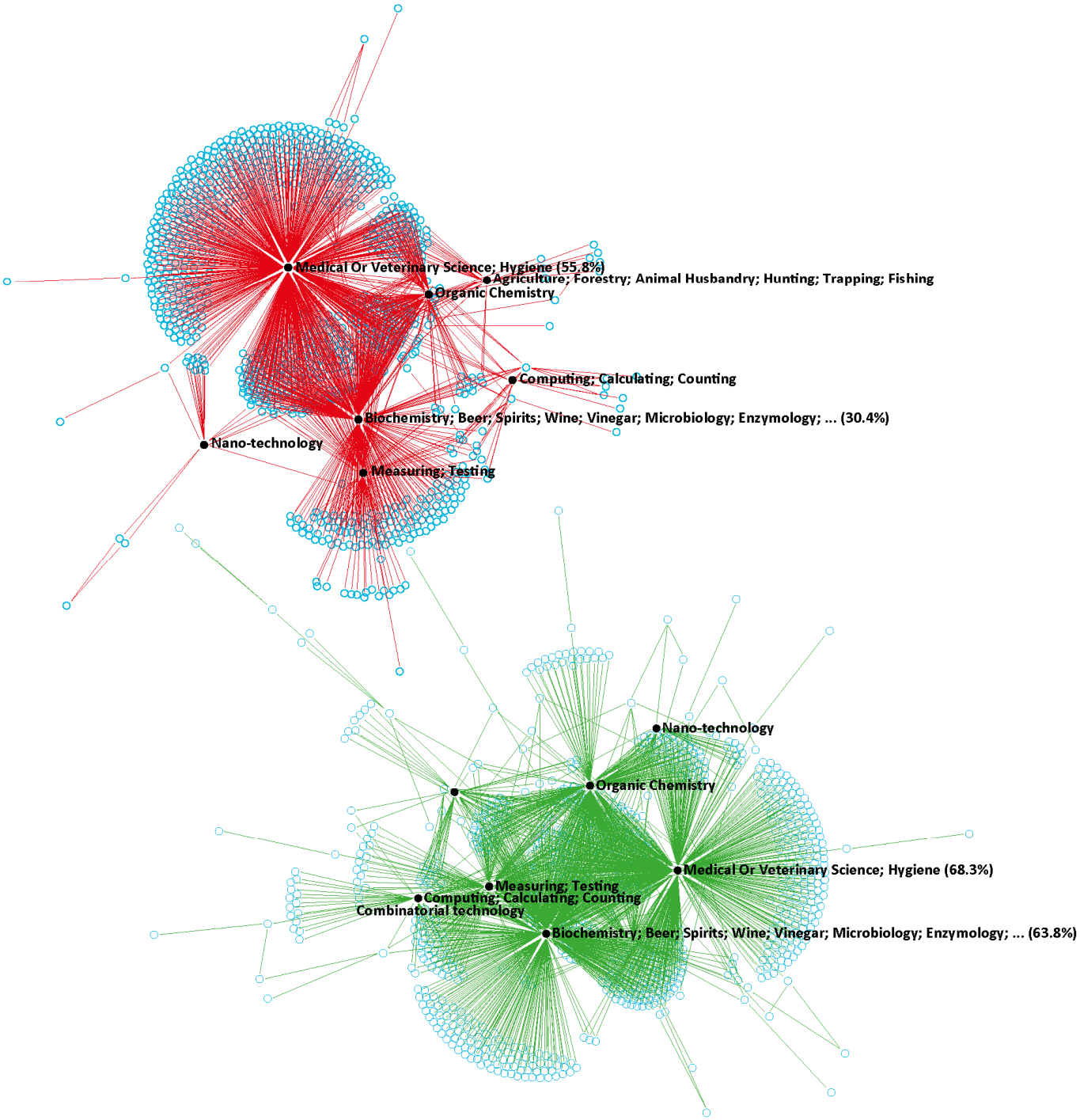

Fig. 19 IPC (3rd digit level) co-classification force directed visualization. IPC A60 and C12 are the most represented areas in the retrieved documents. In these graphs edges' length were generated by the GEM ("Generalized Expectation Maximization") algorithm to minimize intersections for aesthetical purposes. Maps generated with ad hoc software such as Sci² tool.

5.3.3 ASSIGNEES DISTRIBUTION

Directed networks were extracted from files (assignee and publication number as source and target respectively). Visualizations were then generated with display tool such as Gephi or alike, using a dual circle to layout the graph. Nodes were ordered by out-degree and 10 upper order nodes were placed out in a counter-clockwise manner for clarity (Fig. 20). The distribution of assignees illustrates very well the dissimilarity of both retrieved set of patents.

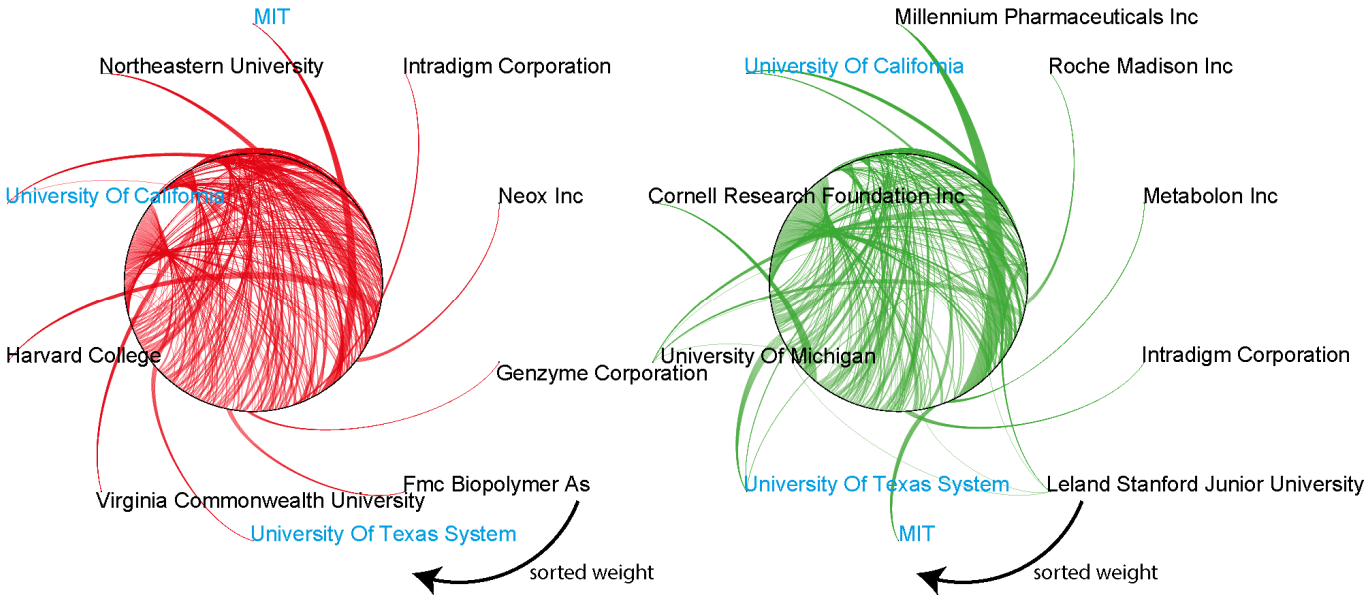

Fig. 20 Assignees distribution in the retrieved patents. The 10 main players are indicated (blue: common to the two systems). Layouts were generated using suitable software such as Gephi.

5.4 WHAT DID WE LEARN FROM THOSE MAPS?

All the information previously displayed would have necessitated expert knowledge to extract them from bar charts or tables. In the situation of more complex searches it would not be possible to go without a first visualization of the data. Several information conclusions can be drawn from these relatively easy case studies. First of all, visual mapping of information is a powerful tool that can ease the task of professionals to quickly detect relevant patterns. Mapping tools exist and can be used with IP material. Not initially developed to use such data, all these software can load and display multiple networks with different degrees of flexibility and interaction. Finally, semantic technologies offer great potentials but need to be used with a little bit of caution. The retrieved sets of documents might differ from one tool to another and it is therefore advisable to not restrict the search to only one. The use of visualization tools allowed a quick review of the available data; it is equally crucial to know what stands behind the different layout algorithm to be able to assess what is relevant and what is purely aesthetical.

Up to 20 to 40 000 patents were analyzed using these tools in a matter of a day, this is basically impossible to perform from a human capability standpoint. Nonetheless, the old adage “garbage in, garbage out” has to be taken seriously even before considering the retrieval of patent of interest. Regardless of the fine tuning quality, there is barely any integrated patent search engine today that can provide such diverse outputs in terms of trends and analysis. The expert can certainly gain time and move faster towards some directions, the neophytes might and will struggle much more. Therefore, the need to improve the IP visual analytics is urgently stressed.

6 CONCLUSION

Visualization tools to analyze IP material without having to acquire new and complex knowledge is at reach. Despite the lack of proper technologies fully focused on the visual analysis of IP data, professionals have plenty of solutions at hand. Inspiration can come from any field of research that uses mapping technologies and tools directly apply onto IP documents. Most of these technologies are based on the Cyberinfrastructure Shell (CIShell) [26] (Herr et al., 2006) and Open Services Gateway Initiative Framework (OSGi) industry standard that support integration of new and existing algorithms [27] (Börner,

2011). Plugins can easily be implemented to create and share among the community new ideas and solutions to display and extract information. The professionals wishing to take a chance on this path are not necessary bound to commercial solutions and can adapt their tools to special needs. Innovation can benefit from a community effort to tackle the Big Data challenge that no industry can ignore.

Innovation and inventions can largely be transformed by visualization, images and motions in general; visual analytics being the next step. The patent language barriers can likely be reduced from new semantic analysis converting thousands of words in new pictures and thousands of pictures in new concepts; 3D animations and virtual comparisons with real situations, including patent images and schematics, hold great potential for fast and disruptive open innovation.

All views are worth the climb in this domain, no one can afford ignoring the advent of "Big Data" as a source of inspiration beyond human conception and pace. Mastering the inputs to optimize the outputs quality is even more important given the unlimited numbers of direct or indirect references that can be used.

The multidisciplinary dimensions of a number of projects can be simplified given the opportunity to relate visual to textual and vice versa.

The next chapter of this series is focusing on the open and disruptive innovation metrics.

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Assessment of Financial Market for Agriculture in Bangladesh

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ABSTRACT: The present study aims at investigating into the existing financial market for agriculture in some selected areas of Bangladesh. The sample was comprised of 27 Public and Private Sector Institutions (PPSIs), 21 Member Based Institutions (MBIs) and a set of 50 Informal Financial Intermediaries (IFIs) comprising 10 intermediaries each from moneylenders, well-to-do people, shopkeepers, businessmen, and friends and relatives. The sample was selected through purposive sampling technique. The specific objectives of this study are to examine the structure of financial market for agriculture including lending policies, loan transactions, interest rate, recovery, efficiency, linkages among the lending institutions. Both descriptive and tabular analysis was employed to achieve the objectives of the study. The study reveals that several components constituted the structure of financial market in the study area. Considerable differences existed in lending policies between PPSIs and MBIs. The average annual credit disbursement of all PPSIs was Tk 332.63 lac while it was Tk 4036.20 lac for MBIs. IFIs' average annual disbursement was Tk 16.466 lac. Share of PPSIs to the lending was 92 percent. The PPSIs interest rate varied between 8 to 11.50 per cent and those of MBIs between 14 to 20 percent. IFIs' interest rate varied from 10 to 100 per cent. MBIs have highest recovery (98 percent). PPSIs could recover only 60 per cent of their loan. MBIs are more efficient than other financial intermediaries. Linkages among the different financial intermediaries are noticeable.

KEYWORDS: Financial Market, credit, interest rate, collaboration, efficiency, linkages.

1 INTRODUCTION

In Bangladesh, the shortage of capital and lack of capital formation is one of the main problems for the farmers to adopt modern production activities. The agricultural credit has been considered as one of the crucial factors toward sustainable development of agriculture sector. Timely and easy access to credit enables farmers to purchase the required inputs and machinery for increasing agricultural production. To get more income as well as savings from agriculture pursuit efficient financial market is essential.

The Government of Bangladesh (GoB) has allocated a considerable portion of agricultural credit and also encourages other organizations (NGO-MFIs, PCBs, FCBs, etc.) to extend their lending facilities to this field. For example, in 2009/10, GoB

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allocated Tk 74047.1 million to the Ministry of Agriculture for the purpose of increasing agricultural production, ensuring food security and reducing poverty (MoF, 2011). Apart from reducing customer duty on commodities in the budget of financial year 2010-11, an allocation of Tk 4,000 crore has been proposed as subsidy to the agricultural sector. In addition, the GoB takes the effort to provide necessary input supports (such as seed, irrigation, fertilizer, etc.) to the farmers. For instance, in 2009/10, about Tk 49,220 million was released as subsidy on fertilizer and for other agricultural inputs (MoF, 2011).

The financial system in Bangladesh includes Bangladesh Bank (the central bank), scheduled banks, non-bank financial institutions, microfinance institutions (MFIs), insurance companies, credit rating agencies and stock exchange. Out of 6562 scheduled bank branches operating in the country, up to end of December 2006 the nationalized commercial banks (NCBs) operate 3384 branches, of which 2146 are in rural areas and 1238 are in urban areas; Specialized Banks have 1354 branches of which 1200 are in rural areas and 154 are in urban areas; Private commercial banks (PCBs) have 1776 branches of which 488 are in rural areas and 1288 are in urban areas; and foreign commercial banks (FCBs) have 48 branches exclusively in urban areas. Out of 30 PCBs 6 have been operating as Islamic banks. After the year 2006 that total numbers of branches are increasing rapidly up to 2009.

The structure of financial market for agriculture in Bangladesh can be categorized into four categories: a) Public Sector Institutions (PSIs), b) Private Banks (PBs), c) Member Based Institutions (MBIs) and d) Informal Financial Intermediaries (IFIs).Prior to the independence of Bangladesh, the financial market comprised two components- institutional and non institutional sources. After independence many NGOs emerged which are serving the poor in many ways including credit delivery. The number of these NGOs increased many folds over the year.

All these components bear noble objective to help resource poor farmers of the country. Their help becomes of immense importance especially for the risk prone areas of northern Bangladesh. As a northern district, farmers of Rangpur need favorable financial market to enhance their production and livelihood. But studies on the financial market for agriculture emphasizing risk prone agriculture of Rangpur district are scant. With these ends in view, the present study has been undertaken to investigate financial market for agriculture in Rangpur municipal under Rangpur district of Bangladesh.

2 MATERIALS AND METHODS

2.1 SURVEY AREA, SAMPLING AND DATA COLLECTION

Considering the objectives of the present study Rangpur municipal under Rangpur district of Bangladesh was selected purposively as the study area. The selection of the study area was based on:

- Availability of required information;
- Easy accessibility and good transportation system;
- High expected Cooperation from the respondents with reliable information;

With a view to fulfilling the purpose of the study a pretesting survey was conducted in the Rangpur Municipal Corporation. Rangpur Municipal Corporation is a market of large number of financial intermediaries. The PSIs and PBs available in this area are Rajshahi Krishi Unnayan Bank (RAKUB), Sonali Bank, Pubali Bank, Janata Bank and Rupali Bank. Grameen Bank, Association for Social Advancement (ASA), Bangladesh Rural Advancement Committee (BRAC) and PROSHIKA are available as MBIs. In the study area, 3 branches of RAKUB, 3 branches of Pubali Bank, 4 branches of Janata Bank, 7 branches of Rupali Bank, 10 branches of Sonali Bank, 5 branches of Grameen Bank, 7 branches of BRAC, 4 branches of PROSHIKA and 5 branches of ASA exist, all of which were investigated. So, all of the PPSIs and MBIs were included in the sample. A small sample of 50 informal intermediaries comprising 10 intermediaries each from money lenders, well-to-do rural people, shopkeepers, businessmen and friends and relatives were selected for the study. Purposive sampling technique was followed for selecting required sample. Data used for the present study covered the period January-December, 2012. Data were collected during the period from March to June, 2013.

2.2 ANALYTICAL TECHNIQUE

Data were presented mostly in tabular form. Some statistical measure like average, percentage graphs and tables were also used to interpret the findings. In order to judge the efficiency of different financial intermediaries functioning in the financial market, some efficiency criteria were determined making deep and effective consultation with both borrowers and lenders in the study area. These criteria are mentioned below in table 1.

Table 1: Criteria for Judging Efficiency

Sl. No.	Efficiency criteria	Definition
1	Formalities	An established form, especially one followed merely for the sake of procedure.
2	Security	A thing deposited or pledged as a guarantee of the fulfillment of an undertaking or the repayment of a loan, to be forfeited in case of default.
3	Time Lag	A period of time between applying for loan and getting it.
4	Adequacy	Adequacy refers to the sufficiency of credit to meet the borrowers demand.
5	Cost	An amount that has to be paid or given up in order to get credit. Cost consists of interest and other charge (both explicit and implicit) borne by the borrowers at the time of taking loan.
6	Supervision	Supervision means the action where or for what purposes loaned money is used.
7	Repayment	The act of paying back money previously borrowed from a lender. Repayment usually takes the form of periodic payments that normally include part principal plus interest in each payment.

Above table shows that efficiency criteria include both quantitative and qualitative variables. All the variables were converted numerically which are as follows:

Table 2: Scoring of the Efficiency Criteria

Sl. No.	Variable	Score
1.	Strict	A weight of 1 to the strict one, 2 to the next and so on up to 3 against the last was given in case of formalities.
2.	Easy	
3.	Minimum	
4.	Compulsory	A value of 1 for compulsory, 2 for minimum and 3 for the last one to measure security.
5.	None	
6.	Minimum	
7.	Weak	Strict supervision was given a score of 3, 2 to the next and 1 against the last.
8.	Strict	
9.	Absent	
10.	Satisfactory	In case of repayment, a weight of 3 was given to the satisfactory variable. Thus mediocre and unsatisfactory were weighted by 2 and 1 respectively.
11.	Mediocre	
12.	Unsatisfactory	
13.	Time Lag	3 for within 7 days, 2 for 8-14 days and 3 for 15 days and above.
14.	Range of percentage	85-90, 70-75, 60-65 per cent were given 3, 2 and 1 scores respectively in case of adequacy. In the case of cost, 25, up to 26-45, 46 and above per cent were given 3, 2 and 1 score respectively.

Efficiency was determined as

$$E_i = \frac{\sum RSi}{\sum TSi} \times 100$$

Where,

E = efficiency;
RS = realized score;
TS = total score;
Σ = summation; and
i = financial intermediaries, i.e. PPSIs, MBIs and IFIs.

It was considered that an intermediary having more E_i value was more efficient compared to other financial intermediaries in the study area.

3 RESULTS AND DISCUSSION

3.1 STRUCTURE OF FINANCIAL MARKET

Structure of financial market for agriculture is shown in Figure 1. Borrowers within the radius of municipal area got the highest opportunity of loan program.

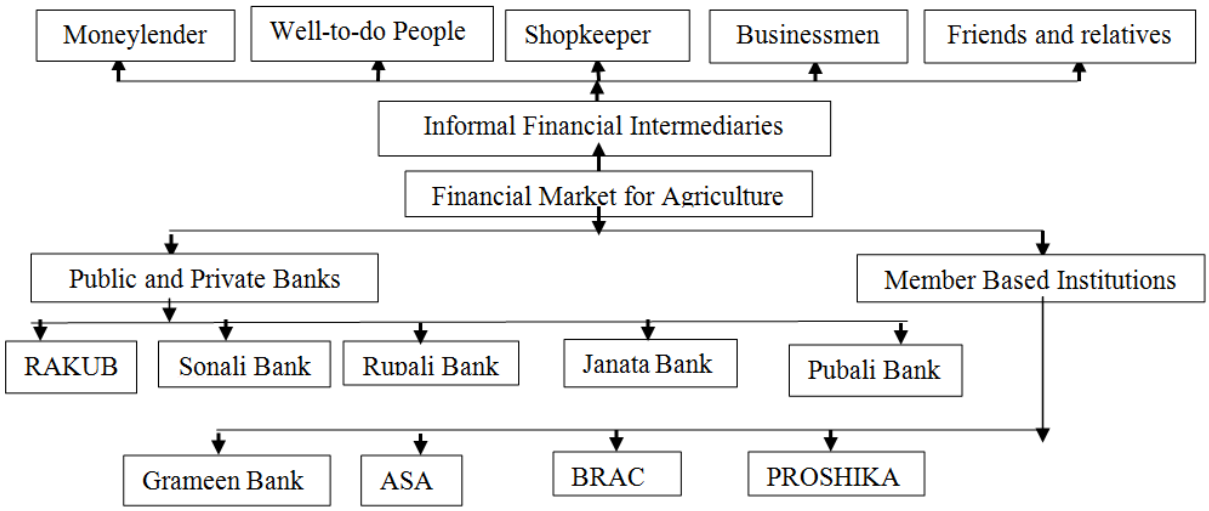

Fig 1. Structure of Financial Market for Agriculture in Study Area

Major credit programs of PSIs and PBs are presented in Table 3. The table reveals that the numbers of total borrowers from RAKUB, Sonali Bank, Rupali Bank, Pubali Bank and Janata Bank are 2711, 6000, 1250, 945 and 1282 respectively. Among the PPSIs, the highest number of borrowers were with Sonali Bank (6000 persons) and the lowest were with Pubali Bank (945 persons). Table 3 reveals areas of credit operations in Rangpur municipal by different PPSIs where RAKUB covered wide areas than any other PPSIs.

Table 3: PPSIs and their areas of credit operations in Rangpur municipal

Name of PPSIs	Coverage (borrowers)	Major credit programs
RAKUB	2711	Crops, livestock, fisheries, agricultural equipment, nursery, rural transportation, income generating activities, cash credit, consumer credit, microcredit, and rural credit.
Sonali Bank	6000	Crops, livestock, fisheries, poultry, and business.
Rupali Bank	1250	Commercial and industries
Pubali Bank	945	Business
Janata Bank	1282	Crops, livestock, fisheries, business, SME, cash credit, consumer credit, and supervises credit.

Source: Field Survey, 2013

Among the MBIs, the highest number of borrowers were from Grameen Bank (18834 persons) and the lowest were from PROSHIKA (9611 persons). All NGOs operated their credit programs in agricultural sector. Major credit programs of NGO were related to agriculture like crops, livestock and fisheries (Table 4).

Table 4: MBIs and their areas of credit operations in Rangpur municipal

Name of MBIs	Coverage (Borrowers)	Major Credit Programs
Grameen Bank	18834	Crops, livestock, fisheries and poultry.
ASA	12207	Crops, livestock, fisheries, poultry, small business and nursery.
BRAC	12987	Crops, livestock, fisheries, poultry and SME.
PROSHIKA	9611	Crops, livestock, fisheries, poultry and handy crafts.

Source: Field Survey, 2013

Financing by IFIs started from time immemorial. IFIs coverage of lending is whole study area. The numbers of total borrowers from the moneylenders, well-to-people, shopkeepers, businessman and friends and relatives were 500, 300, 525, 350 and 270 persons respectively. Moneylenders, well-to-people and friends and relatives disbursed credit both in cash or kind in different activities like agriculture (for rice, wheat, etc.) and non-agriculture (for small business, consumption, health and sanitation**).** Shopkeepers and businessmen lending are in the form of selling product on credit (Table 5).

Table 5: IFIs and their loaning activities

Name of IFIs	Coverage (borrowers)	Loan disbursement activities
Moneylenders	500	Aman rice, Boro rice, Wheat, small business, consumption, health and sanitation, education, and nursery.
Well-to-do people	300	Aman rice, Boro rice, Wheat, education, and consumption.
Shopkeepers	525	Non-agricultural products
Businessmen	350	Aman rice, Boro rice, Wheat, small business, and consumption.
Friends &Relatives	270	Aman rice, Boro rice, Wheat, education, and consumption.

Source: Field Survey, 2013

3.2 LENDING POLICIES OF FINANCIAL INTERMEDIARIES

Loan services of Public sector institutions (PSIs) and Private Banks (PBs) in the study area have been classified under the following heads a) Short Term Loan (STL): loan period is 1 year; b) Medium Term Loan (MTL): loan period is above 1 to 5 years; c) Long Term Loan (LTL): loan period is more than 5 years. Purpose and duration of loan of different terms of loan are presented in Table 6.

Table 6: Purpose and duration of loan of STLs, MTLs and LTLs

Terms of loan	Duration of loan	Purpose of loan
STLs	Not exceeding 18 months	Crops production, animal husbandry, poultry, farming, fishery, livestock dairy, horticulture, forestry, purchasing machinery for irrigation and agriculture goods and inputs trade, storage of agriculture goods, establishment of processing and marketing oriented industry and agro based industry
MTLs	Exceeding 18 months but within 5 years.	Horticulture/orchards, poultry farming, dairy farming, fisheries, sericulture, shallow tube-wells, power pumps including engines, agricultural equipment, income generation activities like nursery, leveling of land and jungle clearance, excavation/embankments, draft animal, bullock carts, indigenous implements, country boats, rural transportation, business, consumer credit and micro credit
LTLs	exceeding 5 years	Deep tube well, tractors and attachments, power tillers and attachments, power pumps including engine, warehouses, cold shortage, land development and rural transportation.

3.3 LOAN SECURITY OF THE PPSIS

MBIs do not require any conventional security (capital asset) that is must for PPSIs. The member must have savings money in his/her account for being eligible to have loans from MBIs. For example, in the case of ASA and PROSHIKA a member has to save Tk. 10 for a loan of Tk. 100. That means, for any size of loan the saving in the account has to be 10 per cent (Table 7).

In case of BRAC, first time a member has to have Tk. 2 as savings for a loan of Tk. 100. That means, for any size of loan the saving in the account of the member of BRAC has to be 2 per cent. Second time, a member has to have Tk. 2.5 as savings for a loan of Tk. 100 that means the percentage of saving in the account has to be 2.5. For the third time, this respective percentage for a member has to save 3 in his/her saving account (Table 7).

Table 7: Security Requirement of MBIs

Name of MBIs	Security
Grameen Bank	5 members of group, one is secured to another.
ASA	Borrowers have to save 10% of the loan.
PROSHIKA	Borrowers have to save 10% of the loan.
BRAC	Has to save 2% first time, 2.5% second time and 3% third time.

Source: Field Survey, 2013

3.4 SECURITY FOR LOAN OF IFIS

Moneylenders keep security for their loans. Land worth Tk. 5 lac is to be kept under the disposal of the moneylenders for a loan of Tk. 1 lac. They loaned Tk. 20,000 against mortgage of 1 acre of land. Well-to-do people disbursed credit against shop or land documents. Businessmen disbursed loan against land or agricultural products. Shopkeepers do not require any specific security for the commodities they sell to the customer. But they charged relatively higher price for the product sold in kind in addition to the 60 per cent rate of interest charged. Friends and relatives do not require any specific security for the agricultural commodities. They charged relatively lower interest compared to other intermediaries.

3.5 INSTALLMENT OF PPSIS, MBIS AND IFIS

Crop loans as provisioned by RAKUB and Sonali Bank were to be repaid at a time along with interest. Term loans (principal plus interest) were required to be repaid in 4 equal installments for 4 years, and long-term loans were repaid in half yearly installment for six years, i.e. loan for livestock, one installment in first year and rest of the year it was repaid in half yearly installment. Agricultural equipment, i.e., tractor, power tiller loans were repaid in half yearly installments for RAKUB. Sonali Bank's agricultural loan was repaid in 33 equal monthly installments for 3 years.

Table 8: Repayment Schedules of a Medium Term Loan Made by PPSIs (Per 25000 Tk.)

Name of the PPSIs	Amount of loan (Tk)	Amount repaid (Tk)			Installment (no.)
		Principal	Interest	Total	
RAKUB	25,000	758	100	858	33
Sonali Bank	25,000	758	114	872	33
Rupali Bank	25,000	758	114	872	33
Pubali Bank	25,000	758	91	849	33
Janata Bank	25,000	695	111	806	36

Source: Field Survey, 2013

Table 8 shows that a medium term loan of 3 years duration must be repaid in 33 installments by all PSBs and PSs except Janata Bank which collects in 36 installments disbursed over 3 years.

Table 9: Repayment Schedule of Loans (thousand Tk.) made by MBIs

Name of MBIs	Amount of loan (Tk)	Amount repaid (Tk.)			Installment (no.)
		Principal	Interest	Total	
Grameen Bank	1,000	20	2	22	50
ASA	1,000	22	3	25	46
BRAC	1,000	22	3	25	46
PROSHIKA	1,000	22	3	25	46

Source: Field Survey, 201

Grameen Bank loans were repaid in 50 equal weekly installments on a declining basis. Loans were repaid in 46 equal weekly installments in BRAC, ASA, and PROSHIKA on a declining balance method at flat rate of 14%. Table 9 shows that average repayment per week of a borrower is Tk 22 for Grameen Bank and Tk 25 for each of all other MBIs. Total installment for repaying Tk 1,000 is 50 for Grameen Bank and 46 for each of other MBIs. All of the loans of the MBIs are required to be repaid in 46 equal weekly installments of the year except Grameen Bank.

Borrowers of moneylenders, businessmen and shopkeepers repaid their credit on monthly basis. On the other hand, borrowers of well-to-do people and friends and relatives repaid their installments with flexible terms and condition.

3.6 MAGNITUDE OF TRANSACTION, INTEREST RATE, RECOVERY AND EFFICIENCY OF FINANCIAL MARKET

Table 10 reveals loan operations of the different PPSIs. It implied that the total average shares of three PSBs were Tk 332.63 lac, while RAKUB shared alone Tk 181.502 lac (54.56 per cent) over the five years for three PSBs (Figure 2).

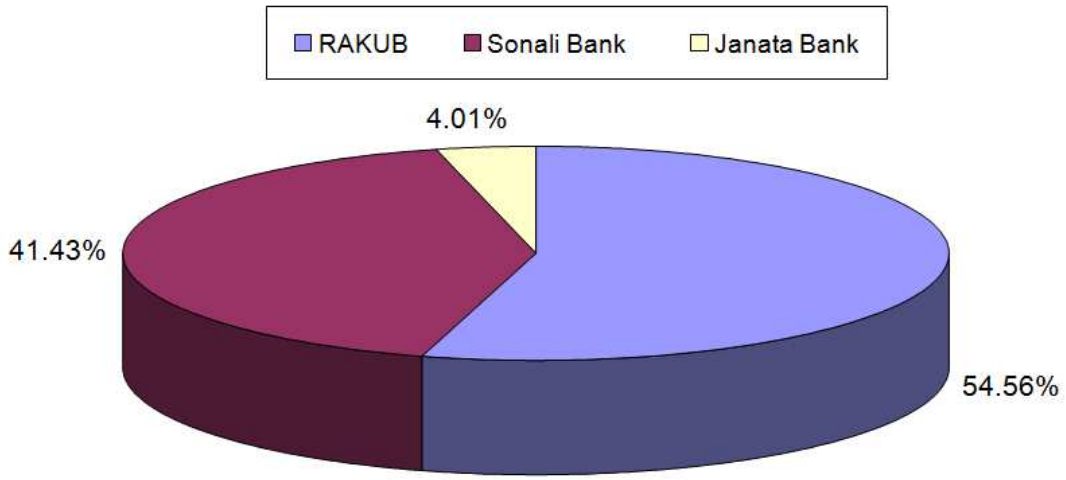

Fig. 2: Shares of Different Participants in Total PPSIs Disbursement

Table 10: Annual Credit Disbursements for Agriculture by PPSIs during 2008-2012

(Tk in lac)

Name of PPSIs	2008	2009	2010	2011	2012	Total	Average
RAKUB	157.11 (17.31)	158.17 (17.43)	159.33 (17.56)	186.77 (20.58)	246.13 (27.12)	907.51 (100)	181.502 (54.56)
Sonali Bank	136.00 (19.74)	137.00 (19.88)	138.00 (20.03)	138.00 (20.03)	140.00 (20.32)	689.00 (100)	137.800 (41.43)
Janata Bank	10.61 (15.92)	11.23 (16.85)	13.26 (19.90)	14.74 (22.12)	16.80 (25.21)	66.64 (100)	13.328 (4.01)
Rupali Bank	-	-	-	-	-	-	-
Pubali Bank	-	-	-	-	-	-	-
All PPSIs	303.72 (18.26)	306.4 (18.42)	310.59 (18.67)	339.51 (20.41)	402.93 (24.23)	1663.15 (100)	332.63 (100)

Source: Field Survey, 2013

'- 'indicates nil and 1 lac = Tk 100000

Figures within the parentheses indicate percentage

3.7 DISBURSEMENT OF MEMBER BASED INSTITUTIONS (MBIS)

Information on the annual disbursement over the years made by the MBIs is presented in Table 11. Grameen Bank disbursed Tk 1378 lac (17.05 per cent) in 2008 which increased to Tk 1772 lac (21.93 per cent) in 2012. During the period of 2008-2012, the disbursement was higher by 23.20 per cent in the year 2012 in case of BRAC (Figure 3).

Table 11: Annual Credit Disbursements for Agriculture by MBIs during 2008- 2012

(Tk in lac)

Name of MBIs	2008	2009	2010	2011	2012	Average	Total
Grameeen Bank	1378 (17.05)	1522 (18.83)	1645 (20.35)	1765 (21.84)	1772 (21.93)	1616.40 (40.05)	8082 (100)
ASA	764 (16.64)	823 (17.92)	975 (21.23)	1000 (21.78)	1030 (22.43)	918.40 (22.75)	4592 (100)
BRAC	921 (18.32)	1014 (20.17)	944 (18.78)	982 (19.53)	1166 (23.20)	1005.40 (24.90)	5027 (100)
PROSHIKA	410 (16.53)	430 (17.34)	460 (18.55)	530 (21.37)	650 (26.21)	496.00 (12.30)	2480 (100)
All MBIs	3473 (17.21)	3789 (18.77)	4024 (19.94)	4277 (21.20)	4618 (22.88)	4036.20 (100)	20181 (100)

Source: Field Survey, 2013

Figures within the parentheses indicate percentages

(1 lac = Tk 100000)

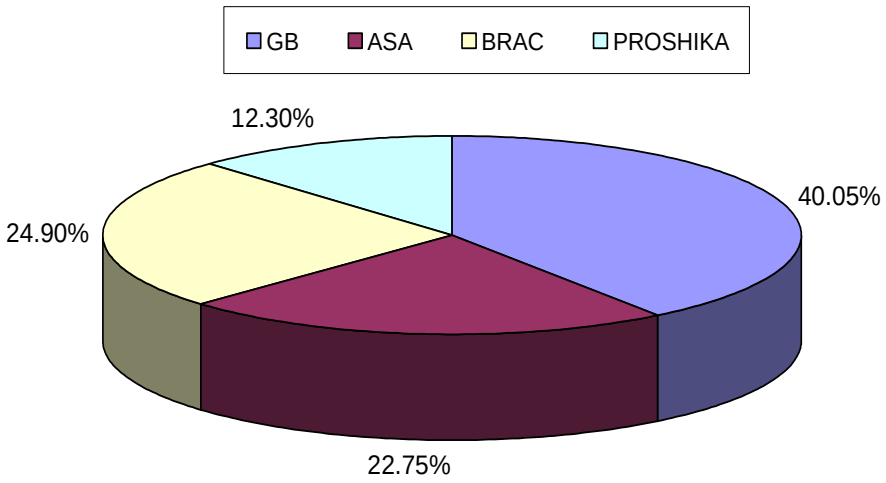

Fig. 3: Shares of Different Participants in Total MBIs Disbursement

3.8 DISBURSEMENT OF INFORMAL FINANCIAL INTERMEDIARIES (IFIS)

Over the year basis the average amount of disbursement of credit made by moneylenders was Tk 5.568 lac (Table 12). It shared 33.81 per cent of total IFI credit (Fig 4). The average amount of this disbursement was Tk 3.49 lac, which shared 21.20 per cent of total informal credit.

Table 12: Annual Credit Disbursements for Agriculture by IFIs during 2008-2012

(Tk in lac)

Name of IFIs	2008	2009	2010	2011	2012	Average	Total
Moneylenders	3.25 (11.67)	4.68 (16.81)	5.72 (20.54)	6.85 (24.60)	7.34 (26.36)	5.568 (33.81)	27.84 (100)
Well-to-do people	3.18 (18.22)	3.27 (18.74)	3.50 (20.06)	3.70 (21.20)	3.8 (21.78)	3.49 (21.20)	17.45 (100)
Shopkeepers	2.13 (18.35)	2.25 (19.38)	2.37 (20.41)	2.40 (20.67)	2.46 (21.19)	2.322 (14.10)	11.61 (100)
Businessmen	3.50 (18.77)	3.65 (19.57)	3.70 (19.84)	3.80 (20.37)	4.00 (21.45)	3.73 (22.65)	18.65 (100)
Friends &Relatives	1.00 (14.75)	1.12 (16.52)	1.31 (19.32)	1.45 (21.39)	1.90 (28.20)	1.356 (8.24)	6.78 (100)
All IFTs	13.06 (15.86)	14.97 (18.18)	16.60 (20.16)	18.20 (22.11)	19.50 (23.69)	16.466 (100)	82.33 (100)

Source: Field Survey, 2013

Figures within the parentheses indicate percentages

(1 lac = 100000 Tk)

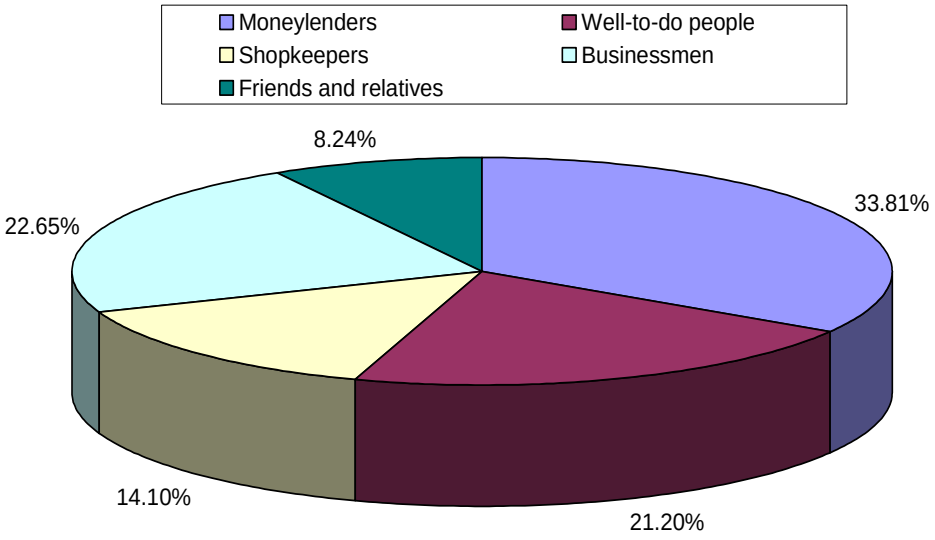

Fig. 4: Shares of Different Participants in Total IFIs Disbursement

3.9 FINANCE CHARGE

The finance charge on loan is payable irrespective of the financial circumstances of the borrowers, because lenders need risk premium for covering default risk and market risk. The interest is usually considered to include payment for three things: a) payment for the use of money; b) risk of losing the money loaned; and c) management and associated costs in making and servicing the loan. The micro-credit organization can make a surplus from two ways (i) disburse big size of loan with low rate of service charge and (ii) charging high rate of service charge for sensitive loan recovery. Table 13 reveals the rate of interest during the period of 2008-2012 by different PPSIs.

Table 13: Rate of Interest during 2008-2012 of different PPSIs (per annum)

Name of PPSIs	Rate of interest (%)									
	2008		2009		2010		2011		2012	
	Ag.	Non-ag.	Ag	Non-ag.	Ag.	Non-ag.	Ag.	Non - ag.	Ag.	Non-ag.
Sonali Bank	8	13	8	14	10	16	10	16	10	17
Janata Bank	11.5	16	10	16	10	16	10	16	10	16
Rupali Bank	-	16	-	16	-	16	-	16	-	16
Pubali Bank	-	16	-	16	-	16	-	16	-	16.5

Source: Field Survey, 2013

'- 'indicates nil; no agricultural credit sanctioned this period.

RAKUB provided credit with a uniform interest rate. In the study area, RAKUB charged interest at the rate of 11 per cent for short term production loan. Interest rates for medium and long term loan ranged from 10 per cent to 15 per cent. Interest rates for agricultural loans ranged from 8 to 10 per cent for Sonali Bank and 11.5 per cent for Janata Bank during the period of 2008-2012. Table 14 shows that GB charged interest at the rate of 20 per cent for all loans except housing and sanitary activities. For agricultural loan BRAC charged interest at the rate of 18 percent.

Table 14: Rate of Interest of MBIs (Per annum)

Name of MBIs	Rate of Interest (%)	
	Agriculture	Non- agriculture
GB	20	8 per cent for housing loan, 5 percent for student loan.
ASA	15	-
BRAC	18	Housing loan 10%
PROSHIKA	14	-

Source: Field Survey, 2013

Table 15 shows the average rate of interest charged by different IFIs. Rates charged by the informal lenders varied across time as well as locations. Moneylenders were found to have charged higher interest rates in the study area. Table 15 shows that moneylenders charged at the range of 100-200 per cent per annum from its borrowers. Most of the times, the friends and relatives did not charge any direct interest.

Table 15: Rate of Interest of IFIs (Per annum)

Name of IFIs	Rate of Interest (%)
Moneylenders	100-200
Well-to-do people	80
shopkeepers	60
Businessmen	70
Friends and relatives	10

Source: Field Survey, 2013

3.10 RECOVERY OF LOAN

The recoverable amount of PPSIs included only a part of the amount to be collected presently and a part of previous due amount. Table 16 represents recovery of the loans disbursed by PPSIs for the period of 2008-2012. Percentage recovery figures of the RAKUB during the period, ranged from a minimum of 68 to a maximum of 83 per cent with and averages of 74.63 per cent. The average recovery was 65.19 61.52 62.34 and 40.79 per cent respectively for Sonali Bank, Janata Bank, Pubali Bank and Rupali Bank (Figure 5).

Table 17 indicates recovery situation of the member based financial intermediaries. GB's and ASA had recovery percentages of 98.328 and 98.592 per cent respectively. The overall recovery of the MBIs appeared to be 98.272 per cent. As far as the MBIs are concerned, the recovery position is much better compared to those of the PPSIs (Figure 6).

Loan recovery positions of the informal financial intermediaries are presented in Table 18. Percentage of recoverable money recovered by the IFIs were 86.14 per cent for moneylenders, 84.65 per cent for well-to-do people, 85.78 per cent for shopkeepers, 82.80 per cent for businessmen and 82.28 per cent for friends and relatives (Figure 7).

Table 16: Status of Loan Recovery by PPSIs during 2008-2012

Name of the PPSIs	2008			2009			2010			2011			
	Total recove-rable loan	Total loans recovered	Percenta-ge of recovery	Total recovera-ble loan	Total loans recovered	Percent-age of recovery	Total recover-able loan	Total loans recovered	Percent-age of recovery	Total recover-able loan	Total loans recovered	Percent-age of recovery	Total recover-able loan
RAKUB	178.40	133.80	75.00	140.54	101.38	72.00	278.20	190.50	68.00	263.00	191.98	73.00	298.40
Sonali Bank	180.00	140.00	77.78	200.00	130.00	65.00	200.00	132.00	66.00	245.00	140.00	57.14	215.00
Janata Bank	148.68	89.21	60.00	162.24	98.97	61.00	180.62	110.18	61.00	196.80	122.02	62.00	209.45
Rupali Bank	194.81	79.87	41.00	202.55	81.02	40.00	227.3	93.19	41.00	233.60	98.11	42.00	262.00
Pubali Bank	48.68	29.21	60.00	57.21	35.47	62.00	58.13	35.46	61.00	60.08	37.85	63.00	64.22
All PSIs	750.57	472.09	62.89	762.54	446.84	58.59	944.25	551.33	59.45	998.48	589.96	59.08	1049.07

Source: Field Survey, 2013

Table 17: Status of Loan Recovery by MBIs during 2008-2012

Name of the MBIS	2008			2009			2010			2011			2
	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan
GB	1565.80	1516.40	96.84	1638.30	1595.20	97.37	1719.70	1700.40	98.88	1789.80	1770.9O	98.94	1802.10
ASA	1289.60	1276.70	99.00	1398.70	1384.71	99.00	1433.30	1404.63	98.00	1450.64	1421.63	98.00	1495.20
BRAC	1020.27	992.80	97.31	1137.30	1120.10	98.49	1227.40	1210.50	98.62	1286.8	1270.40	98.72	1298.70
PROSHIKA	650.00	630.00	96.92	678.72	658.36	97.00	690.00	669.30	97.00	698.65	680.12	97.34	763.46
All MBIs	4525.67	4415.90	97.57	4853.02	4758.37	98.05	5070.40	4984.83	98.31	5225.89	5143.05	98.41	5359.46

Source: Field Survey, 2013

Table 18: Status of Loan Recovery by IFIs during 2008-2012

Name of the IFIs	2008			2009			2010			2011			
	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan	Total loans recovered	Percentage of recovery	Total recover-able loan
Moneylenders	5.14	4. 29	83	5.51	4.62	84	5.75	4.90	85	6.9 2	5.93	86	8.50
Well-to-do People	4.25	3.5 0	82	4.55	3.76	83	4.68	3.93	84	4.72	4.00	85	5.00
Shopkeeper	3.34	2.75	82	3.45	2.90	84	3.65	3.10	85	3.85	3.34	87	4.00
Businessmen	3.60	3.00	83	3.75	3.10	83	4.25	3.43	81	4.65	3.75	81	4.80
Friends and relatives	2.00	1.60	80	2.20	1.80	82	2.25	1.85	82	2.55	2.10	82	2.85
All IFIs	18.33	15.14	82.60	19.46	16.18	83.14	20.58	17.21	83.62	22.69	19.12	84.27	25.15

Source: Field Survey, 2013

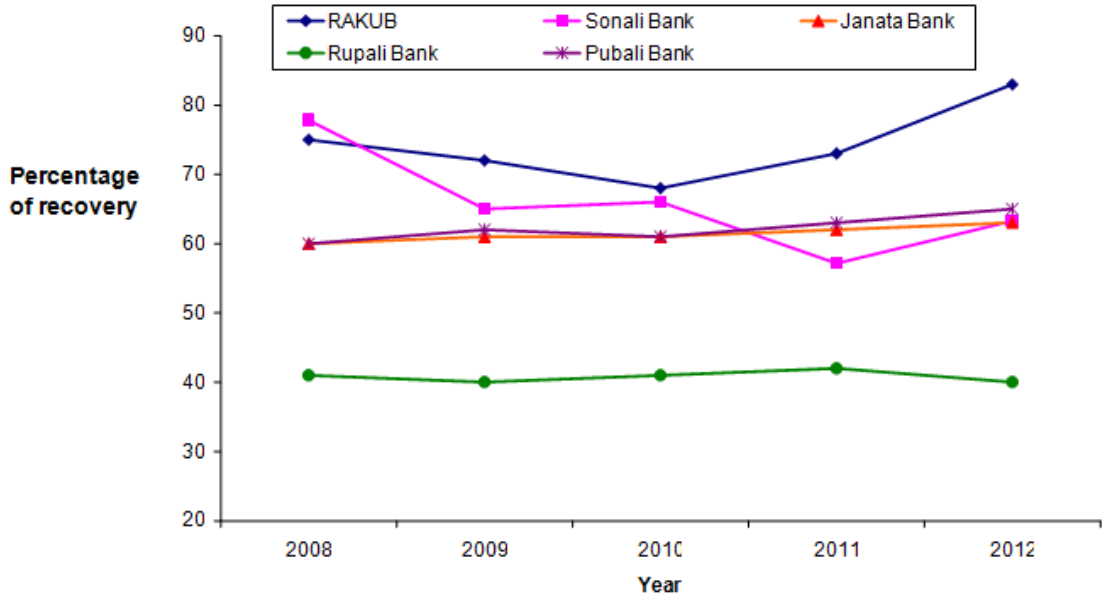

Fig. 5: Status of Loan Recovery by PPSIs during 2008-2012

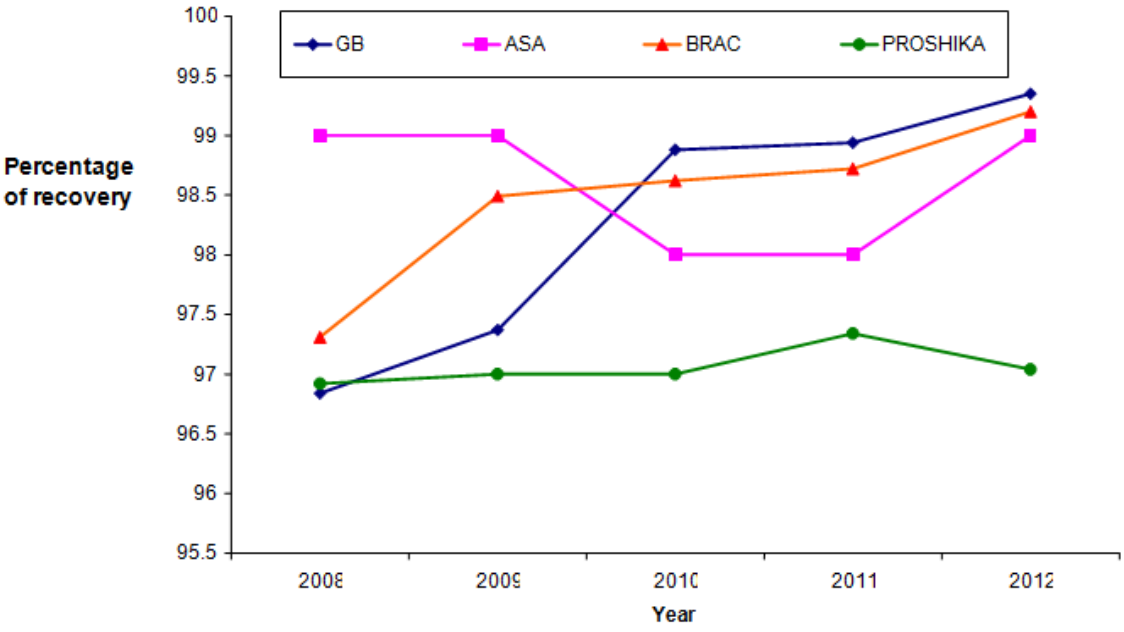

Fig. 6: Status of Loan Recovery by MBIs during 2008-2012

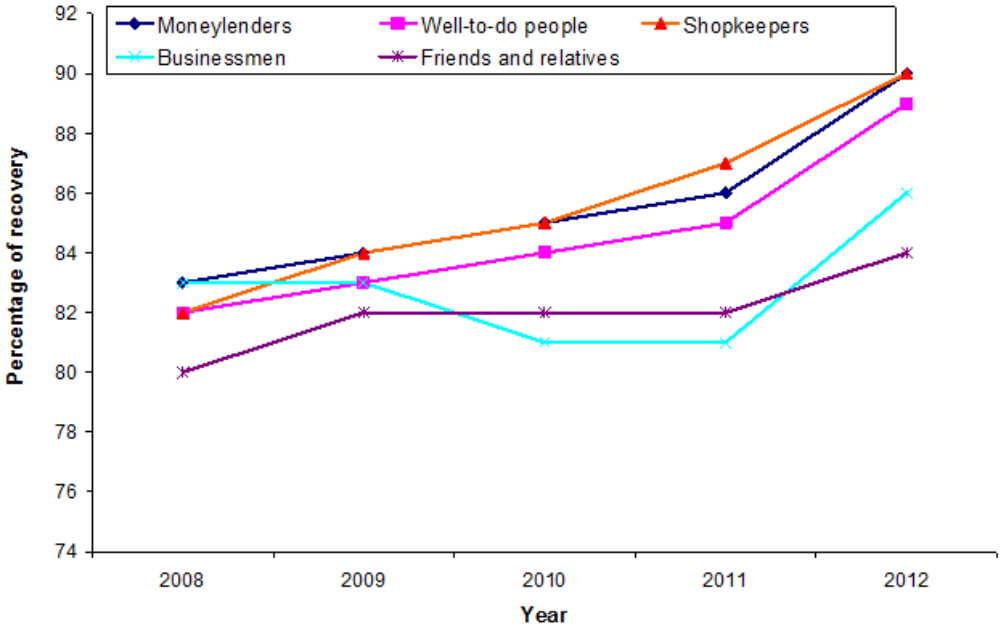

Fig. 7: Status of Loan Recovery by IFIs during 2008-2012

3.11 EFFICIENCY OF FINANCIAL MARKET FOR AGRICULTURE

The criteria considered for measuring efficiency of financial market for agriculture and their performance were shown in Table 19. Then efficiency of different financial intermediaries was presented in Table 20.

Table 19: Performance of Different Financial Intermediaries

Sl. No.	Criteria	PPSIs	MBIs	IFIs
1	Formalities	Strict	Easy	Minimum
2	Security	Compulsory	None	Minimum
3	Time Lag (days)	15-30	7-10	0-3
4	Adequacy (%)	60-65	85-90	70-75
5	Cost (%)	45	25	75
6	Supervision	Weak	Strict	Absent
7	Repayment	Unsatisfactory	Satisfactory	Mediocre

Source: Field Survey, 2013

Table 20: Efficiency of Different Financial Intermediaries

Sl. No.	Criteria	PPSIs	MBIs	IFIs
1	Formalities	1	2	3
2	Security	1	3	2
3	Time Lag	1	2	3
4	Adequacy	1	3	2
5	Cost	2	3	1
6	Supervision	2	3	1
7	Repayment	1	3	2
	Realized Score (ΣRS_i)	9	19	14
	Efficiency, $Ei = \frac{\sum RSi}{\sum TSi} \times 100$	43	90	67
	Overall efficiency	66.67		

Note: $\Sigma TS_i = 7 \times 3 = 21$

With a view to drawing conclusion as to the efficiency of different financial intermediaries, different weights were given to each of the factors mentioned earlier. On giving weights to each of the different factors in Table 20, the scores obtained (ΣRS_i) by PPSIs, MBIs and IFIs were 9, 19 and 14 respectively. So, their respective efficiency (Ei) was 43, 90 and 67 per cent respectively by PPSIs, MBIs and IFIs. It appears from the table that the MBIs secured the highest position. It implies that MBIs has performed the best in dealing with various aspects of agricultural credit. This might have been the result of good and sound credit policy and supervision. So, MBIs is more efficient than other financial intermediaries. Moreover, overall efficiency of the financial market for agriculture (FMA) in the study area is stood at 66.67 per cent. It indicates that the FMA in the study area is not efficient in an all rounding basis.

3.12 LINKAGES AMONG DIFFERENT FINANCIAL INTERMEDIARIES

Linkages among the different financial intermediaries significantly inspired each other in developing a lending framework of financial market. This massive linkage outfit is well organized, pragmatic, experience-based and more practical. Fig. 8 shows that financial links existed in the study area.

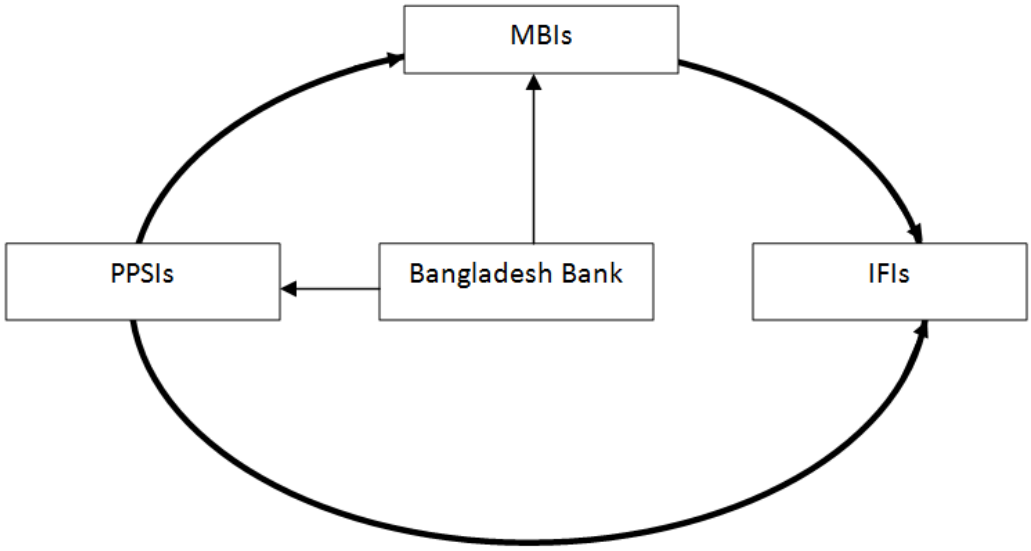

Fig. 8: Linkages among Different Financial Intermediaries

In the study area, linkage between PPSIs and MBIs existed in many forms. The linkage between PPSIs and MBIs is taken place in the form of financing and delivering services to semi-formal institutions. PPSI act as a source of funds and financial operation is conducted by an NGO after promoting the target groups through its own network of offices and staff in the study area. PPSIs received fund from the Bangladesh Bank at concessional rate for lending to clients in the study area. The funds are directly handled by the PPSIs through direct links between clients and bankers. But some of these funds are also handled by the MBIs through PKSF, which receives fund from the PPSIs. There are financial links between the NGOs also.

Table 21: Problems and Constraints for Non-recovery of Loan by PPSIs and MBIs

Name of the financial market participants	Fund insufficiency (%)	Supervision		Non-recovery of loan					Inadequate facilities	
		Shortage of employees (%)	Dislike by borrowers (%)	Natural calamity (%)	Theft of crops, livestock and fishes (%)	Illness (%)	Expenditure for son and daughter's marriage (%)	Political pressure (%)	Low salary (%)	Lack of modern facilities (%)
Public and Private Sector Institutions (PPSIs)										
RAKUB	S	5	12	80	4	4	1	-	15	10
Sonali Bank	S	15	30	70	7	10	2	5	5	5
Pubali Bank	10	3	20	50	5	5	2	11	4	12
Rupali Bank	S	5	15	70	6	4	2	9	6	13
Janata Bank	20	8	25	50	10	7	2	7	10	2
Member based institutions (MBIs)										
GB	S	3	5	15	4	5	10	8	15	3
ASA	15	5	7	20	6	10	15	6	12	4
BRAC	S	2	6	18	9	15	3	4	8	2
PROSHIKA	30	10	5	25	15	13	13	10	18	5

Source: Field Survey, 2013

'S' indicates sufficient

Table 21: Problems and Constraints for Non-recovery of Loan by IFIs

Factors	Money-lenders (%)	Well-to-do people (%)	Shopkeepers (%)	Businessmen (%)	Friends and relatives (%)
Crop damage due to the natural calamities	50	40	15	25	10
Emergency food purchase	5	15	12	10	8
Health and sanitation	13	6	8	9	4
Education	10	5	7	8	6
Low price of rice and other crops	9	7	5	10	7
Theft and death of animal	5	10	6	8	10
Expenditure for son and daughter's marriage	7	6	5	9	8

Source: Field Survey, 2013

4 CONCLUSION

Credit can play an important role by providing the needed liquidity to farmers who do not have sufficient investable funds to exploit the opportunity. Due to the prevalence of monopoly position of the creditors inherent to non-institutional credit market, institutional credit is of prime importance for enhancing production and removing inequalities. Adequate and timely provision of credit ensures that farmers to invest more in the form of modern inputs and use inputs efficiently. These increase overall agricultural productivity and food availability at the national level which is a core component of food security. In this way, the country could meet its existing food crisis. Banks providing agricultural loans are RAKUB, Sonali Bank and Janata Bank. Rupali Bank and Pubali Bank concentrate on nonagricultural lending. MBIs and IFIs also provided loans for agricultural purposes. PPSIs provided all the short, medium and long term loans. IFIs also deal with different terms of loan.

The lending procedure of PPSIs is lengthy and collateral based. The MBIs have very flexible lending policies requiring no physical collateral. The security requirement for the PPSIs loans are very hard, secured value of the assets being 1.33 to 10 times higher than the value of loan. For IFIs, the security is hard too. The linkages among the PPSIs, MBIs and IFIs exist in the study area. For measuring efficiency of financial market for agriculture some criteria were considered. Giving weights to each of the factors, PPSIs, MBIs and IFIs efficiency (Ei) was 43, 90 and 67 per cent respectively. It reveals that the MBIs secured the highest position.

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In Vitro Susceptibility to Atovaquone and Characterization of *Pfcytb* Gene of *Plasmodium falciparum* Isolates From Abidjan (Côte d'Ivoire)

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ABSTRACT: To evaluate the *in vitro* chemosensitivity to Atovaquone (ATQ) and analyze polymorphism of *Pfcytb* gene of *Plasmodium falciparum* isolates from Abidjan. Fifty seven isolates of *P. falciparum* collected between 2010 and 2012 from the outskirts of the city of Abidjan. Were used for testing *in vitro* susceptibility according to the microtest optical version of the World Health Organization (WHO). Polymerase Chain Reaction (PCR) was used to determine mutation in the *Pfcytb* gene. The analysis of the relationship between the observed mutations and chemosensitivity of isolates was made using Cohen's kappa test. The geometric mean IC_{50} of atovaquone is 1,645 mM. All 57 isolates were sensitive to atovaquone. The 29 isolates of *P. falciparum* sequenced showed no mutation of *Pcytb* gene at codon Y268. No other mutation was observed. Our study showed no correlation between phenotypic and molecular data (K**< 0).** This study shows that the combination atovaquone / proguanil can be one of the drugs of choice for the prophylaxis of multidrug-resistant *falciparum* malaria recommended by the World Health Organization (WHO).

KEYWORDS: *Plasmodium falciparum*, *Pfcytb,* Atovaquone*, In vitro* susceptibility, Côte d'Ivoire.

1 INTRODUCTION

Despite drop in the transmission and reduction of 25% in mortality compared to year 2000, malaria endemic disease remains the most common tropical parasitic disease in the world [1]. According to the World Health Organization (WHO), malaria is the first endemic disease of which humanity is paying a heavy price. Records indicate that 216 million episodes of malaria in 2010, 81% from Africa, with 174 million cases. It was recorded more than 655,000 cases of malaria deaths in 2010, 91% in Africa. 86% of malaria deaths have involved children under 5 years [1]. Malaria remains as the leading cause of infant mortality in the world [2]**.** Most malaria deaths are caused by *Plasmodium falciparum* [3]. The emergence and growth of Chloroquine-resistant strains of *P. falciparum* is a major obstacle to the fight against malaria in most endemic areas and This calls into question the conventional chemo prophylaxis with Chloroquine [4].

Today, it is recommended by the WHO, the use of drug combinations. Thus it has been used in endemic areas such as Côte d'Ivoire, combination therapies based on derivatives of artemisinin (CTA), namely artesunate-amodiaquine or artemether-lumefantrine for treating uncomplicated malaria [5]**.** WHO recommends today for chemoprophylaxis of malaria

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atovaquone / proguanil combination in endemic areas of multidrug- resistance and particularly for non-immunized travelers [6].

The atovaqoune works by inhibiting electron transport in the mitochondrial respiratory chain, therefore the atovaqoune inhibits the synthesis of ATP [7].To the best of our knowledge, no study on the *in vitro* susceptibility of *P. falciparum* to atovaquone (ATQ) was conducted in Côte d'Ivoire. However, a recent study conducted at the border of Thailand has shown great effectiveness of atovaquone / proguanil for the preventive treatment of multidrug-resistant *falciparum* malaria [6]. There have been reports of failure of atovaquone proguanil treatment / (AP) mainly in Africa [2].The failure of the AP combination was linked to the point mutation in the *Plasmodium falciparum* cytochrome b *(Pfcytb*) gene of mitochondria at codon Y268. Thus, tyrosine (Y) may be replaced by serine (S) Tyr-268-Ser or Cysteine (Cyst) Tyr-268-Cyst. These mutations are considered key markers for monitoring resistance to atovaquone [8].

This study aims to determine the *in vitro* susceptibility of isolates of *P. falciparum* from the outskirts of Abidjan and carry out genotypic characterization of *Pfcytb* gene at codon 268.

2 MATERIALS AND METHODS

2.1 STUDY SITES

This study was conducted from May 2010 at January 2012 at the Centre for Research and Fight against Malaria in the National Institute of Public Health of Côte d'Ivoire (INSP) for testing *in vitro* susceptibility of *Plasmodium falciparum* isolates to antimalaria drugs and genomic testing. The collection of parasitized blood sample was done at the health center of Anonkoua-Kouté located on the outskirts of Abidjan in Abobo.

2.2 ISOLATES OF *P. FALCIPARUM*

The infected blood samples were obtained from patients with uncomplicated malaria with a single-species infection with *P. falciparum*, the parasite was greater than or equal to 4000 parasitized erythrocytes / µl of blood and who had not received any antimalarial drugs during the past 7 days prior to consultation. The informed consent of patients or their parents or legal guardians for children should be obtained prior to inclusion in the study. The infected blood samples were carried out in strict aseptic conditions. Parasitized blood samples were transported in a cooler at 4°C, the same day of collection, in the laboratory where the *in vitro* chemosensitivity test were performed. Parasitized red blood cells were washed three times in RPMI 1640 and blood smears were stained with GIEMSA and examined microscopically to determine the parasite density and confirm the *Plasmodium* species *(P. falciparum*). Samples with parasitaemia ranged from 0.1% to 0.25% were used directly to test the *in vitro* drug sensitivity. Those with parasite density greater than 0.25% were diluted with uninfected erythrocytes.

2.3 ANTIMALARIA

Atovaquone used for testing *in vitro* susceptibility were obtained from France (University Paris-South, Bldg 445, IBAIC and CNRS-UMR 8080, Orsay). The stock solution of ATQ was prepared from methanol. Two Fold dilutions were made extemporaneously in a solution of RPMI 1640 and distributed in duplicate and triplicate in culture plates of 96 wells.

2.4 *IN VITRO* TESTS

The determination of the *in vitro* activity of Atovaquone was conducted using the optical version of the WHO microtest [9]. The inoculum consisted of parasitized erythrocytes, RPMI 1640 double buffered (HEPES 25 mM), sodium bicarbonate, 25 mM and solution of BSA (bovine serum albumin). For a 96-well plate, 19.2 ml of erythrocyte solution was prepared by adding 18.3 ml of RPS (1.83 ml BSA + 16.47 ml of RPMI 1640) to 900 µl of parasitized red blood cells (PRB),of which the hematocrit was reduced to 50% (450 µl de GRP + 450 µl de RPMI 1640). The inoculum was distributed in the culture plate into 200 µl per well final concentrations of ATQ ranges from 0.78 nM to 100 nM. After brief stirring of the plate, it was placed in a candle jar (Modular incubator chamber, ICN Biomedicals, California, USA) wet and rich in CO2 (5%) environment and incubated in a microbiological incubator (MemmertTM) 37°C for 42 hours. After this incubation time, three thick smears GIEMSA stained were made from pellets of blood from control wells. The percentage of schizont maturation was determined by the ratio of the number of schizonts (asexual forms more than 2 cores) to 200 asexual counted during the microscope reading at a magnification of GX100. We validated tests that the percentage of schizont maturation in control wells was at least 20%.

2.5 MOLECULAR STUDY

Twenty microliters of parasitized blood washed with RPMI 1640 was placed on Whatman No.3 paper, dried for 24 hours and stored for molecular tests. Plasmodial DNA was extracted by the Chelex 100 method described by Paul et al [10]. We used PCR to amplify a fragment embedded 500 bp *Pfcytb* gene. The final volume of the first PCR was 25 µl and the amount of plasmodial DNA was 6.25 µl. For the second PCR, we used as final volume 50 µl and the amount of plasmodial DNA was 5µl. The reaction mixture consisted of 1.5 µl from stock solution of 10µM of a pair of specific primers to be amplified, 5 µl of dNTP 2 mM, 0.25 µl of Taq polymerase, 2.5 µl of solution of 50 mM magnesium chloride, 5 µl of 10X buffer (100 mM Tris-HCl pH 9, 500 mM KCl, 0.2% Tween 20) and milliQ water QS. For the first PCR, the primer pair used were Pfcytb1- 5'-GTT-AAA-GCA-CAC-TTA-AAT-ATA-TAC-3' and *Pfcytb*2R 5'-GCT-TGG-GAG-GTG-TAA-TAA-TCA-TGT-3'. The thermal cycler was programmed to perform a denaturation at 94°C for 2 min, followed by 29 cycles at 94°C for 1 min, 50°C X 1min and 72°C X 1min and 72°C X 10 min at the end. The secondary amplification was performed with a pair of primers *Pfcyt*b-3 5-ATT-GAT-TAT-TAT-ATT-TGT-AAC-TGC-3' and Pfcytb-4R5'-AGT-TGT-TAA-ACT -TCT-TTG-TTC-TGC-3'with the same thermocycler program as the first PCR.

2.6 STATISTICAL ANALYSIS

Determining the values of 50% inhibitory concentrations of maturation (IC_{50}) was performed using nonlinear regression in Excel file. The threshold value used for the evaluation of *in vitro* chemosensitivity was 6 nM to ATQ [10]. Sequence analysis of PCR was performed on ApE software (for Windows). Electropherograms reading was performed on the Chroma Lite software 2.01. *Pfcytb* wild type was defined by alleles Y268.

The Cohen's kappa test was used to assess the degree of agreement between the different methods used to determine drug resistance [11]. The degree of agreement between the two tests can be described as very good, Cohen's kappa coefficient ≥ 0.81 good, 0.61-0.80, moderate, 0.41 to 0.60; poor, 0.21 to 0.4, bad, from 0 to 0.20, very bad, < 0.

3 RESULTS

3.1 *IN VITRO* STUDY

Of 64 isolates tested, 57 gave interpretable results thus a success rate of 89%. The geometric mean IC_{50} of ATQ for all of these isolates was 1,645 nM with confidence interval (IC_{95}) between 1,42 and 1,87 nM. The IC_{50} ranged from 3,96 nM to 0,86 nM. All isolates (100%) were susceptible to ATQ (Table I).

3.2 MOLECULAR TESTS

We tested 41 isolates of which 29 gave clear interpretable results (71%). All isolates tested were the wild-type Y268.We did not observe any single mutation Y268C or Y268S (Figure1). Table II reports the *Pfcytb* gene polymorphism of the isolates according to the profile of sensitivity to ATQ. According to Cohen's kappa test, the degree of concordance between the nature of *pfcytb* gene and *in vitro* sensitivity to this molecule was 0 (Table II).

4 DISCUSSION

Concerning the study of *in vitro* susceptibility to Atovaquone, our results are consistent with similar studies done in Africa and Asia. Indeed, isolates of *P. falciparum* from Africa were tested *in vitro* in the presence of Atovaquone, the results showed that all isolates were sensitive to this drug [12]. A similar study was conducted in 2006 on *Plasmodium falciparum* isolates from tourists returning from a trip to Africa, the results reported that all isolates were sensitive [13]. It has been observed in a similar study in *P. falciparum* multi–resistant areas at the border of Thailand on 83 isolates between 1999 and 2005, the results showed that they were sensitive to Atovaquone with an IC_{50} mean of 3,4 mM [14]. Other similar studies conducted in Guyana on 103 isolates of *P. falciparum* have confirmed our results [6]. All these studies have been conducted in chloroquine resistance high-transmission area (Southern Saharan Africa and South-East Asia). In these areas, isolates of *P. falciparum* remain sensitive to Atovaquone. Whatever the types of *P. falciparum* multi-resistant tested Atovaquone remained sensitive to these parasites and this sensitivity since the use of combination atovaquone-proguanil for the treatment of malaria. Tourists who visit area of high-malaria endemic should be advised to take this molecule along. This lack of development of drug resistance in this molecule can be explained due to the fact that this molecule is either few or not available in Africa and Asia countries. It is sold in most European countries at high prices and its use is rational and reserved only to cases of malaria

prophylaxis. In contrast, in 2010 in Senegal made a study was conducted on the *in vitro* susceptibility of isolates of *Plasmodium falciparum* to Atovaquone, result revealed that isolates were resistant to this drug [12]. This results was confirmed in 2005 when a similar study on 105 isolates of *P. falciparum* in Central Africa, the results reported that 7% (4 isolates) were resistant to the anti-malaria drug with IC_{50} 6 mM [15]. These results are not consistent with ours. These results raise the question of threshold resistance valuea to Atovaquone that could be (IC_{50} 6 mM and 1900 mM) [13]. On the basis of these criteria, the isolates tested in Senegal and Central Africa was sensitive because IC_{50} found was high thus classified as susceptible isolates. In view of these results, we recommend the combination atovaquone-proguanil as an alternative antimalarial drug for the prophylaxis of multidrug-resistant *falciparum* malaria in areas of high chloroquine resistance.

We looked into the area of *Pfcytb* gene sequence which contains the Y268 codon. The analysis of polymorphism of *Pfcytb* gene revealed that all the tested genes sequences were wild type at codon Y268. In this codon, there was no replacement of tyrosine by serine (Y268S) or replacement of tyrosine by cysteine (Y268C). These results are consistent with those found in 2006 study in which isolates from Africa have mutation that were all wild at the codon 268 [16]. A similar study conducted on 295 isolates from Africa reported in 2006 that there was no mutation in the codon 268 of the isolates. These results were confirmed at the border of Thailand on 70 isolates tested [17]. It was reported in 2008 in areas of multidrug resistance in Thailand, that the polymorphism in the 83 *Pfcytb* gene sequences revealed no mutation at codon Y268 [14]. Similar results have been reported in Angola and Ethiopia 249 and 97 isolates tested respectively [2]. In fact, all these studies showed that the mutation of the parasite *Pfcytb* gene at codon Y268 was responsible for the inhibition of Atovaquone. Atovaquone react in the complex III or bc1 complex of oxidative phosphorylation chain. It will bind to its oxidation site at the cytochrome b, which leads to inhibition of electron movement and a depolarization of the mitochondrial membrane potential [13]. Stopping the electron movement by Atovaquone, causes inhibition of breathing (over 70%) [18] and inhibition of the activity of DHOD by 90% [19]. Isolates non-resistance to Atovaquone in our study is due to the fact that this molecule atovaquone-proguanil is not sold in Africa as it is used in the prophylaxis on European tourists visiting malaria endemic areas. The use of this molecule would be rational.

The study of the correlation between *in vitro* chemosensitivity and mutation in codon 268 of *Pfcytb* gene responsible for the inhibition of Atovaquone, showed a poor correlation between the two tests. This test revealed that all isolates sensitive *in vitro* to Atovaquone have not undergone mutation Tyr268Ser or Tyr268Cyst on *Pfcytb* gene. These results are consistent with studies in 2008 in Thailand, where all isolates sensitive were of wild-type Tyr-268 [14]. It was reported also same results in Ethiopia [2].

Table I: In vitro susceptibility of isolates of P. falciparum to Atovaquone

	ATOVAQUONE (ATQ)
Number of tests taking	**64**
Number of interpretable test	**57 (89%)**
Sensitive isolates (IC_{50} **< 6 nM)**	
Number of isolates	**57**
IC_{50} Geometric Mean	**1,64 nM**
IC_{95} Geometric Mean	**1,42-1,87**
Resistant isolates (IC_{50} **≥ 6 nM**	
Number of isolates	**00**
IC_{50} Geometric Mean	**00**
IC_{95} Geometric Mean	**00**

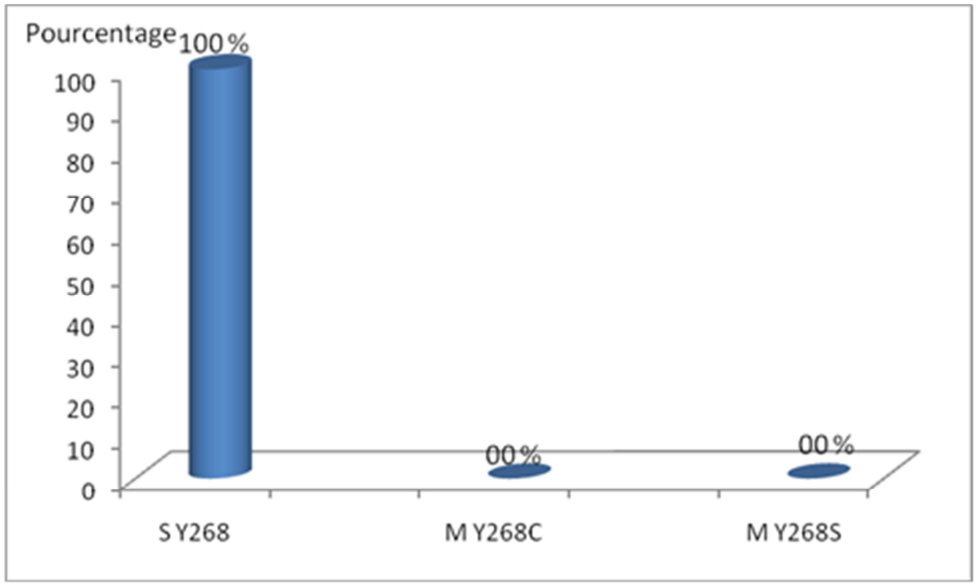

Figure 1: Distribution of isolates according to their genotypes

S = Wild
M = Mutant

Table II: Relationship between polymorphisms of the Pfcytb gene and in vitro susceptibility to Atovaquone

		***in vitro* test**		
		sensitive	resistant	
molecular test	wild	29	0	29
	Mutants	0	0	0
Grand total		**29**	**0**	**29**

K= kappa
K < 0

5 CONCLUSION

These results show that Atovaquone / proguanil combination should always be used in the prophylaxiques programs implemented by WHO.

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DECLARATION OF CONFLICT OF INTEREST

The authors wish to declare that there is no conflict of interest.

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Inventaire de la Biodiversité Aquatique du Bassin du Lac Kivu: Cas Spécifique des Poissons de la Rivière Nyabarongo RD Congo

[Inventory of the Biodiversity of Kivu Lake Bassin: Specific Case of Nyabarongo River Fishes]

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ABSTRACT: In the setting of study of the biodiversity of kivu Lake Basin Rivers, the first activity was done from January 2012 to December 2012 to inventoriate the diversity of fishes in Nyabarongo River.
The knowledge on the fishes kinds species population and the in the case that fishes contribute in the East of the DRC rivers is important pronounced with a high degree in the region, So our study is based on the distribution of fishes in Nyabarongo river.
To reach better results, we have taken specimens of fishes with nets and hooks according to the method of capture at random. The nets (traps) are placed in the river with the opening orientated down wards in direction of the river bed attached on the sticks. Earth worms or advocates, bananas, casava bread was put in /on the trap and was observed since nine o'clock till fourteen in the evening. At the end of the rope was attached a metallic bowl which leads the hook in the bottom of the river.
At all, 352 specimens of fishes were caught in different places of our study in which the Clarias specie dominated because it supports the Nyabarongo river pollution with an elevated percentage followed by the *Barbus kerstenii* with a mean percentage and the Oreochromis niloticus specie (kind) with a feeble percentage.

KEYWORDS: Inventory, Fish, Nyabarongo River, DRC.

RESUME: Dans la le cadre de l'étude de la biodiversité des rivières du bassin du lac Kivu, un premier travail fut entrepris de janvier en décembre 2012 afin de déterminé l'impact environnemental de l'agriculture sur les espèces aquatiques notamment la diversité des poissons dans la rivière Nyabarongo.
La connaissance sur la population des espèces des poissons et la richesse spécifique dans les rivières de l'Est de la RD Congo est très indispensable du fait que les poissons contribuent à la réduction de la mal nutrition qui se vit avec acuité dans la région. Ainsi, notre étude s'est focalisée sur l'étude de l'impact environnemental de l'agriculture sur la diversité ou la distribution des poissons de la rivière Nyabarongo.
Pour aboutir aux résultats fiables, nous avons procédé à la récolte des poissons à l'aide des méthodes d'échantillonnage non quantifiées nasses et hameçons suivant la méthode de capture au hasard. Les nasses ont été placées dans la rivière avec l'ouverture orientée dans le sens du courant sur les rives de la rivière dans les herbes, tandis que les hameçons portaient

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chacun un fil sur lequel était attaché un roseau. Ils étaient appâtés soit par les verres de terre ou l'avocat mur et surveillés la journée. Au bout de la corde était fixé un petit métal (plomb) pour faire descendre l'hameçon vers le fond de la rivière.
Au total, 352 spécimens de poissons ont été récoltés dans différents sites d'étude, dont l'espèce *Clarias sp* était présente dans presque tous les sites à cause de sa tolérance en pollution dans la rivière Nyabarongo avec un pourcentage plus élevé suivi de l'espèce *Barbus kerstenii* avec un pourcentage moyen et l'espèce *Oreochromis niloticus* avec un pourcentage faible.

MOTS-CLEFS: Inventaire, Poisson, Rivière Nyabarongo, RD Congo.

1 INTRODUCTION

L'eau douce est indispensable à toute forme de vie. A cet effet, elle doit être présente en grande quantité pour la plus part des activités humaines. Dans les pays en voie de développement déjà confronté aux problèmes de pénurie d'eau potable et de pollution, les changements climatiques en perturbant des nombreux écosystèmes, contribuent à l'accentuation des phénomènes [1] et surtout la perturbation des écosystèmes aquatiques [2].

L'étude de la biodiversité d'un écosystème est importante pour connaitre son fonctionnement. La composition de la biodiversité dépend des facteurs tels que la localisation géographique, le type d'écosystème et les caractéristiques de la végétation aquatiques [3]. Les inventaires de populations sont des outils d'information puissants et couramment utilisés pour la gestion de la ressource faunique, que ce soit pour la conservation de l'espèce ou la gestion de son exploitation. Toutefois, le type de ressource, c'est-à-dire terrestre ou aquatique, impliquera des méthodes d'inventaire fort différentes [4].La faune ichtyologique africaine comprend plus de 3 200 espèces appartenant à 94 familles, parmi près de 11 000 espèces de poissons peuplant les eaux douces. La découverte et la description de nouvelles espèces de poissons constituent encore une activité scientifique importante en Afrique. Les riches faunes de Cichlidae endémiques des grands lacs d'Afrique de l'Est n'ont pas encore livré tous leurs secrets, et des zones encore mal explorées comme l'Est de République Démocratique du Congo, et dans une certaine mesure, certaines régions du bassin du Congo, devraient nous révéler encore de nombreuses autres espèces [5].

Les poissons représentent une partie importante de l'alimentation humaine et à beaucoup d'endroits du globe, l'homme est voué au prêche surtout dans les régions côtières. De même à l'intérieur, on ne saurait négliger l'importance économique des poissons d'eau douce : des fleuves, des lacs et des rivières [6].

La chaire du poisson avec sa richesse en protéine et vitamines, contribue énormément à la santé des populations. Dans les régions à forte consommation des poissons, les cas de Kwashiorkor sont inexistants

L'introduction des poissons dans le régime alimentaire des populations autour de la rivière Nyabarongo contribuerait à la réduction de la malnutrition dans cette région où le problème de malnutrition se vit avec acuité. Les études sur l'inventaire, la distribution et l'écologie des poissons dans la rivière Nyabarongo sont inexistantes. Les connaissances sur la population des espèces des poissons et la richesse spécifique dans cette rivière aideraient beaucoup dans leur exploitation. C'est pour cette raison que nous sommes tournés vers ce taxa afin d'apporter un élément nouveau dans la connaissance de la biodiversité de cette rivière.

2 METHODOLOGIE

2.1 DESCRIPTION DU MILIEU D'ETUDE

La rivière Nyabarongo qui constitue notre milieu d'étude fait partie des cours d'eau, affluent du lac Kivu [7].Elle est située à cheval de deux territoires de la province du Sud Kivu (Territoire de Kabare et Kalehe) en République Démocratique du Congo, basés sur la rive occidentale du Lac Kivu.

La rivière Nyabarongo prend sa source dans le Parc National de Kahuzi Biega en région forestière à plus de 2000m d'altitude et traverse en suite les régions cultivées et déboisées de Lwamisakule, Changulube, Lugohwa, Ntagalulwa, Karhunvangoma, Cabwinemwami, Ceshero et se déverse dans le Lac Kivu dans la baie de Kasheke Irambo à 1465m d'altitude.

Sa longueur est approximée à 11, 9Km, sa plus grande largeur est 4,15m au niveau de Cabwinemwami et sa profondeur maximum est estimée à 2m à Ceshero. La rivière Nyabarongo est utilisée d'amont en aval par la population riveraine pour ses divers besoins entre autres : la boisson, l'abreuvage des bêtes, le lessivage des habits et ustensile de cuisines, baignade,…

La rivière Nyabarongo loge dans une région à climat tropical humide, caractérisée par une température modérée, variant entre 19 et 20 degrés et une importante pluviosité supérieur à 1500m par an [8] .On y trouve deux saisons : saison de pluie de Septembre à Mai et une courte saison sèche de juin à Août.

La végétation où coule la rivière Nyabarongo est une savane cultivée qui a remplacée la foret *d'Albizzia grandibrateata* [9] et tout au long de son parcours ,les berges sont colonisées par une communauté hygrophile à *Pennisetum ,Brillandibraisia patula ,Ensete ventricosum,Commelina diffusa, Miletia dura,Cyperus latifolia,Digitaria vestu ,Fragmites mauritianus ….,et des cultures vivrières* (*Musa stp, Manihota utilisima ,Phaseolus vulgaaris ; Zea mays , Ipomea batatas et Xanthosoma sagitifolia)*

2.2 LES SITES D'ETUDE

Le choix des sites de prélèvement des échantillons a été inspiré part notre accessibilité à la berge de la rivière et de la fréquentation des populations humaines riveraines pour leurs diverses activités sur la rivière Nyabarongo. C'est dans ce cadre que 6 sites ont été choisis dont les coordonnées sont représentées dans le tableau 1 ci-dessous :

Tableau 1 : Paramètres physiques des sites d'étude

Nom du site	Latitude	longitude	Altitude	profounder	pH	Temperature en ^0C
Kabirikarhaba	02°09'26,6''	028°42'27,0''	1754m	16,36cm	8,05	16,285°
Lugohwa-pont	02°09'50,9''	028°50'29,2''	1752m	40cm	8,57	17°
Ntagalulwa-pont	02°10,03'4''	028'50'29,2''	1646m	53cm	8,62	17,6°
Kabamba cabwinemwami	02°10'29,7	028°51'41,1''	1438m	31,33cm	7,98	18,482°
Entrain marais Ceshero	02°09'59''	028°51'18,7''	1400m	47cm	8,76	19°
Site Ceshero	02°09'45,6	028°51'51,4''	1398m	200cm	7,28	20°

2.3 RÉCOLTE DES POISSONS DANS LES SITES PROSPECTÉS

Tous les poissons sont récoltés vivants à l'aide des nasses et hameçons vivant par la méthode de capture au hasard [10].

2.3.1 LES NASSES LIBRES

Les nasses sont placées dans la rivière avec l'ouverture orientée dans le sens du courant en des rives des rivières dans les herbes. Trois nasses étaient placées par site, déposées le soir et relevée le lendemain matin. Les alvéoles d'abeilles, les avocats mûrs, les bananes étaient utilisées comme appâts.

2.3.2 LES HAMEÇONS

Les hameçons portaient chacun une corde sur laquelle était attachée un roseau. Ils étaient appâtés soit par le vers de terre ou l'avocat mûr et surveillés la journée. Au bout de la corde, était fixé un petit métal (plomb) pour faire descendre l'hameçon vers le fond de la rivière.

2.4 IDENTIFICATION DES POISSONS

Les poissons ont été identifiés par les différentes clés de détermination ; de [11] et de [12]. Les échantillons ont été conservés dans du formol à 4% [8].

2.5 CARACTÉRISTIQUES MÉRISTIQUES DES ESPÈCES

Les caractéristiques méristiques concernent les mesures de la longueur totale, la longueur standard, le poids et la détermination de sexe.

- La longueur totale : Est la distance horizontale de l'extrémité du poisson à l'extrémité de la nageoire caudale
- La longueur standard : Est la distance horizontale de l'extrémité antérieure du poisson à l'endroit où le pédoncule caudal peut être aisément plié (à la base de la nageoire caudale)
- Le poids : le poids (en g) était mesuré pour chaque poisson à l'aide d'une balance digitale de marque AND.
- La détermination de sexe : Le sexe était déterminé par examen de la papille génitale qui chez le mâle est perturbèrent en forme de cône et un pore urogénitale à l'extrémité, alors que chez la femelle, elle est petite, arrondie avec une fente transversale au milieu (pore génital) ou par la présence des œufs [13].

2.6 CARACTÉRISTIQUES MORPHOLOGIQUES

Les caractéristiques morphologiques concernaient surtout le *Claridae.* Cette espèce se distingue facilement de toutes celles à nageoire caudale embrassée par la dorsale et l'anale, par les barbillons plus allongés et par le processus occipital très pointu [14]. Notons que toutes ces caractéristiques (morphologiques et méristiques) ont été poussées jusqu'à l'identification des espèces.

2.7 ANALYSES STATISTIQUES

Les analyses statistiques ont été basées sur le calcul de l'importance relative, la fréquence, l'indice de similarité, la richesse spécifique, de sexe ration et de test statistique (X^2).

2.7.1 L'INDICE RELATIF

D'une population est le degré de présence des individus de cette population dans le milieu considéré. Elle est déterminée par la formule :

$$\mathrm{Im}\ port.relative = \frac{Nombred'individusd'uneespeceX100}{Nombretotald'individus}$$

2.7.2 LA FRÉQUENCE DES ESPÈCES :

Dans la communauté est déterminée en termes de pourcentage et elle est exprimée par la ration :

$$Fréquencedel'espece = \frac{Nbr.desitedanslesquelsl'especeestprésenteX100}{Nbr.totaldessitesexa\,\mathrm{min}\,és}$$

2.7.3 LA RICHESSE SPÉCIFIQUE :

Est le nombre d'espèces composant le peuplement

2.7.4 STRUCTURE SOCIALE OU SEXE- RATION :

Est le rapport du nombre des mâles sur le nombre des femelles dans la population [10].

$$Sexe-ratio = \frac{Nbr.desmâles}{Nbr.desfemelles}$$

2.7.5 RÉPARTITION MENSUELLE DES ESPÈCES:

Les espèces ont été récoltées mensuellement une fois par mois et par site d'étude.

3 RESULTATS

Les poissons ont été récoltés dans la période allant de Janvier 2012 à Décembe2012 dans les différents sites d'étude.

3.1 RÉPARTITION DES ESPÈCES DANS LES SITES PROSPECTÉS

La répartition des espèces dans les différents sites prospectés et représenté dans le tableau 2.

Tableau 2 : Répartition des espèces et leur fréquence dans les sites prospectés

Sites	**Espèces**		
	Clarias sp.	*Barbus kerstenii*	*0reochromis niloticus*
S1	20		
S2	10		
S3	13	10	
S4	10	10	14
S5	50	40	8
S6	100	58	10
Fréquence	100%	80%	60%

Légende:

S1 Site kabiri rarhaba
S2: Site Lugohwa- pont
S3: Site Ntagalulwa-pont
S4: Site kabamba Cabwinemwami
S5: Site entrain marais
S6: Site Ceshero

3.2 NOMBRE DE SPÉCIMENS RÉCOLTÉ PAR TYPE DE PIÈGE ET LEUR IMPORTANCE RELATIVE

Nous avons récoltés au total 352 spécimens dans les différents sites d'étude. Deux types de pièges (Nasse et Hameçon) ont été utilisées pour la récolté des données.

Le tableau 3 montre les résultats de types de piège et importance relative des espèces des poissons récoltées.

Tableau 3 : Types de pièges et importance relative

Types de pièges	**Espèces des poissons**			
	Clarias sp	Barbus kerstenii	Oreochromis *n*iloticus	Total
Nasses	15O	100	20	270(76, 7%)
Hameçons	53	18	11	82(23, 3 %)
Importance relative	203(57, 6%)	118(33, 5%)	31(8, 9%)	352(100%)

Il ressort de ce tableau que les nasses ont été plus efficaces dans la récolte des données (270 poissons, soit 76,7%%) que les hameçons (82 poissons, soit 23,3%).

3.3 CARACTÉRISTIQUES DES ESPÈCES RÉCOLTÉES

Les caractéristiques méristiques des espèces récoltées sont présentées dans le tableau 3. Elles donnent la moyenne de longueur totale, longueur standard, les poids des poissons capturés.

Tableau 4 : Les caractéristiques méristiques (Longueur, Poids et Largeurs) des espèces récoltés dans la rivière Cirhanyobwa.

Espèces	Lt (cm)	Ls (cm)	Poids (g)
Clarias sp	16,5	13,4	40
Barbus kerstenii	11,9	10	19,4
Oreochromis niloticus	11,2	9,3	16 ,8

Il ressort de ce tableau que les *Clarias sp* présentent les plus grandes valeurs possibles de tous ces paramètres (*Clarias sp*, Lt : 16,5cm ; Ls : 13,4 ; Poids : 40g). Le *Barbus kerstenii* et *Oreochromis niloticus* présentent presque les mêmes mesures pour les trois paramètres; cela s'explique par le fait qu'elle est plus représentée presque dans tous les sites.

Le tableau 4 montre aussi les résultats de la détermination de sexe des poissons capturés.

Tableau 5 : Détermination de sexe

Espèces	Femelles	Mâles	sexe indéterminé	sexe-ration
Clarias sp	100	93	10	0 ,93
Barbus kersteni	70	40	8	0 ,57
Oreochromis niloticus	20	10	1	0,5
TOTAL	190	143	19	0,75

Ce tableau montre que le sexe- ration est inférieur à 1, ce qui signifie qu'il ya plus des femelles dans chaque espèce que des mâles.

3.4 RÉPARTITION MENSUELLE DES ESPÈCES

La récolte des espèces a été faite durant une période d'une année de Janvier 2011 à Décembre 2012. Le tableau 6 représente la répartition mensuelle des espèces durant l'année d'étude

Tableau 6: Repartition mensuelle des espèces

Mois	Espèces			
	Clarias sp	*Barbus kerstenii*	*Oreochromis*	**Total**
Janvier	12	18	2	32
Février	20	12	8	40
Mars	16	4	3	23
Avril	7	4	2	13
Mai	6	2	1	9
Juin	10	5	0	15
Juillet	27	12	0	39
Aout	16	3	0	19
Septembre	15	10	5	30
Octobre	19	30	2	51
Novembre	25	12	3	40
Décembre	30	6	5	41
Total	203	118	31	352

Il ressort de ce tableau 6 que les mois de février, de Novembre et de Décembre sont de mois où on a récolté beaucoup de *Clarias.*

4 DISCUSSION

Il ressort de ce tableau 2 que le site Ceshero est plus riche en spécimens car il est aussi riche en zooplancton et récepteur de toutes les décharges organiques entrainées par le courant fort des sites de l'amont en aval L'espèce *Clarias sp.* est l'espèce cosmopolite dans la rivière Cirhanyobwa, elle représente 100% suivie de l'espèce *Barbus kerstenii* avec 80% et l'espèce *Oreochromis niloticus* avec 60%. L'espèce *Clarias sp,* colonise tous les milieux, elle est reconnue comme espèce qui s'adapte facilement à tous les milieux à cause de son régime alimentaire omnivore [15].

Parmi toutes les techniques d'échantillonnage mises en œuvre : filets, pièges, lignes aucune n'est en mesure de fournir un inventaire exhaustif de la faune ichtyologique d'un récif artificiel. Les principes qui déterminent la disponibilité des espèces et l'efficacité de la capture ou de l'observation varient d'une technique d'inventaire à 1' autre. Il semble toutefois que l'utilisation des filets maillants est la technique qui permet d'observer le plus grand nombre d'espèces [16].

Il ressort du tableau 3 que les nasses ont été plus efficaces dans la récolte des données (270 poissons, soit 76,7%%) que les hameçons (82 poissons, soit 23,3%). Le *Clarias sp* est l'espèce la plus abondante de la rivière Nyaborongo à cause de son régime alimentaire par la consommation des macros invertébrés (Chironomidae, Ephéméroptère), des Zooplanctons (Ostracodes) et les broutages à la surface de l'eau pendant la nuit [17].

Sur 190 femelles trouvées les *Clarias sp.* Présentent 100 femelles soit 52,63% et les *Barbus kerstenii* présentent 70 femelles soit 36,84%. On remarque ici que les *Clarias sp sont* nombreux contrairement aux *Barbus kerstenii*. En ce qui concerne les mâles, sur 143 mâles trouvés les *Clarias sp* .présentent 93 mâles soit environs 65,03% et les *Barbus kerstenii* présentent 40 mâles soit environs 27,97%. Nous remarquons ici que les *Barbus Clarias sp* sont nombreux contrairement aux *Barbus kersteni* qui moins nombreux.

Pour ce qui est des *Oreochromis niloticus*, les males représentent 10,52% et les femelles 6,99%. En ce qui concerne les sexes indéterminés 19 espèces ont été trouvées.

Selon le sexe-ration (tableau 5) on remarque chez les *Clarias sp* 0,68, chez les *Barbus kerstenii* 0,52 et chez les *Oreochromis niloticus* rien n'a été trouvé. Dans l'ensemble les *clarias sp.* Plus dominant.

Pour ce qui est de sexe indéterminé, on trouve aussi 10 chez les *Clarias sp,* 8 chez les *Barbus kerstenii* et 1 chez les *Oreochromis niloticus.*

Pour ce qui est de l'espèce *Barbus*, le mois d'octobre est celui dont on a récolté plus. Dans l'ensemble les espèces *Clarias et Barbus* ont été beaucoup récoltées pour les mois de Novembre, Décembre et Février. On observe une chute de capture pour les autres mois mais qui ne sont pas inférieur à 1.L'espèce *Oreochromis* n'a été retrouvée que pour 9 mois. La différence mensuelle pour tous les mois de prélèvement serait due probablement à la variation climatique, effort de capture et la présence des aliments [17].

5 CONCLUSION GENERALE

Ce travail avait pour objet de dresser une liste ichtyologique de la rivière Nyabarongo et de déterminer leur abondance, il a été réalisé durant une période d'une année (Janvier2012 à Décembre 2012). Les résultats montrent qu'il existe dans cette rivière deux ordres de poissons regroupé dans trois familles.

1. L'ordre de *cypriniforme,* représenté par la famille de *Claridae* et de *Cyprinidae*. La famille de *Claridae* regroupe une seule espèce (*Clarias sp.*) et celle de *Cyprinidae* regroupe aussi une seule espèce *Barbus kerstenii).*
2. L'ordre de Perciforme, représenté par une seule famille, celle de *Cichlidae*, regroupée en une seule espèce : *Oreochromis niloticus.*

Le *Clarias sp*, est l'espèce abondante dans la rivière Nyabarongo, tandis que l'espèce *Oreochromis niloticus* est rare dans cette rivière.

L'inventaire faunistique d'un site est d'autant plus exhaustif que les techniques d'échantillonnage mises en œuvre sont variées et utilisées avec un effort de pêche qui couvre au maximum les échelles de variations spatiotemporelles des populations. Il en résulte des moyens matériels à mettre en œuvre qui sont importants, soutenus et donc coûteux. Suite à la

stratégie d'inventaire qui a été mise en œuvre pendant 12 mois, les résultats obtenus montrent bien que la colonisation des ces trois sites n'est pas encore achevée. En conséquence, il est difficile par manque de puissance des tests disponibles de trouver des différences significatives entre les deux récifs et, de ce fait, les résultats préliminaires obtenus devront être confirmés par la suite lorsque la richesse spécifique sera maximale.

La pauvreté ichtyo faune de la rivière est causée par les propriétés physico-chimiques et le régime alimentaire.

Ce travail est le premier de ce genre à être mené dans cette rivière, il serait intéressant :

1) Pour les autres chercheurs de :
    - Poursuivre cet inventaire durant plus d'une année pour bien évaluer les variations saisonnières des espèces dans d'autres rivières.
    - Pour la pauvreté d'espèces, nous suggérons que les études puissent être menées afin de prouver les causes du non colonisation des rivières affluentes du Lac Kivu par la faune ichtyologique.
2) Pour la population riveraine de la rivière Nyabarongo : nous leur recommandons de protéger cet écosystème en évitant de polluer l'eau pour que ces espèces puissent proliférer dans cette rivière.

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Magnitude of Persistent of Tuberculosis Clinical Signs after Completing Anti-TB Treatments in Ethiopia

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ABSTRACT: Tuberculosis is a worldwide problem with a considerable morbidity and mortality per annum. The disease is curable and early diagnosis and chemotherapy is very essential. Despite completing the recommended course of therapy and clearance from the disease causing agent the clinical signs persist in TB patients. The current study aimed to assess the possible claims of persistent signs which are either resulted from the drug side effects or the disease itself by the TB patients. A cross-sectional study design conducted on volunteer pulmonary tuberculosis patients. The variables included were those signs which are used to diagnose tuberculosis. Closed questionnaire with YES or NO answer was used. The current study revealed that three fourth of the treated TB patients claimed the presence of either one or more signs, while one fourth reported free from any signs which they knew before anti-TB treatment. Extra pulmonary tuberculosis (in fact it cloud be new infection) was observed on 7.1% (2/28) of the participants.
It is concluded that persistent of clinical signs after completing TB treatment courses is noteworthy. Prolonging recovery time would affect productivity. Despite the limitations the information generated suggested further study to clear out the mere cause/s of the clinical signs.

KEYWORDS: patient, signs/syndromes, treatment, tuberculosis.

1 INTRODUCTION

Tuberculosis (TB), caused primarily by *Mycobacterium tuberculosis*, is a global problem. Millions of people developed TB in each year and significant number died in the same year from the disease. Ethiopia is one of the TB high burden country ranking 8th in the world. Any form of TB confirmed cases received anti-TB drugs to clear their ailments. Treatment is given for six months and those completed their course of treatment properly believed to be cured from the disease. At this moment the drug of choices for treatment of TB is multiple using DOTS (the best curative methods) [1]. These drugs include isoniazide, rifampin, ethambutol and pyrazinamide at different dosage rates. Although the drugs are not free of side effects, since the benefits outweigh, anti-TB drugs are used in a similar manner to other antibiotics. Some of the side effects that could be noticed by using the multiple therapies are yellow skin (jaundice), unexplained fever, tingling or numbness, skin rash or itchy skin, change of vision as well as liver damage [2], [3]. After completing treatment, it is assumed that the patient would be free from the disease causing agent. Although it is not new, people completing their anti-TB treatment heard while complaining about some post treatment signs they suffered from. In fact this might not be directly related to the drugs only; since the damage resulted from the TB disease could lead to prolonged time of recovery. Besides, the claims stated by the patients are the signs of tuberculosis. The current study aimed to assess the magnitude and the type of signs that did not disappear after completing their course of treatments.

2 METHODS

The study was conducted in North Gondar and Wollo zones of Amhara national regional state, Ethiopia. Study participants were selected purposefully and those TB patients came to health institutes who owned cattle were included. Closed questionnaire with YES or NO answers were prepared to collect the required information. Due to time and logistic

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issues the claims were not checked and verified by physicians. Ethical clearance was obtained from Institutional Review Board of Addis Ababa University and Ethics committee of Armauer Hansen Research Institute. All Participants consented before the interview. Totally 35 TB patients were volunteer to respond, but 7 of them were under treatment and omitted from the interview. Types of claims were directly taken from the clinical signs of tuberculosis. Data entered in and analyzed by SPSS version 20 [4]. Claims were categorized as 0, 1, 2, 3 and >3. Descriptive statistics is implemented and tables used to present the finding.

3 RESULTS

Totally 28 participants aged between 18-45 were included, of which females contributed nearly 68% (19/28). Some claimed as having one or 2 even more than three claims after completing their treatment (Table-1).

Table 1: Category of claims in North Gondar and Wollo zones of Amhara region, Ethiopia N=28

Claims category	Number	Percent
0 Claims	7	25.0
1 Claim	4	14.3
2 Claims	2	7.1
3 Claims	4	14.3
>3 Claims	11	39.3
Total	**28**	**100**

As it is shown in **Table-1**, among the respondents, 53.6% were having 3 and above complaints while one fourth of them were not suffering from any claims. In general three third of the respondents were claimed about the presence of one and more persistent clinical signs.

Table 2: Types of claims by TB patients in North Gondar and Wollo zones of Amhara region, Ethiopia N=28

Claims by sign	Number	Percent
Heamoptysis	0	0
In appetence	2	7.1
Anemia	2	7.1
Weight loss	2	7.1
Fever	7	25.0
Cough	8	28.6
Dyspenia	9	32.1
Tachycardia	11	39.3
Chest pain	12	42.9
Night sweating	12	42.9
Fatigue	16	57.1
Extra pulmonary TB	2	7.1

As it is presented from **Table- 2**, feeling fatigue was the claim which is responded at large. No one responded heamoptysis. In a nut shell 21.3% of the TB patients had in appetence, anemia and weight loss. A quarter of the attendants were suffering from fever and 42.9% claimed the presence of night sweating. Cough, dyspenia and chest pain claims were 28.6%, 32.1% and 42.9%, respectively. Swelling of the lymph node as a sign of extra pulmonary TB was observed on 7.1% of the interviewee.

4 DISCUSSION

Tuberculosis is one of the major public health problems. Active tuberculosis is controlled by chemotherapy [5]. Anti-TB drugs do have known minor and major side effects up on utilization. The signs of tuberculosis could improve within 2-3 weeks after treatment commencement, but if diagnosis is delayed permanent lung damage could occur [5]. In this

preliminary observational study a quarter of TB patients were having persistent TB clinical signs after receiving the recommended drugs and duration of therapy. Most of the respondents were living in the rural community and they might not report early to health institutes. Moreover, despite their appearance to the health institutes for diagnosis due to lower bacilli load in the sputum or some laboratory technical problems acid fast bacilli detection might not be feasible. This delay in diagnosis could lead to severe lung damage and the post treatment sighs seen after therapy could be directly or indirectly related to the lung problem. Among the stated signs, chest pain, cough and dyspenia with accompanying tachycardia and fatigue would suggest the possible damage of the lung.

In addition to these problems linked to food shortage and work overload could exacerbate the condition. Besides, majority of TB patients interviewed were females, which could be double burdened. Slight increase in Uric acid and significant decrease in white blood cells after anti-TB treatment was documented in a study conducted in German Nepal Tuberculosis Project and Korea-Thimi friendship hospital[6]. Uric acid released from lung injured cells or crystals activate the NALP3 (Nacht Domain-, Leucine-Rich Repeat-, and PYD-Containing Protein 3) inflammasomes[7] and the effect might be resembled to gout resulting in inflammation. Liver damage as a possible sequel to the anti-TB drugs side effects could also be responsible to weight loss and fatigue [2], [3], [8].

Reduction in the level of white blood cells affects the immunity of the individual thereby compromising possible recovery [9] and even could be succumbed from super infections. Although the status of the participants in the current study was not known, lymphadenopathy behind the ear were observed on 7.1% of the participants and literatures indicated that extrapulmonary TB could occur roughly 15%, and 50%-70% in immunocompetent hosts and patients co-infected with HIV, respectively [10], [11], [12], [13]. Smaller sample size of interviewees and difficulty of establishing causal relationship of signs either with the anti-TB drugs side effects or continuation of the TB disease, the design and lack of considering duration after completing treatment could be seen as a limitation of this preliminary study. Besides, since it is a self report, bias could be seen as a main drawback.

5 CONCLUSION

Timely treating active tuberculosis patients could help the patient as well as to prevent further spread of the disease. The side effects resulted from the drugs as well as the persistence of TB clinical signs after treatment completion could put a hazard to the patient as well as to the family. Individuals after treatment should come to normal and productive. But, the current finding revealed that the majority were suffering from disease signs. Therefore, follow up after treatment completion for a certain period of time seems mandatory. Since the majority of the participants were rural dwellers giving all the necessary support should be practiced. Apart from these relapse or possible drug resistant problems should come in mind to achieve the millennium development goals regarding TB prevention, control as well as elimination goals. For a better understanding and intervention as well as knowing the magnitude further exploration of the problem is highly recommended.

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Utilisation des moustiquaires imprégnées à Longue Durée d'action (MILD) au Bénin contre le paludisme: impacts des pratiques de lavage en milieu communautaire sur leur efficacité

[Use of the Long-Lasting Insecticide-treat Nets (LLINs) against malaria in Benin: impact of washing practices in the community on their effectiveness]

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ABSTRACT: The effectiveness of the Long-Lasting Insecticide-treat Nets (LLINs) has been widely demonstrated in the last two decades as an effective means of vector control against malaria. To understand how the washing practices in the community affected the effectiveness of LLINs, a survey was conducted in three health areas (Cotonou, Parakou and Tanguiéta) in Benin between February and May 2014. Individuals in the three selected communities were interviewed on their LLIN washing practices particularly on the frequency and sequences (soaking, soaking soap, washing soap, and drying facilities) of LLINs washing. Further, focus groups discussions were conducted with each social group (women households, girls and men) on their perceptions of the effectiveness of LLINs.
Results from our study showed that: i) - several types of soaps were used by people particularly "Klin" at Cotonou and traditional soaps at Parakou and Tanguieta for soaking and washing; ii) - In the three health zones, people who soaked and washed their LLINs with detergents (Klin or traditional soaps) and dried in the sun had their LLINs quickly lose its effectiveness compared with their neighbors who used the soaps "Fanico" or "BF" and dried their LLINs in the shade. These findings show that the different washing practices in the community contribute to the loss of the effectiveness of LLINs. It is therefore crucial that in addition to the recommendations prescribed by the industrial makers, sun drying be highly discouraged as a sanitary method of maintaining the LLINs, with long term implications for reducing the prevalence of malaria in the endemic zones.

KEYWORDS: Mosquito nets, washing, soaking, soap, efficiency, Benin.

RESUME: L'efficacité des Moustiquaires imprégnées à Longue Durée d'action (MILD) a été très largement démontrée ces deux dernières décennies comme moyen efficace de lutte anti vectorielle contre le paludisme.
Dans le but de connaître les pratiques de lavage en milieu communautaire qui pourraient affectées l'efficacité des MILDs, une enquête a été réalisée dans trois zones sanitaires (Cotonou, Parakou et Tanguiéta) au Bénin de Février - Mai 2014.
Dans un premier temps, tous les groupes sociaux (femmes de ménages, jeunes filles et hommes) des 03 sites ont été soumis à un questionnaire préétabli articulé sur l'identification de chaque personne interviewée et son niveau d'instruction. Dans un deuxième temps, ces personnes ont été interviewées sur les pratiques de lavage des moustiquaires en occurrence les fréquences (nombre de fois) et les séquences (le trempage, le savon de trempage, le savon de lavage, le lieu de séchage) de

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lavage des MILDs. Dans un troisième temps, des focus groups ont été organisés avec chaque groupe social et puis avec l'ensemble de tous les groupes sur les critères d'appréciation de l'efficacité des MILDs par ces derniers.
Il ressort de ces travaux que : i)- plusieurs types de savons sont utilisés par les populations notamment le savon "Klin" à Cotonou et le Savon traditionnel à Parakou et à Tanguieta et ceci lors du trempage et de la lessive des MILDs ; ii)- Dans les 03 zones sanitaires, les acteurs qui trempent, lavent leurs MILDs avec des détergents (Klin ou Savon traditionnel) et les sèchent au soleil voient leurs MILDs perdre rapidement son efficacité par rapport á leurs voisins qui utilisent le savon Fanico ou BF et qui la sèchent á l'ombre.
Ce travail montré que plusieurs pratiques de lavages des MILDs en milieu communautaire contribuent á la perte de leur efficacité. En plus des recommandations prescrites par les industriels, il faut ajouter le séchage au soleil qui doit être proscrit pour une meilleure efficacité le plus longtemps possible des MILDs afin de réduire le taux de mortalité et de morbidité dû au paludisme dans les zones endémiques.

MOTS-CLEFS: Moustiquaires, lavage, trempage, savon, efficacité, Bénin.

1 INTRODUCTION

Première affection parasitaire mondiale, le paludisme constitue aujourd'hui un réel problème de santé publique qui menace plus d'un milliard de personnes situées dans la ceinture de la pauvreté [**1**]. Il demeure l'un des fléaux majeurs des pays les plus pauvres de l'Amérique du Sud à l'Asie du Sud-est, en passant par l'Afrique subsaharienne où surviennent 90% des décès dus à la maladie notamment chez les enfants de moins de cinq ans et les femmes enceintes [**1**].

Au Bénin, il demeure la première cause de fréquentation dans les formations sanitaires avec une fréquence de 37% chez les adultes et 41% chez les enfants de moins de 5 ans [**2**].

Le plan stratégique national de lutte contre cette maladie dans la plupart des pays en Afrique au Sud du Sahara, repose sur 3 composantes majeures à savoir : i) le traitement curatif précoce par les Combinaisons Thérapeutiques à base d'Artémisinine (CTA) ; ii) le Traitement Préventif Intermittent (TPI) par la Sulfadoxine-Pyriméthamine chez la femme enceinte ; iii) la lutte anti vectorielle. Cette dernière composante est basée sur l'utilisation des Moustiquaires Imprégnées d'Insecticide à Longue Durée d'action (MIILD), la Pulvérisation Intradomiciliaire (PID) d'insecticide et l'épandage des larvicides biologiques (Kelly-Hope et *al.*, 2008). La lutte anti-vectorielle par l'utilisation des MILD a montré qu'on pouvait réduire la morbidité palustre de 50 à 60% et la mortalité générale de 20% en Afrique [**3-6**]. Au Bénin, le principal moyen de lutte anti-vectorielle repose essentiellement sur l'utilisation des MILDs. Beaucoup d'efforts ont été consentis depuis la dernière décennie dans bon nombre de pays africains pour augmenter l'accessibilité des populations aux MILDs, en particulier aux enfants de moins de cinq ans et aux femmes enceintes. Malheureusement, des problèmes importants subsistent mettant en danger les objectifs et la pérennité des réalisations.

En effet, bon nombre des MILDs distribuées deviennent inefficaces après deux mois d'utilisation du fait de l'apparition des trous de grosses tailles entraînant par conséquent la déchirure totale de la moustiquaire [**7-8**]. En plus de cela, on note une baisse de l'efficacité des MILDs suite á un nombre réduit de lavages en milieu communautaire entrainant par conséquent une perte progressive du rôle de barrière chimique que jouent ces MILDs [**9**]. Or, ces MILD sont censées conserver leur action biologique effective sans nouveau traitement à la suite d'au moins 20 lavages et après trois ans d'usage [**9-10**].

Très peu de données existent sur l'impact des pratiques de lavage en milieu communautaire affectant l'efficacité des MILD.

La présente étude se veut d'identifier les pratiques communautaires de lavage des moustiquaires pouvant inhiber leur efficacité dans les zones sanitaires de Cotonou (Vossa), Parakou et de Tanguiéta au Bénin.

2 MATÉRIEL ET MÉTHODES

2.1 ZONES DE L'ÉTUDE

La collecte des données s'est déroulée dans les zones sanitaires de Cotonou (Vossa), de Parakou, et de Tanguiéta (figure 1). Le choix de la dernière zone sanitaire se justifie par le fait que l'incidence palustre reste élevée dans cette zone [**11**]. La zone de Vossa a été choisie á Cotonou du fait qu'elle est un bas-fond, donc favorable au développement des gîtes de moustiques de tout genre et que bon nombre d'individus de cette localité dorment sous moustiquaire [**12**].

Le choix de la zone sanitaire de Parakou se justifie par le fait que cette ville représente la 3ème à statut particulier au Bénin et de plus, elle regroupe toutes les ethnies du Bénin [**13**]. En plus de ces critères ci-dessus cités, un individu sur deux dispose d'une moustiquaire reçue gratuitement lors de la dernière campagne de distribution des MILDs en 2013 [**14**].

2.2 COLLECTE DES DONNÉES

L'enquête a été faite sur la base d'un questionnaire préétabli articulé sur l'identification de l'individu, les fréquences (nombre de fois) et les séquences de lavage des MILD. La séquence prend en compte le trempage, le savon de trempage, le savon de lavage, le lieu de séchage des Milds. En plus de ces aspects du questionnaire, les critères d'appréciation de l'efficacité des MILDs par les populations ont été pris en compte au cours des focus groups organisés dans les diverses zones sanitaires.

Les données ont été enregistrées sous Excel 2007 et analysées par le Epi-Info 7.

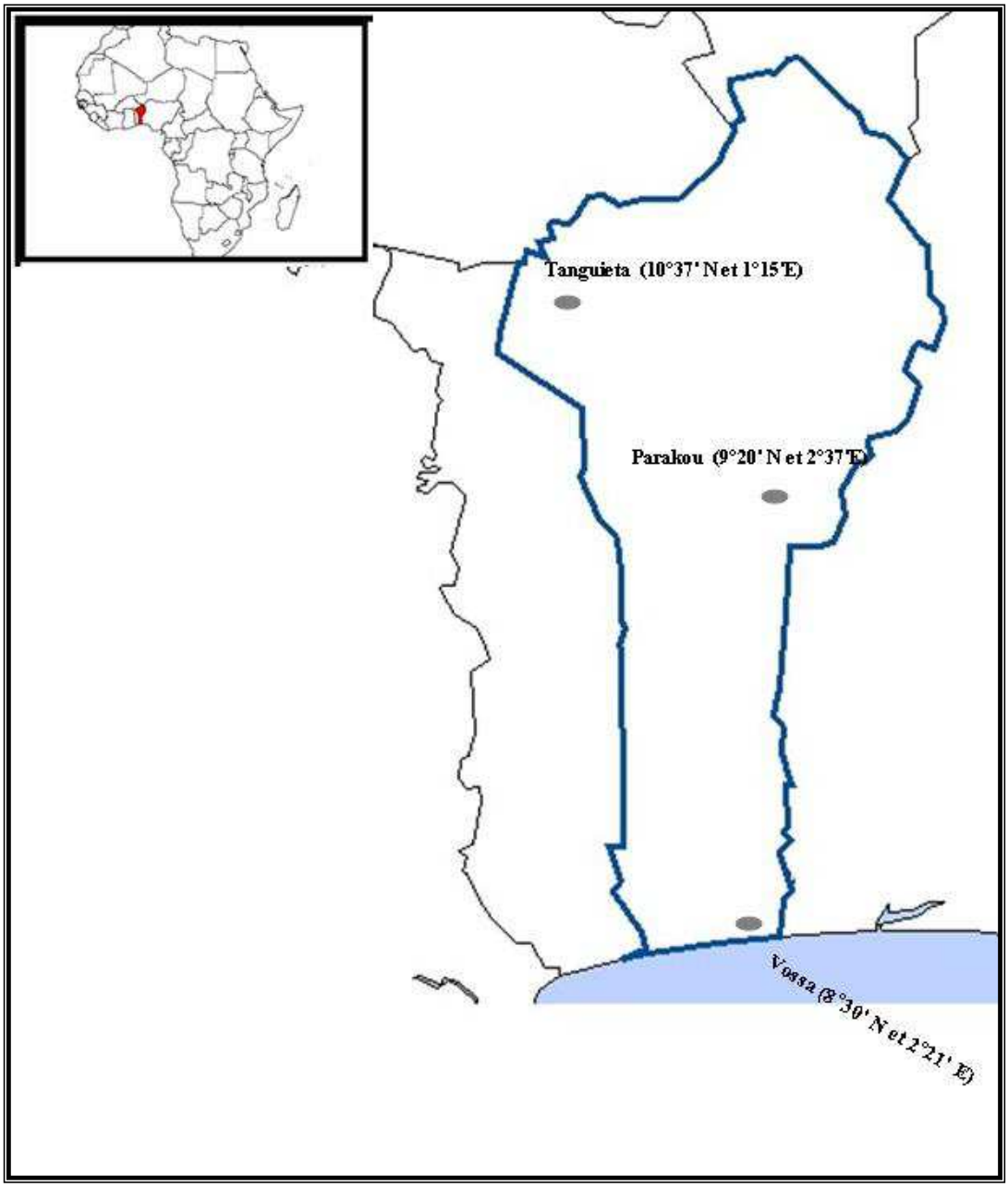

Figure 1 : Carte du Bénin montrant les zones d'études.

3 RÉSULTATS

3.1 STRUCTURE DE LA POPULATION ENQUÊTÉE ET LEUR NIVEAU D'ALPHABÉTISATION

Dans la zone sanitaire de Cotonou (Vossa), sur un total de 1354 individus interviewés dans la localité de Vossa, 1056 (78%) étaient des femmes de ménage, 190 (14%) des jeunes filles et 108 (8%) des hommes (fig. 2). La même tendance a été observée dans les deux autres zones sanitaires.

En effet, dans la zone sanitaire de Parakou, sur 1140 individus interviewés, 912 (80%) étaient des femmes de ménage, 171 (15%) des jeunes filles et 57 (5%) étaient des hommes.

A Tanguiéta sur 1068 personnes interrogées, 876 étaient des femmes de ménage (82%), 150 des jeunes filles (14,0%) et 43 des hommes (4%).

Des trois zones sanitaires, le pourcentage des femmes mariées (80%) est significativement plus important que ceux des autres cibles ($P<0.05$) (Figure 2).

Ces données montrent que le lavage des moustiquaires au Bénin n'est pas seulement l'affaire des femmes ménagères, mais également des jeunes filles et des hommes.

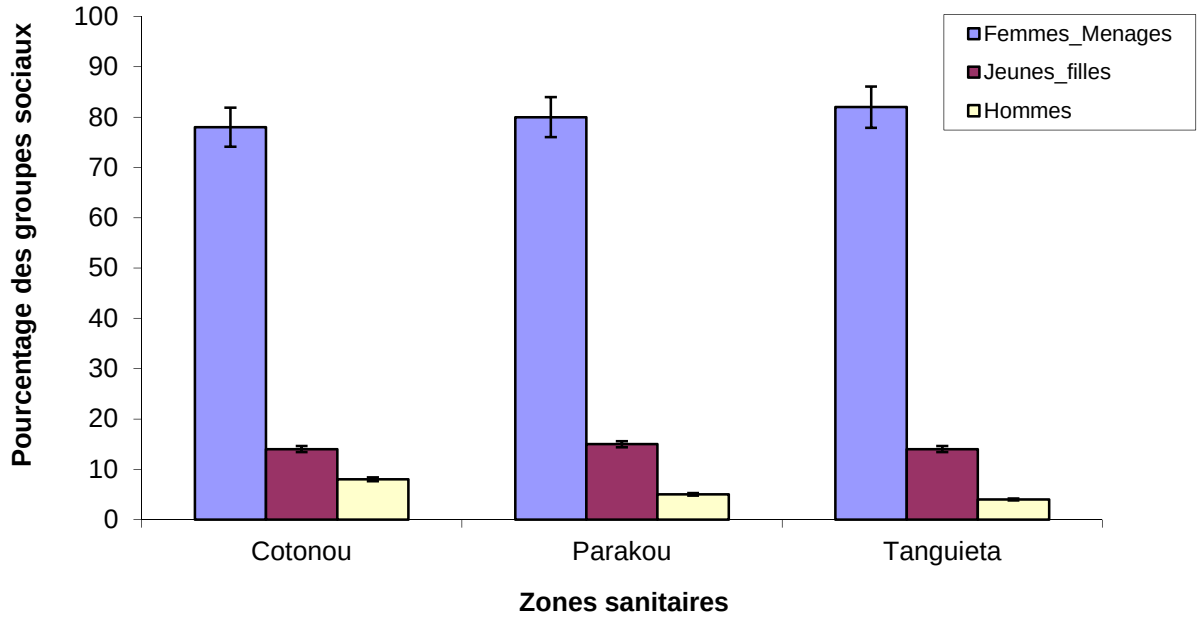

Figure 2 : Structure de la population enquêtée

3.2 ETAT DES MOUSTIQUAIRES DANS LES ZONES SANITAIRES

Globalement, dans les 3 zones sanitaires, l'état des moustiquaires est peu satisfaisant (figure 3).

Dans la localité de Vossa (Cotonou), seulement 8% des MILD sont en bon état, contre 66% qui sont déchirées, 20% de trouées et 6% de cousues (figure 3). Dans les zones sanitaires du nord Bénin, la tendance est la même. A Parakou, 15 % des moustiquaires sont en bon état contre 46%, 18% et 21% de moustiquaires respectivement déchirées, cousues et trouées ont été enregistrées au cours de nos investigations.

A Tanguiéta, 17% des moustiquaires sont en bon état contre 44%, 15% et 24% respectivement de moustiquaires déchirées, cousues et trouées ont été observées au cours de nos investigations.

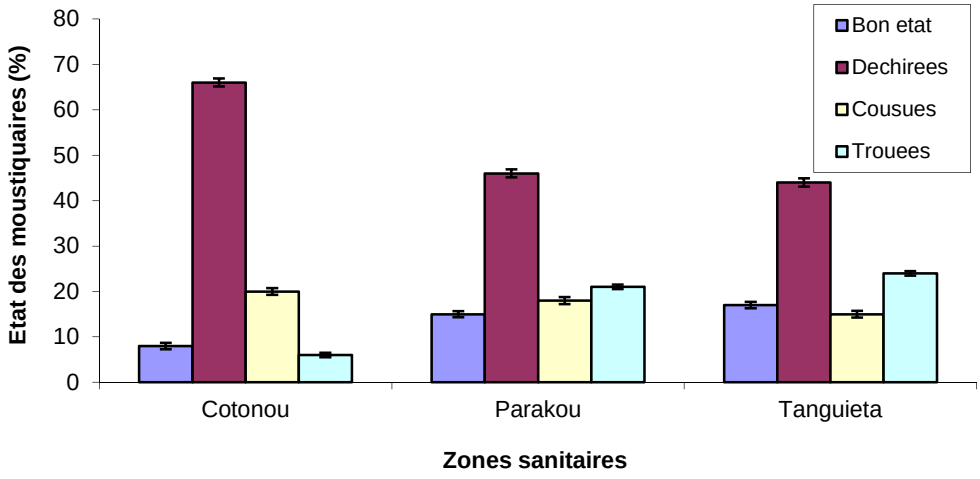

Figure 3 : Etat des moustiquaires chez les populations interviewées dans chaque zone sanitaire.

3.3 LES FRÉQUENCES DE LAVAGE DES MOUSTIQUAIRES

Elles sont élevées et varient suivant le statut du groupe social (mère de famille, jeunes filles ou homme). L'analyse des résultats montrent la même tendance dans les trois groupes sociaux au niveau des 03 zones sanitaires (figure 4).

Pour les individus dont la fréquence de lavage est élevée (> 1 par mois), ils affirment : « *Nous passons des nuits sous la moustiquaire avec nos jeunes enfants, et ceux-ci urinent sur le couchage et les urines se retrouvent sur la moustiquaire, ce qui nous oblige à la laver le jour suivant* ».

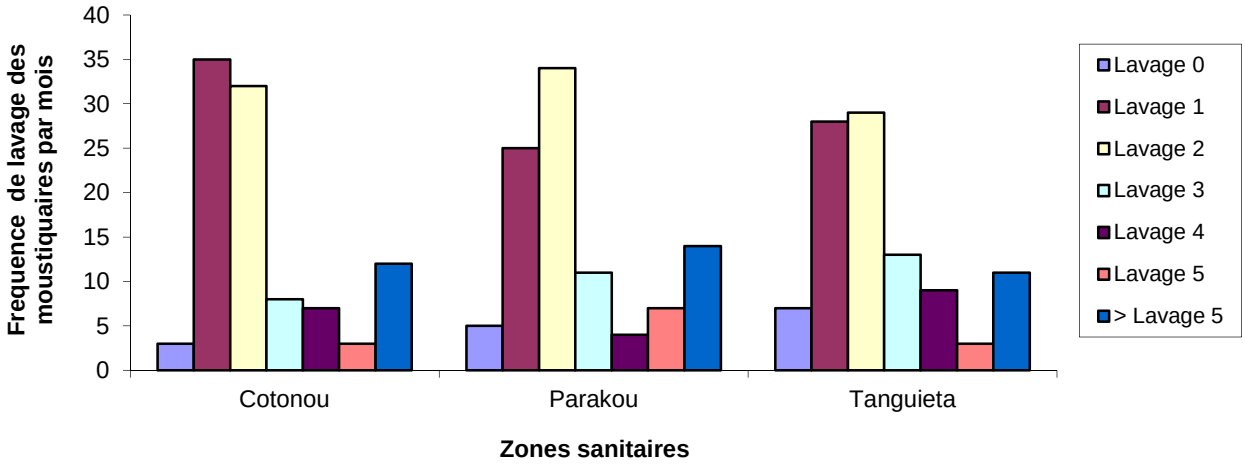

Figure 4 : Fréquence de lavage des moustiquaires dans les zones sanitaires par mois.

3.4 LE TREMPAGE DES MOUSTIQUAIRES

La pratique de trempage est bien connue dans les trois zones sanitaires. Le trempage est fait souvent avec du savon en poudre (''Klin'') ou autres savons (Fanico, Palmida, BF, savon traditionnel).

Dans la zone sanitaire de Cotonou (Vossa), sur 1354 personnes interviewées, 1015 (75%) trempaient leurs moustiquaires avec du savon en poudre « Klin » avant lavage. A Parakou et á Tanguieta, 80% et 85% respectivement des personnes interviewées pratiquaient aussi le trempage mais avec dominance le savon traditionnel avant le lavage (Figure 5).

Ces personnes interviewées (dans les 3 zones sanitaires) déclarent lors des focus groupes : « *le trempage permet d'éliminer rapidement les saletés et les taches de sang* ».

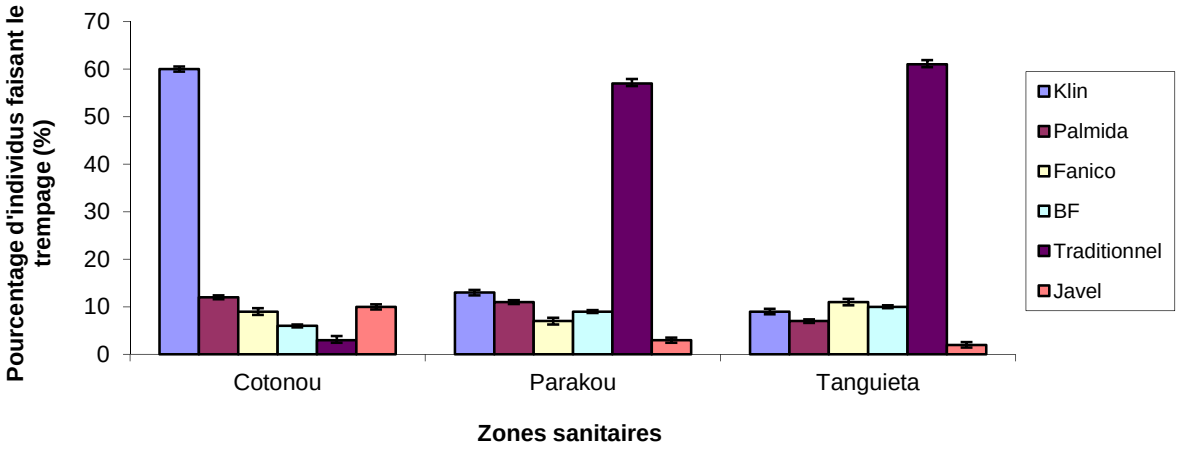

Figure 5 : Les divers types de savons utilisés pour le trempage des moustiquaires dans les zones sanitaires.

3.5 LE LAVAGE DES MOUSTIQUAIRES

Dans les trois zones sanitaires, la plupart des personnes interviewées lavent les moustiquaires « main contre main ». Cependant, certaines personnes notamment à Parakou (4%) et à Tanguiéta (6%) lavent leurs moustiquaires contre un objet dur (figure 6).

Plusieurs types de savons de lavage des moustiquaires ont été mentionnés par les populations interviewées après le trempage (figure 7). À Cotonou, 88% des personnes interviewées utilisent le savon Klin 'contre 8% pour le Palmida, 3% pour le savon 'Fanico ou BF'' et 1% pour le savon traditionnel.

Ces personnes interviewées (dans les 3 zones sanitaires) déclarent lors des focus groupes: «les savons Fanico et BF sentent bon et moussent bien». Pour ce qui est du savon en poudre «Klin et Palmida», les utilisateurs déclarent : «*ils éliminent facilement les taches sur la moustiquaire*». Quant au savon traditionnel mentionné, «*Bien qu'il gratte la peau, nous sommes obligés de l'utiliser du fait que nous n'avons pas beaucoup de moyen financiers*.»

Par ailleurs, après le lavage des moustiquaires, la plupart des personnes interviewées déclarent utiliser une quantité d'eau modérée pour rincer la moustiquaire. À Cotonou, 65% des 1354 personnes interviewées utilisent une quantité d'eau modérée pour le rinçage contre 30% et 5% respectivement pour ''beaucoup'' et peu d'eau (figure 8).

La même tendance est observée á Parakou et à Tanguiéta (figure 8).

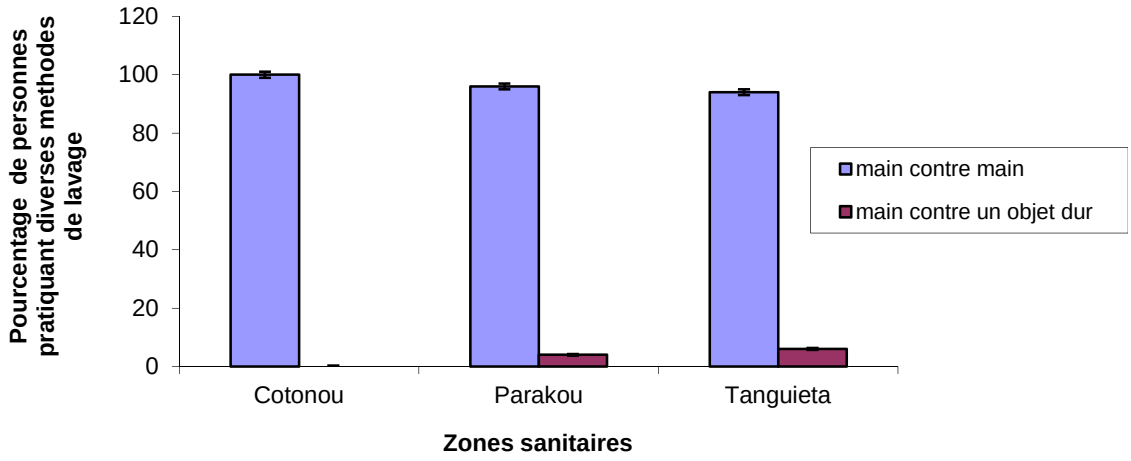

Figure 6: Les diverses méthodes de lavage des moustiquaires dans les trois zones sanitaires.

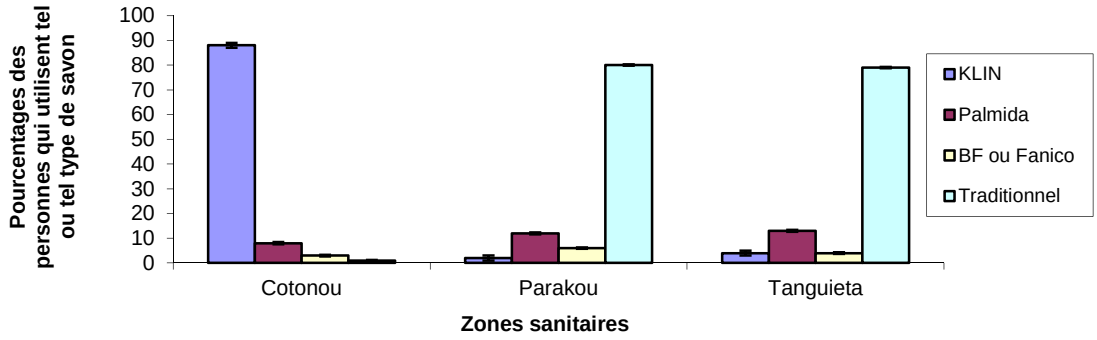

Figure 7 : Les divers savons de lavage utilisés dans chaque zone sanitaire.

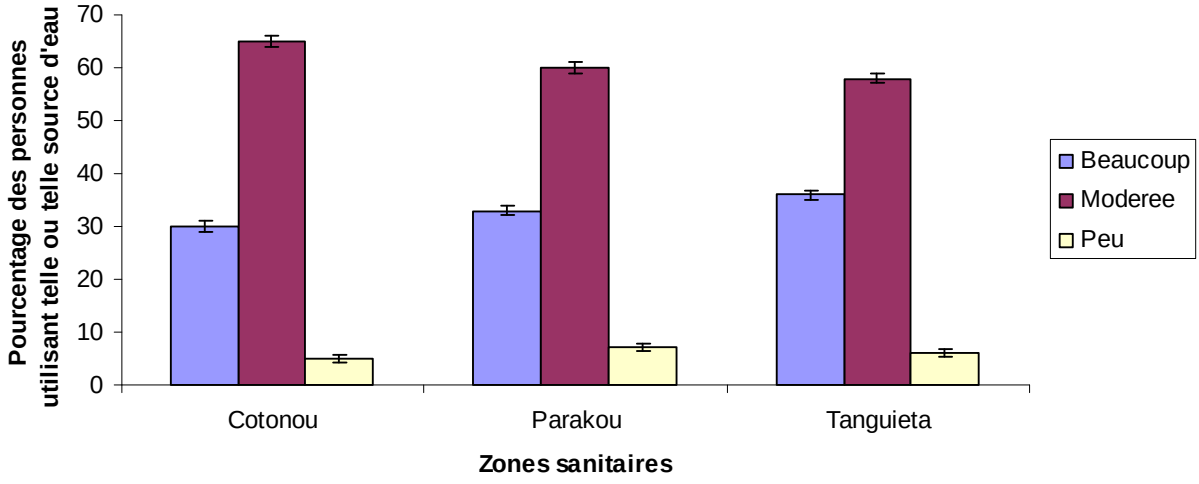

Figure 8 : Les quantités d'eaux utilisées pour le rinçage des moustiquaires dans les diverses zones sanitaires.

3.6 LE SÉCHAGE DES MOUSTIQUAIRES

La pratique de séchage des moustiquaires imprégnées au soleil a été identifiée à plus de 96% au niveau des populations des trois zones sanitaires. A Cotonou, 97% des personnes interviewées sèchent leurs moustiquaires au soleil contre 2,4% à l'ombre (Figure.9). La même tendance a été observée à Parakou (95% au soleil contre % 5% á l'ombre) et à Tanguieta (97% au soleil contre 3% á l'ombre).

Au cours des focus groupes, les populations des trois zones sanitaires ont affirmé que: «*au soleil, ma moustiquaire imprégnée sèche vite mais je sais que le produit diminue dans les fibres. À l'ombre, le produit d'imprégnation se conserve mais je cours le risque de dormir sans moustiquaire au cas où elle ne se sèche pas avant la nuit* ».

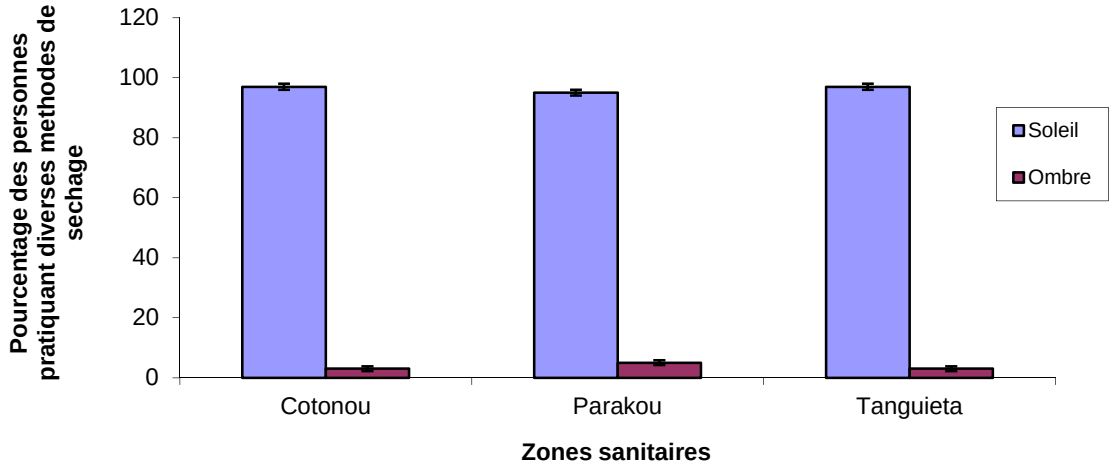

Figure. 9 : Les lieux de séchage des moustiquaires par les populations dans les zones sanitaires.

3.7 LES CRITÈRES D'APPRÉCIATION DE L'EFFICACITÉ DES MILDS PAR LES POPULATIONS

Au cours des focus groups organisés dans les diverses zones sanitaires et dans chaque groupe social (femmes de ménages, jeunes filles, hommes), tous ont évoqué principalement, la disparition de «l'odeur» ou du parfum de l'insecticide et son corolaire d'incapacité de la MILD à tuer les moustiques et autres insectes et bestioles comme elle le faisait dans les premières semaines. Ils affirment : «*Plus nous lavons nos moustiquaires, plus elles deviennent inefficaces à chasser les moustiques de la chambre*». En outre, lorsque les moustiques parviennent à se poser sur la MILD sans être tués ou repoussés par l'insecticide, ou lorsqu'ils parviennent à pénétrer l'intérieur de la moustiquaire, ceci est aussi source d'inquiétude chez les bénéficiaires, qui crient que celle-ci n'est plus efficace.

Aussi, ceux qui lavent ou trempent leurs moustiquaires avec du savon en poudre Klin ou du savon traditionnel déclarent «*Les moustiques rentrent plus dans ma chambre que celle de mon voisin qui trempe et lave sa moustiquaire avec du savon BF ou Fanico*». Dans toutes les trois zones sanitaires, ceux qui sèchent leurs moustiquaires au soleil déclarent : «*ma moustiquaire ne tue plus les moustiques, - les moustiques s'assoient dessus (se posent sur la MILD) - Il y a beaucoup plus de moustiques dans ma chambre que celle du voisin qui a toujours séché á l'ombre*».

4 DISCUSSION ET CONCLUSION

L'efficacité des MILDs a été très largement démontrée ces deux dernières décennies comme moyen de lutte antivectorielle contre le paludisme [**15-16**]. Sans parler de la réduction directe du nombre de piqûres, directement appréciées par les populations, l'efficacité des MILDs a été surtout mesurée par des critères épidémiologiques. En effet, la lutte anti vectorielle par l'utilisation des MILDs a montré qu'on pouvait réduire la morbidité palustre de 50 à 60% et la mortalité générale de 20% en Afrique [**3-6**]. Cette efficacité des MILDs est rendue possible grâce á l'existence de barrières physiques et chimiques qu'offrent ces dernières.

Cependant, certaines pratiques de lavage en milieu communautaire contribuent à la perte de l'efficacité des MILDs ce qui, par conséquent augmenterait le taux de mortalité et de morbidité dans les zones endémiques du paludisme [**17**].

Les résultats du présent travail de recherche dans 3 zones sanitaires au Bénin ont montré que moins de 20% des moustiquaires distribuées par le Programme National de Lutte contre le Paludisme (PNLP) en 2013 sont en bon état (figure 4). Si la plupart des personnes interviewées dans les trois zones sanitaires avancent plusieurs raisons expliquant l'état (déchirées, cousues, trouées) des moustiquaires peu reluisants, celles liées au choix du savon (lors du trempage et du lavage), le séchage (soleil ou ombre) et la fréquence de lavage par mois sembleraient plausible expliquant l'inefficacité des MILDs.

En effet, en se basant seulement sur le choix du savon, les savons de type Klin et traditionnel ont été les plus utilisés pour le trempage et la lessive. Or ces deux savons ne sont que des détergents et qui inactivent l'insecticide contenu dans les fibres de ces MILDs. De plus, la pression exercée au cours de ces nombreuses séances de lavage de ces MILDs avec pour la plupart ces deux savons ci-dessus cités, contribue progressivement á la perte de l'insecticide contenu dans les fibres. Cette perte d'efficacité des MILDs tend à confirmer la thèse selon laquelle les MILDs utilisées dans les conditions de terrain par les populations semblent perdre leur efficacité bien longtemps avant le pic de 20 lavages prescrit par les fabricants [**7**]. Ces résultats obtenus dans les trois zones sanitaires au Bénin, confirment ceux de Doannio et *al* [**7**] en Côte d'Ivoire qui ont montré également la perte de l'efficacité des MILDs suite au trempage et au lavage de ces dernières par autre savon que celui recommandé (Savon de Marseille) par l'industriel [**18**].

Par ailleurs, le principe de faible fréquence de lavage (une fois tous les 3 mois) recommandé par l'industriel comme facteur de préservation de l'effet insecticide dans les fibres des MILDs, ne semble certainement pas être possible en milieu communautaire. En effet, les multiples fréquences de lavage des MILDs en milieu communautaire ont été souvent déclarées par les femmes nourrices qui doivent laver leur moustiquaire tous les jours, du fait de l'urine des enfants. Cette perception devrait être prise en compte par les industriels lors de la fabrication des MILDs.

Aussi, l'effet des rayons Ultra Violet (UV) du soleil semble avoir un impact sur l'efficacité des MILDs. En effet, la plupart des personnes interrogées sur le mode de séchage de leurs MILDs dans les 03 zones sanitaires affirment le faire au soleil et que le nombre de moustiques dans leur chambre est plus important que chez leurs voisins qui ont toujours séché á l'ombre. Cette perception des populations doit être prise en compte par les PNLP dans les pays de l'Afrique Sub Sahélienne lors des séances d'Information d'Education et de Communication(IEC) en milieu communautaire sur l'utilisation des MILDs et leur efficacité á long terme.

Par ailleurs, sur le plan entomologique la baisse d'efficacité des MILDs pourrait être due á la résistance des moustiques en particulier les vecteurs du paludisme aux insecticides en occurrence les pyréthrinoïdes. Ces pyréthrinoïdes recommandées par l'OMS [**18**] pour l'imprégnation des MILDs se retrouvent aussi utilisés de façon anarchique en agriculture pour contrôler les ravageurs des cultures [**19**]. Au cours de la dernière décennie, l'émergence de la résistance d'*An. gambiae* sensu lato (s.l) aux différents insecticides utilisés en santé publique a été signalée dans plusieurs pays Africains comme la Côte d'Ivoire [**20**], le Kenya [**21**] *al* ., 1999 ; 1994), le Burkina Faso [22], et au Bénin [**23-26**].

Cette situation aurait probablement contribué à l'apparition de la résistance des vecteurs du paludisme aux insecticides et pourrait être un handicap à l'utilisation des MILDS et par conséquent compromettre l'espoir que les autorités sanitaires placent dans cette stratégie de protection des populations contre le paludisme.

Au terme de ce travail on peut retenir que beaucoup de pratiques de lavage en milieu communautaire affectent l'efficacité des MILDs. Il convient de souligner que la recommandation faite par les industriels sur le non usage de détergent pour le lavage et le trempage des MILDs a été confirmée par nos résultats. A cela, le séchage au soleil des MILDs doit être proscrit pour une meilleure efficacité des MILDs le plus longtemps que possible afin de réduire le taux de mortalité et de morbidité dû au paludisme en Afrique sub-saharienne.

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Design and Implementation of an E-Library Search System

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ABSTRACT: E-library system makes the work of a person who is in charge of the library more convenient to search, arrange and make an inventory of the contents of the library.
In this paper, a search system for an E-Library for the academic organizations was introduced such as universities, researches centers. This system has some methods of searches and it is convenient for the researchers to find their required information. The data base contains two categories, Books and Theses. The administrator of the E-Library can add, update, and delete any information in the database easily.
We developed an E-Library Search System using PHP, MYSQL and APACHE with WAMP server.

KEYWORDS: Digital Library, E-Library, Search System, Information Retrieval, Automation.

1 INTRODUCTION

The web creates new challenges form information retrieval. The amount of information on the web is growing rapidly, as well as the number of new users inexperienced in the art of web research. People are likely to surf the web using its link graph, often starting with high quality human maintained Indices such as Yahoo! or with search engines.

Human maintained lists cover popular topics effectively but are subjective, expensive to build and maintain, slow to improve, and cannot cover all esoteric topics. Automated search engines that rely on keyword matching usually return too many low quality matches.

Library automation started in the 1960s in the USA. Since then the trend of library automation has been spreading all over the world. Nowadays libraries are continuously increasing in number, and most are being automated. This automation is actually a combination of hardware and software, both being necessary for any automated system. In the field of libraries, software has become more important than hardware. Hundreds of library software packages have been developed and run successfully in advanced countries and there are many directories and other tools available to help librarians in the selection of suitable software for their libraries [1].

Digital libraries facilitate information access and storage, available for a large community of users. Digital documents should be easily retrieved and archived, so large number of researches focuses on the development of efficient information retrieval techniques and optimized data storage. As stated by [2], these issues are only some aspects of the information environment.

Libraries are also places for users to share and to exchange knowledge about library contents. New services are then required: communication between members, knowledge structuring and organization, contextual archiving and contextualizing information exchanged around the documents.

Our purpose is to design and present E-Library Search System. The database of the system contains books names and thesis titles, so it is special for the academic organizations like universities, and researches centers. This system serves the researchers and other users with many facilities in searching stage by many means such as author name, book name, interested area, number of copies, and year of issue.

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2 THE REVIEW OF LITERATURE

In 1999 a website on OSS for libraries (OSS4lib – www.oss4lib.org) was launched at Yale Medical Library in the USA with a mission of building better and free systems for use in libraries and this contains links to useful information on developments, mainly in the USA, for OSS and libraries [3].

Schlumpf [4], in his paper by the title of Open Source Library Systems concluded that the open source movement is a phenomenon that is affecting the software industry in fundamental ways. Morgan [2] is well-known in this field and he has a lot of essays in this subject. One of his essays, based on a presentation given at the 2001 American Library Association (ALA) Annual Conference, enumerates a number of possibilities for open source software (OSS) in libraries and how it can be leveraged to provide better and more effective digital library collections and services. Goh et al [5] have developed a checklist for digital libraries evaluation and use this checklist on four digital library software packages. Krishnamurthy[3] is described that open access and open source movement in the digital library world. He is provided key developments in the open access and open source movement.

3 INFORMATION RETRIEVAL (IR)

At the present time which widely spread of information, importance of information retrieval is very high. However, it is very difficult to search relevant information which is satisfied its purpose from a vast information efficiently. Web search engines are typical examples.

In many cases, user can find no web page when a restriction of query is strict and a great deal of web pages when it is loose. Re-investigations are demanded in the latter cases. “Searching contents which are referred to certain terms or concepts” is a query of general information retrieval. However, such a query practically represents to investigate special features, characteristics, and events of them. An actual meaning of a query is “searching contents which are referred to some terms or concepts with certain relationships mutually”.

Accordingly such relationships may not be denoted by conventional statistical information (i.e. appearance frequency). In addition, users look for their interests from search results. In many cases, there are too many search results, and it is necessary to suggest some information for a direction of narrowing. To solve these problems, a new intelligent method of information retrieval using organized knowledge resources based on semantics relationships is proposed.

In order to represent various semantic relationships, semantic analysis of information and the structuralization of organized knowledge resources based on their attributes, characteristics, meaning, and so on. A model by which multiple hierarchical, overlapping dynamic and relative relationships can be described is devised in order to represent such semantic structures.

It is apparent that neither graph model nor hyper graph model has sufficient capability to represent such conceptual structures. We proposed a new representation of such structure called Homogenized Bipartite Model and made a system for self organized knowledge resources based on semantic relationships [6,7,8,9] .

4 SYSTEM DESIGN

The system is divided into two parts, the first part is SearchSystem side with database represent the server, and the second part isthe E-Library User Interfaceside that represents the client by using PHP , MYSQL and APACHE with WAMP server. System diagram and system database diagram are illustrated in Figures (1,a) and (1,b) respectively.

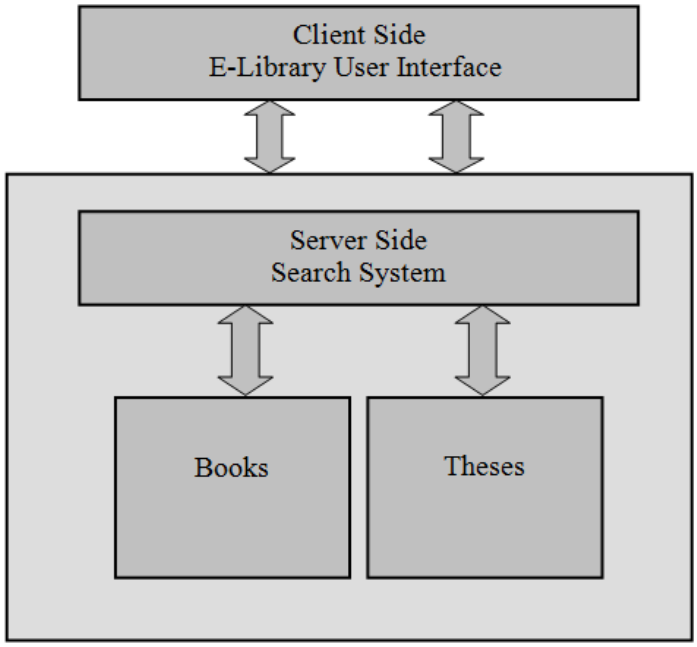

Figure (1,a): System block diagram

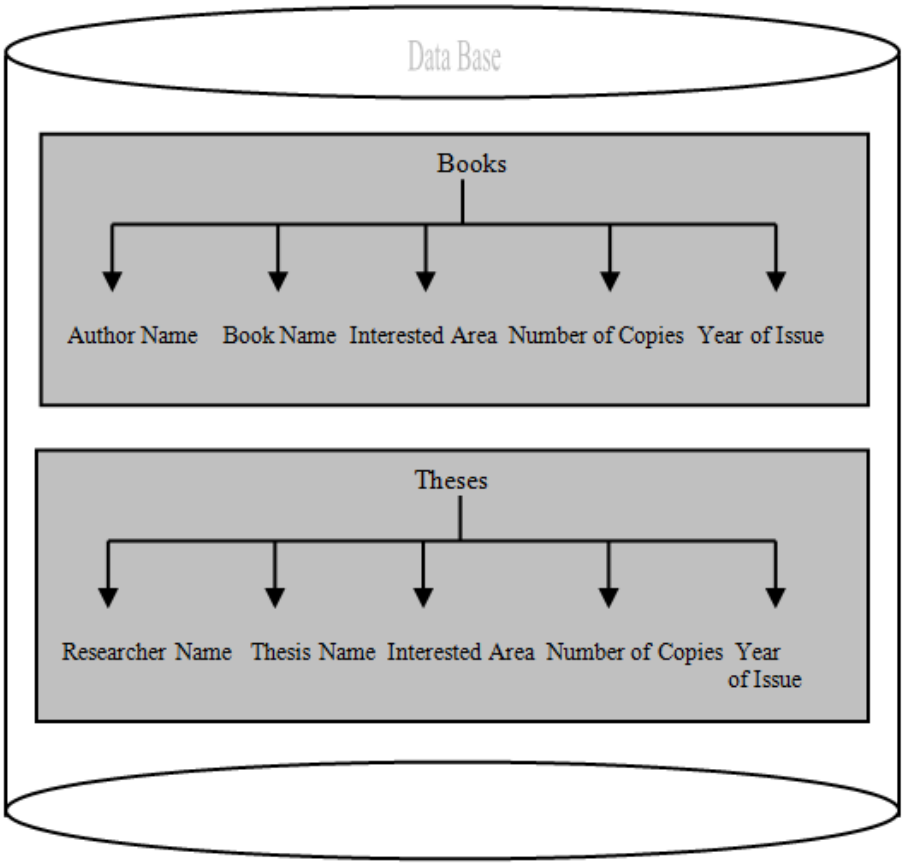

Figure (1,b) : System Database diagram

5 IMPLEMENTATION OF THE SYSTEM

The system database is called (myproj) contains two tables for books, and theses, the first table for books contains : Author Name , Book Name , Interested Area , Number of Copy , Year of Issue .

The second table for theses which contains Researcher Name, Thesis Name, Interested Area, Number of Copies, Year of Issue.

In this Window, there are two ways for entering to the Library System, the first way is : by selecting any link and enter directly , and the second way is : the secure link display. When the user wrote a wrong user name and password, it is unable to enter the system, but if user name and password written correctly, and click on OK button to go to the main page.

The secure page contains set of labels for several pages, which represent the library system that contains the types of search about the database such as books, theses, and all information about them. Notice all that in figure (2).

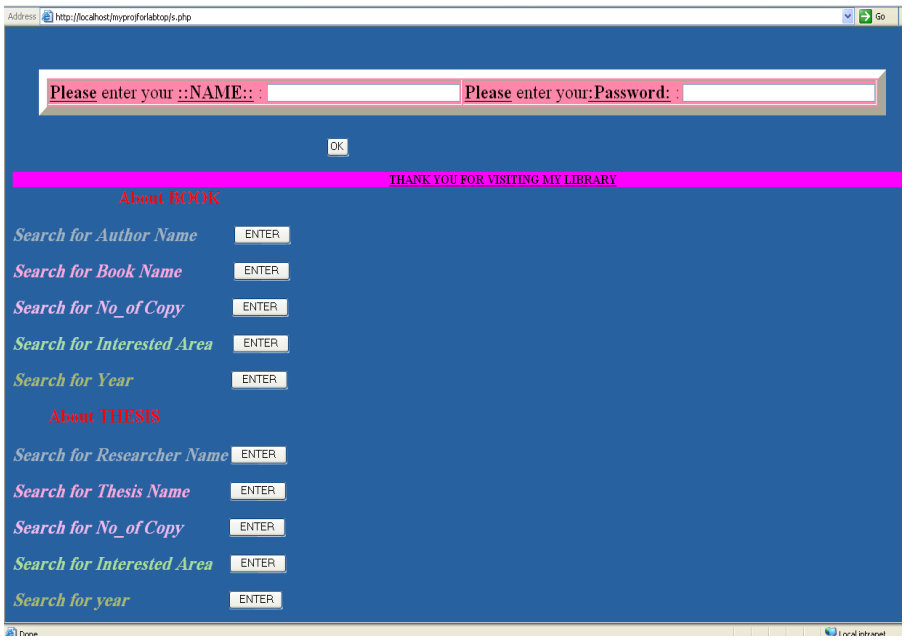

Figure (2): The Main page of the system

The main page suitable for entering to the Library System in order to Search, and After clicking on ENTER button of the first label , the following page will appear as shown in figure (3) below .

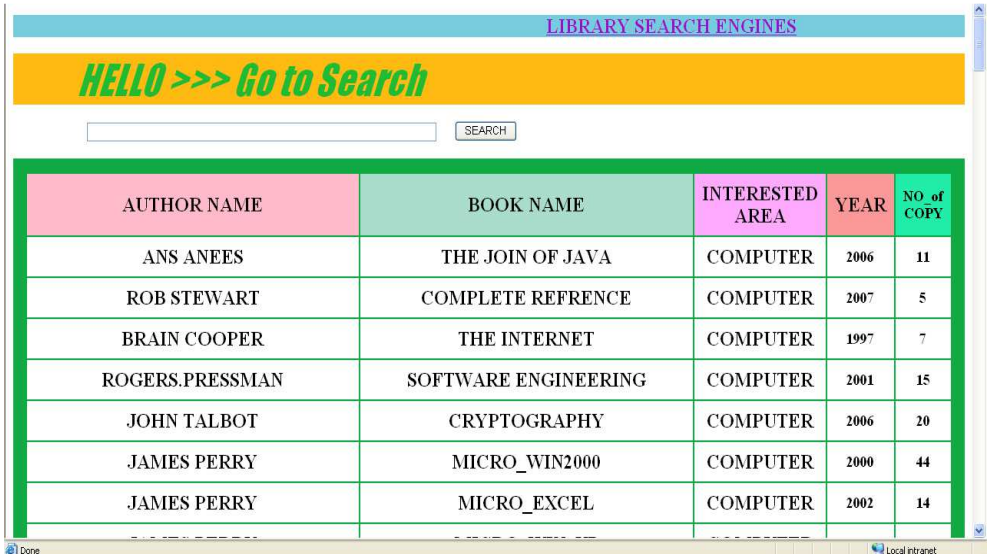

Figure (3): Search about Author Name Window.

This window display the database and the type of search about author name, the user can write any author name and click Search button to find all information about books in the library, and in other way , the user can write only the first name or just one letter from author name, figures (4,5) below explain these ways of search.

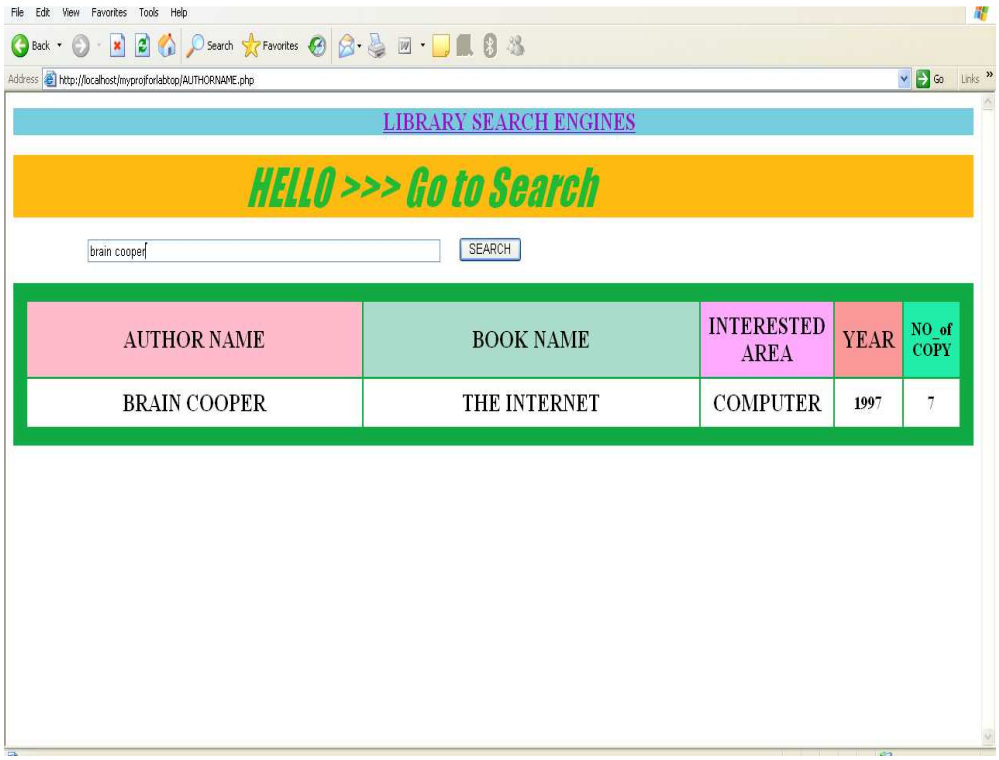

Figure (4): Full author name Window

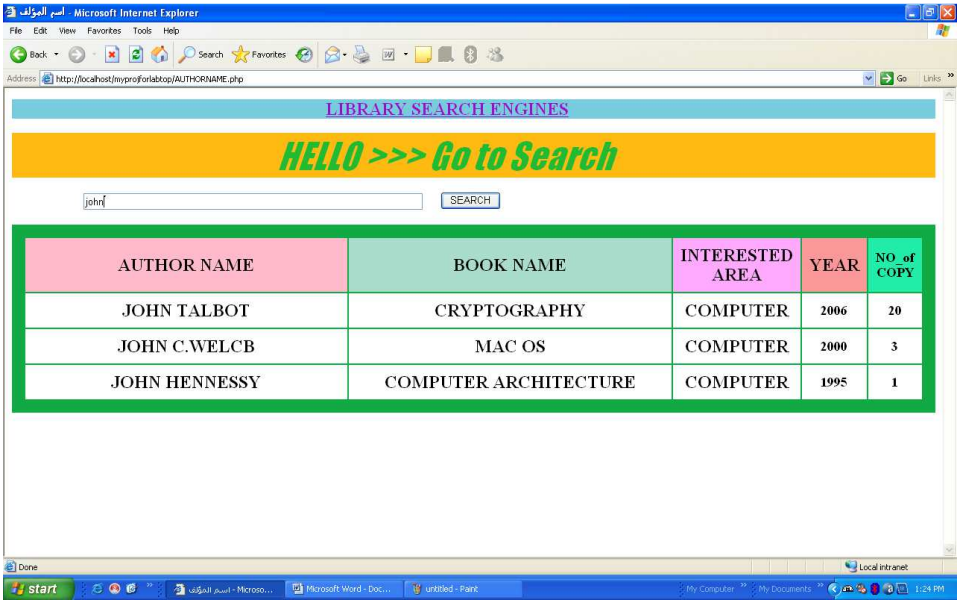

Figure (5): The first author name Window.

The second type of search is about book name, figure (6) below show the page of search about book name.

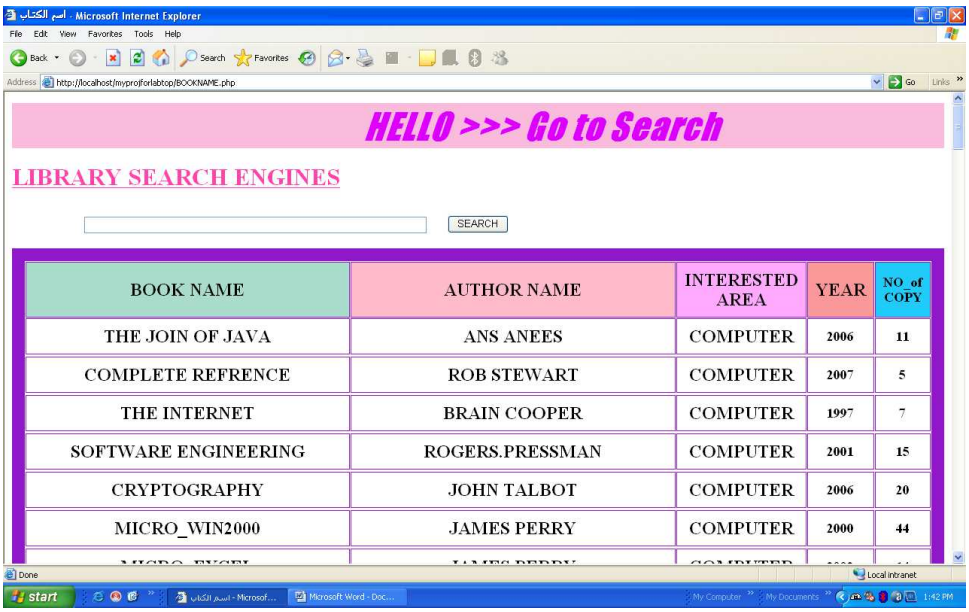

Figure (6) : Book name database Window.

The user can write any book name and Click Search to find all information about books , as shown in figure (7) below for example when written as a keyword “THE INTERNET” click on SEARCH button to retrieve the information about this book and any book consists of this word, will be appear .

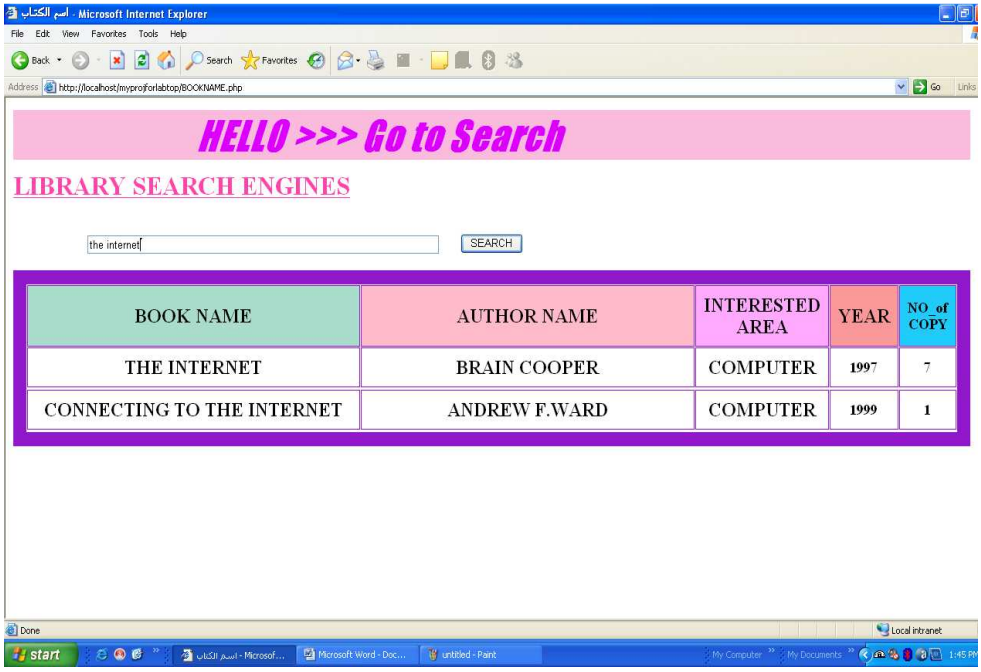

Figure (7): Book name search Window.

If the user write one section of a word like “soft” in text box and click on search button, will find all books contains this section in any order in the book name search.

The third type of search about Number of Copy , show two figures for these information ,The Search for the number of copies in the library system for books, useful to take stock the books in the library generally, figure (8) shown below .

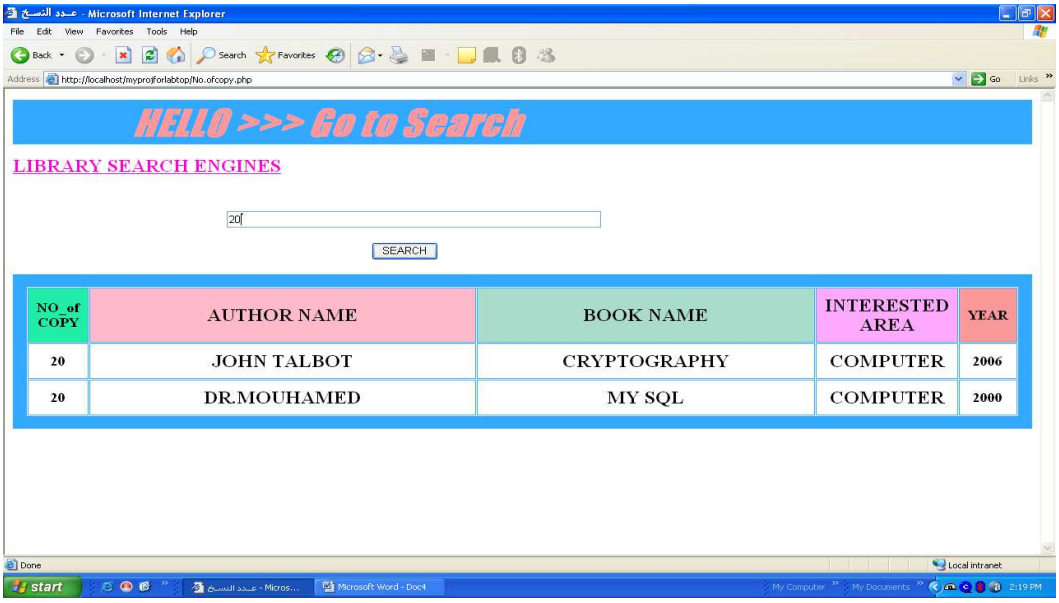

Figure (8): No. of copy Search Window.

The fourth type of Search in the Library System about Year of compilation, and useful for Updating the books in Library after know the last year is there, which is displays the database according to the numbers entering consider the year about books.

For Searching about YEAR “1996” will be appear as in the figure (9) below.

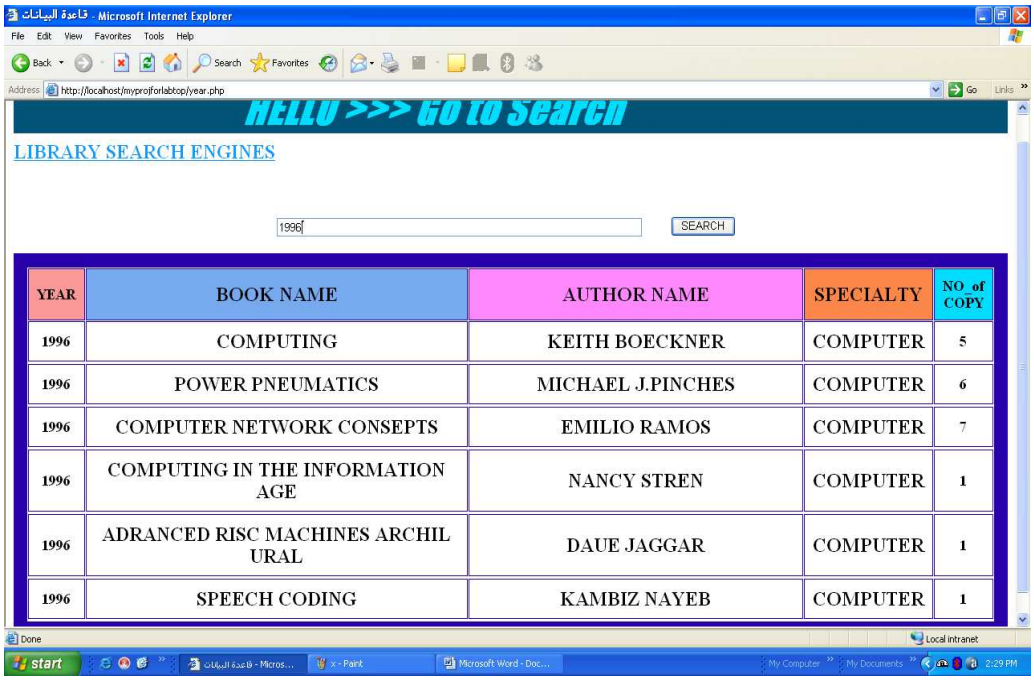

Figure (9) : Search for Year Window.

Finally, the fifth type of Search about the Interested Area for books, When the user chose “COMPUTER” , and considered Computer Library for Books. will be appear as in the figure (10) .

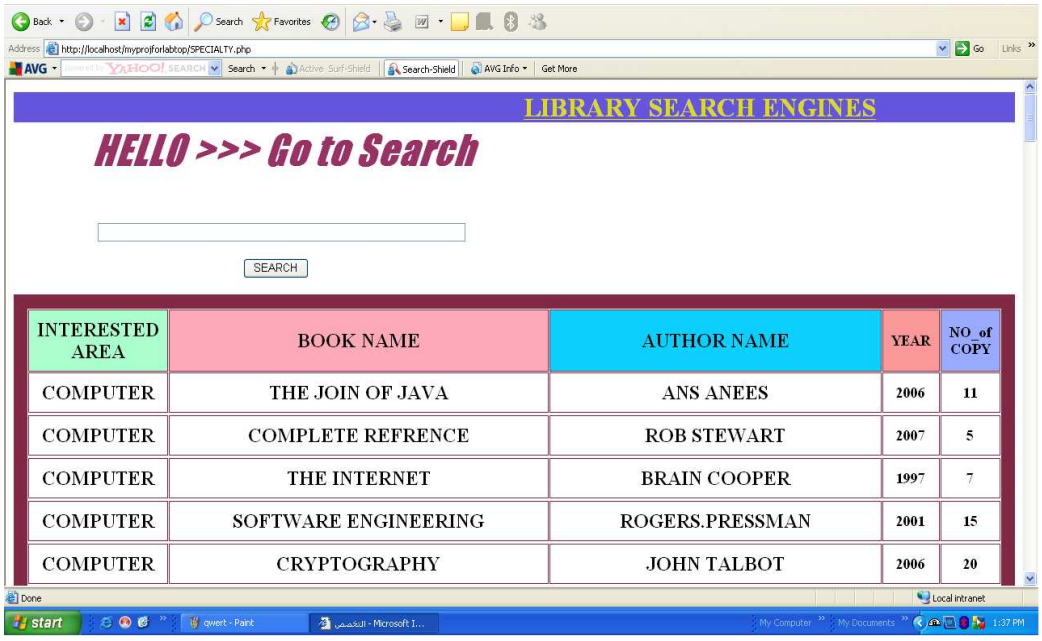

Figure (10) : Interested Area for Books Search Window.

Now, The other part or the other Table in the database contains the Theses, in this section display the main secure window ,and have other types for Search about theses and all components of them, After clicking on ENTER button titled with “RESEARCHER NAME” found the Search Engine pages for researcher name .

When The user write the word " OMER " , Clicking on Search button, find the Information Retrieve consists of this word in the researcher name not in this first name, but in the last name for researcher name .

Like book name search "thesis search" shows the search methods for thesis name after click on ENTER button in the main page.

The other type of search about number of copy like books search ,but here for theses name and for search about year of establishment to theses, is the same possibility for search about books.

The last type of search that represent the interested area for theses and possibility for search about them. when the user write the word "biology" to test a search engine can returns any information from the library system (database).

6 CONCLUSIONS AND SUGGESTIONS

By Implementing the proposed system, we conclude that the gained results and aim is achieved. The officer in charge can do updating on the Database, by deleting, adding, and modifying m also any entry in the keyword field is acceptable even was a letter or more than one letter as a word or a phrase. Increasing of the size of database didn't effect on the searching time and results retrieval time. To make the system to be secure, a password technique had supported.

We suggest to connect the system with the Internet and increasing database of the E-Library by the number of books and theses, and add the database of the system other kinds of publications such as magazines, papers, and articles, and generalize the system database to contain all area of specializations.

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Global University Ranking System: A New Approach by Combining Academic Performance and Web-Based Indicators using Clustering

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ABSTRACT: Global university rankings have cemented the notion of a world university market arranged in a single "league table" for comparative purposes and have given a powerful impetus to intranational and international competitive pressures in the sector.
The studies on evaluation of academic productivity and quality and web presence have led to development of new academic fields such as Bibliometrics, Scientometrics, Informetrics and Webometrics.
During the last thirty years, as an outcome of these new emerging academic fields, several university ranking systems have been developed both at national and global level. Although these university ranking systems have attracted attention; they have been criticized due to a number of issues such as inappropriateness of indicators chosen, scoring procedure adopted, weighting, etc. In this study, a combined academic and web performance evaluation and global ranking system has been developed and implemented using data mining. The new global system which processes about more than 5,000 world universities is based on data from non-subjective, reliable and universally accepted online sources. The scoring procedure includes statistical analysis and data has been collected via a tool developed for this purpose to eliminate human errors.

KEYWORDS: Ranking, Web performance, Academic performance, League tables, Web.

1 INTRODUCTION

University ranking tables are a global phenomenon [1] with more than 30 years of history. Rankings began in 1983, when the US News and World report started to publish the annual America's best colleges review. It spawned the development and publication of more and more ranking tables from numerous countries across the world. Over the last two decades, higher education ranking tables have emerged not only from the private and media-based sectors, but also from professional associations and governments [2]. The goals of ranking tables include: (1) directing an entrant to higher educational programmes, (2) evaluating the phenomena of the international higher education market, (3) introducing market directions for universities at national levels, (4) enhancing sound and positive competition for students, professors, and the funders of universities [3]. Ranking tables also offer information about the quality and other characteristics of higher education institutions, influencing the students' matriculation. In many countries higher education presents a financial burden for students, their parents, and scholarship foundations. When students are granted a scholarship, it is important for them to receive high quality education and other complementary services, thus influencing their future employment possibilities.

There is much criticism about ranking methodologies. Marginson [4] argues that ranking tables conceal a whole array of methodological problems (e.g. weighing) and anomalies, regarding the indicators. University ranking requires a specific definition and quality criteria for indicators developed in order to assess a university's performance. As a result of methodological problems and usage of various indicators, overall rankings and ranking tables differ. It is often unclear why a particular methodology or indicator was chosen, how well it was founded, by whom it was decided and how open and reflective the decision process was [5]. Regarding the indicators, the Academic Ranking of World Universities (ARWU) ranking table uses objective data, measured quantitatively, but the winners are a particular kind of science-oriented universities.

Times Higher Education Supplement (THES) ranking table relies heavily on subjective evaluations by experts and recruiters, directed towards the prestige and power of the university. Marginson [4] argues that the THES ranking table does not express the quality of education, and only slightly touches the research dimension. The latter merely takes account of the number of citations per faculty member, which contributes 20% to the total ranking score.

Regarding the methodologies, data acquisition presents another problem of university rankings. Many ranking tables are based on subjective, qualitative data, received from universities themselves. In the THES ranking table, 50% of the final score is based on subjective evaluations by peer reviewers. Researchers at the Leiden University carried out a correlation between rankings based on subjective evaluations, and citations counting an accepted measure of scientific impact. The results showed that there was no correlation ($R^2 = 0.005$) between them [6]. This has fostered doubts about the credibility of the THES ranking table [7]. Doubts exist regarding the US News ranking table, too. The Institute of Educational Policy from Toronto documented evidence of cheating by universities listed in the US News [7]. Disagreement with the ranking methodologies makes universities hesitate to participate in the ranking.

Nowadays, universities are exhaustively compared from the educational and research perspective, such as student to staff ratio, number of citations, or number of scientific publications. In contrast, the implication of environmental issues has received little or no attention, although many universities are monitoring their environmental footprints.

In the light of the weaknesses of existing ranking systems, a new ranking system has been designed to rank world universities by using indicators which measures academic productivity and quality, teaching quality, knowledge transfer, and Web performance. The study is based on non-subjective and confirmed sources and it is supported by statistical studies in order to apply fair scoring procedure. Moreover, in this study, an automated data collection tool has been developed and implemented to lessen human oriented errors in data collection and a great effort has been spent for institution naming.

The history of higher education rankings goes back to 1983. In that year, Bob Morse, from US News and World Report, published “American Colleges” ranking. However, it began to be published annually in the year 1987. By following US News and World Report ranking, many national and global ranking systems have been developed [8].

2 A NEW SYSTEM FOR GLOBAL RANKING METHODOLOGY

GURS is a ranking system designed to process data of about 5,000 HEIs from all around the world in order to evaluate them according to various indicators. It bases on confirmed, objective and reliable sources. Many processes from data collection to scoring are conducted programmatically. Statistical studies are another main part of the project since they have a crucial role on scoring procedure and result analysis.

The basic steps of this ranking system are given in fig. 1.

Fig. 1. The Basic Steps

2.1 GURS INDICATORS

A summary of indicators is displayed in table 1 below;

Table 1. GURS indicators

No.	Indicators	Objectives	Years	Sources	Weight
1.	No. of Papers	Research Productivity	2009-2013	Scopus and Google Scholar	15%
2.	No. of Citations	Research Quality	2009-2013	Scopus and Google Scholar	20%
3.	No. of Patents	Knowledge Transfer	2009-2013	Scopus and Google Scholar	5%
4.	Student/Staff Ratio	Teaching Quality	2012	Institutions website, Government ministries, Agencies and Wikipedia	10%
5.	Research Centers	Research Quantity	2013	Institutions website, Government ministries, Agencies and Wikipedia	10%
Web-based Indicators					
6.	No. of Backlinks	Visibility	2013	Majestic SEO and Ahrefs	10%
7.	No. of Referring Domains	Impact	2013	Majestic SEO and Ahrefs	10%
8.	Alexa Traffic Rank	Website Popularity	2013	Alexa	10%
9.	Website Reputation	Reputation	2013	Alexa	10%

2.2 DATA COLLECTION MODULE

The data collection system heavily bases on automatic processes in order to eliminate human based errors and accomplish the study in a shorter time period. Thus, Microsoft Office Excel 2010, Quick Macro (QMacro) 6.6 Scripting Edition and Visual Basic for Applications (VBA) tools are used to develop an automatic collection program and collect data.

3 STATISTICAL ANALYSIS AND CLUSTERING

All of the analysis will be based on the raw data gathered for the indicators. In order to accomplish statistical analysis Microsoft Office Excel 2010 and IBM SPSS software was used.

3.1 DESCRIPTIVE STATISTICS

The descriptive statistics provides quantitative descriptions of indicators as presented in the table 2 Descriptive Statistics. The sample of this analysis consists of 5000 world universities selected according to criteria defined previously. The selected sample's raw data are analyzed in nine categories, namely indicators.

Table 2. Descriptive Statistics of the indicators

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness
Papers	5000	1	288000	14229.751	28021.379	785197695.4	5.028
Citations	5000	0	112000	1578.956	6040.303	36485260.54	8.672
Patents	5000	0	63000	507.685	2407.712	5798241.143	11.561
S/S Ratio	5000	2	150	16.959	11.410	130.236	4.747
Res. Cen.	5000	0	112	26.401	16.642	276.972	0.692
Backlinks	5000	1011	7349603	281607.943	403017.595	1.62423E+11	7.260
Domains	5000	11	661670	3466.631	15106.770	228214515.4	30.246
Alexa T. R.	5000	23	37491084	56248.935	555229.306	3.0828E+11	61.895
Reputation	5000	2	66890	3008.615	4170.941	17396750.49	5.083

The indicators' central tendencies are expressed in terms of means. According to analysis the average paper number of 5000 universities is 14229.751 and the average number of citations received for the papers published in years between 2009 and 2013 is 1578.956. Patent average number for the five years was 507.685. The teaching quality average number for all universities which is represented by student/staff ratio has value of 16.959 and for research center was 26.401. For the web-based indicators backlinks, domains, Alexa traffic rank and web site reputation were 281607.943, 3466.631, 56248.935 and 3008.615 respectively.

The spread of data for each indicator can be evaluated via standard deviation values. In fact, the minimum and maximum values of indicators provide a view on the wide dispersion of values. As an example, the raw data of papers indicator vary between 1 and 288000 Standard deviation of the same indicator is 28021.379. It means that the data is spread out over 28021.379 from the mean which is 14229.751.

This large range also occurs in other indicators. It is due to the size variance of selected universities. In other words, since there are 5000 universities from all around the world, their published documents, received citations, patents, s/s ratio and research centers are expected to be varied in a wide range. It is same with the web-based indicators.

4 CLUSTERING

In order to decrease the best university's effect on remaining ones 'scores, and to classify the institutions into 5 levels, data mining is applied by using K-Means algorithm to cluster the total score into 5 groups. IBM SPSS Clementine software used to implement this algorithm. The clusters, their records, mean and the standard deviation for each cluster are given in table 3 below:

Table 3. Clustering of GURS

Cluster	Number of Institutions	Mean	Std. Deviation
1	14	93.624	3.743
2	3464	41.204	1.502
3	1157	68.781	1.434
4	446	48.961	3.522
5	30	79.808	3.954

It is clear that the cluster 1 is the highest level group of 14 institutions which has 93.624 average number of total score , while the lowest level represented by cluster 2 containing 3464 institutions with average number of total score 41.204.

The two screen shots of Clementine software in fig. 2 and fig. 3 below explained the Pei charts and clusters ratio using K-Means algorithm and the frequency distribution of the total scores.

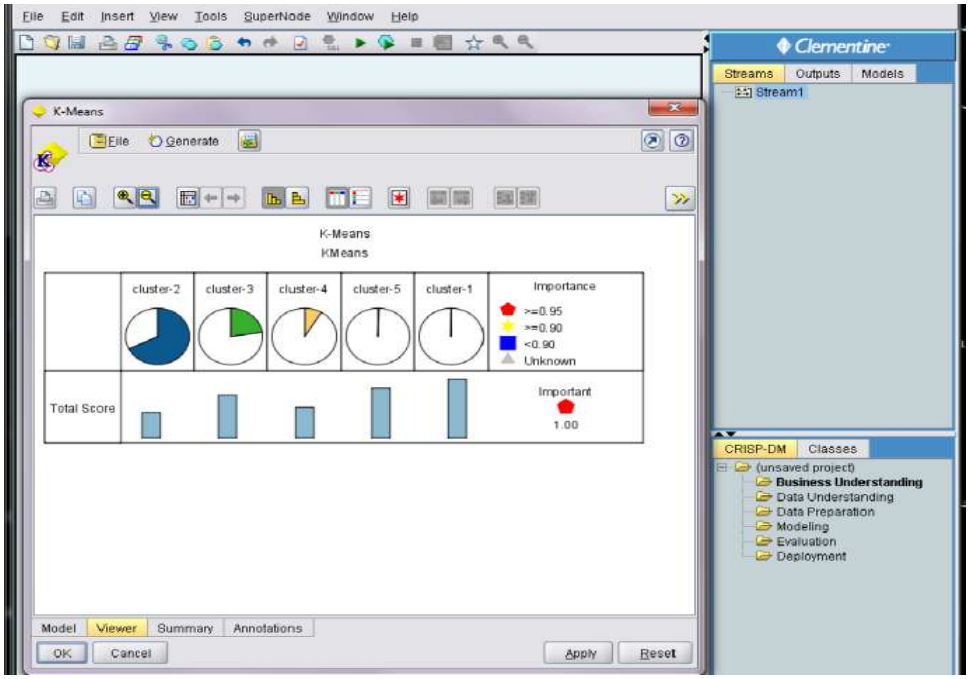

Fig. 2. The Screen shot of clustering result using K-Means algorithm

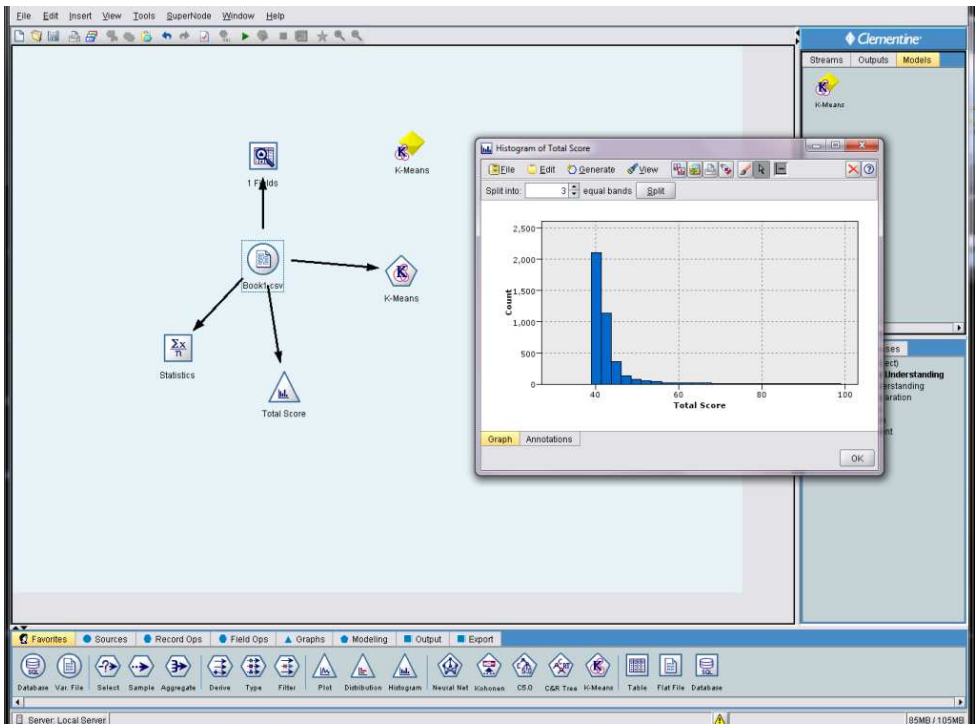

Fig. 3. The Screen shot of Total Score Distribution

5 RANKING RESULTS

After completion of data collection, statistical analysis, scoring procedures and clustering, a new list containing indicator based scores and overall score of each university has been created. The sorting of overall scores in descending order in this list produces the ranking of Top 5,000 world universities. According to the results, the Top 50 of them is as in table 4.

Table 4. Top 50 universities and Total Scores

Rank	University	Total Score	Rank	University	Total Score
1	Harvard University	98.545	26	Cornell University	80.155
2	Stanford University	97.914	27	University of California Berkeley	80.154
3	University of Pennsylvania	96.374	28	State University of New York	80.142
4	University of North Carolina	96.045	29	Barry University	80.044
5	University of Michigan	95.883	30	University of Hong Kong	79.791
6	New York University	94.306	31	University of North Texas	79.676
7	University of Oxford	94.039	32	University of Virginia	78.503
8	University College London	92.785	33	Wright State University	78.203
9	Massachusetts Institute of Technology	92.565	34	University of New Mexico	77.706
10	George Washington University	92.214	35	Long Island University	76.004
11	Columbia University New York	90.409	36	University of Tokyo	75.715
12	Michigan State University	90.269	37	University of Bath	75.640
13	University of Toronto	90.141	38	Johns Hopkins University	75.063
14	University of Florida	88.687	39	University of Minnesota	75.033
15	Princeton University	88.106	40	Indiana University	75.024
16	Carnegie Mellon University	87.068	41	Rice University	74.770
17	University of Cambridge	86.626	42	Boston University	74.486
18	Duke University	86.270	43	National Taiwan University	74.383
19	University of Southern California	85.696	44	Florida State University	73.875
20	Yale University	85.327	45	University of Edinburgh	73.739
21	University of Western Australia	83.660	46	York University	73.206
22	University of Georgia	82.074	47	Northwest University	72.959
23	University of Chicago	81.046	48	Australian National University	72.840
24	University of Washington	80.369	49	American University Washington DC	72.010
25	Ohio University	80.350	50	Central Washington University	71.881

6 DISCUSSIONS ON RANKING RESULTS

6.1 TOTAL SCORES DISTRIBUTION

Total scores distribution versus ranking of universities are given in fig. 4 Total scores distribution. The total scores of institutions are distributed in a non linear trend line against their corresponding ranks. There is a rapid increase in total score for the first left most tail and rapid decrease for the first most right tail. The reason of the increasing is the effect of the outlier which is the best performing universities in the list, while the reason of the decreasing is worst performing universities in the list.

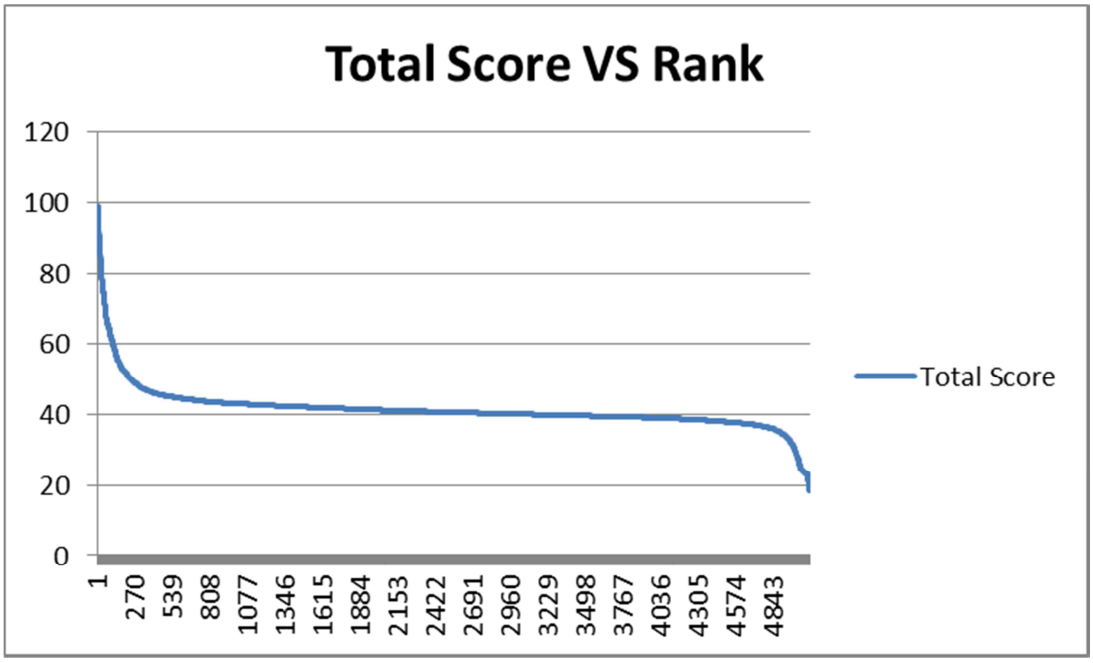

Fig. 4. Total scores distribution

6.2 GURS VERSUS OTHER RANKING SYSTEMS

The Coefficient of Determination (R^2) has been evaluated for each comparison to indicate the similarity ratio between any two ranking systems.

In the table 5 below, R^2 values are given for each comparison. The results indicate that the highest similarity has been found in comparison of WEBOMETRICS due to the nature of its web-based indicators and the big number of ranked universities like our system. The lowest one is ARWU due to the nature of its ranking methodology. Another significant result is that GURS is more similar to HEEACT ranking than QS ranking.

Table 5. Comparison with ranking systems

	ARWU	URAP	WEBOMETRICS	QS	HEEACT
GURS	60.90%	69.40%	81.50%	77.30%	79.30%

Another comparison of ranking systems will be on the universities. The table 6 provides some university examples which are in the Top 500 of GURS and their corresponding rank numbers in the systems.

Table 6. University examples in GURS and other ranking systems

Universities	GURS	ARWU	URAP	Webometrics	QS	HEEACT
New York University	6	27	52	35	43	37
Duke University	18	36	20	17	20	18
University of Tokyo	36	20	10	48	30	16
Universität Wien	237	151-200	169	84	160	202
Seoul National University	332	101-150	39	281	37	69
Cardiff University	346	151-200	152	484	143	147
Université de Geneve	435	69	160	137	74	117

7 CONCLUSIONS AND FUTURE WORKS

In this study, a system, names as GURS, designed for ranking Top 5,000 world universities according to their both academic and web performance. GURS is based on non subjective and confirmed sources. In the scope of this study, a new tool has been developed to collect data from various sources. Moreover, statistical analyses on scoring procedure have been conducted. Data mining technique using K-Means algorithm was applied to cluster the universities into 5 groups levels in terms of their total scores.

To sum up, this study can support improvement of institutions academically and their web sites as well by evaluating their current situation. It is especially important for the universities of emerging and developing countries. The increase in academic quality and web visibility of HEIs supports the scientific development. It contributes to prosperity of the country. Thus, worldwide prosperity and peace can be settled.

There are issues which have been left out of the scope in this study for future studies. Firstly, the methodology of the current ranking system may be developed by adding new indicators. Moreover, ranking institutions by their subject areas, fields or disciplines may be another future study. Thus, the institutions might be compared according to their specialized areas instead of as a whole. The number of institutions which have been processed and ranked is about 5000. In the future studies, thousands of new institutions may be added into the list.

There may be future studies on data collection process by developing more user friendly tools. Another future study on data collection can be obtaining required data from databases directly instead of limited web interface.

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Factors Influencing Smallholder Farmers' Adoption of Agricultural Water Technologies and Innovations in Lare and Elementaita Divisions of Nakuru County, Kenya

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ABSTRACT: Water for agricultural use has been adversary affected by climate change in Arid and Semi-Arid Legions. Water inadequacy and un-reliability can be addressed by farmers' adoption of agricultural water technologies and innovations of water harvesting, storage and application. Adoption of these technologies is low in developing countries. This study aimed at investigating factors influencing smallholder farmers' adoption of agricultural water technologies and innovations Lare and Elementaita Divisions, Nakuru County Kenya. These areas were selected as they are water constrained and inhabited by smallholder farmers some having while others having not adopted these technologies. Study objectives were: to document the socio-economic status of the farmers and ecological characteristics' influence on technologies' adoption. Descriptive research design was used with a sample size of 114 and 76 farmers who had, and not adopted the technologies respectively and selected using purposive and proportionate sampling techniques. Data was collected by use of face-to-face administered structured questionnaire and analyzed using descriptive and inferential statistics. Findings indicate that the farmers had low education level by Kenya's standard. Chi-square analysis indicated existence of statistically significant relationship between land topography, affordability of irrigation facilities and availability of technical and financial support and adoption of the technologies. No statistically significant relationship exists between soil types and water harvesting, storage structures and adoption of technologies. Financial constraints and lack of skills in management of these technologies were challenges. Technical, financial and supportive policy focusing the farmers' technologies' adoptive capacities is advised.

KEYWORDS: Agricultural water inadequacy, Climate change, Water technologies, Innovations Adoption, Smallholder farmers.

1 BACKGROUND OF STUDY

Climate change has become a major threat to food security in many regions of the world especially those that depend on rain-fed agricultural production [1]. Although Africa is a continent that is least responsible for climate change, it is the most vulnerable to the negative effects of the change. According to reference [2], projected climatic changes for Africa suggest a future of increasingly scarce water, collapsing agriculture yields and encroaching deserts. Unexpected prolonged droughts, food insecurity, water stress-related crop failure, livestock deaths and community conflict over scarce water resources are now frequent in marginal areas in Kenya [3], [4], [5]. Other disasters include infrastructures' destructive flooding, receding lake levels and drying rivers [6]. Agriculture is the backbone of the Kenyan economy and the major share of agricultural activities is carried out by smallholder farmers. These agricultural activities, that drive rural communities' development, are rain-fed. Therefore, climate change, leading to agricultural water scarcity majorly impedes rural community development. Water variability poses a challenge for Kenya in her determination to become a food secure country by the year 2030.

The chronic water problems experienced in Kenya may be attributed to climate change and destruction of water catchment areas among others. According to reference [7], deforestation, forest fires, overgrazing and agricultural activities

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within the Mau-Complex, has led to reduced rivers' discharge, drying up of water sources and receding of ground water table among others. Therefore, in the wake of water scarcity occasioned by climate change, appropriate agricultural water technologies and innovations needs be well understood and agricultural water adoptive capacities up-scaled at smallholder farmers' level. To mitigate water scarcity threat requires application of innovations based on integrated technologies both indigenous and modern, stakeholders' involvements and policy intervention.

Due to agricultural water inadequacy, some farmers in Lare and Elementaita Divisions of Nakuru County have been involved in agricultural water technologies and innovations that include water harvesting, storage and application. Lare and Elementaita Divisions differ in terms of ecological characteristics such as topography and soil types. Individual smallholder farmers in these areas also differ in terms of socio-economic status. Since majority of farmers in Lare and Elementaita Divisions are resource scare and their livelihoods hinge on agriculture. Adoption of agricultural water technologies and innovations would be one approach of empowering these farmers to mitigate the effects of water vulnerability and uncertainty due to climate change and sustainably enhance food and economic security of smallholder farmers. This is because, harvested water can be used for many interrelated agricultural activities such as kitchen gardening, poultry keeping; zero grazing, biogas digester installations, drip irrigation, fish farming and apiculture among others. All these farming activities translates into increased income generation, improved household food and economic security, creation of on-farm employment, decreased rural urban migration, poverty reduction and conservation of environment, among others (Kenya Rainwater harvesting Association [8]. In addition, harvested water can serve as an artificial recharge to groundwater [9].

According to reference [10], climate change is both a global environment and a local development challenge, as it could jeopardize the livelihoods of millions. This is particularly so where poor rural communities are already vulnerable to water scarcity and have limited coping capacity. Africa is experiencing increased incidences of prolonged droughts, extreme floods and reduced or failed agricultural production. All these lead to both food and economic insecurity and also increased risk of communities' conflict over scarce water resources. In Kenya, human-wildlife conflict, arising from human encroachment of marginal areas, in search of water resources, is on the rise [6]. Frequent and prolonged droughts have made communities that were one time food and economic secure to be destitute relying on relief food and water supply for their survival. Therefore water variability, particularly water scarcity, poses one of the greatest challenges for Kenya in her determination to become a food and economic secure country, according to her Vision 2030. However, the adverse effects of water scarcity can be ameliorated at household levels by adoption of agricultural water technologies and innovations. In rainfall seasons, rainwater, in form of runoff, wastes away. It is possible to harvest this runoff, store and use it in dry seasons [11]. Uncontrolled runoff causes destruction in the form of farm flooding, landslides, soil erosion, infrastructure destruction and community displacement among others. According to reference [12], one way of reducing incidents of communities' water related conflicts and infrastructure destruction is through water harvesting and storage in rainy seasons and efficient application of stored water in dry seasons. This may be achieved through the farmers' adoption of agricultural water technology and innovations.

According to reference [10], close to 80% of Kenya's population is rural and dependent on agriculture for basic livelihoods. The makes the country highly vulnerable to rainfall variability since 98% of the country's agriculture is rain-fed, hence sensitive to rainfall scarcity [3] and [13]. Therefore adoption of agricultural water technologies and innovations may be one approach of mitigating climate change adverse effects on agriculture.

A report by reference [14] showed that Kenya with a population of about 40 million is capable of meeting the water needs of six to seven times of its current population. Rainwater harvesting can yield numerous social and economic benefits, and therefore contribute to poverty alleviation and sustainable development [15]. According to reference [11], rainwater harvesting technologies are acceptable and replicable across many cultural and economic settings. However, it is puzzling to observe a farmer who has adopted these technologies, with easily observable positive outcomes bordering fellow farmers ignorant of these technologies in Lare and Elementaita Divisions. It is envisaged that the adoption of a technology does not only depend on its potential outcome, but also on the socio-economic situation of adopting farmer, among others. The study therefore focused on how these technologies' characteristics and the smallholder farmers' socio-economic situations influenced adoption of agricultural water technologies and innovations in Lare and Elementaita Divisions in Nakuru County.

Characteristics of technologies as perceived by individual adopters include relative advantage, compatibility, past skills, needs of potential adopters, complexity and observability. Ecological factors include individual farm topography and soil types. The study therefore focused on how these technologies' characteristics and topography influence smallholder farmers' adoption of agricultural water technologies and innovations.

2 RESEARCH METHODOLOGY

The study used descriptive survey to collect data from Lare and Elementaita Divisions in Nakuru County. The design was deemed suitable because it provided information about subjects under study on the past and current situation [16]. Lare and Elementaita Divisions were purposively selected as these areas are water constrained and inhabited by smallholder farmers, majority of whom have adopted agricultural water technologies and innovations. Purposive sampling was used to select study locations with high concentration of farmers who have adopted the technologies under the study. Proportionate sampling technique was used to assign a proportionate representative sample for each selected location. Simple random sampling was then used to pick the sample size for the study in each location [17]. The study used a researcher-administered semi-structured interview guide to collect data. Statistical package for social sciences (SPSS) was used for data analysis. Descriptive statistics was used whereby frequencies percentages and means were generated from the various data categories were computed and represented in different tables and figures. Chi-square was used for inferential statistics analysis.

3 FINDINGS AND DISCUSSIONS

3.1 FARMERS' GENDER PARTICIPATION

The study established that household heads are male at 55.2% and female at 44.8% as shown in Table 1. Therefore views of both genders have been captured in this study as both are involved in agricultural water technologies' adoption**.** Though women contribute 66% of all the hours worked throughout the world [18], they do not benefit as men do from technologies' adoption.

Table 1. Gender of Respondents

Gender		Percent
Male	63	55.2
Female	48	44.8
Total	115	100

3.2 FARMERS' AGE

Based on age, majority of the respondents (51.7%) were 51yrs and above. This consist of a generation of farmers that first acquired and settled in Lare Division hence commonly referred to as the original land owners. They believe they have final say on agricultural water technologies' adoption on their farms even in instances where some parts of their farms have been inherited by their off springs. A study by [18] found that age influences a farmer's adoption of technologies, but direction of the influence is in contention. Some researchers find it positively influencing adoption and others find a negative correlation or no significant.

3.3 FARMERS' EDUCATION LEVELS

Majority of the respondents (70%) had primary or no formal education, while 23.4% and 5.2% had secondary and college/university education respectively. Generally, respondents had a low level of education by Kenyan standards. According to reference [18], education has been found to influence adoption of agricultural related technologies such as agricultural water technologies. This is because education is believed to create a favorable mental attitude for the uptake of new practices. Therefore, educated farmers would be expected to embrace new technologies in order to experience the benefits that come with new practices. Education level correlates significantly with adoption of Harvesting and abstracting water technology as shown in Table 2.

Table 2 Education Level Correlation with Agricultural Water Technologies Adoption by Lare Farmers

	Education level	Harvesting and abstracting water	Storing harvested water?	Have been applying irrigation
Education levelPearson Correlation	1	-.191*	-.120	-.156
Sig. (2-tailed)		.041	.203	.097
N	115	115	115	115
Pearson Correlation	-.191*	1	-.034	.103

*. Correlation is significant at the 0.05 level (2-tailed).

4 ECOLOGICALCHARACTERISTICS

On ecological characteristics, Chi-square analysis revealed existence of statistically significant relationship between land topography and adoption of the technologies. Water pans/pods were observed to be concentrated more on lower gentle and flat rather than on the upper sloppy areas. However, no statistically significant relationship existed between soil type and adoption of the technologies as shown in Table 3.

Table 3. Relationship between Ecology's Characteristics and Technologies' Adoption.

Variable	P Value	Df	Chi-square Value
Land topography	13.948[a]	2	.001
Soil type	4.891[a]	2	.087

*Significant = p <0.05

5 TECHNOLOGIES' CHARACTERISTICS

On technologies' characteristics, results indicate no statistically significant relationship exists between affordability of harvesting and storage facilities and adoption of the technologies. However, there exists statistically significant relationship between affordability of irrigation facilities and their adoption. While the maintenance of harvesting facilities does not influence the technologies' adoption, the same is untrue with the maintenance of irrigation facilities. There also exists statistically significant relationship between availability of financial support and adoption of the technologies as shown in Table 4.

Table 4. Technologies' Characteristics and their Adoption

Variable	P Value	Df	Chi-square Value
Harvesting facilities (affordability)	3.830[a]	4	.429
Harvesting facilities (maintenance)	3.141[a]	3	.370
Harvesting facilities (easy to use)	2.429	4	.657
Storage facilities (affordability)	1.489	3	.685
Irrigation facilities (affordability)	9.531	3	.023
Irrigation skills	6.894	4	.142
Irrigation facilities(maintenance)	16.233	4	.003
Technologies fitting farm activities	6.121[a]	4	.190
Financial support	11.912	3	.008

*Significant = p <0.05

6 INNOVATIONS

On innovations, it was found that a few farmers have designed and constructed house roofs that facilitate water harvesting. Some have landscaped their compounds in order to direct runoff to their farms. A few farmers have constructed road runoff diverting trenches that harvest both water and eroded soil. They maintain these trenches by regularly scooping deposited soils which they use as manure in their farms. Where land slope and soil type permits, these farmers have strategically designed and constructed water pans to harvest surface runoff and then use gravity to irrigate land down slope. Flood barriers in form of vegetative strips and trenches have been erected across farms to reduce runoff speed and its erositivity hence facilitate water infiltration thereby recharging ground water table. The farmers have also adopted innovative ways of cleaning and conserving the harvested water by use of greenish minute floating mass of a local azolla plant that has been introduced to cover the stored water surfaces thereby minimizing water loss through evaporation and physically cleaning the stored runoff. Suspended plant roots eventually turn brown runoff to sparkling clean water.

7 CONCLUSIONS

- Low literacy levels among household decision makers, inadequate follow-up by experts in provision of technical & financial support in management of agricultural water are some cited constraints in technologies' adoption.
- In citing, design & construction of water pans, it appears the following may not have been adequately considered hence not factored in :
    - Household agricultural water needs as majority of the farmers reported water inadequacy.
    - Siting of water pans to allow crop irrigation using water flow by gravity.
    - Safety of water pans' users; children & livestock have been reported to have drowned in water pans
    - Costs and maintenances skills were cited as significant constrains in adoption of these technologies. This would imply availability of financial and technical expert support would enhance farmers' adoption of these technologies.

The issue of water for agriculture is one that affects all families within the Lare and Elementaita communities. The effects of climate change have only exacerbated these problems. However, as seen through this study, simple solutions such as adoption of agricultural water technologies can help mitigate these issues. Also illustrated is the importance of the implementation process of these solutions. Although simple, if a farmer is not properly educated on how to properly execute and upkeep these processes, they will prove to be of no help and can end up having a negative impact. Furthermore, if the outreach and education about these solutions is not done properly, it can leave families unable to partake in these opportunities. A focus needs to be placed on availability of funding. Without proper funding opportunities, those most affected by poverty are not able to participate in the innovations to alleviate the adverse side effects of climate change. The smallholder farmers are in need of these innovations most, as they are the ones who have no resources to recover from the impacts. If these improvements are made and education is given a priority, members of the Lare and Elementaita communities will feel the positive effects of agricultural water technologies and inventions adoption. They will have a higher ability to successfully adapt to climate change induced water vulnerabilities, produce higher crops yields hence become water, food and economic secure.

Agricultural water technologies' and innovations' adaptation is not an issue for farmers alone. It is a social learning process expected to equip farmers, researchers, extension workers, local decision makers and other stake holders with information on how to respond to challenging circumstances brought about by climate change. For ownership and sustainability of intervention measures, agricultural water technologies and innovations should start off from farmers' indigenous technical knowledge, skills and experiences.

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Inter comparaison des analyses des phycotoxines paralysantes (PSP) au niveau des coques rouges entre le laboratoire de la société DINAY et les laboratoires des phycotoxines de l'INRH réalisées par test biologique sur souris (protocole AOAC n°: 959.08, 1990)

[Inter-comparison analyzes of Paralytic Shellfish Poisoning (PSP) at the red shells from the laboratory of the company DINAY and laboratories phycotoxin INRH performed by mouse bioassay (AOAC protocol No.: 959.08, 1990)]

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ABSTRACT: The main vectors of paralytic shellfish poisoning are bivalves that accumulate toxins through their mode of nutrition (filtration) during proliferation of toxigenic algae.
Acanthocardia tuburculatum is one of the most important bivalve molluscs which cause paralytic shellfish poisoning problems in Moroccan and Spanish Mediterranean coasts this species is capable of accumulating high levels of PSP toxins for a long time in these same tissues when microalgae producing potentionnellement toxin are not present. This presents a danger to the health of consumers.
This work is part of a cooperation agreement and scientific research between the NHRI and DINAY Company is to do a study on the contamination of the red shell (Acanthocardia tuburculatum) paralytic marine biotoxins (PSP) by dosage of these last by the biological method in mice jointly by five laboratories.
Taking into account the coefficient of variation of the method of mouse bioassay is 20% our results concluded that the comparison of results obtained by the statistical test between the different laboratories revealed no significant difference in the same commission inter responsible for monitoring the safety of marine and shellfish acknowledged in September 2008 that these results are satisfactory.
This study also allowed taking measures during internal checks and monitoring of the marine environment as expand the batch of samples and diversifies in terms of size and that each lot is the subject of several repetitive analyzes.

KEYWORDS: Acanthocardia tuberculatum, Paralytic Shellfish Poisoning (PSP), Mousse Bioassay, Morocco.

RESUME: Les principaux vecteurs d'intoxication paralysante sont les mollusques bivalves qui accumulent les toxines par leur mode de nutrition (filtration) lors de prolifération des algues toxinogènes.
Acanthocardia tuburculatum est une des plus importants mollusques bivalves qui cause des problèmes d'intoxication paralysante dans les côtes méditerranéennes marocaines et espagnoles cette espèce est capable d'accumuler des taux

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importants de toxines paralysantes pendant longtemps dans ces tissus même lorsque les micro-algues produisant potentionnellement la toxine ne sont pas présentes. Ce qui présente un danger pour la santé des consommateurs.
Ce travail entre dans le cadre d'une convention de coopération et de recherche scientifique entre l'INRH et la société DINAY qui consiste à faire une étude sur la contamination de la coque rouge (*Acanthocardia tuburculatum*) par les biotoxines marines paralysantes (PSP) par dosage de ces derniers par la méthode biologique sur souris conjointement par cinq laboratoires.
En tenant compte que le coefficient de variation de la méthode de test biologique sur souris est de 20% nos résultats ont permis de conclure que la comparaison des résultats obtenus par le test statistique entre les différents laboratoires ne révèle pas de différence significative de même la commission interministérielle chargée du suivi de la salubrité du milieu marin et des coquillages a reconnu en septembre 2008 que ces résultats sont satisfaisantes.
Cette étude a permis aussi de prendre des mesures durant les autocontrôles et la surveillance de milieu marin telle que d'élargir le lot de prélèvement et le diversifier en terme de taille ainsi que chaque lot fait l'objet de plusieurs analyses répétitives.

MOTS-CLEFS: Acanthocardia tuberculatum, phycotoxines paralysantes (PSP), test souris, Maroc.

1 INTRODUCTION

Il est à signaler que la pêche des bivalves en méditerranée marocaine occidentale occupe une activité importante, du fait qu'elle engage plusieurs personnes dans l'exploitation des coquillages. En effet la zone Oued Lou - Kaâ Srass (OL-KS) recèle une richesse en gisements coquilliers très importantes notamment les coques *Acanthocardia Tuberculatum* et les vernis *Callista Chione*.

Contrairement au vernis les coques présentent un risque majeur pour la santé publique du fait qu'elles accumulent de façon permanente les toxines paralysantes (PSP) même en absence des micro-algues produisant la toxine [1] cette permanence qu'est dû au fait que les PSP ont tendance à s'accumuler dans les organes non viscéraux (pied et branchies) de la coque rouge [2] ainsi que la présence de la PSPBP, nouvelle protéine capable de fixer et retenir les toxines paralysantes empêchant la détoxification de la coque [3] [4].

A cet égard, une étude sur la contamination de la coque rouge (*Acanthocardia tuberculatum*) par les biotoxines marines (PSP) a été menu conjointement entre les laboratoires d'analyses des biotoxines marines de l'INRH et celui de la Société DINAY.

Il est à rappeler que DINAY est une société de valorisation des bivalves (conserves) qui dispose d'un agrément pour la détoxification des coques rouges en cas de dépassement des taux de toxines de 300 µg éq STX /100g (1500 US dans 100g de chaire) (US= unité souris).

A cet égard, la dite société a mis en place un laboratoire d'analyse des toxines marines et dispose aussi d'une animalerie d'élevage des souris utilisés pour réaliser le test biologique [5]. La présente étude est réalisée en 2006 et 2007 sur des échantillons de coque rouge issues de la zone de production Oued Laou – Kaâ Srass.

Le but de cette étude est de procéder à une inter-comparaison des résultats obtenus entre les laboratoires de l'INRH et celui de la société DINAY pour une meilleure surveillance du milieu marin.

2 MATÉRIELS ET MÉTHODES

2.1 SITES D'ÉCHANTILLONNAGE

La zone est riche en gisement naturel de bivalve notamment les coques et vernis. Pars ailleurs cette zone connue des phénomènes recrutant de la présence de la PSP à des taux élevés au niveau des coques rouges pendant une longue période de l'année. La zone abrite deux points de débarquement dédiés à la pêche artisanale (voir photo ci-joint), sis aux villages oued Laou et Kaâ Srass. Les limites géographiques de la zone d'étude (voir carte ci jointe) sont :

35°27',310 N – 05°05',067 W

35°24',682 N – 05°03',445 W

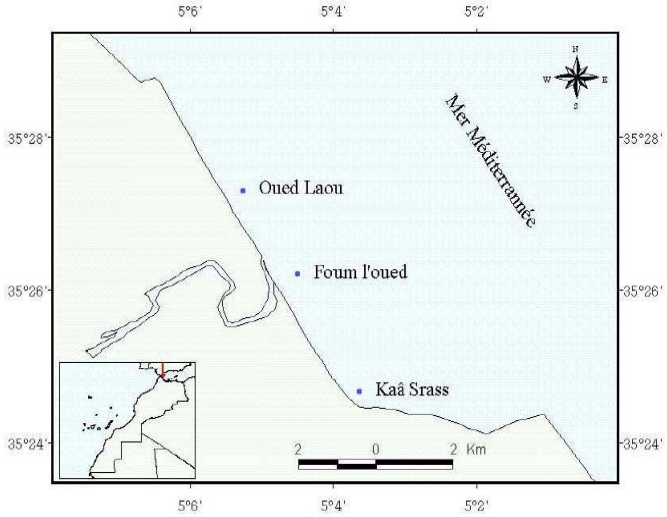


Fig. 1. Carte de la zone de production des coques à Oued Laou – Kaâ Srass

2.2 ESPÈCE ÉTUDIÉE

Fig. 2. photo de la coque rouge (Acanthocardia tuberculatum)

L'espèce de bivalve sur laquelle l'étude a été menue est la coque rouge (Acanthocardia tuberculatum), c'est un bivalve fouisseur superficiel qui vit dans le sédiment sableux – sableux vaseux où se concentreraient les kystes de G.catenatum qui engendrent une toxicité permanente de ce bivalve [6].

2.3 FRÉQUENCE D'ÉCHANTILLONNAGE

Les campagnes d'échantillonnages ont été réalisées durant la période mars-avril 2006 et septembre-novembre 2007. Les échantillons prélevés au niveau de chaque site ont été subdivisés en plusieurs lots de coques d'environ 20 individus de différentes tailles. Chaque laboratoire concerné reçoit les lots correspondants.

Tous les échantillons seront conservés au congélateur à une température de moins 20 **°C** avant expédition aux laboratoires concernés.

2.4 PROCÉDURE D'ANALYSE

Au cours de chaque prélèvement chaque laboratoire a reçu deux lots de coque issus des deux points de prélèvements (Oued Laou et Kaâ Srass). Chaque lot a été subdivisé en trois portions et qui ont été traité et broyé selon la méthode AOAC. L'extrait obtenu va subir trois répliquas (3 ou 2 analyses/ lot).

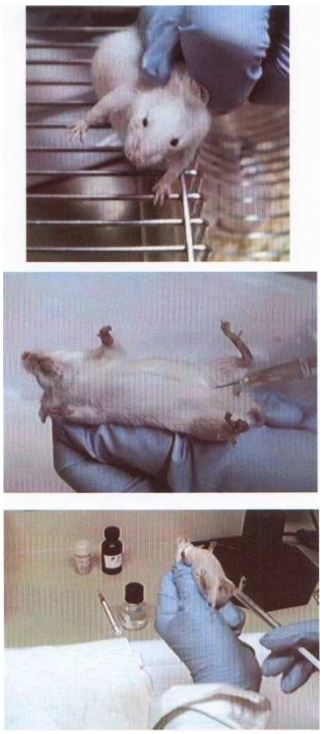
2.5 LABORATOIRES PARTICIPANT À L'ÉTUDE

L'étude a été réalisée conjointement entre les laboratoires d'analyse des biotoxines marines :

- Le Laboratoire d'analyse des biotoxines marines de la Société DINAY à Martil,
- Le Laboratoire Centrale d'analyse des biotoxines marines de l'INRH à Casablanca,
- Le Laboratoire d'analyse des biotoxines marines du Centre Régional de l'INRH à Agadir,
- Le Laboratoire d'analyse des biotoxines de la Station du RSSL de l'INRH à M'diq,
- Le Laboratoire Régionale d'Analyse et de Recherche Vétérinaire Tanger LRARVT.

2.6 TECHNIQUE D'ANALYSE

La technique d'analyse utilisée a été la même pour les cinq laboratoires, c'est la méthode préconisée par l'AOAC qui consiste en l'extraction en milieu acide du contenu de coquillage et de sa purification avant injection à des souris mâles d'un poids de 20±2g.



Cette technique consiste à faire le :

- Décorticage des coquillages ;
- Nettoyage et égouttage de la chair ;
- Broyage de la chair;
- Extraction acide des toxines avec HCl ; ajustement du pH;
- Mettre à ébullition; ajustement d'eau et pH;
- Centrifugation ;
- Injection intra péritonéale de 1ml de surnageant à une souris mâle ;
- Mesure du temps de survie ;
- Calcul de la toxicité.

Fig. 3. Analyse des toxines paralysantes par test biologique sur souris (méthode de l'AOAC 1990)

3 RÉSULTATS

Les résultats sont regroupés dans la figure suivante :

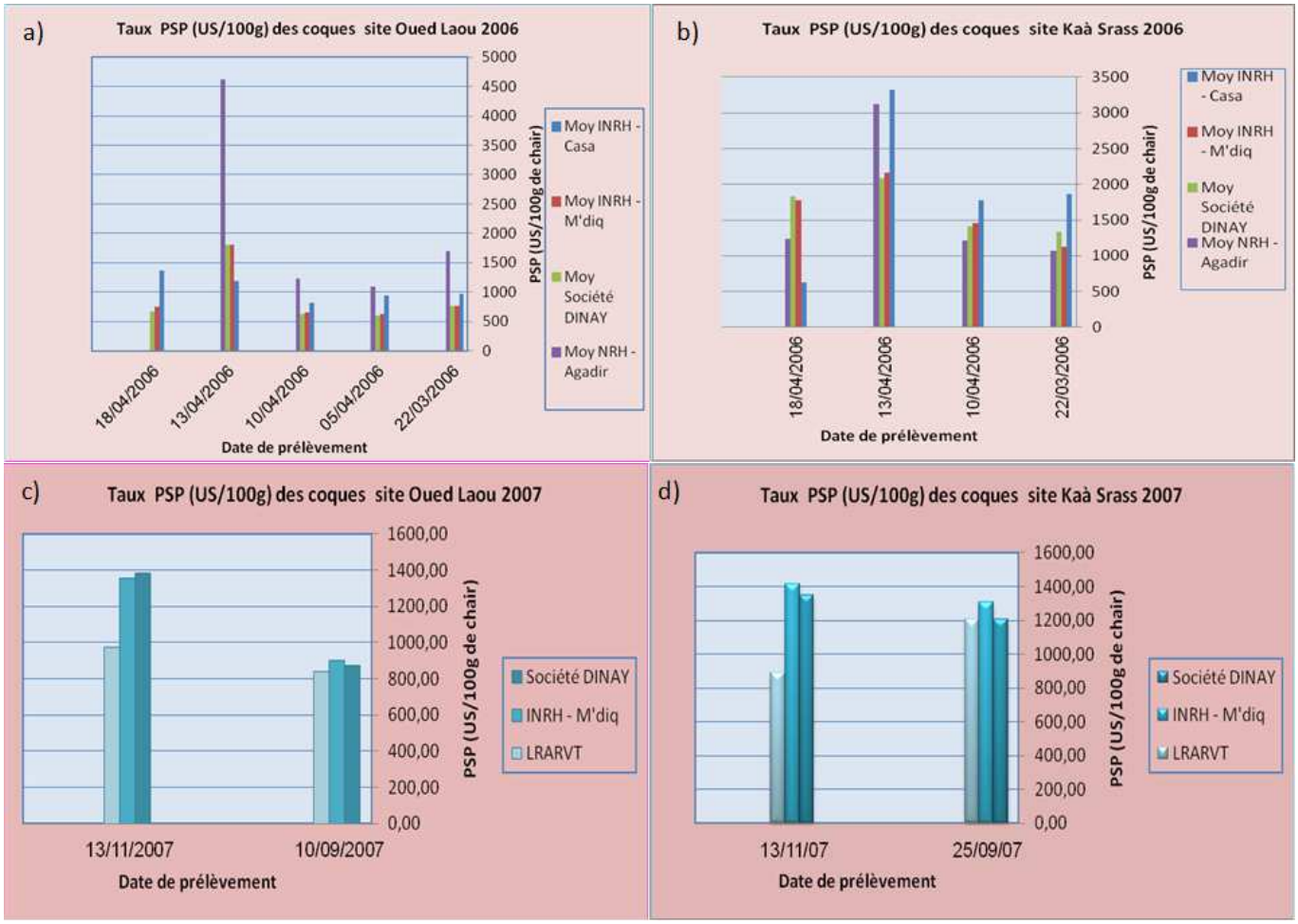


Fig.4. résultats d'analyse des biotoxines marines PSP (US/100g) réalisée par les laboratoies au niveau du site (a: OL 2006; b: KS 2006; c: OL 2007; d: KS 2007).

4 DISCUSSION

Les résultats enregistrés par chaque laboratoire ont montré au cours de la durée d'étude que le taux de PSP enregistrés dépasse parfois le seuil de 1500 US/100g de chaires.

Il est à signaler que chaque lot a fait l'objet de trois ou deux analyses répétitives voir tableaux des résultats d'analyse en annexe.

Les résultats comme les démontrent les figues et tableaux ci-joint montrent une légère différence de toxicité au niveau du même point de prélèvement et une divergence significative concernant un seul laboratoire (INRH Agadir) par rapport aux autres laboratoires qui ont des résultats proche (voir calcul statistique des résultats en annexe).

En septembre 2008 la commission interministérielle chargée du suivi de la salubrité du milieu marin et des coquillages a reconnu que les résultats obtenus en 2007 ne révèlent pas de différences significatives entre les laboratoires.

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ANNEXES

Tableau 1. Taux de biotoxines PSP (US/100g) des coques issues du site Oued Laou pour chaque laboratoire (2006).

Date de prélèvement	Echantillon	INRH - Casa	INRH - M'diq	Société DINAY	INRH - Agadir 1	INRH - Agadir 2
22/03/2006	A1	960	906,56	1059	1653	1730
	A2	971	699,13	564	//	//
	A3	//	695,25	660	//	//
05/04/2006	C1	1125	716,44	641	1079	1101
	C2	858	584,94	589	//	//
	C3	834	566,67	569	//	//
10/04/2006	D1	1044	679,89	644	1190	1281
	D2	775	639,34	618	//	//
	D3	628	628,52	605	//	//
13/04/2006	F1	1280	1882,65	1811	4908,5	4326
	F2	1242	1830,2	1889	//	//
	F3	1063	1692,55	1728	//	//
18/04/2006	H1	1488	938,22	873	//	//
	H2	1336	611,97	569	//	//
	H3	1277	694,69	574	//	//

Tableau 2. Calcul statistique des Taux des biotoxines PSP enregistrés au niveau des coques issues du site de Oued Laou (2006).

Date de prélèvement	MOY INRH - Casa	MOY INRH - M'diq	MOY Société DINAY	INRH - Agadir	Moy	Max	Min	Ecart type	Variance
22/03/2006	965,5	766,98	761	1691,5	1046,25	1691,50	761,00	440,54	194075,81
05/04/2006	939	622,68	599,67	1090	812,84	1090,00	599,67	241,06	58112,10
10/04/2006	815,67	649,25	622,33	1235,5	830,69	1235,50	622,33	283,10	80143,70
13/04/2006	1195	1801,8	1809,33	4617,25	2355,85	4617,25	1195,00	1534,84	2355719,40
18/04/2006	1367	748,29	672	-	929,10	1367,00	672,00	381,15	145274,54

Tableau 3. Taux de biotoxines PSP (US/100g) des coques issues du site Kaa Asrass pour chaque laboratoire (2006).

Date de prélèvement	Echantillon	INRH - Casa	INRH - M'diq	Société DINAY	INRH - Agadir 1	INRH - Agadir 2
22/03/2006	B1	1716	1429,64	1501,3	1048	1099
	B2	1869	1048,27	1108,2	//	//
	B3	2004	898,88	1388,14	//	//
10/04/2006	E1	1848	1811	1351,41	1178	1250,5
	E2	1755	1362,45	1435,12	//	//
	E3	1716	1178,17	1453,6	//	//
13/04/2006	G1	2880	2855,84	2359,4	2883	3352,5
	G2	3660	1554,34	2005,8	//	//
	G3	3420	2074,7	1886,05	//	//
18/04/2006	H1	888	1597,53	1579,2	1202	1269
	H2	512	2142,36	2131,3	//	//
	H3	475	1597,73	1775,82	//	//

Tableau 4. Calcul statistique des Taux des biotoxines PSP enregistrés au niveau des coques issues du site de Kaa Asrass (2006).

Date de prélèvement	MOY INRH - Casa	MOY INRH - M'diq	MOY Société DINAY	INRH - Agadir	Moy	Max	Min	Ecart type	Variance
22/03/2006	1863	1125,6	1332,55	1073,5	1348,6625	1863	1073,5	360,68	130091,32
10/04/2006	1773	1450,54	1413,38	1214,25	1462,7925	1773	1214,25	231,37	53531,26
13/04/2006	3320	2161,63	2083,75	3117,75	2670,7825	3320	2083,75	639,04	408368,91
18/04/2006	625	1779,21	1828,77	1235,5	1367,12	1828,77	625	563,03	317001,60

Tableau 5. Taux de biotoxines PSP (US/100g) des coques issues du site Oued Laou pour chaque laboratoire (2007)

Date de prélèvement	Echantillon	Société DINAY	INRH - M'diq	LRARVT
10/09/2007	A1	825	924	832
	A2	874	858	835
	A3	912	924	845
13/11/2007	C1	1459	1436	954
	C2	1312	1269	990
	A1	825	924	832

Tableau 6. Calcul statistique des Taux des biotoxines PSP enregistrés au niveau des coques issues du site de Oued Laou (2007).

Date de prélèvement	MOY Société DINAY	MOY INRH - M'diq	MOY LRARVT	Moy	Max	Min	Ecart type	Variance
22/03/2006	870,33	902,00	837,33	869,89	902,00	837,33	32,34	1 045,59
10/04/2006	1385,50	1352,50	972,00	1 236,67	1 385,50	972,00	229,80	52 808,58

Tableau 7. Taux de biotoxines PSP (US/100g) des coques issues du site Kaa Asrass pour chaque laboratoire (2007).

Date de prélèvement	Echantillon	Société DINAY	INRH - M'diq	LRARVT
25/09/2007	B1	1232	1124	1112
	B2	1112	1464	1210
	B3	1280	1336	1293
13/11/2007	D1	1312	1392	810
	D2	1392	1440	972
	B1	1232	1124	1112

Tableau 8. Calcul statistique des Taux des biotoxines PSP enregistrés au niveau des coques issues du site de Kaa Asrass (2007).

Date de prélèvement	MOY Société DINAY	MOY INRH - M'diq	MOY LRARVT	Moy	Max	Min	Ecart type	Variance
22/03/2006	1208,00	1308,00	1205,00	1240,33	1308,00	1205,00	58,62	3 436,33
10/04/2006	1352,00	1416,00	891,00	1 219,67	1 416,00	891,00	286,43	82 040,33

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Iraq in the Eye of Terror Storm

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ABSTRACT: The ancient name of Iraq is Mesopotamia. The word Mesopotamia is a combination of two words 'Meso' & 'Potamia'. The Word 'Meso' refers to 'between or middle while 'Potamia' refers to 'Water body or river. Therefore it is a land between two rivers and these two rivers were Tigris and Euphrates. The middle location can be sometimes useful while other times it may be a destructive. Iraq's geographical middle location has been responsible for rise and fall of many civilizations since ancient times. But in the present paper a discussion has been made on the present i.e. in 21st century Iraq. Presently, Iraq is trapped, firstly, between two sectarian ideologies of Islam, one is the 'Sunni sect' whose philosophy and ideology is supported by Saudi Arabia and other one is 'Shia or Shiite sect' supported by Iran. Iraq is also caught between the rivalries of U.S.A. and Russia. For both also a stable Iraq is not favorable because both supply arms and ammunition to Iraqi army. The result is in front of us, a terror off shoot of Al-Qaida known as ISIS (Islamic state of Iraq and Syria /Levant) has captured a large swath of area in the north as well as west of Iraq and capital Baghdad is under the threat of their attacks. In the present paper an attempt has been made to known exactly what are the causes behind this sectarian evil war in Iraq its geopolitical effects and some possible remedies for the solution of the current problem in Iraq have also suggested.

KEYWORDS: Mesopotamia, Location, Trapped, Rivalries and Swath.

INTRODUCTION

Iraq is an important Middle East Asian country. It shares its international borders with Turkey in north, Iran in east, Kuwait in south-east, Saudi Arabia in south, Jordan in south-west and Syria to the west. Its capital is Baghdad and 97% of its population is Muslim. Among Muslims are Shias, Sunnis, Kurds and Turkmen are important while non-muslims account for only 3% of total population of the country. About 65% of Iraqi population is Shia.

Iraq's modern borders were demarcated in 1920 AD by the League of Nations when the Ottoman Empire was divided by 'Treaty of Sevres'. After the fall of Ottoman Empire, Iraq was placed under the authority of United Kingdom as 'British Mandate of Mesopotamia'. A monarchy was established in it in 1920AD. Later on this kingdom got independence from UK in 1932. In AD 1958 there was fall of monarchy and 'Republic of Iraq' was created. Iraq remained under the control of 'Arab Socialist Ba'ath Party' from 1968 to 2003 AD. But after the fall of Saddam Hussein and his Ba'ath party by an invasion led by United States and its allied countries' a multi party democracy was established in the country. But Iraqi insurgency is still Continue after the departure of United States and its allied nations' forces in 2011, in form of 'Islamic State of Iraq and Syria/Levent' (ISIS) fighting against present democratic government and having an aim of establishing Caliphate over entire Iraq and its surrounding areas.

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OBJECTIVES

Following are the main objectives of this study:

(I) To study the causes behind events that led to this struggle between government and ISIS terrorist forces.
(II) To study geopolitical impacts of this sectarian civil war.
(III) To study role of regional as well as global super powers behind present conditions in Iraq.

METHODOLOGY

The present paper has used information obtained from various sources including articles from newspapers, magazines, internet and numerous books and research papers.

AREA OF STUDY

The country of Iraq is situated in Middle East Asia. It is also known as 'Mesopotamia'. It has a hot arid climate with sub-tropical influences. It has vast reserves of mineral oil on which the heartbeat of modern day industrial world runs. In the present paper an attempt has been made to study causes and effects of present day violent conditions prevailing in the country.

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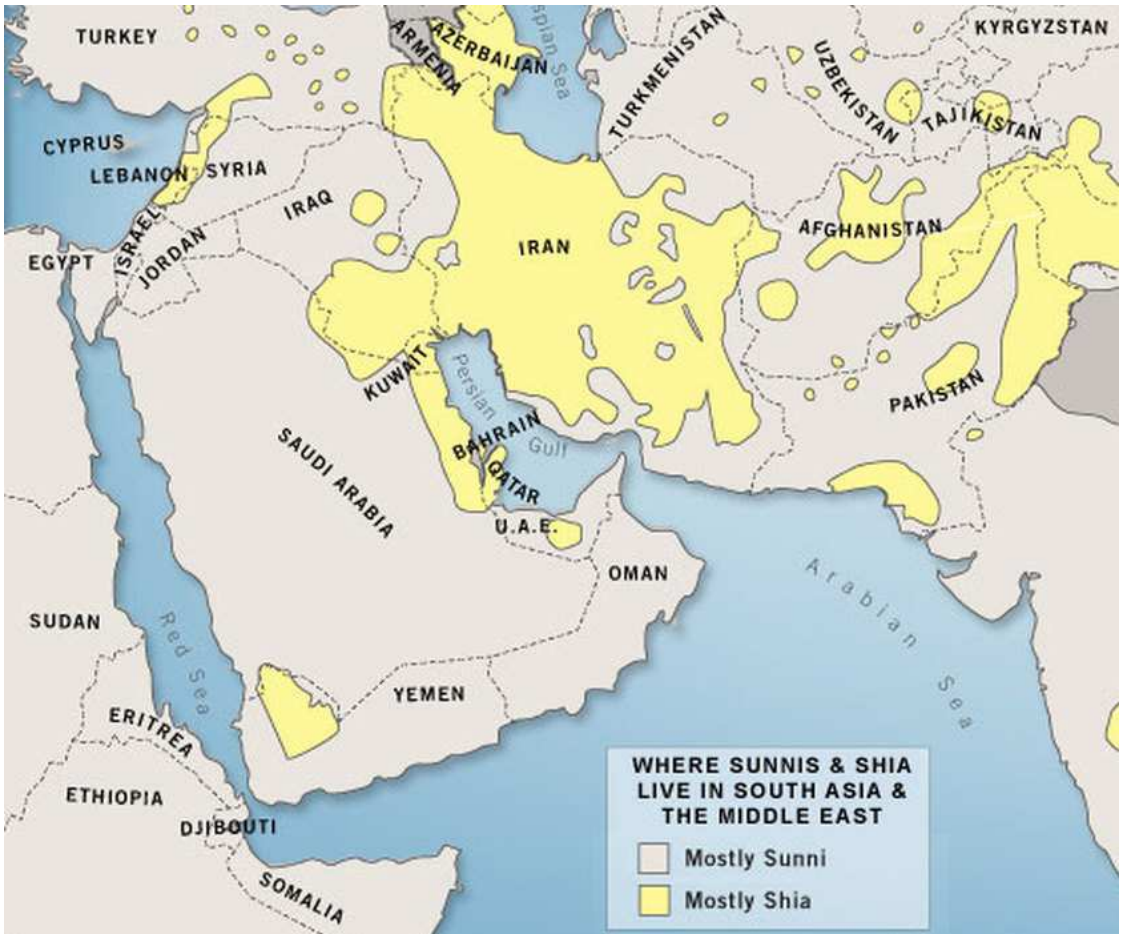
BACKGROUND

Following the withdrawal of United States and its allied troops in 2011, the insurgency continued and a political instability in the country started emerging. The influence of 'Arab Spring' also failed to topple the present government in Iraq. In 2012 and 2013 the level of violence in Iraq increased and civil war in Syria also gave it much needed strength. In December 2012, mainly Sunni Arabs protested against the present Nouri-Al-Maliki's Shiite dominated government for marginalizing them. Thus a sectarian fight started and a large number of people belonging to Sunni and Shia sects started attacking each other. In 2014, an Al-Qaida splinter ISIL or sometimes ISIS (Islamic state of Iraq & Levent/Syria) a terror group, which also comprise

many fighters who were earlier loyal to Saddam Hussein, seized control of several major Iraqi cities including Tikrit, Faluja and Mosul. This capture of important cities has led to thousands of internally displaced persons and thousands have been killed due to fighting between government forces and terrorist forces.

The sectarian civil war in Iraq has a number of causes behind its existence. Some important causes are as follows:

1. SHIA-SUNNI SCHISM: This is the most Important cause of present day conditions in Iraq. The rift between two great denominations of Islam is the oldest one. Out of total world's Muslim population, Shias comprise about 10% to 20% of the total Muslim population of the world. In most of the countries they are in minority. But in Iraq, Iran, Bahrain and Azerbaijan they out number their co-religionists.



The rift between these two sects goes right back to the beginning. After the death of Prophet Mohammad in 7th century the question of succeeding him arose. A majority of Prophet Mohammad's followers were of view that Prophet Mohammad's close associate 'Abu Bakr' should be the leader. So they became Sunnis. But a minority of followers believed that Prophet Mohammad's son-in-Law and nephew 'Ali' should succeed. Shia is an abbreviation of 'Shia Ali' which means 'The Party of Ali'.

Later on Ali was killed and his son Hussein was also killed. This has led to a widening of rift as well as seeds of civil war had also been sown. Their mutual hatred has led to brutal and genocidal persecution of Shias in many parts of the world.

2. SELFISH INTERESTS OF WESTERN POWERS: Among western world powers first of all Britain in order to strengthen its position in Iraq utilized first the Shia-Sunni rift just like in India they use 'divide and rule' policy against Hindus and Muslims which led the division India and Pakistan on the basis of religion. Similarly due of fear of a severe Shia rebellion, Britain used an elite of Sunni army officers to crush the revolt.

After World War II the geopolitical situation of the world changed and now United States of America (U.S.A) and Russia become dominant players on international arena.

Both of these countries have their own interest in this region. U.S.A. is very much interested in this region due to vast reserves of crude oil in this region. Had the government in Iraq been strong, U.S.A. will not be able to obtain oil at cheaper rates but due to fragile political conditions, particularly after the fall of Saddam Hussein, U.S.A. has used the oil reserves of this country at its own will and also at the cost of preserving her own oil reserves. By maintaining strong position in Iraq, it can also keep eye on the movements of is cold war opponent Russia. Thus, for this U.S.A. has also used the fragile political nature of Iraq for it own benefits and now when there is a real need of American help to Crush the forward Movement of ISIS militant forces, it is showing lesser interest while to counter U.S. influence by providing fighter aircrafts to Iraq, Russia is using the situation for her own interest.

3. RIVALARIES OF REGIONAL POWERS:- In this Middle East Asia region, on the basis of religious sects Shiite Iran and Sunni Saudi Arabia from a long time are fighting a proxy war against each other to gain roots as well as influence over Iraq. Saudi Arabia is indirectly helping the Sunni insurgents in Iraq whereas Iran's support to Shiite government in Iraq has also contributed to sectarian civil war.

4. RAMPANT CORRUPTION: - Iraq is suffering from this problem especially when the Americans told Iraqi army to outsource food and other supplies in 2005. A battalion commander was paid for a unit of 600 men but they generally had 200 to 300 men, the money for extra soldiers who do not exist in reality goes in to the pockets of the high officers. To some retired army officer, army has become a source of corruption for senior officer. Same is the condition of normal public administration. Youth has no jobs. As a result they got attracted towards these terrorist agencies which pay a hefty sum of money to its recruitees.

ROLE OF SUPER POWERS

Two most important super powers U.S.A and Russia have their own interests in this region even after the end of cold war still U.S.A wants to keep on eye on its rival Russia who has the boundaries touching in this region. U.S.A. is mainly interested in the vast oil reserves of Iraq. Therefore in this region U.S has always supported those governments who are the puppets of U.S.A. or pro-Western governments be it 'The Shah of Iran' who was later on toppled by Ayatollah Khomeini of Iran or the rulers of Saudi Arabia who have always enjoyed the patronage of U.S.A. Contrary to this, anti-American rulers like Saddam Hussein of Iraq and Bashar-al-Asad of Syria suffered the anger of U.S.A. Saddam Hussein was deliberately put to death by U.S.A.

There were very little evidences of weapons of mass destruction in Iraq. But most probably due to 9/11 tragedy, oil reserve control, to eliminate Saddam Hussein and establishing a weak democratic pro-western government, U.S. attacked Iraq.

Moreover to show its military superiority U.S. invaded Iraq. Due to this reason U.S. and its allies did not bothered about a majority of other nations who were not in the favor of invasion of Iraq.

On the other hand Russia wants to counter the influence as well as U.S. interference in this region because it may have an impact on its Chechnya, Georgia and other southern status. A pro- US government in Middle East usually lends support to the Jihadists fighting in the above mentioned parts of Russia. Russia recently has succeeded in side tracking the U.S. efforts to dethrone Bashar-AI-Asad in Syria by providing a solution to destroy the chemical as well as weapons of mass destruction. Moreover, due to reluctance of U.S. and other western powers to directly help militarily to Iraq and refusal to U.S.A. to provide air force help to ground based Iraqi military has given the Russia and opportunity to increase her influence in the region. Therefore for the said purpose Russia has given Iraq second hand Sukhoi fighter aircrafts as well as its ammunition to launch an all out attack on ISIS terror force.

Moreover Middle East Asia is also a testing ground for new weapons. Therefore, both of these countries have used this area to test their new weapons in one or the other part of the present history.

ROLE OF REGIONAL POWERS

Three are three major regional powers who have a great role in shaping events in Iraq. These regional powers are Iran, Saudi Arabia and Egypt. Israel is also and important actor of this region. First of all we must understand the role of Iran in present problem of Iraq. Iran's relations, since the written history begins, have seen ups and downs with Iraq. But being a Shia Muslim population majority country, Iran has always kept a soft corner for Iraq. Though their relation went to lowest ebb during the reign of Saddam Hussein, a Sunni dictator ruler of Iraq and both countries fought war against each other. But during this time too, Iran housed a number of anti- Saddam Shiite organization.

But after post- Saddam era, there relations have been improved and now Iran is Iraq's largest trade partner. A Shiite government in Iraq, according to some geopolitical scholars will always be favorable for Iran because being a strong country, good relations with Shia dominant countries may help Iran to represent itself as a 'Protector of Shias' in the world. This feeling is also working behind the ideology of Iran to develop nuclear arsenal to which U.S.A. and its allies in the west are opposed because this will make Iran very strong in the region against Saudis and Israel, all these are important allies of US in this region.

On the other hand, Saudi Arabia has uneasy ties with present government of Iraq because of its close ties with Iran and marginalization Sunnis of Iraq. Saudi Arabia has blamed only Iraq for its present condition. We know that Saudi Arabia is Sunni majority country. It wants to counter the Shia Islamic influence in Iraq. Therefore, it has always supported financially the Sunni jihadist terror fighters in Iraq. Saudi Wahhabis have always helped and financed these terror group Iraq. ISIS (Islamic State of Iraq and Syria/Levent) is a beneficiary of Saudi Wahhabis. Moreover, Saudis also have divergent views with Iraq regarding oil production and exports. Saudis want to keep Iran in isolation and also indirectly supporting instability in Iraq so that a so called 'Shia Axis' including Iran, Iraq, Syria and Lebanon may not emerge against them and Saudis may remain an influential power in this region.

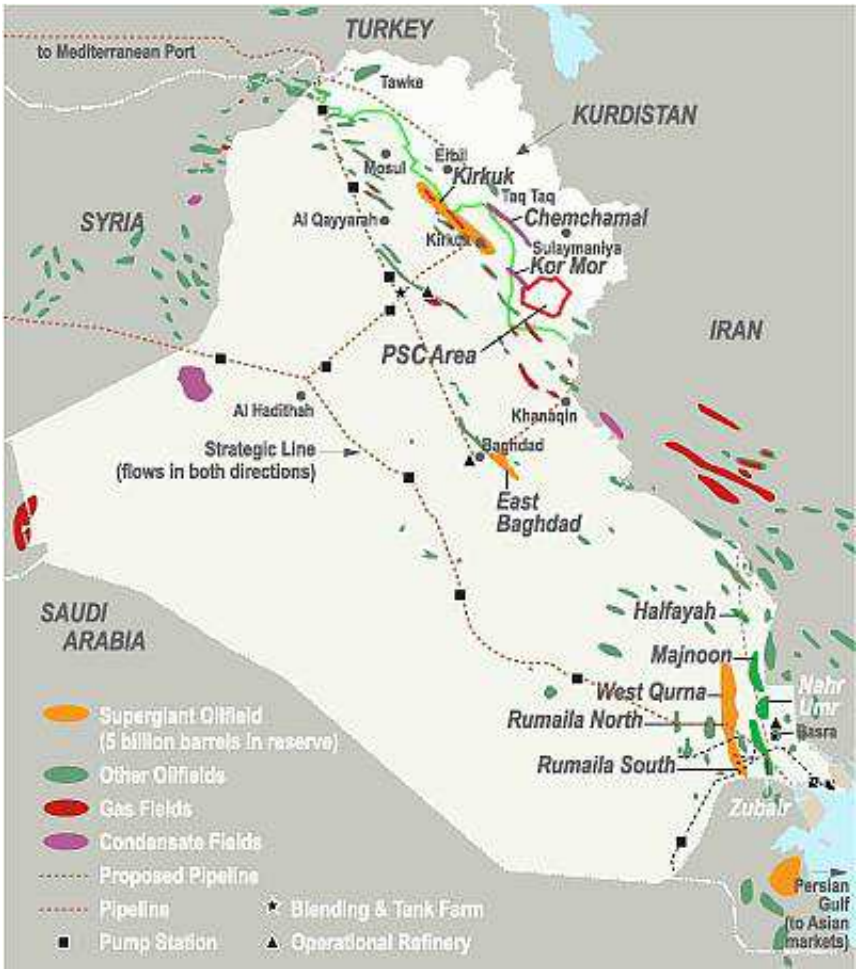
Egypt another Sunni Islamic power of this region is absent from the scene because of its domestic political upheavals.

Israel, another important country in region and an ally of U.S.A is also in favour of not involving Iran in internal matters of Iraq. Israelis' are of the view that good relations of Iran & Iraq will not be in favour of Israel as both Iran and Israel are the emerging powers of this region.

GEOPOLITICAL IMPACTS OF IRAQI CIVIL WAR

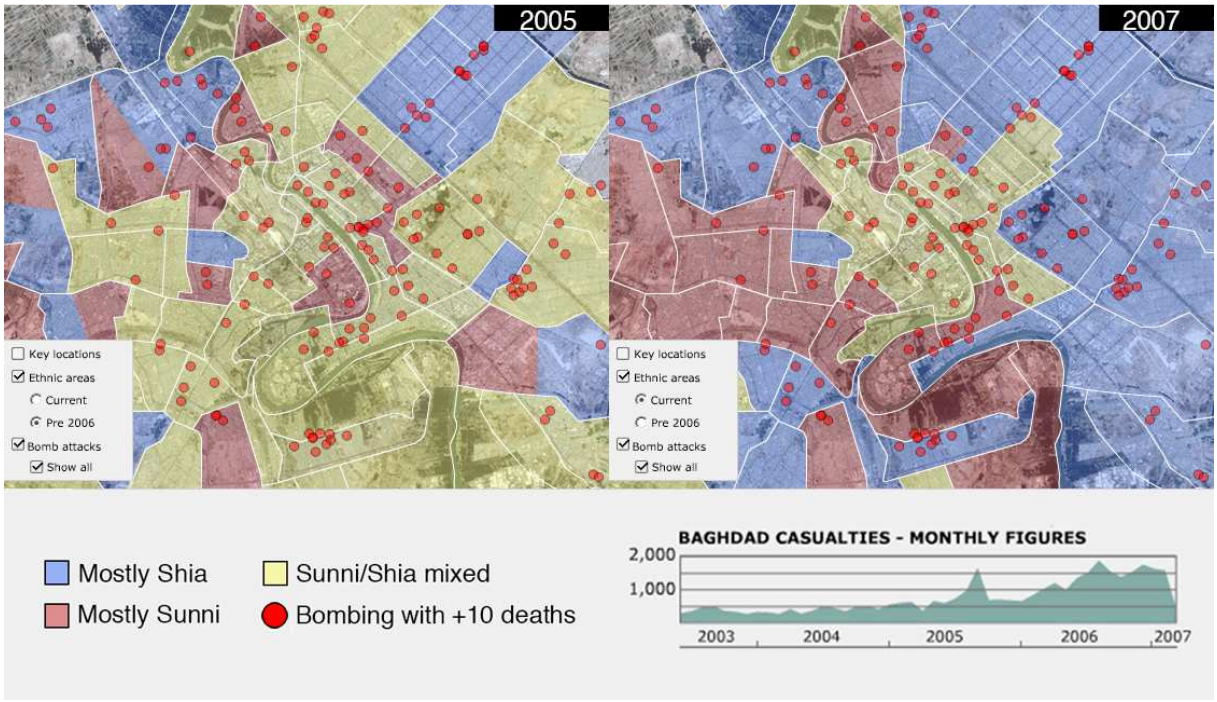
They are as follows:

1. RISE IN GLOBAL OIL PRICE: Iraq has fifth largest proven reserves of mineral oil in the world. This oil is mainly concentrated in Shia dominated south and Kurdish north. The Sunni dominated western region of the country lacks this mineral wealth. Therefore, the ISIS has captured the oil refineries of the country. This may result in rise in global crude oil prices. Moreover, they can purchase much needed material for war to continue their struggle against the legitimate government in Baghdad.



(See major oil production centers of Iraq in Map)

2. ETHNIC CLEANSING OF IRAQ: The present nationwide sectarian civil war may led to ethnic cleansing of one sect in the dominated areas of other sects. (see the map below of Baghdad city & religious make up in 2005 Mixed neighborhoods, then the norm are in yellow. The map on right shows what it looked like by 2007, after two awful years of Shia-Sunni killing, bombings (shown with red dots), death squads and militias. The forced evictions and thousands of deaths effectively cleansed neighborhoods, to be mostly Shia (blue) or mostly Sunni (red).

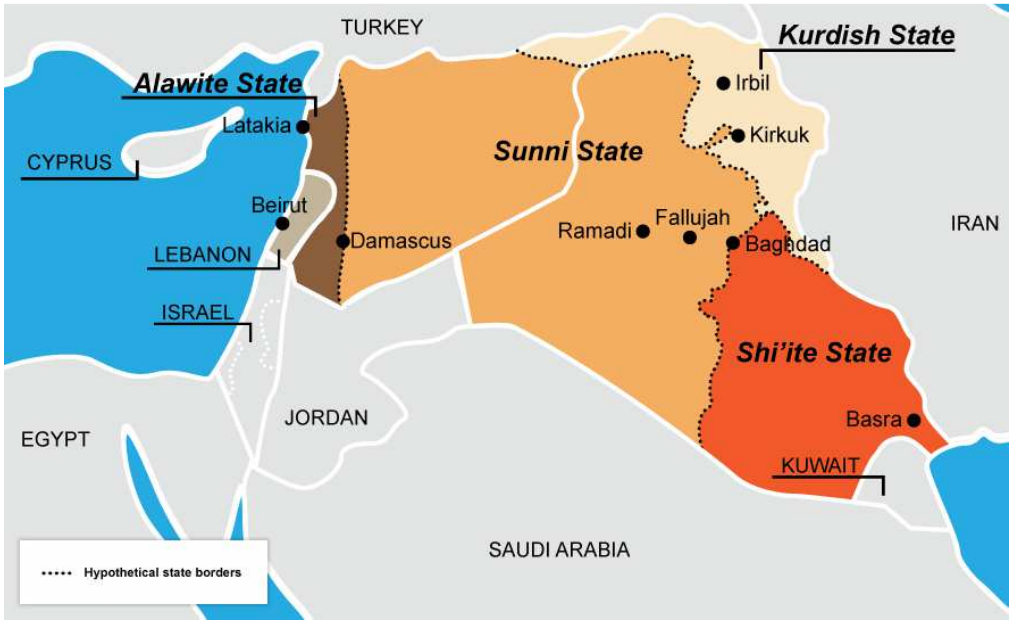


The ethnic violence in Iraq may result in worldwide sectarian violence among Shias & Sunnis particularly in Pakistan, India, and Indonesia etc.

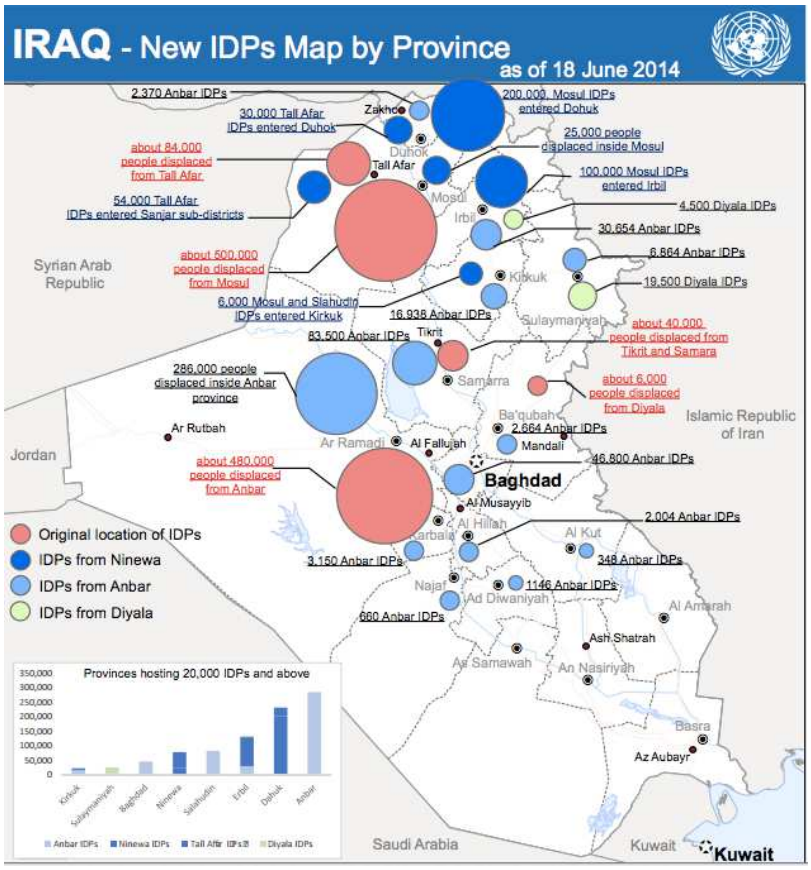
3. THREAT TO WAR AGAINST TERROR:- The disintegration of Iraq will give a massive blow to the launched war against terror by U.S.A not only in this region but also in the entire world.

4. DESTRUCTION OF HERITAGE SITES: - Many heritage sites in areas under the control of ISIS are either destroyed or may face the danger of their destruction. This may further generate anger among the world community.

5. THREAT TO INTEGRITY OF THE STATE OF IRAQ: - ISIS's declaration of their captured areas as independent may result in the disintegration of Iraq in to its three major ethnic components such as Kurdistan in north, Sunni dominated western and areas along Syrian borders and Shia dominated southern and eastern. Iraq Now challenge before the present government of Iraq is to unite their people first and then fight against ISIS.



6. IRAQI CIVILIANS DISPLACED BY THE CRISES: This sectarian civil war has resulted in more than one million internally displaced people which are roughly about 3% of country's total population. Their resettlement will be a challenge for the government.



POSSIBLE REMEDIES

There is nothing impossible in this world. The problem of ISIS and ethnic civil war cannot be solved in one day. But certain steps should be taken to achieve a victory over these problems. These are as follows:

(1) Unity of nation at the time of crisis is first and most important thing. Government of Iraq should ensure a strong feeling of patriotism and defense of their motherland against the marching enemy terror troops among its all population. Terrorist is no one's friend. All sections of society should be united together to fight against ISIS terrorists.

(2) As Iraqi political leaders failed to select their representative in their parliament who will takeover the reign of country after the exit of Nouri-al-Maliki. They should select such a leader who represents all sections, of Iraqi society without any discrimination.

(3) Major world powers at this point of time should help militarily to the ground forces of Iraq to capture the lost areas from terrorist's forces.

(4) United Nations should come forward in solving Iraqi dispute without hurting the territorial integrity of this nation.

(5) Regional powers such as Iran and Saudi Arabia should also help Iraq in this situation. Only Iran has already declared for full scale help to Iraq. But no such declaration has come from the sides of Saudi Arabia.

CONCLUSION

Iraq also known as 'Mesopotamia' in ancient times today is passing through its one of the most difficult a phase in its history when its survival as a unified state is in danger. Now the time has come that in global fight against terrorism all the sectarian minorities as well as majority people have to forget their personal disputes and fight against the evil of ISIS to save

their country. Because once you loose your motherland, you lose everything. Moreover international community should also come forward in support of present Iraqi government. If no immediate actions are taken then it will be a threat for Iraq as an integrated nation and also a massive blow to international community's war against terror.

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CHARACTERIZATION OF INDUSTRIAL WASTEWATER TREATED BY NATURAL LAGOON (PAPER MILL IN SIDI YAHIA GHARB, MOROCCO)

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ABSTRACT: The impact of industrial effluents on environment is an obvious reality and a serious threat in the medium term for the quality of surface water and ground water as well. The impact on the water environment surrounding the paper mill (CDM) in Sidi Yahia Gharb is mainly due to the use of water in the manufacturing of pulp using the Kraft process and the discharge of waste effluents in: the Maâmora forest, its water table and Sebou River.

The physicochemical characterization of wastewater studied during the probationary period 2012/2013 was used to assess their properties and degree of pollution. Raw release is characterized by an average pH of 6.3 in summer and in winter 7.9; an average temperature of 47°C in summer and 41°C in winter; an average (BOD5) of 334.3 mg/L in summer and 252.8 mg/L in winter; an average (COD) of 1072.2 mg/L in summer and 1567.5 mg/L in winter and average levels of (SS) 48.8 mg/L in summer and 86.6 mg/L in winter. These liquid wastes are of a mixed nature (COD/BOD5 is between 3 and 5).

During wastewater treatment, the average purification efficiency reaches 40.7% (BOD5), 38.5% (COD) and 66.1% (SS). This assessment allows us to say that biological Wastewater Treatment Plant (WWTP) of the CDM is inefficient and do not meet the standards of indirect discharges.

KEYWORDS: CDM, Wastewater Treatment Plant (WWTP), physicochemical parameters.

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1 INTRODUCTION

Water is a precious commodity that undergoes various types of pollution and degradation of various origins: industrial, domestic and agricultural. With the industrial revolution of the nineteenth century, the value of water vapor has not only the answer to the need of the industry but also the development of its productive capacity. Water has become an essential material for the operation of plants. Consequently, water is faced with difficult situations and causes disruption of all ecosystems especially aquatic systems. The major problems of water in Morocco today are related firstly to the overexploitation of water supplies, and secondly to the degradation of the quality of water resources given the inadequate and sometimes the lack of wastewater treatment [1]. In Morocco, the pulp and paper industry has always been linked to a greater need for water consumption. Indeed the paper industry ranks third in the world for the use of water (5 to 20 m3 per ton of paper produced) and is one of the industries with the greatest amount of effluent [2].

The present work aims to characterize the physicochemical properties of raw and treated wastewater of the industrial unit Cellulose Du Maroc (CDM) during the internship period 2012/2013. Its main objective is to highlight the degree of pollution from various industrial activities of this unit and deduce the performance of the water treatment station in question. This study is based on physicochemical parameters such as pH, temperature, biological oxygen demand (BOD5), chemical oxygen demand (COD) and suspended solids (SS).

2 MATERIALS AND METHODOLOGY

2.1 STUDY AREA

Cellulose Du Maroc is located 4KM from Sidi Yahia Gharb (Figure 1). The city of Sidi Yahia Gharb is a municipality within the province of Sidi Slimane and is part of the region of Gharb Cherarda Bni Hssein. Sidi Yahia center is located about 26 km north east of the city of Kenitra and connects the cities of Kenitra and Sidi Slimane on the main road RP3 [3]. The city of Sidi Yahia Gharb is located along South East Gharb plain, on the transition zone between the Maâmora and the Gharb water tables; it is a very low but large basin that covers an area of 616 ha. The population of this city, according to the 2004 census, is 31705 inhabitants. The climate of Sidi Yahia Gharb is marked by:

- The oceanic influence, within a sub humid bioclimatic zone with a moderate temperature in winter.
- Higher air humidity and lower temperature.

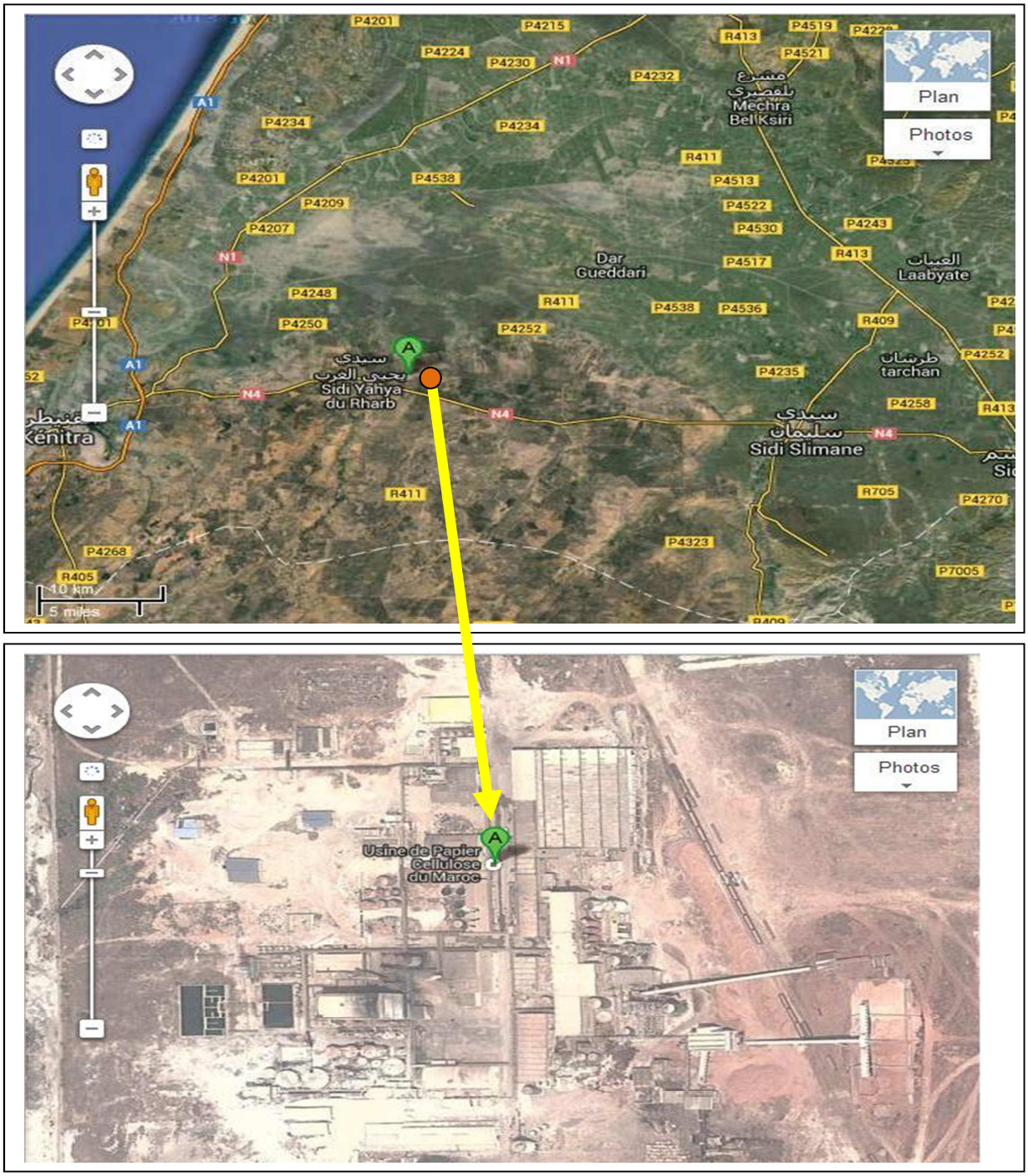

Fig.1. geographical location of Sidi Yahia Gharb and paper mill (CDM).

Founded in 1952, Cellulose Du Maroc (CDM) manufactures pulp by the KRAFT process using caustic soda (NaOH) and sodium sulfide (NaS_2) as cooking liquor (processed in sodium sulfate). Eucalyptus is used, 50% of which comes from Moroccan forests and the other part is imported. The choice of the location of this paper mill can be justified by the following factors:

- The presence of a large groundwater (Maâmora 390 km² in stretch).
- The existence of a road and rail infrastructure facilitating transactions.
- The presence of the port of Kenitra.
- The existence of a nucleus plantation covering 10 000 ha during its creation.

2.2 DESCRIPTION OF WASTEWATER TREATMENT OF CDM

Effluents from the paper mill of CDM are processed by the natural lagoon. This Wastewater Treatment Plant (WWTP) is composed of three basins in a series of varying depths of one meter to 1.5 meters. Wastewater can stay there for about 5 days in summer and winter. No mechanical ventilation, however, is provided for these two basins. The first basin is 300 m long by 30 m wide. The second tank has a width of 35 m and a length of 350 m. The last portion of the treatment cell is the maturation pond with a width of 35 m and a length of 380 m. This terminal provides the sedimentation of organic waste that remains in suspension and the elimination of pathogens.

2.3 SAMPLING AND ANALYSIS OF WASTE WATER

The sampling was carried out in the anaerobic wastewater treatment unit during the summer of 2012 (June, July and August 2012) and the winter of 2012/2013 (November, December 2012 and January 2013).

The samples were taken at two specific locations: at the entrance of the WWTP (raw wastewater) and the output of the WWTP (treated wastewater).

Wastewater samples were taken in a1 liter plastic container and then stored at about 4 ° C.

Physicochemical parameters under observation were: temperature, pH, Chemical Oxygen Demand (COD), biochemical oxygen demand for 5 days (BOD5) and suspended solids (SS).

The temperature and pH were determined by a Consort C831 pH meter with a temperature measuring probe.

The SS (Suspended Solids) are determined by filtering a volume of waste water by means of a borosilicate glass fiber filter.

The COD was determined by the colorimetric method (oxidation with potassium dichromate in acid) [4].

Biochemical oxygen demand (BOD5) was determined by the OxiTop method which is still one of the most important measures in hydrology. It assesses water and wastewater loads in biodegradable substances.

3 RESULTS AND DISCUSSIONS

In the paper mill, the water takes part in the manufacturing process as a factor of dispersion and transport of fibrous raw materials and additives. The many tasks assigned to water makes of it a key element both qualitatively and quantitatively. Detailed results of the physicochemical analysis of wastewater of Cellulose du Maroc are summarized in tables 1, 2, and 3.

Table 1. Physicochemical parameters of raw wastewater

Parameters	Number of samples	Summer				Winter			
		Min.	Max.	Average	Standard Deviation	Min.	Max.	Average	Standard Deviation
T (°C)	16	45	49	47	2	39	44	41	2,6
pH	16	5,1	7,18	6,3	1,1	7,36	8,25	7,9	0,5
BOD5 (mg/L)	16	301,67	382,75	334 ,3	42,8	195,90	325,5	252,8	66,2
COD (mg/L)	16	857	1427	1072,2	309,6	1221	1812,67	1567,5	308,7
SS (mg/L)	16	15,50	83,33	48,8	33,9	18	196	86,9	95,5
COD/BOD5	16	2,69	3,73	3,2	0,5	5,57	7,04	6,3	0,7

Table 2. Physicochemical parameters of treated wastewater

Parameters	Number of samples	Summer				Winter			
		Min.	Max.	Avg.	Std. Dev.	Min.	Max.	Avg.	Std. Dev.
T (°C)	16	32	35	33,3	1,5	30	41	34,3	5,9
pH	16	4,54	7,10	6,1	1,4	7,49	7,72	7,7	0,2
BOD5 (mg/L)	16	164,67	315,25	224,8	79,7	93,67	140,33	121,8	24,8
COD (mg/L)	16	425,5	782	597,2	178,6	792	1090	1023,8	206,8
SS (mg/L)	16	3,50	26,67	12,8	12,2	16	24	31,6	20,4
COD/BOD5	16	1,85	4,75	2 ,9	1,6	6,02	7,8	8,8	3,5

Table 3. Daily pollutants flux totals and corresponding average concentrations of (CDM), calculated from the average of two studies (summer & winter of 2012/2013).

Pollutants (2012/2013)	Flux rate (m^3/j)	Flux total at the entrance	Flux total eliminated	Flux totals at the exit	Average global output of the WWTP (en %)
COD_{avg} (mg/L)		1319.85	509.35	810.5	38,5%
COD (kg/day)	17000	22437450	8658950	13778500	
$BOD5_{avg}$ (mg/L)		293.4	119.7	173.3	40,7%
DBO5 (kg/day)	17000	4987800	2034900	2946100	
SS_{avg} (mg/L)		67.7	44.8	22.2	66,1%
SS (kg/day)	17000	1150900	761600	377400	

The demand for paper products will increase over the next decade and this trend will most likely have an impact on the aquatic environment. Given the drastic measures of legislation with regard to the discharge limits authorized in the natural environment, industries are paying more and more attention to the treatment of effluents.

Table 4. Specific Discharge Limit Values applicable to discharges from industries of pulp, paper and cardboard [5].

Parameters	Specific Discharge Limit Values	
	Pulp paper Industry	Pulp paper and cardboard industry
Temperature	30 °C	Do not exceed 10 ° C temperature of the receiving environment
pH	5,5-8,5	5,5-8,5
BOD5	100 mg/L	200 mg/L
COD	1000 mg/L	900 mg/L
SS	200 mg /L	400 mg/L
Iron (Fe)	3 mg/L	3 mg/L
Sulfide ($S2^-$)	2 mg/L	--
Arsenic (As)	0,1 mg/L	0,1 mg/L
Aluminium (Al)	10 mg/L	--
Zinc total	2 mg/L	mg/L

3.1 THE TEMPERATURE

Variations in the temperature of the WWTP have important effects because they influence the development of colonies of micro-organisms [6].

At the entrance to the WWTP, the water temperature is an average of 47°C in summer and 41°C in winter. At the outlet of the WWTP, the water temperature is an average of 34.3°C in summer and 33°C in winter. These temperature values

represent a risk of thermal pollution to the receiving environment, but in favor of an acceleration of the biological processes of waste water and mud, as they contribute to increasing the kinetics of degradation of organic matter [7].

3.2 pH

The pH is an efficient pollution indicator which varies according to the basic nature of the effluent (cooking, washing of resin: NaOH, NA_2S) or acid (dioxide, washing the resin: H_2S_4). The biological pH range is between 6.5 and 8.5 [8]. During the two sampling periods, the pH of the WWTP remained relatively constant at the output. However, it was noted that the pH of the raw effluent has large fluctuations. Indeed values vary between 4.6 and 8.25 units and the average value is around 6.3 to 7.9 in summer and winter. pH fluctuation of the raw effluent is due to the use of chemicals at the bleaching stage (ClO_2 and SO_2).

3.3 Suspended Solids (SS)

The effluents are better characterized and described in terms of BOD5, SS and COD. Suspended solids (SS) do not decrease enough during their passage through the WWTP. This stability is due to the fact that SS consist mainly of wood fibers, which because of their short length, are not retained by the sieve during the process of transformation [9]. In addition, remaining suspended solids (including lignin) are less biodegradable and usually take a long time to degrade [10]. At the entrance of the WWTP, suspended solids (SS) are on average 86.9 mg/L in summer and 48.8 mg/L in winter. At the end of WWTP, they are averaging 31.6 mg/L in summer and 12.8 mg/L in winter, while in a similar study by BeiSavance (1998) in Canada [11], the values averages found at the outlet of the WWTP are 27 mg/L was 50 mg/L in the winter. These values recorded at the entrance of the basin, both in summer and winter, indicate that they are within paper mill emissions standards (200 mg /L) [5].

3.4 Chemical Oxygen Demand: COD

COD is used to assess the concentration of organic or mineral materials, dissolved or suspended in water, through the amount of oxygen required for the total chemical oxidation. At the entrance to the WWTP, the average COD is 1072.2 mg/L in summer and 1567.5 mg/L in winter. At the outlet of the WWTP, the average COD is 597.2 mg/L in summer and is1023.8 mg/L in winter. In comparison with the COD of other food industries [12], these values are lower but they exceed the limits of discharges of pulp industries by the Moroccan standard (1000 mg/L) [5].

3.5 Biochemical Oxygen Demand: BOD5

BOD indicates the amount of oxygen which is used for the destruction of organic substances decomposed by biochemical processes [13]. At the entrance of the WWTP, BOD5 is in average 334.3 mg/L in summer and 252.8 mg/L in winter. At the output of WWTP, BOD5 is in average 224.8 mg/L in summer and 121.8 mg/L in winter. These values exceed the limits of paper discharges by the Moroccan standard (100 mg/L) [5].

3.6 The ratio COD/BOD5

The COD/BOD5 ratio is relevant to the definition of the chain of effluent treatment (COD/BOD5 ratio less than 3) [14]. Indeed, a low value of COD/BOD5 ratio implies the presence of a large proportion of biodegradable material and makes it possible to think of biological treatment. Conversely, a large value of this ratio indicates that much of the organic material is not biodegradable and, in this case, it is preferable to consider a physicochemical treatment. The results of this report stress the importance of pollutants which are less biodegradable or not biodegradable at all. At the entrance to the WWTP, the average ratio of COD/BOD5 is 3.2 in summer and 6.3 in winter. At the outlet of the WWTP, the COD/BOD5 ratio is 2.9 in summer and 8.8 in winter. The treatment efficiency of the WWTP of CDM classifies wastewater from the CDM as mixed (containing organic and inorganic materials) and less biodegradable since the COD/BOD5 ratio at the outlet of WWTP is between 3 and 5. Thus, the COD/BOD5 ratio confirms the specificity of wastewater from paper mills in general and the CDM in the city of Sidi Yahia, in particular, for being mixed; hence, a suitable biological treatment might be suitable.

3.7 FLOW POLLUTING TOTAL OF THE CDM

For COD, BOD5 and SS, table 3 shows that daily concentrations remain very high at the entrance and the exit of the WWTP. They get from 22437450 kg/day to 13778500 kg/day for the (COD), from 4987800 kg/day to 2946100 kg/day for (BOD5) and from 1150900 kg/day to 377400 kg/day for (SS) with a turnover rate of approximately 40.7%, 38.5% and 66.1% respectively. The high turnover rate of SS is mainly due, on the one hand, to the improvement of the system of fiber recovery in the processing plants, and secondly, to the fact that the suspended solids reside easily. Furthermore, it should be noted that the development of a foam layer is due to the hydrolysis of various fats used or generated during the manufacturing process of pulp.

4 CONCLUSION

This work was carried out in order to diagnose the physicochemical state of the wastewater of industrial paper mill of the city of Sidi Yahia Gharb and to assess the performance of its WWTP. We can safely conclude that:

The effluent from the CDM is relatively concentrated compared to the grid established for Moroccan pulp mill effluents. This wastewater concentration is reflected in this case by the mean values of COD and BOD5 exceeding the upper limits of normal range [5].

Temperatures and pH slightly exceed the standards of papermaking discharges.

The COD/BOD5 ratio, calculated through the monitoring results during the 2012/2013 study, shows an average value of 4.5.These liquid wastes are of a mixed nature, which means that these effluents contain biodegradable substances and other poorly biodegradable ones(lignin).

suspended solids (SS) meet specific limited values of papermaking releases set by Decree No. 5448 of 29 Jumada II 1427. Rabat 2006.

The purifying efficiency of the WWTP of CDM of BOD5, COD and SS are respectively 40.7%, 38.5% and 66.1%. These results are restricted because the treatment is limited in anaerobic lagoons.

This assessment enables us to say that the WWTP of the CDM is less effective. For this reason and to meet the Moroccan standards papermaking releases, we recommend two solutions:

1 - Improving the technique used by making optional and maturation lagoons.
2 - The transfer of the natural lagoons into aerated lagoons feeding the existing anaerobic lagoons by aerators.

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Impact of Corporate Governance on Corporate Cash Holdings: An empirical study of firms in manufacturing industry of Pakistan

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ABSTRACT: Basing on agency theory this empirical study explores the effect of corporate governance on managerial cash holding decisions. For the sake of a testable propositions concerning the determinants of corporate cash holdings, different theories of corporate cash holdings are reviewed (pecking order theory, trade off theory and free cash flow theory).The investigation is performed using panel data procedure for a sample of 138 firms listed on Karachi Stock Exchange during 2008-12.The results suggest that cash flow is the only variable which is statistically significant and positively related to cash holdings. Alternatively, liquidity, leverage, bank borrowing variability of cash flow is significantly and negatively related to cash holdings. Dividend, market-to-book ratio and ratio of non-executive to total directors are positively whereas firm size family dummy and CEO duality are negatively related to cash holdings but the relationships are insignificant. In particular managerial ownership (MAN) and MAN^3 is negative but significant however MAN^2 is positively related to cash holdings. These variations in sings indicate the non-linear relationship between managerial ownership and cash holdings. To author knowledge this is first study that explores corporate governance as an important determinant of cash holding.

KEYWORDS: Corporate governance, Cash holdings, Pakistan, Manufacturing firm.

1 INTRODUCTION

One saying is: *"revenue is vanity, cash flow is sanity, but cash is king "*. Cash is king because any businesses can survive in the short- to medium-term even if they are making loss but with sufficient amount of cash .So firms prefer to hold significant amount of cash but a question leading to an unsolvable mystery is why firms hold large amount of cash and what are the factors which effect managers cash holding decisions. Finance Literature defines cash holding as sum of cash and cash equivalents (Opler, Pinkowitz, Stulz, &Williamson, 1999) (Ferreira & Vilela, 2004)(Ozkan & Ozkan, 2004) (Bates, Kahle & Stulz, 2009). Advantages of cash holing are ,firms with sufficient cash can reduce transaction cost , loss of underinvestment and it will make firm able to stabilize its cash flow volatility (Chen & Chung , 2009).And disadvantage of cash holding is its cost that includes opportunity cost of interest forgone ,loss of cash discounts on purchases and loss of business opportunities (Adetifa, 2005):

The persuasion of corporate governance elucidates synergic relationships between stakeholders and management which is framed to improve organizational efficiency and market competitiveness (Gompers et al., 2003). Because of momentous epochs of cash in corporate finance literature and its importance in working capital management, various slants are being used to explain the factors that can affect cash holding decisions. The distinction of this study from prior Pakistani investigations is to provide a detailed review of the theoretical and empirical literature on determinants of corporate cash holdings with special focus on managerial ownership, board structure and family controller among other firm characteristics like cash flow, liquidity, leverage, firm size, dividend, bank debt, market book (proxy of growth opportunities) and variability on sample of Pakistani manufacturing firms. Corporate governance is a credential contrivance for controlling the agency problem. The reason for special focus on managerial ownership lies in agency problems which may be different for bondholders, shareholders, and minority shareholders. According to the agency literature, a higher level of cash holdings provides managers with greater discretion. Papaioannou *et al.* (1992) suggests that managers hold more cash as immunity,

and Myers and Rajan (1998) argue that managers can obtain more private benefits from liquid assets. Opler *et al.* (1999) also document that entrenched managers prefer to hold cash than to pay dividend. So owners want to limit Managerial cash discretion (Jensen, 1986 and Stulz, 1990). The corporate governance mechanism being an important determinant of corporate liquidity provides stakeholders with opportunity to tether managerial cash discretion (Zangina ,2009).Good governance maximizes the stake holder's wealth and dictates a reasonable amount of cash, while weaker governance results a higher conflict of interest (Harford et al. ,2008)

The rest of the paper is structure as follows, In section 2 most prominent theoretical and empirical findings are surveyed, In section 3 the potential determinants of Corporate cash holding are summarized with concerning empirical evidence. Section 4 is empirical part of the paper which describes the data and methodology employed in the study .In Section 5 results are discussed section 6 is about conclusion

2 REVIEW OF CASH HOLDING THEORIES

To explain the determinants of cash holding many prior studies like the study of Kim, Maurer, & Sherman (1998), Opler et al. (1999), Ferreira & Vilele (2004). Ozkan & Ozkan (2004) have used three theoretical models: the trade-off theory (Myers, 1977), the pecking order theory (Myers and Malijuf, 1984), and cash flow theory (Jensen, 1986). When cash holding is explained by the trade-off model means that there is an optimal level of cash holding which can be attained by balancing the marginal cost and marginal benefits associated with cash holding (Myers, 1977) .Marginal benefits of cash holding are : with cash holding firms can avoid financial distress, it act as tool to formulate a optimal investment policy and firms with large cash holdings can reduce increasing financial cost which is increasing because of external fund raising or by liquidating existing assets. The marginal cost of cash holding is basically the opportunity cost associated with cash holding i.e. return of current short term investments which u r foregoing for transactional or precautionary motives (Opler et al. ,1999). Opler et al. (1999) named it transactional model because it explains transactional motives of cash holding.

In pecking order theory which also known as financial hierarchy theory cash is seen as a buffer between retained earnings and investment needs and there is no optimal cash level (Myers and Malijuf, 1984). Pecking order theory consider asymmetric information a central issue of financing decision which need to be address .The first and foremost reason for this central importance is that information asymmetry information makes external fund raising costly and difficult so firms prefer retained earnings than external financing. Secondly when firms becomes bank corrupt then bankers have more rights or on top of the list to get their money back so here again problem of asymmetric information arises because here both parties do not have same level of information .So the purpose of Pecking order theory is to minimize asymmetric effect cost and other financial cost, (Ferreira & vilela, 2004). According to Opler et al. (1999) this theory is opposite to trade off model because it predicts no optimal level of cash holding rather support high level of cash holdings. In pecking order theory cash is at second to meet financing need because firms use cash when retained earnings are not sufficient to finance new investment and after cash it comes debt

Free cash flow theory of Jensen, (1986) advocates large amount of cash he argument that with large cash holding firm can raise its asset and increase the power of investment decision. According to Jensen (1986) free cash flow is leftover cash after financing all projects and meeting all operational needs. By having a sufficient amount of cash for investment it will be easy for firm to pursue without disclosing project information to bankers ,it will also make firm able to make better investment decisions, (Ferreira & vilela, 2004)

To investigate a desire level of cash balance, Nadiri (1969) made first investigation on cash holdings by collecting data from US manufacturing sector from 1948 to 1964. The results showed that the demand for real cash balances is determined by output, the interest rate, the expected rate of change in general price level, and factor prices. Campbell and Brendsel (1977), conducted an empirical study by collecting data from US manufacturing firms from 1953-1963 using Ordinary Least Square (OLS) regression analysis to examine the impact of compensating balance requirements on the cash holdings. and found that compensating balance requirements are not binding. And then Opler et al (1999) with sample of 1048 US publically traded non-financial firms from 1971 to 1993 using cross section and time series test explore that firms with high volatility in cash flows and better growth opportunities hold more cash, he also found that well performing firms hold more cash.

Ozkan & Ozkan (2004) with sample of 1029 publically traded UK firms from 1984-1999 investigated empirical determinants of cash holding and find ownership structure a important determinant of cash holding, he also explored a non-monotonic relation between managerial ownership and cash holding .In his analysis cash flows and firm growth opportunities were in positive relation while leverage , liquidity and bank was in negative relation with level of cash holding .Later Ferreira

and Vilela (2004) with sample of 400 EMU firms from 1987-2000 found that cash flow, bank debt liquidity are in negative while investment opportunity is in positive relation with cash in addition they also investigated that capital development is in negative relation with cash holding and investor protected economies is in positive relation with cash holding.

Nguyen (2005) with the sample of 9168 firm year observations from Tokyo stock Exchange for the period of 1992-2003, and he explored that precautionary motives of cash holding can be used to alleviate operating earnings volatility .He investigate that cash holding is in negative relation with firm size and debt ratio and has positive relation with profitability, growth opportunity and dividend payout. Saddour (2006) investigated determinants of cash holding for sample of 297 French firms from 1998-2002.Basing his research on trade-off and pecking theory he investigated that leverage is in negative relation with cash holding while growing firm with riskier activities hold more cash .He also investigated that firm size investment opportunities and dividend payout is in direct relation with cash holding.

Afza and Adnan (2007) with the sample of 203 non-financial KSE listed Pakistani firms over the period of 1998-2005 with the data of firm size , growth opportunities ,cash flow , networking capital , leverage ,cash flow uncertainty, and dividend payments .the found negative relationship between market-to-book ratio and cash holding and firm size cash flow, variability of cash flow networking capital and leverage also has some impact on cash holdings. Now recently Shah (2011) with the sample of 280 non-financial KSE listed Pakistani firms over the period of 1996 to 2008 he with static panel data model observed that growing ,dividend paying and large firms with more cash inflows hold more cash and firms of quick conversion cycle and longer debt maturity hold less cash. Rizwan and Javed (2011) with sample of 300non-financial KSE listed Pakistani firms investigated that cash holding has positive relation with market book ratio and has negative relation with leverage and networking capital.

Drobetz and Gruninger (2007) with the sample of 156 non-financial Swiss firms investigated the determinants of cash holding between 1995-2004.he found that level of tangible asset and firm size are in negative relation with corporate cash holding and dividend payments and operating cash flows have positive relation with cash flows .they also investigated a positive but significant relation between CEO duality and Corporate cash holding and negative but insignificant relation with board size and corporate cash holdings

Hardin III et al. (2009) used a sample of 194 USA real estate firms over 1998-2006 .He with ordinary least square methods found that cash holdings are inversely related with operating funds and leverage and in direct relation with cost of external financing and growth opportunities. He also found that real estate firms prefer to hold less cash to mitigate agency problem. Isshaq, Bokpin and Onumah (2009) with the sample from Ghana Stock Exchange observed determinants of corporate cash holdings and found leverage, share price, and earning volatility significant determinants of cash holdings

Paskelian and Nguyen(2010)with the sample of 1164 Chinese and Indian firms over a 14 year time span and Megginson and Wei (2010) with sample of Chinese privatized firm over 1993-2007 found that smaller more profitable and high growth firms hold more cash and they also conform that view that there is negative relation between debt networking capital and cash holding.Chen and Mahajan (2010) with the sample of firms from 15 European Union countries and 31 non-European countries from 1994-2004 find anti director rights and creditor rights as important determinant of corporate liquidity.

Kim et al. (2011) for a sample of 125 publically traded US restaurant firms over 1997-2008 find that restaurant firms with more potential investment opportunities hold greater amount of cash and large firms prefer to hold cash equivalents. Dividend paying firm was holding less cash Kim et al. (2011) also support this argument that precautionary and transactional motives play an important role in explaining the determinants of cash holding and they are highly influential in corporate cash strategy formulation for US restaurant industry.

3 DETERMINANTS OF CASH HOLDINGS

This section briefly explains the attributes, suggested by the different conditional theories of corporate cash holding and prior investigations, which may affect the firm's cash holding decisions. These attributes are denoted as cash flow, liquidity ,leverage , firm size , dividend , bank debt , market book(proxy of growth opportunities) ,variability ,board independence , managerial ownership and family controller

Cash flow is one of most important determinant of corporate cash holding. Finance literature defines Cash flow as sum of pretax profit and depreciation (Ferreira &Vilela, 2004) (Ozkan & Ozkan 2004).Trade-off model of cash flow states that cash flow act as readymade source of liquidity i.e. they can be seen as substitute to cash (Kim et al. 1998) and there is negative relation between cash flow and cash holdings. Ozkan & Ozkan (2004) in their investigation found a negative relation between cash flows and cash holdings. According to pecking order theory there is a positive relation between cash flows and cash holdings because high cash flow is prediction of smooth operation with more investment opportunity so firm can hold more

cash for precautionary and transactional motives .Opler et al. (1999) and Pinkowitz and Williamson (2001) found a positive relation between cash holding.

Leverage is defined as the ratio of total liabilities to total asset in finance literature and empirical investigations of different authors leverage is explained as a proxy of firm's debt issuing ability .Except pecking order theory all other theories i.e., trade off and cash flow theory predict negative relation between cash holding and leverage. Ozkan & Ozkan (2004) in their empirical investigations observed a negative relation between cash holding and leverage .Though it is common perception that firms with high leverage prefer to hold more cash .According to Ferreira &Vilela (2004) debt is in direct relation with retained earning i.e. it will grow with growth in retained earnings and fall with decline in retained earnings, which is advocating a negative relation between cash holding and leverage but he was unable to give any evidence in favor of this argument .Opler et all. (1999) also found an inverse relation between internal funds and leverage because firms most of the times prefer to have excessive cash to meet financing need than issuing equity which is expensive due to the reason of adverse selection.

Liquidity is the degree to which an asset or security can be bought or sold in the market without affecting the asset's price. Assets with property of liquidity or which can be easily bought or sold are known as liquid assets, these assets include account receivable and inventory. Pecking order theory states a negative relation between cash holding and liquidity.Opler et al (1999), Ferreira &Vilela, (2004) & Ozkan & Ozkan (2004) all observed a negative relation of liquidity and cash holding with argument that firm can satisfy its precautionary and transactional needs with liquid asset and it can act as proxy for cash

Firm Size is natural log of total asset .Trade off theory of cash flow suggest negative relation between cash flow and firm size and other two theories i.e. pecking order theory and free cash flow theory predicts a positive relation between cash flow and firm size . Faulkendra (2002) observed a negative relation he found that cash holding and economies of scale has negative relation .Ferreira &Vilela (2004) found that small firms hold more cash. Pinkowitz and Williamson (2001) and Bates et al.(2009)observed a negative relation between cash flow and firm size for US firms, all results are supporting tradeoff view .Ozkan & Ozkan (2004) observed a positive relation between cash holding and firm size Opler et al (2009) also found a positive relation between firm size and cash holding

Market to Book ratio is the ratio of market value of equity **t**o book value of equity . Ozkan & Ozkan(2004), Paskelian and Nguyen(2010), Wei (2010) all found a positive relation between firms growth opportunities and cash holdings .All three theories predicts a positive relation between growth opportunities .

Dividend is ratio of dividend payment to total asset, Ozkan & Ozkan (2004) Ferreira and Vilela (2004) found a negative relation between dividend payments and cash holdings it means dividend paying firm can hold less cash, because they can raise fund for any precautionary or transactional motive by just cutting their dividend. If a firm is not paying dividend then it has two options first it can consult capital market for fund raising or can raise the level of cash holding by issuing more equity (Opler et al. ,1999)

Bank Borrowing is the ratio of total bank borrowing to total liabilities all three theories of corporate cash holdings are suggesting a negative relation between bank debt and cash holding .The reason for this negative relation can be that firms with more bank debt in capital structure are in good relations with bank and can raise funds for emergency and transactional motives whenever they need , meanwhile another possible reason for this negative relation is that firm with more bank debt in their capital structure face monitoring from financial institutions which decreases the managerial discretion of decisions about cash holding . Ozkan & Ozkan (2004) and Ferreira and Vilela (2004) found a negative relation between bank debt and cash holding

Variability is ratio of standard deviation of cash flows to average total asset (Ozkan & Ozkan., 2004). According to trade off theory there is positive relation between cash holdings and cash flow variability. Opler et al. (1999) Ozkan & Ozkan (2004) Ferreira and Vilela (2004) Bigelli & Sanchez-Vidal, (2010) found a positive relation between cash flow variability and cash holdings .The reason of this positive relation can be that firm with more volatile cash flow and less liquid asset hold more cash to meet transactional and precautionary need.

Corporate governance**:** The capital structure and cash holding decisions are central to the conflict between shareholders and managers, almost every discussion on corporate governance try to answer the question of managerial entrenchment and its impact on cash holdings. According to agency theory entrenched managers prefer cash holding than dividend distribution and these cash holdings cause agency problem of free cash flow (Ditmar et al., 2003; Jensen, 1986).Level of Cash holding is a subject of managerial discretion because conversion of cash to private benefits is much more easy than any other asset .Weak corporate governance leads to excessive cash holdings (Ditmar et al., 2003). Kuan, Li and Chu (2011) with the sample

of Taiwanese family owned firms and Ozkan & Ozkan (2004) with the sample of UK firms observed that corporate governance has significant impact on formulation of corporate cash holding policy

To examine the role of corporate governance in formulating corporate cash policy we are using flexibility, spending and shareholder power hypotheses which earlier used by Harford et al. (2008) and Kuan, Li, and Chu (2011).They find that the influence of managerial ownership and board independence have different impacts on family firms compared to their impact on non-family firms. *Flexibility hypothesis* states that to exploit unanticipated investment opportunities management is allowed to hold a significant and comparatively larger amount of cash .*Spending hypothesis* in contradiction with flexibility hypothesis suggest a low level of cash holding .It is considering agency cost as important determines which states that entrenched managers find spending more useful than excessive cash holding (Harford. ,2008 and Kuan et al. , 2011).*Shareholding hypothesis* suggests large cash holdings ,according to firms operating in imperfect capital markets face information asymmetry which make external financing difficult and costly so to minimize information asymmetry. So firms with majority shareholder hold large amount of cash for shareholders wealth maximization.

Managerial Ownership is the percentage ownership by company director's .Managerial ownership and cash holding has nonlinear relation i.e. at lower level of managerial ownership firms hold low level of cash, than with increasing ownership level of cash holding increases and at very high level of managerial ownership start decreasing (Ozkan &Ozkan 2004). The positive relation at higher level managerial ownership highlighting entrenchment effect i.e. to peruse self-interest manager yearns for large cash holding, however risk aversion is also a possible reason of this positive relation because at higher level managerial ownership manger becomes more risk averter(Opler et al.,1999).Some observed cases revealing realignment of interest at very high level of managerial ownership which is clear from negative and significant relationship between MAN^3 and Cash holding (Ozkan & Ozkan 2004).

Board structure plays an important role in determining corporate cash holdings to measure the impact of board structure on cash holdings ,this study has included its two variables i.e. board independence and CEO duality a dummy in analysis. Smaller independent board's low managerial ownership reduces information asymmetry which leads to lower cash holdings (Ozkan and Ozkan, 2004). Brenes et al. (2011) and Desai et al. (2005) suggest that outside board monitoring can provide better Shareholder protection and improve family business performance. Opler et al. (1999) and Kuna, Li, and Chu (2011) suggest a positive relation between board independence and managerial cash holdings .Flexibility hypothesis predicts a positive relation between cash holdings and CEO duality. But spending hypothesis predicts negative relation between cash holdings and CEO duality .Opler et al. (1999) also argued that high managerial control rights can stimulate mangers to peruse their self-interest at the cost shareholders.

Controller is the central in addressing agency problem because when the ultimate controllers' ownership goes beyond a certain level, than they have the strong controlling power to affect corporate cash policy. Claessens et al. (2000), La Porta et al. (1999) and Mok et al. (1992) define ultimate controller an individual or owner having ownership rights 10 % more.Firms with *family control* are tuff because along with business requirements managers have to satisfy family owner interest (Claessens et al., 2000, Anderson et al., 2003 Fama and Jensen, 1983: La Porta et al., 1999; La Porta et al., 2000: Ward, 1987). For retention of their birth control family controller can demand polices for satisfaction of their interest at the cost of minority shareholders. Ozkan and Ozkan, (2004) in their sample of UK firms and Kuan, Li, and Chu (2011) with the sample of Taiwanese family owned firms observed that firms with families as the ultimate controllers tend to hold more cash. However, the incentives for managers to hold cash in such firms remain unclear. Spending and shareholding hypothesis suggest positive while flexibility hypothesis suggests negative relationship between family dummy and cash holdings.

4 DATA AND METHODOLOGY

4.1 DATA

In order to investigate the impact of corporate governance on corporate cash holding the data taken from annual reports of non-firms listed on Karachi Stock Exchange Pakistan during 2008-2012. Initially, all non-financial firms listed in KSE were included in the sample; however firms with incomplete data were deleted from analysis. Thus, final sample composed of a balanced panel of 138 firms over a period of 5 years. Table 1 presents the descriptive statistics of main variables used in our study.

The mean cash ratio over the sample is 5 %.The average of managerial ownership is 22% .The mean of non-executive director to total director is 84%.In an average firm, the number of executive director and non-executive directors are 1.32 and 6.94 respectively .So on average board of Pakistani companies is comprise of 8.28 directors. In 27 % companies CEO and chairman is a same individual. At the 10% level 37 % companies are being controlled by families.

Table 1. Descriptive statistics

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
$CASH$	690	0	1	0.05	0.078
$CFLOW$	690	0	1	0.12	0.133
LIQ	690	-1	1	0.04	0.183
LEV	690	0	1	0.55	0.202
$MRKTBOOK$	690	-5	3378	69.57	378.936
$BDEBT$	690	0	1	0.37	0.287
$SIZE$	690	11	20	15.42	1.462
$VARIABILITY$	690	0	134	4.71	11.705
$DIVIDEND$	690	0	0	0.03	0.059
MAN	690	0	1	0.22	0.255
MAN^2	692	0	1	0.11	0.188
MAN^3	690	0	1	0.07	0.152
EX_DIR	690	1	6	1.32	1.7884
NON_EX_DIR	690	2	13	6.94	0.8420
NON_EX/DIR	690	0	1	0.84	0.103
CEO_COB	690	0	1	0.27	0.445
$FAMILY$	690	0	1	0.37	0.483
Valid N (listwise)	690				

4.2 METHODOLOGY

Panel data methodology is adopted in this study. Panel data involves pooling of observations on cross-section units over several time periods and provides results that are simply not detectable in pure cross-sections or pure time-series studies. The panel regression equation differs from a regular time-series or cross-section regression by the double subscript attached to each variable.

The general form of panel data model can be specified more compactly as

$$Y_{it} = \alpha_{it} + \beta X'_{it} + \quad \varepsilon_{it} \qquad (1)$$

i=1,……,138, t =1,……, 5

Where the subscript *i* denoting the cross-sectional dimension, t representing the time-series dimension. Y_{it} represent the dependent variable in the model, which refers to the firm's debt ratio. α is constant term over time t and specific to the individual firm i. β is the vector of estimated coefficients. X_{it} contains a set of explanatory variables in the estimation models and ε_{it} is the error term. The error vector given by

$$\varepsilon_{it} = v_{it} + u_{it} \qquad (2)$$

Where v_{it} the individual is effect of each of the industrial companies and u_{it} is the error which assumes normal distribution.

To measure the impact of corporate governance on corporate cash holding, we used Ozkan & Ozkan (2004) models, which are given below

$$CASH_{it} = \alpha_0 + \alpha_1 CFLOW_{it} + \alpha_2 LIQ_{it} + \alpha_3 LEV_{it} + \alpha_4 BB + \alpha_5 MBR_{it} + \alpha_6 SIZE_{it} + \alpha_7 VAR_{it} + \alpha_8 DIV_{it} + \alpha_9 MAN_{it} + \alpha_{10} MAN^2{}_{it} + \alpha_{11} MAN^3{}_{it} + \varepsilon_{it} \qquad (3)$$

$$CASH_{it} = \alpha_0 + \alpha_1 CFLOW_{it} + \alpha_2 LIQ_{it} + \alpha_3 LEV_{it} + \alpha_4 BB + \alpha_5 MBR_{it} + \alpha_6 SIZE_{it} + \alpha_7 VAR_{it} + \alpha_8 DIV_{it} + \alpha_9 MAN_{it} + \alpha_{10} MAN^2_{it} + \alpha_{11} MAN^3_{it} + \alpha_{12} CEOD_{it} + \alpha_{13} NEDDIR_{it} + \varepsilon_{it} \quad (4)$$

$$CASH_{it} = \alpha_0 + \alpha_1 CFLOW_{it} + \alpha_2 LIQ_{it} + \alpha_3 LEV_{it} + \alpha_4 BB + \alpha_5 MBR_{it} + \alpha_6 SIZE_{it} + \alpha_7 VAR_{it} + \alpha_8 DIV_{it} + \alpha_9 MAN_{it} + \alpha_{10} MAN^2_{it} + \alpha_{11} MAN^3_{it} + \alpha_{12} FAM_{it} + \varepsilon_{it} \quad (5)$$

Where $CASH_{it}$ is the ratio of cash and cash equivalent to total asset for the i[th] term of t, $CFLOW_{it}$ is the ratio of cash flow to total asset for the i[th] firm of time t , LIQ_{it} is the liquidity for i[th] firm of t time, BB_{it} is ratio of bank borrowing to total debt for i[th] firm of t time , MBR_{it} is market to book ratio for i[th] firm of t time , $SIZE_{it}$ is natural log of asset for i[th] firm of t time VAR_{it} is cash flow variability for i[th] firm of t time, DIV_{it} is the ratio of dividend paid to total asset of i[th] firm for time , MAN_{it} is managerial ownership for i[th] firm for time t , MAN^2_{it} is square of managerial ownership for i[th] firm of time t , MAN^3_{it} is cube of managerial ownership for i[th] firm of time t , $CONT_{it}$ Shareholder with shareholding 10% or more for i[th] firm of time t , $NAEDDIR_{it}$ is the ratio of non-executive directors to total directors for i[th] firm of time t . $CEOD_{it}$ is dummy variable which gives value 1 if CEO and Chairman for i[th] firm of time t is same and 0 otherwise , FAM_{it} is family controller for i[th] firm of time t , $INST_{it}$ is institutional ownership for i[th] firm of time t α_{it} is intercept , $\alpha_1 - \alpha_{13}$ are coefficients of concerned variables and ε_{it} is random error term for i[th] firm of time t .In above equations $CASH_{it}$ is dependent and $CFLOW_{it}$, LIQ_{it}, BB_{it} , MBR_{it} , $SIZE_{it}$, VAR_{it} , DIV_{it} , MAN_{it} , MAN^2_{it} MAN^3_{it} $CONT_{it}$ $NAEDDIR_{it}$. $CEOD_{it}$, FAM_{it} , are independent variables in or study.

5 RESULTS AND DISCUSSION

We estimated the pooled OLS model. The estimation results are presented in Table 2, which indicates that profitability, size, non-debt tax shields, tangibility, and liquidity proved to be significant in confidence level of 5 percent. Earnings volatility found less significant while the variable growth opportunities found highly insignificant. The OLS regression has high adjusted R square appears to be able to explain variations in the debt ratio. Furthermore, the F-statistic confirms the significance of the OLS regression model.

The relationship between cash flows and cash holding is positive and significant. The positive relationship is consistent to the predictions of the pecking order theory which states that firm with high cash flow prefer to hold a significant amount of cash. Moreover, it indicates the ability of firms to meet their transactional requirements as well as to avail the benefits of unexpected opportunities that arise with the passage of time. The positive relationship between cash flow and cash holdings is consistent with earlier empirical studies such as Opler et al. (1999), Pinkowitz & Williamson (2001) and Afza and Adnan (2007).

The relationship between liquidity and cash holdings is negative but significant. This negative relation is consistent to the prediction of trade off theory which states that firm with more liquid assets holds less cash. Furthermore it indicates that firms with abandon liquid assets use their assets to meet cash requirements. The negative but significant relation between liquidity and cash holding is consistent with prior empirical studies of Opler et al. (1999), Pinkowitz & Williamson (2001), Ozkan & Ozkan (2004), Ferreira &Vilele (2004) Bates et al (2009).

Leverage is in negative but statistically significant relation with Cash holdings. This negative relation is consistent to the predictions of all three theories i.e. pecking order theories ,trade off theories and cash flow theories which .These theories state leverage as proxy for debt so firm with more debt in their capital structure prefer low amount of cash. This negative result between leverage and cash holding is consistent with prior empirical findings of Opler et al. (1999), Pinkowitz & Williamson (2001), Ozkan & Ozkan (2004), Ferreira &Vilele (2004) Bates et al (2009).

The relationship between bank borrowing and cash holding is negative but significant. This finding is consistent with empirical findings of Ozkan & Ozkan (2004) and Ferreira and Vilela (2004). This negative relation intimating that firms with more bank debt in their capital structure are in good relations with bank and can raise funds for emergency and transactional motives. Meanwhile another reason for this negative relation is that firm with more bank debt in their capital structure face monitoring from financial institutions which decreases the managerial discretion of decisions about cash holdings.

Table 2. OLS regression of cash holdings on managerial ownership, family controller, board structure and other firm characteristics

Dependent Variable : $CASH$	(1)	(2)	(3)
$CFLOW$	0.180***	0.179***	0.180***
	(0.027)	(0.027)	(0.027)
LIQ	-0.189***	-0.194***	-0.186***
	(0.019)	(0.019)	(0.019)
LEV	-0.198***	-0.199***	-0.197***
	(0.017)	(0.019)	(0.017)
MBR	0.082***	0.080***	0.082***
	(0.000)	(0.000)	(0.000)
BB	-0.300***	-0.301	-0.299
	(0.011)	(0.011)	(0.011)
$SIZE$	-0.077**	-0.081**	-0.080**
	(0.002)	(0.002)	(0.002)
VAR	-0.111***	-0.114***	-0.112***
	(0.000)	(0.000)	(0.000)
DIV	0.012	0.019	0.011
	(0.058)	(0.059)	(0.058)
MAN	-0.631***	-0.600***	-0.638***
	(0.072)	(0.072)	(0.072)
MAN^2	1.068**	0.992**	1.081**
	(0.216)	(0.219)	(0.216)
MAN^3	-0.576*	-0.524*	-0.582*
	(0.167)	(0.170)	(0.167)
$NEDDIR$		0.984	
		(0.026)	
$CEOD$		-0.022	
		(0.006)	
$FAMILY$			-0.200
			(0.006)
R^2	0.259	0.261	0.260
Adjusted R^2	0.247	0.246	0.246
F-statistic	21.553	18.334	19.749
Prob.(*F* – Statistics)	0.000	0.000	0.000
S.E of Regression.	0.067	0.068	0.068
Number of firms	138	138	138

*,**,*** denote statistical significance the 0.10, 0.05 and 0.01 level respectively

The relationship between markets to book ratio is positive and insignificant which is consistent with Ferreira and Vilela (2004), Ozkan & Ozkan (2004), Opler et al. (1999), Kim et al. (1998). Market to book ratio is proxy of firms growth opportunities so firms with high market to book ratio hold large amount of cash (Opler et al., 1999).

The relationship Between Size and cash holding is negative and insignificant. This negative relation is in accordance with predictions of trade off theory which state size as an inverse proxy of information asymmetry .Which means smaller firms have more information asymmetry than larger firms. Firms view this decreased information asymmetry as positive signal to banks because information asymmetry problem cause some additional borrowing constrains which leads to costly external financing (Kim et al., 1998) .As firm with larger size can easily raise funds from capital market, so one can expect a negative relation between cash holdings and firm size. This negative result is consistent with prior empirical findings of Ferreira &Vilela, (2004), Pinkowitz and Williamson (2001) and Bates et al. (2009) which means firm with larger size hold less cash

There is positive but insignificant relationship between cash holding and dividend. This positive relation indicates that firms which pay dividends hold more cash. This result is consistent with the prior empirical findings of Opler et al (1999) and Afza and Adnan (2007).

Cash flow variations have statistically significant and positive relation cash holdings. This finding is consistent with predictions of trade off theory which states that to avoid liquidity crises firm with high cash flow variation holds more cash. Moreover it indicates that firms with volatile cash flow take cash as buffer to increase chances of survival and to avoid unexpected cost of liquidity. This positive relation between cash flow volatility and cash holdings is consistent with earlier empirical findings of Opler et al. (1999) Ozkan & Ozkan (2004) Ferreira and Vilela (2004) Bigelli & Sanchez-Vidal, (2010)

The relationship between managerial ownership (MAN) is negative and significant at 1% which is consistent with Ozkan & Ozkan (2004) and confirming a common view that there is interest alignment of shareholder and manger at lower level managerial ownership (Opler et al., 1999). $MAN^2$is in positive and statistically significant relationship with managerial ownership .This positive relation at higher level managerial ownership highlighting entrenchment effect i.e. to peruse self-interest manager yearns for large cash holding, however risk aversion is also a possible reason of this positive relation because at higher level managerial ownership manger becomes more risk averter (Opler et al., 1999). Some observed cases revealing realignment of interest at very high level of managerial ownership which is clear from negative and significant relationship between MAN^3 and Cash holding (Ozkan & Ozkan 2004).From above results it is clear that cash holding and managerial ownership has nonlinear relationship i.e. at lower level of managerial ownership firms hold less cash, than with increasing ownership level of cash holding increases and at very high level of managerial ownership start decreasing and relationship again turn to positive .

There is positive but insignificant relation between NEDD and cash holding .This positive relation between board independence is consistent with prior empirical findings of Opler et al (1999), Brenes et al (2011) and Desai et al, (2005). This positive relation indicates that firm with more outsider independent directors hold more cash. The relationship between COED and cash holding is negative and insignificant .The insignificant relation of board composition variables and cash holdings indicates that, the impact of managerial ownership on cash holding does not change with board composition. As the prime responsibility of board of directors is to monitor the actions of top management so board composition has no significant impact on the level of cash holdings rather, it has impact on usage of cash (Ozkan and Ozkan .,2004 and Ditmar and Smith .,2005).

Cash holding and family controller has negative but statistically significant relation. This negative relation is consistent with flexibility hypothesis which suggests that family controlled firms with higher managerial ownership tend to hold less cash. This statistically significant negative relation between family ownership is also consistent with prior empirical finding of Y Kusnadi (2011).

6 CONCLUSION

To analyze the impact of corporate governance and firm characteristics pooled ordinary least square(OLS) technique is used .In our regression analysis cash flow is the only variable which is statistically significant and positively related to cash holdings. Alternatively, liquidity, leverage, bank borrowing variability of cash flow and family dummy are significantly and negatively related to cash holdings. Dividend, market-to-book ratio, ratio of non-executive to total directors and controller dummy are positively whereas firm size institutional dummy and CEO duality are negatively related to cash holdings but the relationships are insignificant. In particular managerial ownership (MAN) and MAN^3 is negative but significant however MAN^2 is positively related to cash holdings. These variations in sings indicate the non-linear relationship between managerial ownership and cash holdings. The positive relation between cash flow and cash holdings indicates the ability of firms to meet their transactional requirements as well as to avail the benefits of unexpected opportunities that arise with the passage of time. The negative relation between Liquidity and cash holdings indicates that firms with abandon liquid assets use their assets to meet cash. The negative relation between leverage and cash holdings indicates that firms with more debt in their capital structure prefer to hold low amount of cash. The positive relation between market to book ratio and cash holdings indicates that firm with potential growth opportunities prefer large cash holdings. The negative relation between firm size and cash holdings indicates that larger firm with decreased information asymmetry can easily excess to capital market so they can afford low cash holdings. The positive relation between dividend payments and cash holdings indicates that dividend paying firms hold more cash. The positive relation between cash flow volatility and cash holdings indicates that firms with volatile cash flow take cash as buffer to increase chances of survival and to avoid unexpected cost of liquidity. The insignificant relation of board composition variables and cash holdings indicates that, the impact of managerial ownership on cash holding does not change with board composition. The negative relation between family and cash holdings indicates that

family controlling firms preffer low cash holding In sum these findings are consistent with all prior investigations and cash holding theories .From our findings we can conclude a negative relation between corporate governance and cash holdings.

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APPENDIX. A

Variable	Proxy	Definition
Dependent Variable		
Cash	$CASH_{it}$	Ratio of total cash and equivalent to total asset
Independent Variables		
Cash Flow	$CFLOW_{it}$	Ratio of cash flow to total asset. Cash flow is the sum of profit before taxes and depreciation.
Liquidity	LIQ_{it}	Ratio of (current asset – current liabilities.+ cash) to total asset
Leverage	LEV_{it}	Ratio of total debt to total asset
Bank Debt	BB_{it}	Ratio of total bank borrowing to total asset
Market Book	MBR_{it}	Ratio of market value of equity to book value of equity
Size	$SIZE_{it}$	Natural log of asset prices
Variability	VAR_{it}	Ratio of standard deviation of cash flows to average total asset
Dividend	DIV_{it}	Ratio of dividend payment to total asset
Managerial Ownership	MAN_{it}	% of equity ownership by directors.
	MAN^2_{it}	Square of Managerial Ownership
	MAN^3_{it}	Cube of Managerial Ownership
Non-Executive Directors	$NEDDIR_{it}$	Ratio of number of non-executive directors to total number of directors
CEO-COB	$CEOD_{it}$	DUMMY : 1 if CEO and COB is same individual 0 otherwise
Family	FAM_{it}	DUMMY : 1 if there is controlling shareholder in the firm is family and 0 otherwise

APPENDIX .B

Description of Sample

Sr No.	Sector	No. of Companies	%age
1	Automobiles	12	8.7
2	Cement	16	11.59
3	Chemical	20	14.49
4	Energy	5	3.62
5	Electronics	1	0.72
6	Food	23	16.67
7	General	10	7.24
8	Media	4	2.90
9	Minerals	6	4.34
10	Paper	4	2.90
11	Petroleum	7	5.07
12	Textile	29	21.10
13	Transport	1	0.72
TOTAL		138	100

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ANALYSE DES CONTRAINTES AU DEVELOPPEMENT DE LA PRODUCTION PORCINE DANS LA REGION DE KATANA, SUD KIVU, RD CONGO

[ANALYSIS OF PROBLEMS LINKED TO PIG PRODUCTION DEVELOPMENT AT KATANA, SOUTH–KIVU, DRC]

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ABSTRACT: Numerous kinds of animals are domesticated in the world for fruman feeding.The domestication methods has also changed to satisfy the meat request. The Traditionnal domestication alwaysexists but the big or important part is industrial.At Katana, the pig domestication has helped the population to promate the economy and fight against the poorness.Thin population in occupied try pig domestication because they have noticed that animal brings a lot of benefet which can help to make face to different problems of social order.So,if we want to know the causes at consequences of diminution or regression of pigs domestication in this region,in this part of the South Kivu,an identificationof differents difficultives is necessary and helps to lead the new technics which can push the population in that activity(domain).

KEYWORDS: Domestication, Pig, Production, Difficulties or problems, development, Katana, DRC.

RESUME: De nombreuses espèces d'animaux sont élevées dans le monde pour l'alimentation de l'homme. Les méthodes d'élevage ont également beaucoup changé afin de satisfaire la demande en viande. L'élevage traditionnel existe toujours, mais la majorité de la production est devenue industrielle. Dans la région de Katana, l'élevage des porcs a servit à la population de renforcer son économie et lutter tant soit peu contre la pauvreté. Cette population se livre sérieusement à l'élevage des porcs car au fait, elle a remarqué que cet animal lui apporte d'importants revenus qu'elle utilise afin de faire face aux différents problèmes d'ordre social. Ainsi, pour mieux appréhender les causes et conséquences de la régression de l'élevage des porcs dans cette région, une identification des contraintes de cet élevage s'est avéré nécessaire et a pu orienter des nouvelles techniques pouvant motiver la population dans ce domaine.

MOTS-CLEFS: Elevage, Porc, Production, Contrainte, Développement, Katana, RD Congo.

INTRODUCTION

L'élevage de porcs existe un peu partout dans le monde [1]. Dans les campagnes notamment, de nombreuses familles possèdent quelques cochons qu'ils laissent circuler (fouiner) librement autour de leur maison et qu'ils utilisent pour leur consommation familiale. On trouve aussi des entreprises d'élevage porcin aux abords des villes, qui contribuent largement à l'approvisionnement alimentaire de celles-ci [2].

La place du porc dans la consommation totale de viande est relativement faible sur le plan national dans plusieurs pays du monde. Elle est encore plus limitée à l'échelon villageois car, substituée par l'autoconsommation d'autres viandes provenant du petit élevage et/ou de la pêche dans les lacs et les rivières. La plupart de temps, le porc se consomme lorsqu'il est abattu aux fins des cérémonies. Or, cette espèce animale avec la volaille, est appelée à jouer un rôle important dans l'accroissement rapide de la production des protéines animales, compte tenu de leur potentiel de productivité élevé [3]. Cependant, l'offre de porc destinée à ravitailler les grands centres de consommation provient en grande partie des pays voisins et dont les statistiques sont très mal connues [4].

Effectivement l'agriculture et l'élevage constituent les principales activités pratiquées par l'homme pour lui garantir sa subsistance et lui procurer des revenus importants; à l'échelle mondiale dans des pays dits développés mais surtout dans des pays sous développés où plus de 70% de la population active se classent dans le secteur primaire [5]. C'est le cas de hautes terres du Kivu dont les populations sont des pasteurs, agriculteurs, sédentaires qui se livrent à la pratique de l'élevage et de l'agriculture pour subvenir à leurs besoins alimentaires et à l'élevage de certaines espèces d'animaux comme la vache, la chèvre, les moutons, les porcs et les poules.

Dans la région de Katana, l'élevage des porcs a servit à la population de renforcer son économie et lutter contre la pauvreté. Cette population, se livre sérieusement à cet élevage de porc car au fait, elle a remarqué que cette espèce d'animal lui apporte d'importants revenus qu'elle utilise pour faire face aux différents problèmes d'ordre social comme par exemple la scolarité des ses enfants, les soins de santé, la construction, l'alimentation etc.… Mais, ces dernières années, la crise économique issue des guerres à répétitions, a bouleversé les comportements des populations dans les productions animales. Dès lors, la production du porc comme celle des autres espèces animales a fortement régressé. Les recherches consacrées à la problématique de l'élevage porcin à notre connaissance, se sont limitées à un inventaire exhaustif des problèmes des éleveurs [6] ; [7] ; [8]. Ces auteurs soulignent que la pathologie, les ressources génétiques, l'alimentation, le logement, l'accès au crédit, la commercialisation, les vols ou pertes d'animaux, etc., constituent tous des facteurs limitant du petit élevage intensif de porcs. Or, une bonne maîtrise des causes de ces phénomènes peut permettre de mieux appréhender les véritables entraves au développement de la production du porc. De ce fait, l'environnement de la production joue un rôle clé, non seulement dans l'accroissement de la production mais également pour l'intégration réelle de la filière porcine dans l'économie de la région et de soutenir de façon durable les revenus aux producteurs dans le but d'améliorer le bien-être et la qualité de vie des populations.

Afin de mieux appréhender les causes et conséquences de la régression de l'élevage des porcs dans la région de Katana, une identification des contraintes de cet élevage s'avère nécessaire et pourra orienter les nouvelles techniques, motiver les populations dans l'élevage des porcs.

DESCRIPTION DU MILIEU D'ETUDE

Le groupement d'Irhambi-Katana se trouve compris entre 02° et 02° 30' de latitude Sud et 028° 30' et 029° de longitude Est. Il est limité au Nord et à l'Ouest par le Territoire de Kalehe, au Sud par le groupement de Bugorhe alors qu'à l'Est, il est baigné par le lac Kivu [9]. Situé dans le Graben Est africain où logent des nombreux lacs, le Groupement d'Irhambi-Katana fait partie des hautes terres du Kivu. Sa superficie est de 93 Km^2 et comprend six localités à savoir : les localités de Mwanda, Kahungu, Kabushwa, Mabingu, Kabamba et Kajuchu.

Le climat est tropical humide est caractérisé par une température moyenne de 19,5 °C et une pluviosité dépassant 1500 mm par an. A la longue saison de pluies (Septembre – Mai) succède une courte saison sèche (Juin – Aout). Cette abondance des pluies pendant une bonne partie de l'année et la variation des températures moyennes ont des effets positifs sur la végétation. A Katana, la végétation primaire a été détruite sous l'action de l'homme. Toutefois, on rencontre encore de bambous aux flancs des premiers contreforts de l'ensemble montagneux de Kahuzi. Ce domaine forestier de l'Ouest est un véritable refuge des animaux sauvages. Par contre, les régions basses de l'Est se caractérisent par leurs champs et leurs bananeraies. Les sols de bas fond sont des formations soit alluvionnaires. Elles diffèrent donc des terres des plateaux et des collines par la nature de leur matériel.

La densité varie d'une localité à l'autre avec une population de 53.515 âmes (Rapport de l'Etat-Civil de Chibimbi, 2008), le groupement d'Irhambi-Katana connaît une densité moyenne d'environ 575,4 habitants au $Km^{2.}$ La population d'Irhambi-Katana est essentiellement agricole. En plus des activités agricoles, la population se tourne de plus en plus vers d'autres activités souvent rémunératrices comme le petit commerce et l'élevage du petit bétail. Toutefois, l'agriculture reste l'activité prédominante dans la région [10].

L'élevage est aussi une source de revenu pour les personnes qui le pratiquent. Nous retiendrons que l'activité pastorale a sensiblement diminué par manque de pâturage qui est aussi une conséquence de la forte densité de la population, et les guerres appelées guerres de libération qu'a connue la République Démocratique du Congo depuis 1996 à nos jours. Néanmoins, certaines familles élèvent des chèvres, des porcs, la volaille, les lapins et même des vaches. L'élevage des vaches est surtout pratiqué aux bords du Parc de Kahuzi (Luciga) où on a encore de l'espace. Par contre, celui des chèvres est pratiqué dans les jachères.

La pêche est pratiquée sur le lac Kivu. Elle y est exercée surtout par des riverains du groupement d'Irhambi-Katana et même par certains autres pêcheurs en provenance des îles du lac Kivu telle que : Iko, Ibinja, Ihoka, Ishovu, … Les genres *Haplochromis*, *Orechromis*, et le *Limnothrissa* sont les plus représentés dans le lac Kivu.

MATERIEL ET METHODES

L'étude des contraintes de l'élevage des porcs a été évaluée dans 600 élevages entre Juin et Octobre 2012 dans les six localités du groupement d'Irhambi Katana, Sud Kivu, République Démocratique du Congo (figure 1).

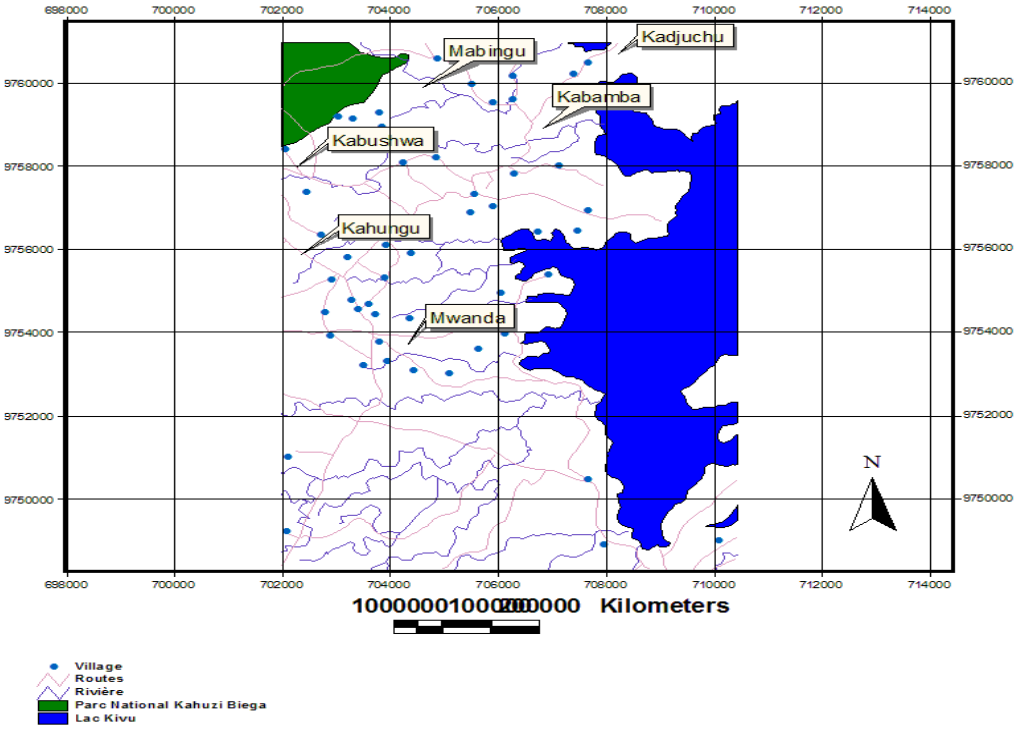

Figure 1. Le groupement d'Irhambi Katana et ses localités.

Pour mener nos enquêtes, les éleveurs de ces six localités dans le groupement d'Irhambi Katana ont été interviewés sur base des listes des éleveurs que dispose le service vétérinaire du groupement. Le choix d'éleveur a été fait en fonction de la disponibilité des éleveurs à répondre aux questions. Les informations recueillies à l'aide d'interviews directes et d'un questionnaire structuré, sont relatives aux caractéristiques socio-économiques et techniques des élevages ainsi qu'aux problèmes évoqués par les éleveurs de porc ou observés sur le terrain.

Les principales caractéristiques socio-économiques étudiées concernent le sexe, l'âge, le niveau d'éducation, l'activité principale et les sources de financement de l'éleveur, la formation en élevage, l'expérience professionnelle, la main-d'oeuvre, la taille du troupeau de base et le motif d'adoption du métier de porciculteur. Les techniques de production quant à elles ont trait au matériel animal, à la conduite du troupeau, aux systèmes d'alimentation et d'exploitation et au suivi sanitaire.

Les résultats de l'enquête ont été enregistrés sur les fiches sur terrain et le dépouillement des données a été réalisé après toutes les enquêtes. Après collecte et codification, les données recueillies, qualitatives pour la plupart, ont été analysées et comparées aux conditions indispensables au succès d'un élevage porcin [11] afin d'identifier les véritables contraintes au

développement de cette filière. La séquence dans laquelle ces paramètres sont présentés n'indique pas nécessairement une hiérarchisation éventuelle entre elles mais, une présentation simplifiée pouvant rendre les réflexions plus claires.

Les analyses statistiques ont été faites à l'aide de logiciel Statview 5.0 ou/et Past. Les comparaisons entre les réponses des enquêtés ont été faites par le test t de student et chi ^{2}

RESULTATS

Le résultat du dépouillement de l'enquête sur la répartition des élevages des porcs en fonction des caractéristiques socio-économiques est présenté dans le tableau 1.

Tableau 1. Répartition des élevages porcins en fonction des caractéristiques socio-économiques et zones de production (%)

Paramètre	Kahungu	Mwanda	Kabamba	Mabingu	Kabushwa	Kadjuchu	Total
Sexe							
Homme	61	74	89	72	52	79	70
Femme	39	26	11	28	48	21	30
Age							
<30	38	40	32	33	27	33	34
30 – 50	62	60	68	67	73	67	66
Niveau d'étude							
Néant	59	34	20	39	59	31	42
Primaire	20	36	38	44	31	42	35
Secondaire	20	27	35	17	10	24	21
Supérieure	1	3	8	0	0	3	2
Formation en élevage							
Oui	28	20	21	11	10	15	18
Non	72	80	79	89	90	85	82
Expérience professionnelle							
1 - 5 ans	54	74	61	56	48	58	58
>5 ans	46	26	39	44	52	42	42
Activité principale							
Porciculteur	22	26	33	28	21	31	26
Agriculteur	50	39	41	44	68	42	48
Autres	28	35	26	28	11	27	26
Sources des financements							
Fonds propres	95	64	61	67	81	64	73
Crédit bancaire	3	7	11	0	1	5	4
Autres	2	29	29	33	18	31	23
Main d'œuvre							
Familiale	93	93	88	78	83	82	86
Salariée	7	7	12	22	17	18	14
Troupeau de base							
1 a 5	58	80	65	67	86	67	71
>5	42	20	35	33	14	33	29
Motif d'adoption du métier							
Divagation	4	14	14	0	8	5	7
Chômage	92	65	58	78	88	69	76
Vocation	4	21	29	22	4	26	16

L'analyse statistique a été réalisée sur les totaux des échantillons des localités visitées.

Le résultat du dépouillement de l'enquête sur la répartition des élevages des porcs en fonction des techniques et zones de production est présenté dans le tableau 2.

Tableau 2. Répartition des élevages porcins en fonction des techniques et zones de production (%)

Elément technique	Kahungu	Mwanda	Kabamba	Mabingu	Kabushwa	Kadjuchu	Total
Type génétique							
Race locale	100	84	56	80	97	68	90,82
Tout venant (Croise)	0	10	8	0	0	4	4,11
Race améliorée	0	6	2	10	3	6	5,05
Conduite du troupeau							
Claustration permanente	7	12	9	0	27	4	11,04
Semis liberté	93	71	48	70	72	59	77,34
Divagation	0	17	9	20	1	15	11,61
Système d'alimentation							
Aliment complet	59	40	45	70	75	57	64,79
Sous produit+céréales	41	60	16	15	22	16	31,83
Sous produit uniquement	0	0	5	5	3	5	3,37
Suivi sanitaire							
Agent vétérinaire	3	18	9	10	5	9	10,11
Eleveur lui-même	97	82	57	80	95	69	89,88
Maladies fréquentes							
Affection virale	7	30	13	30	14	21	21,53
Affection bactérienne	93	28	28	50	84	39	60,29
Affection parasitaire	0	34	18	10	2	14	14,60
Affection carencielle	0	8	7	0	0	4	3,55
Contraintes de l'élevage							
Alimentation	36	20	2	10	25	6	18,53
Vol	0	20	2	0	0	1	4,30
Abris	64	40	52	80	75	66	70,59
Tabous	0	1	1	0	0	1	0,56
Destruction des plantes	0	19	9	0	0	4	5,99

DISCUSSION

Il ressort du tableau 1, que le genre masculin des nos échantillons était plus nombreux (70 %) que le genre féminin (30%). Ceci montre que les hommes ont été plus favorables à notre enquête car ce sont eux qui sont les responsables de l'élevage dans les ménages comme l'indique les enquêtes menées au Cameroun où 15 % des femmes seulement s'occupent de l'élevage des porcs [3]. En effet, notre enquête se pratiquait dans les après- midi lorsque les femmes étaient dans d'autres activités pour rechercher la ration de la famille et ce sont les hommes qui se trouvaient aux domiciles. Du point de vue statistique cette différence est significative comme l'indique le test de Chi^2 (p= 0,157). On observe aussi que le nombre des éleveurs enquêtés varie d'une localité à une autre.

Quant à l'âge des nos enquêtés, il ressort que les personnes d'âge variant entre 30 – 50 ans sont plus intéressées de l'élevage porcin (66 %). Cette observation a été faite aussi dans les régions du Cameroun où l'élevage est souvent pratiqué par cette tranche d'âge. Cette différence est significative et montre que notre enquête a utilisé les personnes responsables de l'élevage. Quant au niveau d'études de nos enquêtés, on observe que les enquêtés n'ayant pas étudié sont plus éleveurs (42 %) que les autres enquêtés. Car ces personnes n'ont pas d'autres activités régénératrices de revenus surtout que l'élevage dans les milieux ruraux est un moyen pour garder l'argent utilisable lorsqu'on a des difficultés (mariage, études des enfants, maladies, accouchements,…).

A la question de savoir si nos enquêtés ont subit une quelconque formation pour l'élevage des porcs, le résultat de dépouillement des fiches montrent que la formation est moins suivie par nos enquêtés (18 %). En effet, le groupement d'Irhambi/ Katana est constitué des éleveurs qui n'ont pas étudié et des telles formations ne les intéressent pas, cause pour laquelle le nombre des gens qui ont suivi la formation d'élevage est réduit.

Quant à l'expérience des enquêtés sur l'élevage des porcs, elle est encore très basse comme le montre le tableau 1. La majorité des enquêtés n'ont que 1 à 5 ans d'expérience (58 %) dans l'élevage des porcs. Ceci contribue aux multiples

problèmes de l'élevage dans ce groupement. L'activité principale des enquêtés est l'agriculture (48 %) suivie de la porciculture (26 %) et enfin autres. Donc avec ce résultat, on constate que l'élevage des porcs est pratiqué par les enquêtés mais cela ne constitue pas leur activité principale.

Pour comprendre les contraintes de cet élevage dans le groupement, nous avons voulu connaitre les sources de financement de l'élevage des porcs. 73 % de nos enquêtés utilisent leur fonds propres pour l'élevage des porcs. Ceci justifie pourquoi l'élevage des porcs n'est pas une activité principale de l'éleveur.

A la question de savoir d'où l'éleveur tire la main d'œuvre, 86 % viennent de la famille. Cette situation couplée avec la source de financement est une contrainte majeure de l'élevage. Cette différence dans l'utilisation de la main d'œuvre montre une différence très significative au seuil de $p>0,005$. Le nombre du troupeau de base des enquêtés varie d'une localite a l'autre. Il ressort que les éleveurs qui ont 1 à 5 têtes sont plus abondants (71 %) que ceux qui ont plus de 5 têtes (29 %). Ceci confirme bien que l'élevage dans le groupement n'est pas prospère et les éleveurs se contentent d'avoir moins de bêtes pour minimiser le coût. Par contre, dans d'autres pays les effectifs moyens par exploitation varient selon les zones comme au Cameroun et au Tchad [12]. En zone rurale, ils vont souvent de 3 à 18 porcs [13], mais des exploitations de plus de 30 animaux sont observées. Ceci est vraiment contraire à nos résultats dans le groupement d'Irhambi/ Katana.

Quant au motif d'adoption du métier d'élevage des porcs, 76 % de nos enquêtés ont choisi ce métier d'élevage des porcs parce qu'ils sont en chômage, mais d'autres ont confirmés qu'ils ont cette vocation mais le taux est très faible (16 %). Comme c'est un élevage familial beaucoup des nos enquêtés ne sont pas intéressés par cet élevage.

Il ressort du tableau 2, que La race des porcs élevés dans le cheptel des nos enquêtés est surtout locale (90,82 %), presque tous nos enquêtés élèvent seulement le porc de race locale et ne connaissent pas les autres races qui existent dans le groupement. Seules quelques personnes seulement connaissent la race améliorée. Ces résultats corroborent très bien avec la formation des nos éleveurs. En effet, nos éleveurs n'ont pas de formation requise pour élever les autres races des porcs. C'est pourquoi, ils se contentent d'élever la race locale qu'ils métrisent bien. Aussi, la race améliorée est trop chère pour nos enquêtés qui doivent se prendre en charge pour le financement de l'élevage.

Quant à la question de savoir comment l'élevage est conduit, 77,34 % des enquêtés pratiquent la semi-liberté dans leur élevage. Cette pratique est avantageuse car elle évite que les animaux ne détruisent pas les cultures des voisins. Les deux autres pratiques, la claustration permanente et la divagation totale sont pratiquées par un petit nombre d'éleveurs.

Quant au système d'alimentation des porcs, la plus part des enquêtés pratiquent dans leur élevage l'alimentation complète (64,79 %). Ces sous produits sont rares pour les éleveurs du groupement d'Irhambi. Pour s'en procurer il faut faire une grande distance et le coût n'est pas à la portée des éleveurs qui n'ont que 1 à 5 têtes. Cette situation contraint les éleveurs à utiliser les aliments qui existent avec toutes les conséquences sur le rendement de leur élevage.

Le suivi sanitaire de l'élevage dans le groupement est assuré par l'éleveur lui-même qui fait le suivi sanitaire de son élevage (89,88 %). Les enquêtés qui font recourt aux vétérinaires sont rares (10,11 %). En effet, le coût sanitaire de suivi du cheptel est énorme pour un éleveur paysan qui se prend en charge comme nous l'avions dit précédemment. Cette situation fait que chacun utilise ses connaissances et même la médecine vétérinaire traditionnelle pour son cheptel.

Les maladies fréquentes trouvées dans l'élevage du groupement d'Irhambi/ Katana sont les affections bactériennes (60,29 %), suivi des affections virales (21,53 %), ensuite les affections parasitaires (14,60 %) et enfin les affections carencielles (3,55 %). Selon les enquêtés ces affections bactériennes déciment fortement les porcs dans le groupement.

En effet, la divagation des porcs pose un problème sanitaire réel notamment le parasitisme. L'infestation massive des porcs par les cysticerques de *Taenia solium* est souvent observée. Dans le groupement d'Irhambi/ Katana et le groupement de Bugorhe, cette pathologie constitue la première cause de saisie des animaux d'abattage [14]. Sur les terroirs villageois de Ngoko et de Tchanar, en zone soudanaise, [13] a mentionné des cas d'amaigrissement (33 %), de toux (26 %), d'œdème de l'encolure (probable manifestation du charbon bactéridien) dans 15 % des cas, de diarrhées (11 %) et de poux (15 %). Toutes ces maladies proviennent de la divagation des animaux.

En effet, il est clair que l'élevage des porcs dans le groupement d'Irhambi a des contraintes majeures. Ces contraintes énoncées par nos enquêtés sont rangées en 70,59 % des enquêtés parlent de l'abri comme contrainte majeure de l'élevage des porcs suivi de l'alimentation (18,53 %), destruction des plantes (5,99 %) et enfin le vol (4,30 %). Seul 0,56 % indiquent le tabou. Au Nord du Cameroun, selon [15], plusieurs contraintes entravent l'accroissement de la productivité du cheptel bovin. Celles-ci sont liées pour la plupart à l'eau et à l'alimentation, à la santé, aux pratiques d'élevage et à l'écoulement des produits. Ces mêmes contraintes sont aussi les causes de la régression du cheptel dans le groupement d'Irhambi Katana.

CONCLUSION

De cette étude, il ressort que la production porcine dans le groupement d'Irhambi possède déjà une base de développement non négligeable. Toutefois, les performances de cet élevage, d'un niveau déjà appréciable, peuvent encore être améliorées de façon substantielle par la mise en œuvre des moyens permettant d'éliminer ou du moins d'atténuer les effets de ses contraintes majeures que sont les connaissances techniques, les ressources alimentaires, les objectifs de gestion des éleveurs, les structures de commercialisation et d'encadrement adéquats. Les problèmes tels que la disponibilité en matériel animal, la pathologie, le capital, les vols et pertes d'animaux ainsi que les tabous relèvent tout simplement des conditions du milieu.

IL est donc nécessaire que tout soit mis en œuvre pour baisser le coût de l'alimentation et importer des géniteurs en République Démocratique du Congo, sans oublier de mettre des crédits à la disposition des fermiers. Un avenir radieux du secteur de la production porcine peut dans ce cas être envisagé.

Les efforts devront continuer, pour réaliser un diagnostic complet sur les contraintes de l'élevage des porcs. Les recherches devront s'orienter vers l'établissement d'une typologie des élevages porcins, devant déboucher sur une étude de la dynamique des systèmes de production porcins dans le groupement d'Irhambi/ Katana. De plus, la place du porc dans les rapports socioculturels et dans l'économie familiale, la gestion technique des élevages porcins pendant la campagne agricole, la commercialisation des porcs sur pieds et de leur viande et l'élaboration d'un plan de prophylaxie adapté, sont des thèmes de recherche qui devront être abordés pour pouvoir mieux comprendre cette production.

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IMPACT DE L'AGRICULTURE SUR LA VARIABILITE JOURNALIERE DES SEDIMENTS EN SUSPENSION ET LEUR FLUX DANS LA RIVIERE CIRHANYOBWA, LAC KIVU, REPUBLIQUE DEMOCRATIQUE DU CONGO

[IMPACT OF THE AGRICULTURE ON THE DAILY VARIABILITY OF SUSPENDED SEDIMENTS AND THEIR FLUX IN THE RIVER CIRHANYOBWA, LAKE KIVU, DEMOCRATIC REPUBLIC OF CONGO]

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ABSTRACT: In this present study an evaluation of a daily variability of suspended sediment flux of the river Cirhanyobwa, one of the important tributary of Lake Kivu, is reported. A daily sampling was done during one year. Suspended sediment and discharge was measured using standards method and floating method respectively. The results shown that agricultural has a impact on the transport of suspended sediment in this river. The quantity of suspended sediment in the river Cirhanyobwa was high during the beginning of the first tillage in July-August and February. Daily Suspended sediment and flux increased with daily flow. Ecological techniques are useful to prevent the suspended sediment transport in the river bed. These techniques consist of agricultural practices and conservation of river bank.

KEYWORDS: Daily variability, Suspended Sediment, Discharge, Agricultural.

RESUME: Dans ce présent travail, une évaluation de la variabilité journalière des flux des sédiments en suspension de la rivière Cirhanybwa, l'un des affluents importants du Lac Kivu, est reportée. Un échantillonnage journalier a été effectué durant une année. Ainsi, les sédiments en suspension et le début de la rivière ont été mesurés suivant la méthode standards et la méthode de flotteur respectivement. Les résultats montrent que l'agriculture a un impact sur le transport des sédiments en suspension dans cette rivière. La quantité des sédiments en suspension dans la rivière Cirhanyobwa est élevée au début du premier labour en Juillet, Août et Février. La concentration journalière des sédiments en suspension et le flux augmentent avec le débit journalier dans la rivière Cirhanyobwa. Des mesures écologiques sont nécessaires pour empêcher que les sédiments n'arrivent dans le lit de la rivière. Ces mesures consistent à mettre en pratique les techniques agricoles et la conservation des berges de la rivière.

MOTS-CLEFS: Variabilité hebdomadaire, sédiment, débit, agriculture.

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1 INTRODUCTION

La connaissance des caractéristiques du transport des sédiments en suspension constitue un enjeu important en terme de gestion des rivières et du développement des activités économiques dont dépendent ces ressources [1]; [2]. Les sédiments en suspension transitant dans le lit d'une rivière, constituent un vecteur de transport d'éléments (polluants, éléments biogènes comme le carbone, le phosphore, l'azote), mais peuvent également apparaître comme un gène pour la biodiversité des rivières.

La sédimentation importante dans les retenues ou les lacs conduit à l'envasement progressif de celle-ci [3]. Les apports des sédiments en suspension sont essentiels pour l'écosystème de la rivière. Une grande quantité de sédiment en suspension peut bloquer la lumière et une petite quantité peut augmenter l'érosion. La mesure des sédiments en suspension permet d'apprécier la charge solide en suspension d'une eau naturelle ou résiduaire [4]. Les écoulements dans les rivières sont généralement tridimensionnels, dans un état tourbillonnaire. Par conséquent, une analyse précise de l'écoulement et du transport des sédiments dans une rivière à méandres est une tâche plutôt difficile [5]. La quantification du flux des sédiments en suspension dans les rivières est très important dans les études de l'érosion du sol, de la qualité de l'eau, de la sédimentation des lacs, des habitats des poissons et les autres impacts écologiques [6]; [7].

Les effets du changement anthropogéniques et de l'utilisation des terres ont stimulés les recherches hydrobiologiques dans les rivières du bassin du Lake Kivu, un lac très sensitif aux changements climatiques dans ces dernières années [8]; [9] ; [10]. Les sédiments en suspension sont aussi sensibles aux changements dus au climat et à l'utilisation des terres, mais reçoivent une faible attention. La quantité des apports en suspension transportés par les rivières dépende du volume et de la vitesse de la rivière, la nature et la grandeur des matériels disponibles dans un temps, la couverture végétale et la caractéristique du lit de la rivière. Le processus du transport de sédiments en suspension est fonction du climat, de la végétation, de la caractéristique du sol et de la topographie [1].

La rivière Cirhanyobwa est soumise à la pression des activités anthropogéniques exercées dans le sous-bassin versant sur un parcours respectivement de 14,8 Km (rivière Cirhanyobwa) avant de se déverser dans le lac Kivu. Un des problèmes posés est de déterminer la quantité des sédiments transportée par les rivières dans le Lac Kivu : soit via les apports sous forme dissouts dus essentiellement aux rejets des activités anthropogéniques (fabrication des briques cuites, lessivage et pêcheries) des populations environnantes [11] [8] ; [12] ou soit via les apports particulaires plus liés au lessivage des terres agricoles (champs des maïs, des maniocs, des haricots, des bananiers et des cultures maraîchères). Ces activités ont réduit le couvert végétal, mis le sol très vulnérable à l'érosion dans les rivières qui ont des implications sérieuses sur la morphologie du lit et la sédimentation du Lake Kivu. L'objectif principal de ce travail est d'étudier les comportements des sédiments en suspension dans la rivière, puis de tenter d'en tirer des informations pour la gestion du bassin versant. Les données d'une année (Juillet 2012 à Juin 2013) ont utilisées à cette fin.

2 MATERIEL ET METHODES

2.1 DESCRIPTION DU MILIEU D'ÉTUDE

La rivière Cirhanyobwa est située en territoire de Kabare plus précisément à Kabamba. Elle prend source à plus de 2000 m d'altitude dans le Parc National de Kahuzi-Biéga, coule dans une région cultivée pour se déverser dans le lac Kivu à 1460 m d'altitude [13]. Sa longueur de la source à l'embouchure est estimée à 14,8 Km, sa profondeur moyenne varie de la source (28 cm) à l'embouchure (250 cm) et sa largeur est en moyenne de 2,5 m. Elle arrose une superficie de 59 Km² dans la zone de Kabare [14]. Cette rivière est ravitaillée par des différents cours d'eau tel que : Nyaweza, Kanyeremavurha, Kanyamwera, Nyamakoma, et Nyakatorwa (Figure 1).

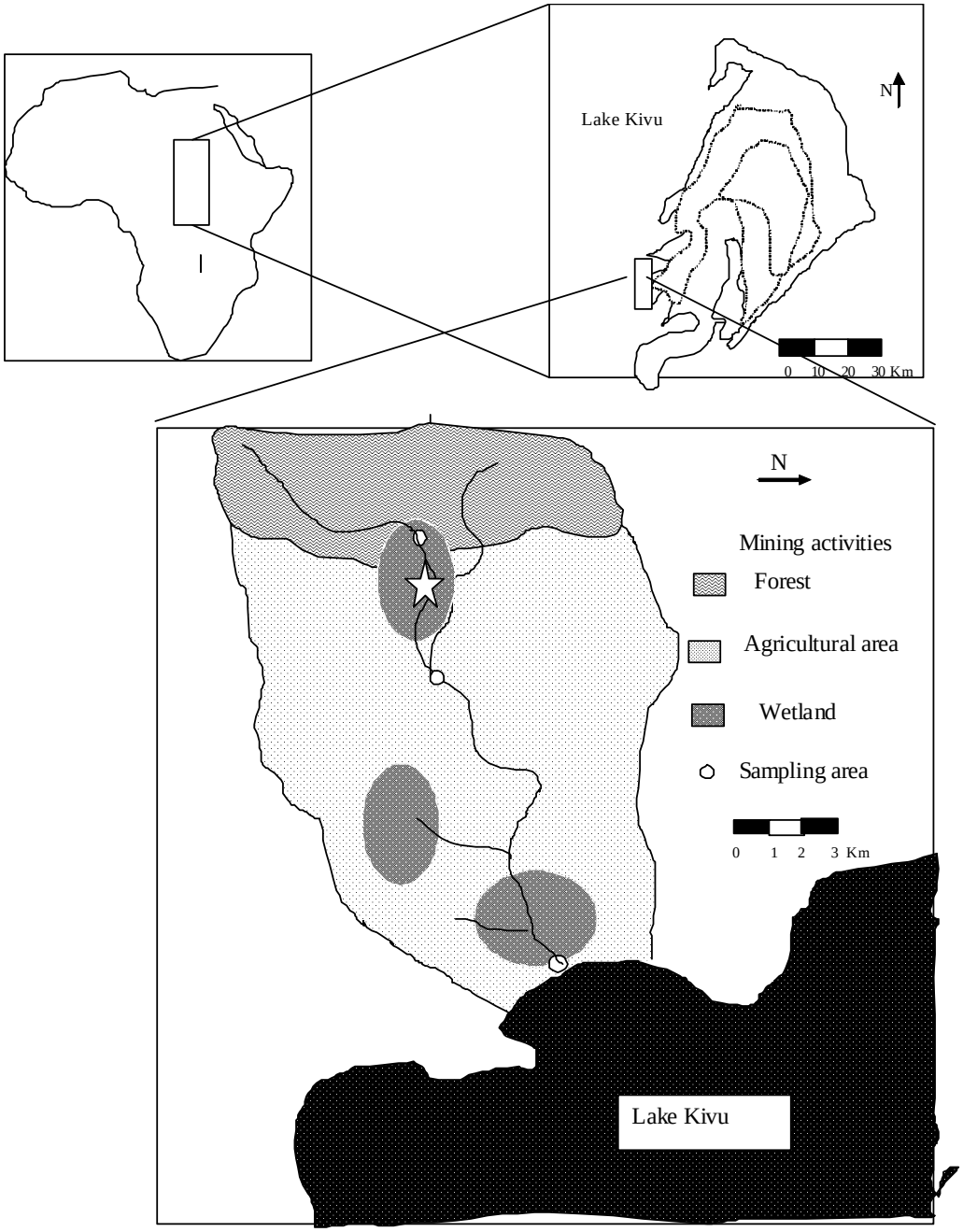

Figure 1. Carte du sous bassin de la rivière Cirhanyobwa
Figure 1. Map of the under basin of the river Cirhanyobwa

Le climat dans cette région est du type tropical humide à saison sèche qui s'étend du mois de Juin à Août et une saison de pluie de Septembre à Mai. La température moyenne annuelle est de 22°C, les précipitations annuelles sont supérieures à 1500 mm/an [10]. Sa végétation prédominante était constituée d'*Albizia grandibracteata, Fucus exasperata,* mais avec la pression de la population, on y trouve seulement des reliques aux alentours de la rivière. Du point de vue géologique, c'est un massif formé de roches anciennes ou récentes de nature diverse mais en majorité d'origine volcanique ou fortement métamorphisées [13].

Un site de prélèvement a été choisi sur la rivière Cirhanyobwa situé à 500 m de l'embouchure du Lac Kivu à 1515 m d'altitude. Ce site reçoit toutes les eaux des affluents de cette rivière avant de se jeter dans le Lac Kivu. A 100 m de l'amont de ce site la population utilise ses eaux pour le lavage des habits et leurs baignades. La végétation environnante est dominée par : *Achantus pubensis, Pennisetum purpureum, Senna spectabis, Eucalyptus globulis.*

2.2 ECHANTILLONNAGE D'EAU DANS LA RIVIÈRE CIRHANYOBWA

La quantité des sédiments en suspension de la rivière Cirhanyobwa a été suivie par les mesures hebdomadaires du débit et des prélèvements d'eaux du 10/07/2012 au 31/08/2013 pour les analyses des sédiments au laboratoire de Malacologie du Département de Biologie du Centre de Recherche en Sciences Naturelles de Lwiro. La connaissance de la charge en sédiments d'un cours d'eau requiert une surveillance continue [3].

Les échantillons d'eau ont été prélevés dans des bouteilles en polyéthylène de capacité de 250 ml et transportés au laboratoire pour filtrage. Les sédiments en suspension (mg/L) ont été estimés par filtration de 250 ml d'eau d'échantillonnage sur papier filtre (Whatman 589, 185 μm de porosité) qui était d'abord séché dans l'étuve à 105 °C pendant 1 heure et pré-pesée [15]; [16]. Après filtrage, les papiers ont été de nouveau séchés jusqu'à un poids constant et repesés. La différence des poids constitue la quantité des sédiments en suspension.

Le début a été mesuré à partir de la largeur du lit, la profondeur et la vitesse du courant d'eau utilisant la méthode de flotteur. La vitesse a été mesurée à l'aide d'un courant mètre après une moyenne de 15 prélèvements dans la section du lit de la rivière. Le début (m^3/s) est alors le calcul de la vitesse (m/s) et la surface en (m^2) [17].

2.3 ANALYSE DES ESTIMATIONS DU FLUX DES SÉDIMENTS EN SUSPENSION

L'estimation annuelle du flux des sédiments en suspension a été calculée en fonction de la concentration journalière des sédiments en suspension et du début en utilisant la formule [18]; [19]; [20] ci-dessous :

$$L = aQ^b \quad (1)$$

L quantité des sédiments en suspension, **a** et **b** sont des constantes de l'équation de régression et **Q** le début.

La détermination de la corrélation entre les sédiments en suspension et le début [21] est calculée en utilisant les données recueillies à la station de jaugeage localisée à 500 m de l'embouchure de la rivière au Lac Kivu par le logiciel Past.

3 RESULTATS

Les activités anthropogéniques ont un potentiel d'augmenter le niveau des sédimentations. Les sédiments sont lavés des terres vers les rivières et les ruisseaux pendant la période de grandes pluies par voie de flux des terres. Toute activité qui dérange le sol et l'expose aux pluies permettra la déposition des sédiments (figure 2).

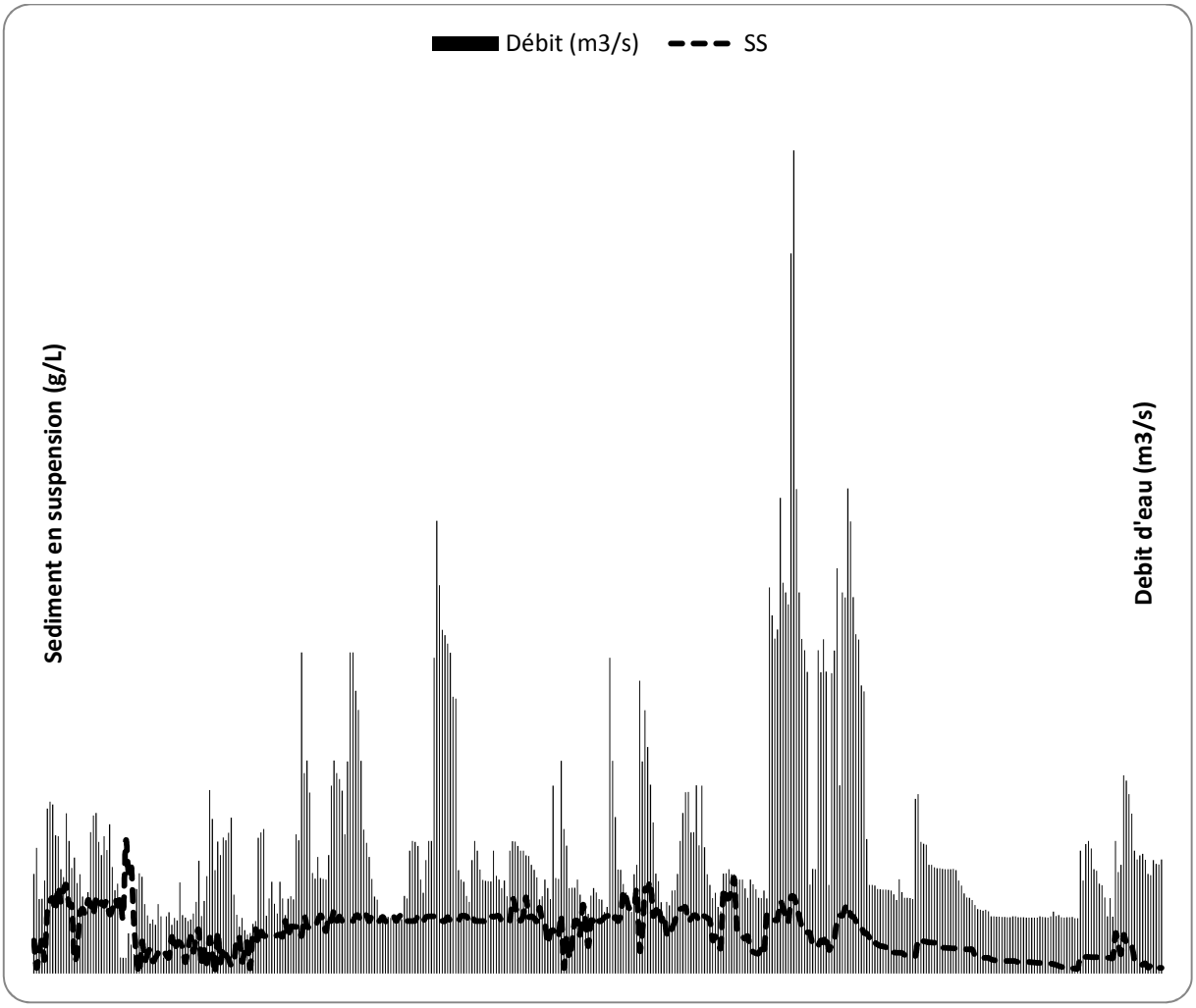

Figure 2. Variation journalière du débit et des MES dans la rivière Cirhanyobowa du 10 Juillet 2012 au 31 Août 2013.
Figure2. Daily variation of flow and the suspended matter in the river Cirhanyobowa from 10 July 2012 to 31 August 2013.

Le débit journalier de la rivière Cirhanyobwa est représenté dans la figure 3.

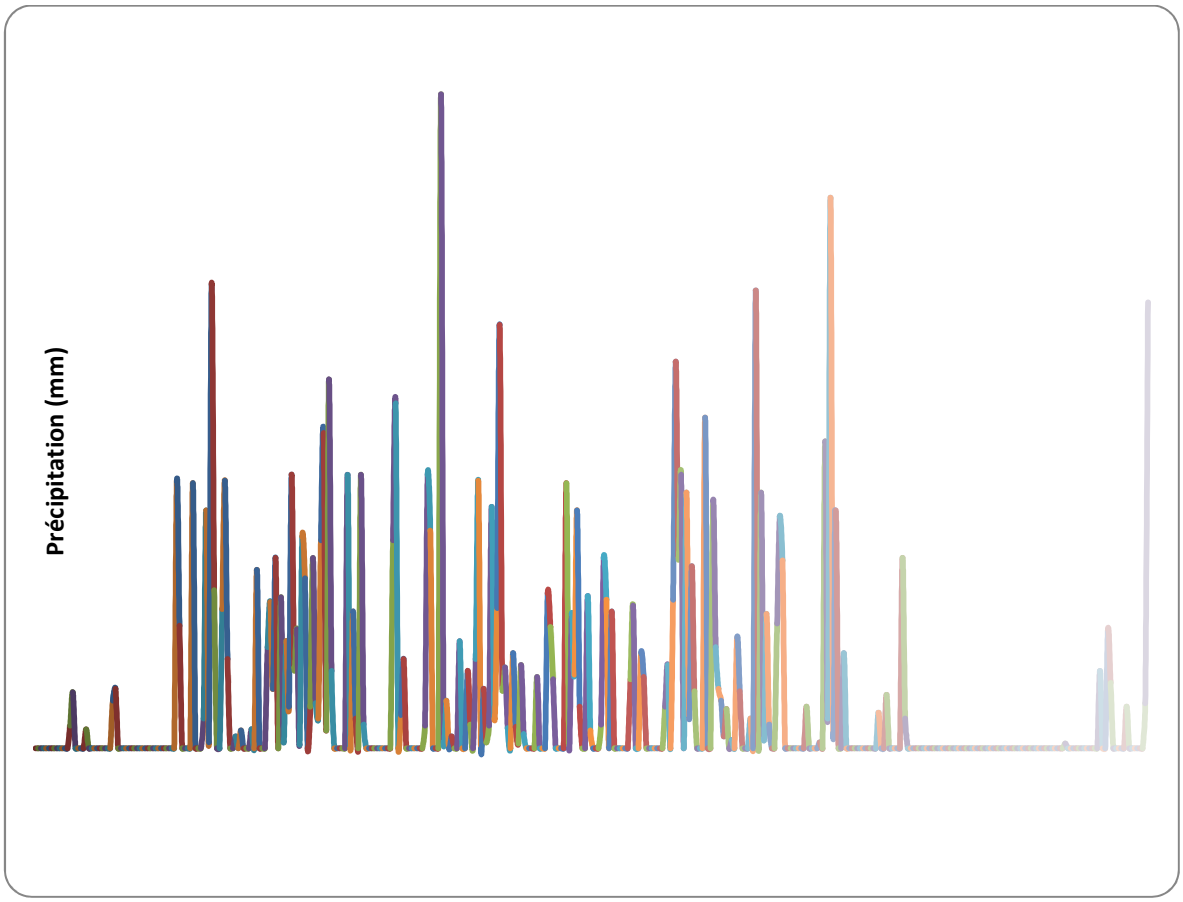

Figure 3. Variation de précipitation (mm) durant la période d'échantillonnage
Figure 3. Variation of the precipitation (mm) during the period of sampling.

Le flux (t/jr) journalier des sédiments en suspension dans le sous-bassin de la rivière Cirhanyobowa est présenté dans la figure 4.

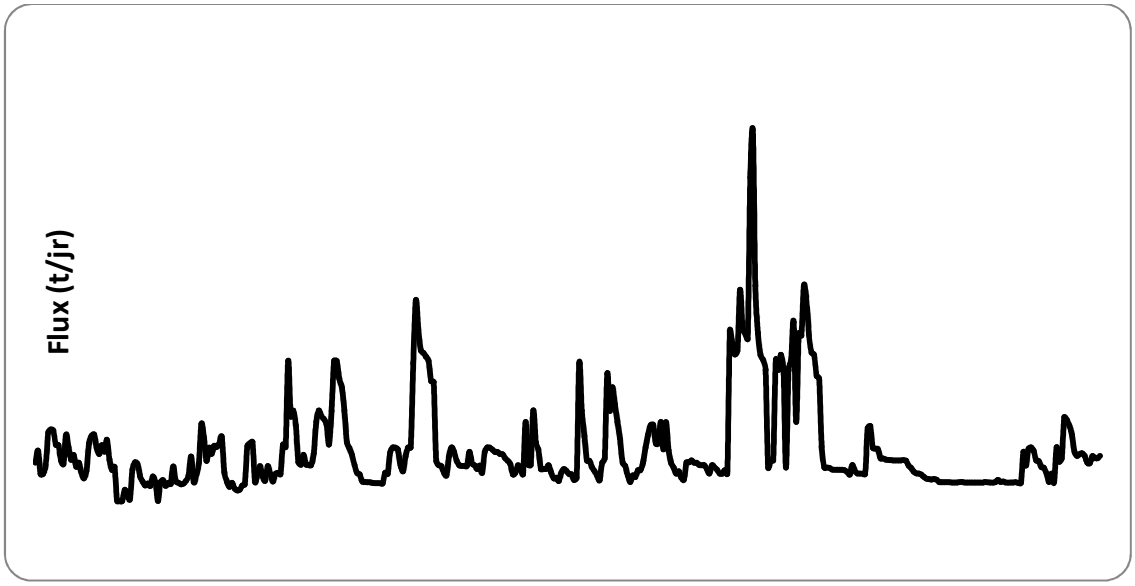

Figure 4. Quantité des sédiments en suspension apportée par la rivière Cirhanyobwa (t/jr) suivant la méthode courbe d'estimation.
Figure 4. Quantity of suspended sediments curried by the river Cirhanyobwa (t/day) according to the estimation curve method.

4 DISCUSSION

Il ressort de la figure 2 que la concentration des sédiments en suspension dans la rivière Cirhanyobwa est faible en saison sèche (0,02 g/l mesurée en Août 2012) et le maximum est en même période (2,819 g/L en Août 2012). La variation des concentrations des sédiments en suspension dans cette rivière ne dépend pas du climat mais des activités anthropogéniques dans le sous-bassin. En effet, pendant la saison sèche, la population de Kabamba, se livre à la fabrication des briques cuites pour la construction le long de la rivière. Cette situation est probablement responsable de cette augmentation de la concentration des sédiments en suspension pendant cette période. Ces observations ont été révélées aussi ailleurs au Fleuve rouge en Vietnam [12] où les activités anthropogéniques influencent la concentration des sédiments dans la rivière.

Il ressort de la figure 3 que le débit journalier de la rivière Cirhanyobwa est élevé en Avril 2013 tandis que le débit faible a été enregistré en Aout 2012. Cette variation suit bien la variation des précipitations dans la région [10]. En effet, le mois d'avril est parmi les mois les plus arrosés de la région (Figure 3).

En effet, la grandeur du bassin versant joue un grand rôle dans le rechargement de la rivière et même de la quantité des sédiments en suspension entrainée dans celle-ci. Le petit bassin versant transporte souvent une grande proportion des sédiments par unité de surface que pour le large bassin [22]. Ceci à cause de la probabilité des grandes orages qui apparaissent souvent dans le petit bassin et transportent les sédiments en suspension dans le lit de la rivière rapidement. La corrélation r de Person montre bien qu'il ya une faible corrélation positive (r= 0.306) entre le débit de la rivière Cirhanyobwa et les sédiments en suspension.

De la figure 4, le flux journalier possède un pic en Avril et présente une allure en dent de Cie pendant la saison sèche. Il varie en fonction du débit des eaux dans la rivière. [23], montre bien que la concentration et le flux des sédiments en suspension sont liés au débit des eaux dans certaines rivières. L'allure de la courbe de variation des sédiments en suspension de la rivière Cirhanyobwa montre bien que la cause principale de cette variation est l'agriculture pratiquée dans les endroits à forte pente; la destruction de la végétation aux bords de la rivière et aussi la fabrication des briques cuites dans la rivière. Les activités anthropogéniques, surtout l'agriculture dans les bassins de nombreuses rivières ont été à la base de l'augmentation des sédiments en suspension dans les rivières [24] ; [25].

Une charge excessive de sédiments peut avoir des effets négatifs sur la faune aquatique, comme par exemple l'ensablement des frayères et la réduction de la qualité de l'eau [26]. Les sédiments entraînés par le ruissellement peuvent

aussi réduire la capacité de stockage de l'eau des lacs et réservoirs, engorger les rivières et les canaux, augmenter la fréquence et la sévérité des inondations et endommager les réseaux de distribution d'eau. Les sédiments en suspension dans l'eau servent de véhicule pour le transport du phosphore et d'autres polluants tels que les pesticides et les métaux [27]; [28].

A part l'augmentation de la turbidité, la qualité de l'eau peut être affectée par l'augmentation des nutriments et substances toxiques attachées aux particules des sédiments en suspension. L'augmentation de la turbidité a des effets physique, physiologique et comportemental sur les poissons. Les sédiments en suspension sont dangereux sur les branchies, causent des maladies, réduisent la croissance et causent la mort éventuelle. Les poissons aiment voir leur proie souffrir avec la diminution de la visibilité dans l'eau turbide. La déposition des sédiments en suspension dans le lit de la rivière change la diversité de l'habitat dans la rivière. Certaines espèces vivent dans les roches au fond de la rivière, d'autres vivent dans les sables profonds ou dans les débris végétaux morts. Une sédimentation importante dans la rivière Cirhanyobwa peut conduire à l'envasement progressif de celle-ci mais aussi du Lac Kivu.

5 CONCLUSION

La qualité de l'eau de la rivière Cirhanyobwa est affectée sérieusement par les activités agricoles qui prennent place dans le bassin versant mais aussi des autres activités anthropogéniques comme la fabrication des briques cuites pendant la saison sèche. Les méthodes traditionnelles de travail du sol, le manque de pratiques de conservation des sols et les autres activités anthropogéniques sont autant de raisons qui expliquent les apports de sédiments en suspension. Un plan d'action axé sur le contrôle de ces sources de pollution pourrait contribuer à la réduction à long terme des impacts négatifs qui ont été rapportés dans ce travail.

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An Examination of the Impact of Terrorism on Small and Medium Scale Enterprises' Mortality Rates and Standard of Living in the Northern Region of Nigeria

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ABSTRACT: In Nigeria today, terrorism has claimed waves with its dire consequences on Small and Medium Scale Enterprises and living standards of the people. Terrorism has posed insecurity and hazards in the business environment, thereby, engineering unimaginable upheaval in the northern region of the country. This study aimed at examining the impact of terrorism on Small and Medium Scale Enterprises mortality rates and standard of living in the northern region of Nigeria. The study used both primary and secondary methods of gathering reliable and adequate data and information to achieve its purpose. The primary method includes the personal interview and questionnaire administered to the randomly selected respondents; and the secondary method includes textbooks, journal and internet. To analyze the data gathered for this study, descriptive statistical tool, tables and Chi-Square method were used. The study revealed that terrorism can lead to high mortality rate of SMEs and degradation of the living standards of the people in the northern part of Nigeria. It was concluded that terrorism will not only lead to high mortality rate of SMEs and degrade the living standards of the people, but may crumble the country's national economy at the long run if no vibrant measure is taken to halt the menace. The study therefore recommended that the government should formulate and implement vibrant policies and programmes as mechanism towards addressing the root causes of insecurity in Nigeria and putting a halt to the menace.

KEYWORDS: Terrorism, Small and Medium Scale Enterprise, Development, Living Standards, Insecurity.

1 INTRODUCTION

Over the years, the issue of terrorism has claimed waves, particularly, in the northern part of Nigeria. This menace is long observed to have been impairing the foresight of growth and economic development of the region and making Nigeria at large uneasy business environment.

The popular notions and impacts pertaining to what Small and Medium Scale Enterprises (SMEs) can offer are being falsified. Meanwhile, SMEs are factually the citadel of the Nigeria and other developing countries' economy. SMEs are not only the backbone, but also the cerebellums for every feasible operation in every sector of the economy. The relative importance of small and medium scale enterprise in advance and developing countries has led and would continue to lead to a reconsideration of the role of small and medium scale enterprise in the economy of nations, [6]. Thus, a fall in the healthy state of SMEs in any business environment has concomitant effect on the economy.

Unfortunately, the terrorists' activities have incrementally marred the comprehensive roles of SMEs in Nigeria. Terrorism has often acts as inevitable determinant of death-or-life situation for most businesses. Terrorism has posed insecurity and hazards in the business environment, thereby, engineering unimaginable upheaval in the northern region of Nigeria. It has established wide gaps between most SMEs vision and mission, and foretold the accomplishment of their objectives as being unrealistic. These hindrances are not only secluded to SMEs in the region, but have greater implications on the living standards of the people. The people are scared away by unforeseen terrorist attacks, and this makes trading hard-nut-to-crack activities due to unavailability of market for variety of consumers' products.

1.1 OBJECTIVES OF THE STUDY

This paper does not aim at addressing terrorism from the holistic point of view, but investigates its inverse impact on SMEs and living standard at the Northern region of Nigeria. The objectives of this study are:

i. To determine whether terrorism can lead to high mortality rate of SMEs and degradation of standards of living in the Northern Nigeria.
ii. To investigate the categories of terrorism in the Northern Nigeria.
iii. To examine the security challenges facing the continuous operation of SMEs in Nigeria

1.2 RESEARCH HYPOTHESIS

Based on the objective one above, this paper drew a hypothesis:

H_0 : That terrorism cannot lead to high mortality rate of SMEs and degradation of standards of living in the Northern Nigeria.

H_1 : That terrorism can lead to high mortality rate of SMEs and degradation of standards of living in the northern Nigeria.

2 CONCEPT OF TERRORISM

According to Nielsen [7], terrorism has come to signify race and religion though everyone is careful not to say so. Terrorism refers to those violent acts that are intended to create fear (terror); are perpetrated for a religious, political, or ideological goal; and deliberately target or disregard the safety of non-combatants, [12]. Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government or its citizens to further certain political or social objective, [13]. In the Nigerian context, terrorism is violence against humanity, properties and businesses as result of some ideologies which may be political, social and religious in nature. Accordingly, when a young man is poor, illiterate and unemployed, he becomes a clean slate for any kind of brainwashing which, according to Marx is more potent when it comes from religion and aided by culture, [4].

2.1 CATEGORIES OF TERRORISM IN NORTHERN NIGERIA

This paper gathered from interviews that terrorism takes various shapes, depending on the rationale behind its course. One oblivious attitude of respondents is their fear to unveiling this rationale, but gave the researchers the required inkling concerning the categories of terrorism. Terrorism may take these forms:

i. *Terrorism that is religion inclined:* This is a kind of terrorism that has its base from religious indoctrination.
ii. *Terrorism that is politically oriented:* This is a kind of terrorism that arises as a result of conflicting political interests.
iii. *Terrorism that is hostile in nature:* This is a kind of terrorism that occurs based on enmity among different ethnic groups.
iv. *Terrorism that is instrumental in nature:* This kind of terrorism is embraced by some group of hooligans due to the pleasures the members derived from harming others.

2.2 EXAMINING THE IMPACT OF SMALL SCALE BUSINESSES IN NIGERIA

It is no doubt that SMEs take the lead at the forefront of development of any nation. Small Businesses are the backbone of all economies and their importance as an impetus to economic development especially in developing economies cannot be over-emphasized, [1]. Epileptic SMEs friendly environment can cause whole lots of backdrops for development of every facet in a nation. The roles of SMEs are indisputably a *sine qua non* for the Nigerian economy. Onuoha [8] stated some of the roles as follows:

i. Small business helps to sustain economy and economic recession.
ii. Small firms avoid diseconomies
iii. Small business provides the public with consumer goods which would have been imported
iv. Small scale business have helped in export promotion especially in the area of agriculture thus enabling the country to even the much needed foreign exchange which is used for financing other projects and schemes that are very crucial to economic development.

2.3 TOWARDS A STABLE DEVELOPMENT OF SMES IN NIGERIA

Having discovered SMEs as the inevitable tool for economic growth and development, ample effort was directed by the government and its agencies towards achieving SMEs development. According to Anietie [5], as a part of the development plan a Nigerian Local Development Board (NLDB) was established and charged with the following functions among others:

i. The promotion and development of village crafts and industries, and industrial development of the products of Nigeria;
ii. The setting up and operation of experimental undertakings for the testing of industrial or processing development of any Nigerian products; and
iii. Other suitable projects approved by the Governor-in-Council.

Factually, the idea behind the establishment of NLDB is to spring up effective and efficient SMEs in the economy. This resulted into the formulations of a policy. The overall objectives of this policy are to create, nurture and promote the necessary conditions for the growth and development of SMEs, [5]. This policy according to SMEDAN [11] spans through the following areas:

i. Institutional, legal and regulatory framework
ii. Human resource development
iii. Technology, research and development
iv. Extension and support services
v. Marketing
vi. Infrastructure; and
vii. Finance.

Onuoha [10] identified some of the key government policies or programmes on entrepreneurship and economic development in Nigeria as follows:

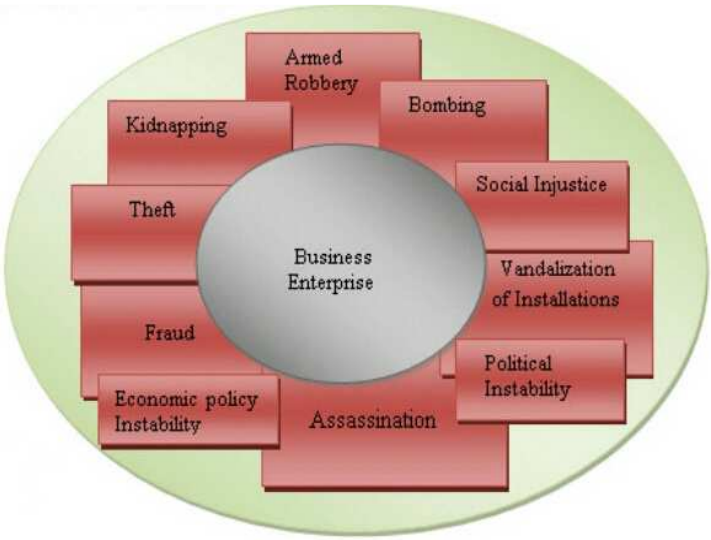
i. The establishment of small scale industrial estates and putting in place such policies as pioneer status, accelerated depreciation tariff protection, approved user scheme, Small and Medium Industrial Equity Investment Scheme (SMIEIS), soft loan scheme, the agricultural credit guarantee scheme, etc.
ii. The establishment and funding of Polytechnics, Universities, Administrative Staff College of Nigeria (ASCON), Centre for Management Development (CMD), and research institutes such as Nigerian Institute for Social and Economic Research (NISER), Projects Development Agency (PRODA), Federal Institute of Industrial Research Oshodi (FIIRO), Nigerian Institute for Oil Palm Research (NIFOR), Raw Materials. Research and Development Council (RMRDC), etc.
iii. The establishment of the Niger Delta Development Commission (NDDC), Small and Medium Enterprises Agency of Nigeria (SMEDAN), Bank of Industry (BOI), Standard Organization of Nigeria (SON), Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), African Development Bank (AFDB), Export Stimulation Fund Scheme, Nigerian Export Import Bank (NEXIM), Nigerian Communications Commission (NCC), the Oil and Gas Sector Reform with emphasis on local content, etc.
iv. The establishment and funding of Industrial Development Centres (IDCs): Small Scale Industries Corporation (SSIC); SME Apex Unit Loan Scheme; The defunct National Economic Reconstruction Fund (NERFUND); Nigerian Export Promotion Council (NEPC); the New Industrial Policy; National Directorate of Employment (NDE); Nigerian Airspace Management Agency (NAMA): Nigerian Copyright Commission (NCC); etc.
v. Getting inputs from the Organized Private Sector (OPC); trade associations such as NECA, NACCIMA, MAN, NASSI, etc., in budget preparations and economic policies.

2.4 SECURITY CHALLENGES ON BUSINESS GOING CONCERN IN THE NORTHERN NIGERIA

It is uncontroversial that Nigeria is one of the best markets in the world. The country has versatile of natural resources that can facilitate investment of various kinds, but the security shortcomings in its Northern business environment poses challenges and discouragement to investors. Akin [3] defined security as the situation that exists as a result of the establishment of measures for the protection of persons, information and property against hostile persons, influences and actions. It is the existence of conditions within which people in a society can go about their normal daily activities without any threats to their lives or properties, [2].

It is significant to make an assertion that business and the society are inseparable Siamese. The problem of one is the problem of the other. Where the relationship between business and the society is cordial and mutually beneficial, the business thrives well, makes profits, grows and the society enjoy good quality products at reasonable price, [9].

Though, Nigerian government has substantially directed effort towards luring investors, but it is quite unfortunate that not all parts of the country have business credibility. The northern part of Nigerian has lost business credibility due to security challenges in the region. The security situation has not only affected business operations in the northern business environment, but has also impacted negatively on other regional business activities. Small businesses have lost their assets and employees, and such the two major alternatives available are to either continue with high risk of mortality or geographically migrate from this hazardous business environment. The figure 2.4.1 below shows various factors of insecurity surrounding business enterprises in this business environment.



Source: *Achumba, [2]*

2.5 PROBLEMS FACING SMES AS A RESULT OF TERRORISM IN THE NORTHERN PART OF NIGERIA

i. Manpower problem

Despite the increase number of the labour force in Nigeria, the high level of unrest in the north has led to unprecedented mass emigration. Therefore, decreasing manpower inventory is recorded almost on a daily basis.

ii. Religion problem

Religion ought to be the opium of the masses, but it has become a tool and a motive for terrorist attack under religious ideology. These religious groups and ideologies are the basis for the impediment of businesses in the north.

iii. Ethnicity Problem

Nigeria is a diverse nation, ranging from languages, cultures, tribes, etc. These are drivers of sentimentality, and have heavy implication on survival of businesses in the Northern Region of Nigeria.

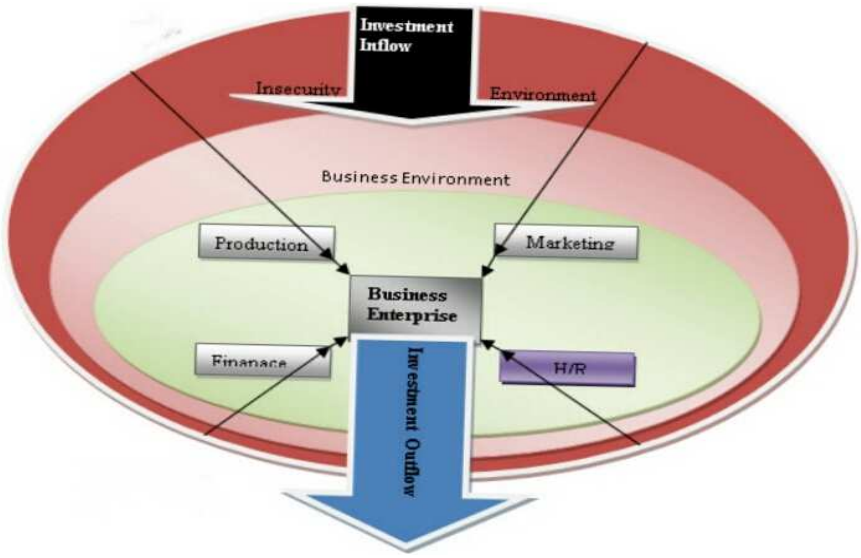
Other problems facing SMEs in the northern part of Nigeria are Political Problem, Financial problem, Transportation problem, and Market and marketing problems.

2.6 THE IMPLICATIONS OF TERRORISM ON SMES

In the past decades, the northern parts of Nigeria were business friendly environment. The beginning of terrorism marked high level of dooms in both the business environment and human endeavour. One attack of this insurgency often leads to several destruction of properties and lives. This accounts for significant mobility of both labour and business from this geographical area to better site where peace and tranquility exist. Terrorism has so many implications on SMEs in the North, out of which two are briefly discussed.

i. Employee Turn over: Despite the high rate of unemployment in Nigeria, there are large observed large numbers of employees leaving their jobs in the north for peaceful places. Employees forcefully leave their jobs to fend for their lives and families lives with or without the knowledge of their firms. This makes increasing job openings for those who can take the risk of death.

ii. Religion: The religion implication of terrorism on SMEs may be observed with the goods being traded or the caliber of its employees. For instance, Beer parlour business is against the religion doctrine in the north and one or another religion may view the recruitment of female employees as *haram* (not proper in religious doctrine). Similarly, a member of one religious group will never do business in the domain of another religion group. The figure 2.6.1 below also gives pictorial view of the implications of insecurity (terrorism) on business functions.



Source: *Achumba, et al [2]*

3 METHODOLOGY

This study used primary and secondary sources for gathering reliable and adequate data and information. The primary sources of data include the personal interview, observation and structured questionnaire administered to the study area. The secondary sources include Newspaper, Journal and Internet. This research was conducted in the North central, Nigeria. The study randomly selected 255 respondents, and administered the questionnaires evenly among tribal groups that may be significant for the research. The purpose of this is to divorce this research from been bias. The researchers took time to carry out the research objectively and successfully. This study analyzed the data collected with Chi-Square statistical method of testing hypothesis, percentages and tables.

4 DATA INTERPRETATION, ANALYSIS AND DISCUSSION OF FINDINGS

Table 4.1: The Demographic Characteristics of Respondents

Demography	Responses	Percentage (%)
Gender		
Female	137	53.7
Male	118	46.3
Total	**255**	**100**
Occupation		
Employee	48	18.8
Business owner	78	30.6
Residence	129	50.6
Total	**255**	**100**
Duration of Stay in The North		
1-5 years	48	18.8
6-10 years	56	22.0
11-15years	83	32.5
16-20years	51	20.0
21 and above	17	6.7
Total	**255**	**100**

Source: Field Survey, 2014

From the table 4.1. showing the demographic characteristics of respondents, it is discovered that137 respondents (53.7%) were female and 118 respondents (46.3%) were male. The table also shows that 48 respondents (18.8%) were employee; 78 respondents (30.6%) were business owners; and 129 respondents (50.6%) were residents of the study area. And that 48 respondents (18.8%) have spent 1-5 years in the study area; likewise 56 respondents (22.0%) have spent 6-10 years; 83 respondents (32.5%) have spent 11- 15 years; 51 respondents (20.0%) have spent 16-20 years; and 17 respondents (6.7%) have spent 21 years and above.

Table 4.2: Showing the Implication of Terrorism on Smes and Standards of Living in the Northern Nigeria

Terrorism Can Lead To High Mortality Rate Of SMEs And Degradation Standard Of Living In The Northern Nigeria				
Response	**Armed Attack**	**Bombing & Explosion**	**Total**	**Percentage**
Yes	87	107	**194**	**76.1**
No	14	15	**29**	**11.4**
Not Sure	7	25	**32**	**12.5**
Total	**108**	**147**	**255**	**100**

Source: Field Survey, 2014

From the table 4.2 above, it is observed that 194 respondents (76.1%) agreed that terrorism can lead to high mortality rate of SMEs and degradation standards of living in the northern Nigeria; 29 respondents (11.4%) disagreed; and 32 respondents (12.5%) have no inkling or opinion on this subject.

4.1.1 TEST OF HYPOTHESIS

From the table 4.2 above, the Expected frequency is computed and presented in the table below:

Response	Armed Attack	Bombing & Explosion	Total	%
Yes	87 **12.16**	107 **111.83**	**194**	**76.1**
No	14 **12.28**	15 **16.71**	**29**	**11.4**
Not Sure	7 **13.55**	25 **18.44**	**32**	**12.5**
Total	**108**	**147**	**255**	**100**

Source: Field Survey, 2014

Expected Frequency= $\frac{RowTotal\ X\ ColumnTotal}{Grand\ Total}$

Fo	Fe	$Fo-Fe$	$(Fo-Fe)^2$	$\frac{(Fo-Fe)^2}{Fe}$
87	82.16	4.84	23.4256	0.2851
14	12.28	1.72	2.9584	0.2409
7	13.55	-6.55	42.9025	3.1662
107	111.83	-4.83	23.3289	0.2086
15	16.71	-1.71	2.9241	0.1750
25	18.44	6.56	43.0336	2.3337
				∑=6.4095

Level of Significance = 5% or 0.05
Degree of Freedom (df) = (R-1)(C-1)
(3-1)(2-1)= (2)(1)= 2

$X^2 \rangle X^2_{0.05}$

Cell	Fo	Fe	Df	Calculated X^2 Critical Value	X^2 Value	Decision
I	87	82.16	2	*6.410*	*5.991*	*Reject H_o*
Ii	14	12.28				
Iii	7	13.55				
Iv	107	111.83				
V	15	16.71				
Vi	25	18.44				

4.1.2 DECISION

Since $X^2 \rangle X^2_{0.05}$, that is, the calculated Chi-Square (**X^2 =** 6.410) is greater than the critical value ($X^2 \rangle X^2_{0.05}$ = 5.991), the null hypothesis is rejected and the alternative hypothesis is upheld. We therefore conclude that terrorism can lead to high mortality rate of SMEs and degradation of standards of living in the northern part of Nigeria.

5 CONCLUSION

There is no doubt that the northern Nigeria's economy has been facing the mud since the inception of terrorism in the country. Human and business life witness death unduly on a daily basis. The increasing mortality rate of business and owners have made many business owners to either relocate or wind up their businesses, and this has inverse implications on the living standard of the people in the region.

Terrorism by its simple indication is violence against every existence, and is inimical to development at every facet of life. Terrorism is categorized based on the reasons for which it is established. Terrorism, be it of any shape or form, if persistent will not only lead to high mortality rate of SMEs and degrade the standards of living of the people, but may crumble the country's national economy at the long run if no vibrant measure is taken to halt the menace.

6 RECOMMENDATIONS

i. Government should investigate the root cause of insecurity and particularly the categories of terrorism in Nigeria
ii. Government should formulate and implement vibrant policies and programmes as mechanism towards addressing the root causes of insecurity in Nigeria and putting a halt to the menace.
iii. The Legislature and judiciary arms of government should redefine their interventions in addressing security issues affecting both human and SMEs lives.
iv. SMEs owners should invest much time in the analysis of business friendly environment before making the choice of their business location.
v. SMEs owners should be security conscious, and should educate their employees on the need to alarm terroristic activities during their daily routine.

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A Socio-Political Conflict between Religious Conservatism and Liberalism in Pakistan: A Comparative Study of Aligarh and Deoband School of Thought

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ABSTRACT: The major problem of Pakistan since its formation is huge difference among religious conservatism and liberalism. Both perceive the formation of Pakistan according to their views but, this rivalry is not new. During British India, such ideologies were working against each other and Muslim society had been divided into two schools of thought: the Aligarh and the Deoband. Aligarh School of thought motivated Indian Muslims regarding getting western education as solution of their current socio-political problems, while Deoband School of Thought found this solution in religious education.

This article highlights the difference among ideologies and practices of both the school of thoughts with special reference to Pakistan, and solution of this difference according to the theories of Sir Syed and Allama Iqbal. Both the scholars found the reason of Muslims backwardness is far from the modern education. If Sir Syed gave the concept of rationalism in religion for the purpose of getting rid off from orthodox and rigid behavior, Allama Iqbal focued upon the need of ijtehad and reconstruction of religious thoughts that is a solution of all the modern issues and problems. Both the point of views are discussed in this article.

KEYWORDS: Socio-Political Conflict, Religious Conservatism, Liberalism, Pakistan.

INTRODUCTION

As Pakistani society is experiencing highly dogmatic attitude and that is usually belonging to the Deoband School of Thought. Therefore, this study is conducted because the only solution of protecting Pakistani society from militant attitude and political religiosity is to following the ideology of Sir Syed Ahmed Khan and teachings of Allama Iqbal.

LITERATURE REVIEW

Ikram (1992) and C.Kozlowski (1985) analyze an educational environment of British India after 1957 war of independence and highlight the efforts of Muslim scholars for their community.

Hassan (2006), Muhammad (1999) and Jaina (1965) talk about Aligarh movement and describe the role of Sir Syed Ahmed Khan regerding taking educational steps. Similarly, Tabassum (2006), Jayapalan (2000) and Jaffrelot (2002) evaluate the ideology and impacts of Deoband movement on Indain Musim society.

Fair (2008)**,** Akhtar (2000) and McDonough (1984) focus upon the militant attitude and tendency in Pakistan with highlighting the ratio of Madaris, activities of religious parties and religious politics of mainstream political parties since the formation of Pakistan.

Hanif (1999) and Masud (2009) describes the concept of Islamic modernity, given by the Muslim scholars of all over the world including British India like Jamal-ud-Din Afghani, Sir Syed Ahmed Khan and Allama Iqbal. Similarly, Ali (2005) and

McDonough (1984) define the theme of rationality in Islam, given by the Sir Syed. They also highlight the motivations of Sir Syed regarding promoting western education in Indian Muslims for their better future.

Fair (2008), Singh (2012) and Zaidi (2003) emphasize on Deoband ideology and mindset since the formation of this institution to till now its implementation in Pakistan. They point out political, religious and socio-cultural activities of all those groups and parties which are affiliated with this mindset in Pakistan.

Iqbal (1930) presented his ideas about reconstruction of religious thoughts in Islam and Iqbal Academy Pakistan published its new edition in 2012. In these ideas, Iqbal motivates the Muslims of all over the world to adopt the way of ijtehad in Islam. He argues that this is the only way, through which Muslims can find the solution of their modern problems. Ashraf (1964) and Mir (2006) redefine and explain the ideas of Iqbal in easy language that what Iqbal wanted to advise and what kind of society Iqbal wanted to see.

ESSAY

Formation of Pakistan is not just a result of political movement, but its roots are searched in educational movements during British rule in India, that facilitate Pakistan movement very much than any other effort (C.Kozlowski, 1985, P.156)(Ikram, 1992, P.494).

After the death of Aurangzeb in 1707, Mughals had lost their actual power in subcontinent and Muslims were trying to restore their status but got continuous failure during War of Plessey, Mysore war and Jehad of Syed Ahmad Shaheed. During failure of Muslims power in subcontinent, educational movements played a vital role for educational development and political socialization of Muslims. Initially, sons of Shah Wali-ullah and his Madrassa Raheemia guided Muslims, but after 1857, circumstances had been totally changed (Ikram, 1992, P.495). Muslims lost their rule and Britishers got over all rule in India. In these circumstances, Muslims of India had been divided into three schools of thoughts. One were in favor of Jehad like Syed Ahmad bralvi, second were supported getting religious education like Moulana Qasim Nanotwi of Dar-ul-Uloom Deoband, and the third were in favor of having relationship with the Britishers like Sir Syed Ahmad Khan (Ikram, 1992, P.495).

Some Muslims leaders felt that Aligarh just heighten modern education while Dar-ul-Uloom Deoband just deliver religious education, and in these circumstances, Muslims of India should be appraised from both the knowledge. So, they established “Nadwa-tul-Ulama” (Ikram, 1992, P.496).

Now we have to dispute reasons and achievement of these movements and their impacts on formation of Pakistan.

ALIGARH SCHOOL OF THOUGHT

After war of independence in 1857, Britain captured all over the India. Sir Syed Ahmed khan was government employee at that time. He cannot see Britishers behavior towards his nation. On the other hand, Muslims also do not want to shake hand with Britishers. Sir Syed Ahmed Khan wrote booklet “Reasons of Indian Revolt” just for overcome the tension among Muslims and the Britishers. Sir Syed Ahmed Khan contemplated that Muslims have just a way of negotiations with the Britishers and their educational system regarding leaving their backwardness (C.Kozlowski, 1985, P.158)(Hasan, 2006, P.65)(Muhammad, 1999, P.136)(Jaina, 1965, P.165).

Sir Syed affirmed that British educational system have so many faults that if it was adopted over all then national identity and Islamic civilization will be destroyed in all over the India. He started Aligarh movement just to save Islamic identity along getting benefits from western educational system. Aligarh College was established for this purpose, because Sir Syed wanted to make its status like Oxford and Cambridge (C.Kozlowski, 1985, P.158)(Hasan, 2006, PP.66-67) (Muhammad, 1999, P.136)(Jaina, 1965, P.166).

In fact, there were several reasons of initiating Aligarh school of thought. For escaping Muslims from the drawbacks of British educational system and adopting its good attributes, Sir Syed took several steps which are considered to be a part of Aligarh movement under his ideology. Reasons of Aligarh movement are as follows:

1. After annihilating in 1857 war, and facing crucial behavior of Britishers, Muslims had realized that there is no way except co-operation with the Britishers, because they are not such strong militarily like them. Aligarh College was the first motive regarding adopting this approach (C.Kozlowski, 1985, P.159)(Hasan, 2006, P.272) (Muhammad, 1999, P.138)(Jaina, 1965, P.167).
2. Britishers had gotten Hindus co-operation and both wanted to devalue Muslims in Indian economy. Sir Syed realized that only modern education can help Muslims regarding getting strong financial position. This thinking also became

a reason of starting Aligarh Movement (C.Kozlowski, 1985, P.159) (Muhammad, 1999, P.138)(Jaina, 1965, P.167) (Hasan, 2006, P.273).

3. Hindus, after assimilating modern professional education, had gotten a status of literate nation, and now they had to get government jobs. Sir Syed was feeling that if this routine will remain continue then a day will not far away when India will lead by Hindus. So, this was also a motive to start Aligarh movement (C.Kozlowski, 1985, P.159) (Muhammad, 1999, P.138)(Jaina, 1965, P.167) (Hasan, 2006, P.273).
4. After 1857, all the educational institutes were under the control of British government. So, there was an avid of independent Muslim institution which can protect Muslim civilization and identity. Therefore, Aligarh College established (C.Kozlowski, 1985, P.160) (Muhammad, 1999, P.138)(Jaina, 1965, P.167) (Hasan, 2006, P.274).
5. British educational system was an effort to destroy Muslims' culture. Therefore, Muslims were forced to keep far away their children from such schools (C.Kozlowski, 1985, P.160) (Muhammad, 1999, P.138)(Jaina, 1965, P.167) (Hasan, 2006, P.274).
6. The way of teaching in government schools was in English language that was difficult to understand by unvaried Muslim students. Therefore there was a need of such educational institute where Muslims can feel comfortable regarding getting education (C.Kozlowski, 1985, P.160) (Muhammad, 1999, P.139)(Jaina, 1965, P.168) (Hasan, 2006, P.274).
7. Government schools were using for preaching of Christianity, and also syllabus was against Muslims history and culture. Even religious education was prohibited but Christianity was preached in schools openly. Therefore, Muslims were avoided to send their children in such schools (C.Kozlowski, 1985, P.160)(Hasan, 2006, P.275) (Muhammad, 1999, P.139)(Jaina, 1965, P.168).

DEOBAND SCHOOL OF THOUGHT

Due to British educational policies against Islam and Muslim identity, it was felt intensely to protect the Islamic values and education. For this purpose, Molana Muhammad Qasim Nanotwi opened a little madrasa in a non-famous town "Deoband" of district Saharanpur (Tabassum, 2006, P.42). He was a pupil of Molana Mamlook Ali who was a student of Shah Wali-Ullah. Therefore, Dar-ul-Uloom Deoband became a reason of revival of Shah Wali-Ullah's thoughts. So, we can called it Shah Wali-ullah School of Thought or Deoband School of Thought. This institute was non-align from the funding of British government. Even it does not accept funded of those Muslims who were westernize in their thinking. This institution is still running since 1866, which generated great Muslim philosophers like Molana mehmood Hassan, Molana Ubaid-Ullah Sindhi, Molana Shabir Ahmed Usmani, Molana Muhammad Ilyas and Molana Ashraf Ali Thanwi (Tabassum, 2006, P.43)(Jaffrelot, 2002, P.224).

The reasons of Deoband movement under the ideology of this school of thought were as follows;

1. Its basic objective was to restore Islamic education which had been almost destroyed by the British government through policies regarding closings of Muslims religious institutions (Jayapalan, 2000, P.136) (Jaffrelot, 2002, P.226) (Tabassum, 2006, P.44).
2. As government was supporting preaching of Christianity,. it was an intense need of that time to preach an actual shape of Islam (Jayapalan, 2000, P136)(Tabassum, 2006, P.44) (Jaffrelot, 2002, P.226).
3. As British educational system was motivating Indian Muslims towards materialism, this movement was started to socialize spiritually (Jayapalan, 2000, P.136)(Tabassum, 2006, P.45) (Jaffrelot, 2002, P.226).
4. British government and Hindus were trying that time to create differences among Muslims, and they were funding to generate different sects among Muslims. This movement was an effort to unite Muslims under their pure identification of Muslim (Jayapalan, 2000, P.136)(Tabassum, 2006, P.45) (Jaffrelot, 2002, P.226).
5. To eliminating impacts of western civilization through new inducted educational system by British government, this movement played vital role (Jayapalan, 2000, P.136)(Tabassum, 2006, P.46) (Jaffrelot, 2002, P.226).

CONTRIBUTION IN PAKISTAN MOVEMENT

Aligarh movement blessed sincere leadership to the Muslims who participated in Pakistan movement with their full time effort and made this movement as a successful movement with achieving a separate state for the Muslims of British India (Begum, 1985, P270)(Ikram, 1992, P.505). Similarly, Ex-scholars of Deoband played a significant role in Pakistan movement. This institution never accepted any type of British aid or got any political pressure. These scholars were fully against British policies and participated against them with all local parties. Molana Shabir Ahmed usmani and Mufti Muhammad Shafi participated in Pakistan movement and supported Quaid-e-Azam openly. Molana Shabir Ahmed Usmani waved manifesto of

All India Muslim league in all over the British India, that cannot be forgot (Jaffrelot, 2002, PP.228-230)(Jayapalan, 2000, P.192)(Tabassum, 2006, PP.47-48).

SOCIO-POLITICAL IMPACTS OF BOTH THE SCHOOL OF THOUGHTS ON PAKISTANI SOCIETY

Aligarh and Deoband, both the school of thoughts left their huge socio-political impacts on Pakistani society. Even Pakistan has gotten independence and at that time, the basic objective of both the school of thoughts and their movements was to get a free homeland for the Muslims of Subcontinent. But after 1947 to till now, there has been created a huge difference among the followers of both the school of thoughts, and have been highlighted internationally as well specially after 9/11. In detail, we have to discuss such impacts of both the school of thoughts on Pakistani society, given below:

Aligarh School of Thought gave a modern direction to the new generation in a sense that they got theocratic knowledge at new patterns (Hanif, 1999, PP.11-19). There was a beautiful relationship among religion and science. Sir Syed's work "ilm-ul-kalaam (علم الكلام)" which is also called "New Theology" or "Islamic Modernization" changed the way of thinking in the Muslims of Subcontinent. Pakistan got independence but this school of thought left an inspired group which is still working on that rational approach that was introduced by the Sir Syed Ahmed Khan (McDonough, 1984, P.110). There is some analysis about socio-political impacts of Aligarh School of Thought on Pakistan society that can be entitled as:

1. This movement developed the trends of getting western knowledge.
2. Western knowledge became a reason of getting strong financial status.
3. Although students of Aligarh were spoken Urdu language and they developed the trends of speaking Urdu language. So, Urdu language became a symbol of elite class language.
4. The basic theme of Aligarh movement was to infuse morals and manners in the Muslims of Subcontinent and after independence of Pakistan, the followers of Aligarh School of Thought were showed their specific look and manners and that had been considered idealism among Pakistani society.
5. The slandered of civilized nation have been changed in getting Islamic as well as modern western knowledge rather than the adopting militant attitude after getting religious education from traditional madrassas of rigid mind-set.
6. Modern education was considered as an essential with the religious education.
7. The concept of rationality and Ijtehad became very popular and people found the solution of their modern socio-religious problems in the teaching of Islam under following this concept.
8. The patterns of cultural conservatism were gone towards liberalization (Zaidi, 2003, PP.23-26).

On the other hand, population inspired by Deoband School of Thought is almost consisted upon 65 percent of total. Their major desire and demand is to make the Pakistan a theocratic Islamic state. Since 1947, its role in the society is most dominant. From the presentation of Objective Resolution in 1949 to the movement against Ahmediyya community in 1970s and from anti-Shia sectarian movement in the decades of 1980 and 1990 to the militant struggle in Kashmir and Afghanistan, this school of thought participated a lot (Farwell, 2011, P.23-24). Several organizations like Lashkar-e-Jhangvi, Sipah Sahaba, Jaish-e-Muhammad and Harkat-ul-Mujahideen which have been declared as terrorist organizations from the Government of Pakistan, are belonged to this ideology. Similarly, in July 2007, Laal Masjid issue became a big challenge for Pakistani government (Farwell, 2011, PP.24-25).

According to the survey report of 1988, we find that Deoband School of thought has deep roots in the society. There were 590 Deobandi institutions in Punjab. While the ratio of other sectarian institutions was very low. Beralvi institutions were 548, Ahl-e-Hadith institutions were 118, Shia institutions were 21 and some others were 43 in Punjab. In Sindh, There were 208 Deobandi institutions, Beralvi institutions were 61, Ahl-e-Hadith institutions were 06, Shia institutions were 10 and some others were 06. 278 Deobandi institutions were in Balochistan where Beralvi institutions were 34, Ahl-e-Hadith institutions were 03, Shia institutions was 01 and some others were 31. Similarly, 51 Deobandi institutions were in Azad Jammu and Kashmir. Beralvi institutions were 20, Ahl-e-Hadith institutions were 02 and there was no one Shia institution in Azad Jammu and Kashmir at that time. Some others were just 03. In Islamabad, the capital of Pakistan, Deobandi institutions were 22, Beralvi institutions were 20, Ahl-e-Hadith institutions were none, Shia institutions were 02 and some others were 03. In Gilgit-Baltistan (Northern areas of Pakistan), Deobandi institutions were 60, Beralvi institutions were 02, Ahl-e-Hadith institutions were 27, Shia institutions were 11 and some others were 02. But in Khyber pakhtunkhwa (NWFP), the number of Deoband institutions was very high. There were 631 Deoband institutions, 32 were Beralvi institutions, 05 were Ahl-e-Hadith institutions, 02 were Shia institutions and some others were 08. So, according to this survey, there were 1840 Deobandi institutions in all over the Pakistan in 1988 from the total of 2861 that covering huge mind-set of Pakistani society (Fair, 2008, PP.132-141).

During analyses the socio-political impacts of this school of thought, we observe that according to them:

1. Westernization and modernization is un-Islamic.
2. Only religious education must be study in educational institutions.
3. Method of teachings must be according to the teachings of Islam.
4. Teachings of other Islamic sects are also un-Islamic and illegal.
5. Modern education is a reason of un-Islamic attitude in the new generation.
6. The Jihad (Militant struggle) is only a source of Islamic orders' implementation.
7. Gulf monarchies are respectable due to funding and all the other nations (including Shia majority states like Syria and Iran) are able to hate.
8. Women are not allowed to go out from her home without their blood relation.
9. Women have no right of vote, getting education or earning (Fair, 2008, P.151-152)(Farwell, 2011, PP.31-33).

A SOCIO-POLITICAL CONFLICT BETWEEN RELIGIOUS CONSERVATISM AND ENLIGHTMENT

Pakistan came into being in August 14, 1947 but this is a misfortune that the Pakistani society has not become yet a nation even after 66 years as there is no sense of unity. People have divided themselves in many groups, blocks and sects. The most recent issue is of attacking the people of different believe and they are assassinating one another on this issue. There is no value and consideration of human rights and this is due to lack of education which becoming the Pakistanis a narrow minded (Akhtar, 2000, P.07).

Creation of Pakistan is really a great revolution but this is also the truth that some of the religious parties like Jamiat Ulama-e-Hind, Jamat-e-Islami, and Majlis-e-Ahrar-e-Islami were against the formation of Pakistan, All India Muslim League and Quaid-e-Azam Muhammad Ali Jinnah. Even Quaid-e-Azam was declared as non-Muslim or "Kafir" by some Muslim religious leaders and scholars. And, these religious parties were belonged to Deoband School of Thought (Singh, 2012, PP.26-28). Now the question is that what sort of Pakistan, Quaid-e-Azam wanted? There is totally a division among Pakistanis on the answer of this question. Both the school of thoughts have different ideology on this issue. Actually, there is a conflict between the conservatives and the liberals where conservatives are the followers of Deoband School of thought while liberals are the followers of Aligarh School of thought. The conservatives say that Pakistan is created on the name of religion while the liberals highlight the orientations of Quaid-e-Azam that he said in the 1st Constituent Assembly of Pakistan on August 11, 1947 that:

"You are free. You are free to go to your temples. You are free to go to your mosques or to any other place or worship in this State of Pakistan. You may belong to any faith or class or creed that has nothing to do with the business of the state (Singh, 2012, P.29)."

We observe that the people from both the school of thoughts have explained the words of Quaid-e-Azam in support of their interests. And, this was the bad luck for Pakistan that he died very soon otherwise there would not have been such a crucial situation. There was no other leader who could have such honor and respect which he had.

After the sudden death of Quaid-e-Azam, eventually the religious elements gained significant importance in the Pakistani politics. On the other hand, there were more educated people in the liberal parties. So, the liberals minded people opposed the "controversial" Objectives Resolution (قراردادِ مقاصد) of March 12, 1949 that was passed by Liaqat Ali Khan, the Prime Minister of Pakistan at that time. Political parties of having both the conservative and liberal ideologies showed their patience and tolerance at some level (Fair, 2008, P.155)(Zaidi, 2003, P.30).

Such ideological differences were hitting the highest point during the military government of General Zia-ul-Haq (1977-88) who dismissed the elected government of Zulfaqar Ali Bhutto on July 5, 1977 and imposed third Martial Law in Pakistan. In fact, Bhutto has a socialist mindset. Therefore, he was a threat for the imperialist powers. So, Tehrik-e-Nizam-Mustafa was initiated by the funding and support of such powers. Zia was also a hard liner and belonged to the ideology of Deoband School of Thought. He promoted such ideological differences which have taken the Pakistani society at point of no return. Firstly, the Afghan civil war and then the Soviet invasion in Afghanistan in December 1979 facilitated and supported the conservative groups and parties in Pakistan (Farwell, 2011, P.42). Now, there was a crime to be a liberal. Religious extremist parties were established and funded by the government. Though, General Pervez Musharraf banned some of these groups and parties during his regime (1999-2008) but these have now been active with new names (Fair, 2008, P.159)(Farwell, 2011, P.44).

Now, this difference has been fully opened that both the school of thoughts have different ideology. Supporter of Aligarh School of Thought adopt and promote western education, fashion and culture under the limits of religion through the concept of rationality and Ijtehad (اجتہاد) (Hanif, 1999, P.33). They establish and favor educational institutions and particularly female institutions. But, the followers of Deoband School of Thought demand for Islamic punishments (Singh, 2012, PP.39). These two schools of thoughts have segregated the entire Pakistani society. Assassination of Salman Taseer (Governor of Punjab province) has raised many questions. There was a thinking of General Zia that this is his responsibility to defend Islam and he politicized religion for the sake of his wicked political benefits. So, now Pakistan is harvesting the sectarian crop that has been sown here by the rulers specially General Zia-ul-Haq (Farwell, 2011, PP.160-162). And still, the gap between both the schools of thought is increasing day by day.

HOW TO OVERCOME THIS CONFLICT

The relationship among religion and modernity is a contemporary hot topic in the field of Religious Sociology. There are several approach and interpretations but in fact, modernity is a multidimensional and complex phenomenon. So, every school of thought tries to adopt it in its own direction (Hanif, 1999, P.38). As we live in Subcontinent where there are two main dominant schools of thought: Deoband and Aligarh. Both the school of thought has deep roots in Pakistani as well as Indian society. And, after partition in 1947, these schools of thought have become rivals in the socio-political scenario of Pakistan. But, now the question is how to overcome this conflict within the society of Pakistan because this has become a big security threat that is creating domestic as well as international risks of the country.

The answer of this question has three steps. Firstly, we have to define what the relation between Islam and modernity is. Secondly, what is the Sir Syed's concept of rationality and, thirdly, what Allama Iqbal says about Islamic theology of modernity.

RELATIONSHIP BETWEEN ISLAM AND MODERNITY

Eighteen century was the age of industrial revolution in Europe. New ideas regarding enlightment were being transformed within the Europe. Several historians declare this change a cause of declining Ottoman Empire because industrial revolution was shifting the balance of power towards Europe. When Napoleon's army captured Egypt in 1798 when it was a province of Ottoman Empire. Even, this occupation was just for three years but people of Egypt got inspiration from the new ideas of enlightment and new technology. And, such inspirations generated sense of deprivation among the people of Egypt. Muhammad Ali (the new governor of Egypt) now tried to draw such system into Egypt and for this purpose he sent several scholars towards the Europe. Rifa al-Tehtawi was also a Muslim scholar, sent by Muhammad Ali to Paris in 1826. After his returning, he wrote several European work into Arabic and also wrote his experiences about Europe (Masud, 2009, PP.71-73). He argues now that:

"This is essential to adopt Sharia with new circumstances. There is not a vital difference among the principles of Islam and the principles of natural law which are the base of modern Europe (Masud, 2009, P.73)."

Now, ottoman government had been forced to practice new trends and technology within the empire. In the era between 1839 to 1876, Ottoman rulers started new reforms in all the institutions and tried to strengthen the institutionalization in the Empire. This procedure was known as Tanzimat (تنظیمات). New syllabus was designed in the universities and modern economic system was adopted in the financial institutions (Masud, 2009, PP.74-75).

This was the period, when Britain has captured the Subcontinent. The thinking regarding modernization in Islam has been emerged. Jamal-ud-Din Afghani (1838-97) was the first who introduced the idea of Islamic Modernization. He gave the idea that Islam is compatible with the reasoning and scientific knowledge, and to counter the European powers, Muslim world has to hold progress (Masud, 2009, P.76). Similarly, Sir Syed Ahmed Khan (1817-98) and Allama Iqbal (1877-1938) were gave the ideas regarding relationship among Islam and modernity to the Muslim society of the British India that are discussing below.

SIR SYED'S CONCEPT OF RATIONALITY AND MODERN INTERPRETATION OF ISLAM

Sir Syed Ahmad Khan was a great Muslim leader, a broadminded, reformer, scholar and a thinker whose visualization about Muslims of British India transcended space and time. His overview about the past with complete awareness of the present made him able to sketch for the future. At that time, when Muslims were considering Britishers as their enemy and protesting against them, he guided in a new way where they can live with the peace with Britishers. His theories delivered modified concepts regarding different teachings of Islam. His productiveness of thinking made him realize motivation and

awareness were man's reproduction of divinity. His dignity of soul completed his entire life a long chronicle of sacrifice and service. His concentrated hard work brought a significant radical modification in the Muslim community of British India during and till the end of his life. His spirit to God, intelligence to think and hand to do effort, melted the static believes and rigidities, and removed the accumulated dirt of inhibitions. It was only he who alarmed and warned the nation that inactive pools activated no mills. Unless we modify with times to experience the new facts and realities, time would wipe out us (McDonough, 1984, P.122)(Hanif, 1999, P.61)(Ali, 2005, PP.12-13).

Sir Syed Ahmad Khan was extremely victorious in his task of social transformations, ethical change and rational modifications. But, there were two controversial theories; one was his spiritual and religious thought, and the second were his political ideas. In religious studies, Sir Syed Ahmad Khan belonged to the school of Shah Waliyullah's thoughts of liberalism and fundamentalism. He agreed and supported the thesis of Ibn Taimiya that rationalism (اجتہاد) is existed in Islam. During studying the Islamic teachings and principles, Sir Syed argued that rather than tafsir and hadith, fiqh has been too much traditional and conservative regarding interpreting the Islamic laws. Sir Syed Ahmed Khan's first religious work, Rah-e-Sunnat-o-Rah-e-bid'at (راہِ سنت و راہِ بدعت), presented the theory of rationalism in Islam. And, this was relatively in the line with the Mutazzilah, Ikhwan-ul-Safa and Shah Waliullah's thoughts (Ali, 2005, PP.14) (McDonough, 1984, PP.125-126)(Hanif, 1999, P.62).

Sir Syed considered religion as an essential obedience regarding establishment of moral standards. Its spirit is truth and reality rather than the devotion. And, truth requires an unvarying investigation for reality, and does not consist upon blind devotion or faith in a meticulous dogma or doctrine. Devotion is one of the components of this truth, and must be based on understanding and the knowledge of what must be rational (Ali, 2005, P.14)(McDonough, 1984, P.126)(Hanif, 1999, P.62).

Sir Syed argued that truth is equal with the nature and the natural laws which are concluded the causality of all materialistic and non-materialistic phenomena. Such natural laws carry the moral standards which comprises the basis of societal ethics. And, reasons behind all the natural laws indicate their final cause that is the only God. In fact, Sir Syed's all the theories about religion are based on rationalism therefore, rigid and conservative scholars of that time declared him a "Kafir (کافر)" or non-Muslim. A major reason of this declaration was his disagreement with miracles relation with fiqh. Similarly, his concepts about Wahy (وحی), Jibrail (جبرائیل) and Meraaj (معراج) were criticized by traditional and fundamentalist minded Muslim scholars. Sir Syed considered the theme of hell and heaven to deliver the teachings regarding ethical way of life (Ali, 2005, PP.17-18)(Hanif, 1999, PP.63-64)(McDonough, 1984, PP.128-129).

Sir Syed Ahmad Khan was the first Muslim scholar who had believed in the "Darwinian Theory of Evolution", and argued that it has been confirmed in the Quran which proclaims that:

"One species of creation is related to another, and that man is the last creation prior to whom the animal kingdom and the vegetative were brought into existence (Ali, 2005, P.20)."

He thinks about the soul as a pragmatic truth which is present the in a animal as well as in a man, there is just a difference in having consciousness (Ali, 2005, P.20).

He talked about some sensitive topics of Islam like jehad (جہاد), slavery and polygamy. During interpretation of the concept of Jehad, he argued that Islam sanctioned only self-protective wars, and that person has the right to defend if others desire to devastate him. The literary meaning of Jehad is struggle, to go all-out, to attempt, to work, and it becomes fighting for Islam after its implication. In fact, Sir Syed discourage the traditional militant attitude of the Muslims that was not drived from the teachings of Islam (Ali, 2005, P.20)(Hanif, 1999, P.65)(Singh, 2012, PP.31-32).

In short, He made four basic contributions in modifying the religious thoughts in Islam. Firstly, he eradicated the western misperceptions about Islam, secondly, he supported Islam and advocated it as a true religion, having based on nature, natural laws and reason, thirdly, he wiped out all the dust of wrong practices on the name of Islam from centuries, and the fourth last, he presented new interpretations of some believes in Islam according to the new needs of contemporary time. Although, he was fully criticized by the religious scholars of that time and declared him a "kafer (کافر)" or non-Muslim but he continued his efforts. The popularity of his educational institutes and social works made the Muslim community able to stand on their own foot. And, its result was showed in 1906 when from the platform of Muhammadan Educational Conference, All India Muslim League had been established that became a reason of the formation of Pakistan without any war and without adopting any militant attitude that was becoming a reason of western misunderstanding about Islam (McDonough, 1984, P130-132)(Ali, 2005, PP.22-23) (Hanif, 1999, PP.66-67).

IQBAL'S APPROACH TO ISLAMIC MODERNITY AND RECONSTRUCTION OF RELIGIOUS THOUGHTS

Several scholars argue that the work and research about rationalization in Islam, started by Sir Syed Ahmed Khan, is completed by Allama Muhammad Iqbal. As Sir Syed's "Jadid Ilm-ul-Kalam" defined the modernity in Islamic theology, Iqbal's "the Reconstruction of Religious Thoughts in Islam" delivered the new dimensions of modernization in the religion (Ashraf, 1964, P.03). In fact, during western colonial regime, Islam was considered not be compatible with the modern needs of time. So, firstly, the Sir Syed and then Allama Iqbal gave their new thoughts for the revival of Islam according to the new paradigm and proved that Islam is compatible with the modern needs since its beginning (Ashraf, 1964, P.04). Due to generating links of religion with the natural sciences and the reason, both faced strong opposition of traditional and conservative Muslim religious scholars but they continue their work and research in their times. Sir Syed's (1817-1887) work and Iqbal's (1877-1938) research made the intellectual portion of Muslim society able to understand what the actual Islam is. On the other hand, the work and research of both the personalities became the reason of western misunderstanding about Islam (Ashraf, 1964, P.04). Basically, Iqbal's "the Reconstruction of Religious thoughts in Islam" had some objectives and these were as follows:

1. To highlight the original theme of Islam in front of West and Western influencing Muslims.
2. To explore the links of Islam with scientific knowledge, especially with Physics.
3. To invite all the human beings at one place on universal principles.
4. To promote the sense of getting modern developments rather than adopting rigid and militant attitude.
5. To courage the efforts regarding finding solutions of modern issues according to Islam.
6. To develop the sense of unity among Muslims of all over the world.
7. To remove traditional, conservative and orthodox believes that were being practiced since centuries.
8. To establish welfare, harmonize, liberal and develop society under the teachings of Islam (Mir, 2006, PP.09-13).

Historians argue that the wave of theo-logical thinking continued in several Muslim societies including India till the starting of colonial period. Although at that time, India was not an Islamic country but under the Mughal Muslim rulers till 1857. Colonial regimes were actually, became a reason of thinking about Islam in new dimensions by Muslim thinkers. Like Jamal-ud-din Afghani, Muhammad Abduh and Sir Syed Ahmad Khan, several other thinkers were the product of this colonial crisis in the Muslim world. However, the conventional theology continued as it was. But, there were some thinkers, came into view in all these Muslim countries who realized the consequence of re-thinking prevailing theological problems and issues. Sir Syed, Molvi Chirag Ali and Molvi Mumtaz Ali Khan were great Muslim thinkers and scholars. They decided to respond on such crisis in Muslim society, installed by the colonial powers. So, they wrote and did work on related topics (Mir, 2006, PP.15-16).

Sir Syed also commenced to write down a new explanation on the holy Quran. But, he could not complete this due to the huge opposition from the rigid, orthodox and traditional theologians. His main concern was to widen modern education and knowledge among Indian Muslims. But, Molvi Chirag Ali and several others were keeping on their movement for re-thinking and reconstructing issues and countering to new needs of time. And, this was their actual priority (Mir, 2006, PP.17-18).

Allama Iqbal arrived later on this scene. He had also the knowledge of both: the traditional theocratic believes and modern education. Iqbal's arrival in the modern Indian history as a Muslim reformer was the reaction of traditional as well as conservative and rigid attitude of the Indian Muslims. The elite class of Indian Muslims had misplaced political influence and now had been forced to participate with the Hindu elite for getting administrative posts and elected agencies. Moreover, they had gotten complex as well as a status of minority in the British India (Mir, 2006, P.19)(Ashraf, 1964, P.07).

Iqbal had been aware regarding this situation. Similarly, Muslims were suffering from a great shock of falling Turkish khilafat after the First World War. The Khilafat movement turned into a major cause in the establishment of separate home land for Muslims in India as well. Fall of Turkish Empire motivated Iqbal to wrote his famous poem Khizr-e-Rah (خضرِ راہ). And, during this time, Iqbal presented his another famous concept of ego (یخود) or self. The basic objective of giving the concept of ego was to overcome the thinking regarding deprivation among the Muslims and deliver them the wisdom of self esteem and also produce power-consciousness in them (Mir, 2006, P.23-24)(Ashraf, 1964, PP.08-10).

Allama Iqbal knew the reality that conservative and rigid theo-logical thoughts cannot be enough to face new emerging challenges of modern time. So, at that time, There was an immense requirement for reforming and reconstructing religious believes, thoughts and ideas in Islam. He presented some of his ideas in his impressive poems like Israr-e-Khudi (اسرارِ خودی) and Rumuz-e-Bekhudi (رموزِ بےخودی). On the other hand, he had not stated himself on these subjects systematically in writings (Ashraf, 1964, P.16)(Mir, 2006, P.26). When he was invited in 1932 from Madras to convey his six lectures, he wrote down his ideas and thoughts that were published in book with the name, "The Reconstruction of Religious Thought in Islam".

This book is consisted of seven lectures:

1. Knowledge and Religious Experience
2. The Philosophical Test of The Revelations of Religious Experience
3. The Conception of God and the Meaning of Prayer
4. The Human Ego His Freedom and immortality
5. The Spirit of Muslim Culture
6. The Principle of Movement in the Structure of Islam and
7. Is Religion Possible? (Iqbal, 2012, P.04)

In the recent socio-cultural scenario of Pakistan during comparing Aligarh School of Thought and Deoband School of Thought, the sixth lecture, "The Principle of Movement in the Structure of Islam" is very important. In this lecture, Allama Iqbal emphasizes the need for modification, change and movement in Islamic ideas and thought as since its beginning. Iqbal argue here that there is a need of maintaining balance among change and permanence. As religion is permanence and undying, it must be reconciled with the changes in the society. And, no one can deny from the developments and changes in the society with the passage of time (Ashraf, 1964, P.18)(Iqbal, 2012, P.01-02)(Mir, 2006, P.27).

Now, those who are committed with the rationalization, try to reconcile their believes and thoughts with the new emerging challenges of changing patterns in the society. But, this is reality that they adopted new patterns under the teachings of permanent faith, believe or religion. Iqbal knew about needs of such new patterns and respected this adopting trend of rationalism. On the other hand, there were some people or group of people who ignored the elements of modification. According to them, adopting changing patterns is total a sin. In fact, they were and they are rigid minded. Therefore, they cannot bear such developments and reconstruction of religious thoughts in Islam. And, the diffenrece among Aligarh and Deoband schools of thought is also the following of such attitude. Followers of Deoband school of thought have been adopted such attitude since the period of Sir Syed Ahmed Khan and its same pattern was continued in the age of Allama Iqbal. And, same practice is continuing till now and is discouraged and opposed by firstly, Sir Syed and then Allama Iqbal (Masud, 2009, PP.82-84).

Even, Allama Iqbal was careful about permanent believes in the religion but he emphasized that religious thoughts do not refuse to adopt new patterns of society under its teaching. Therefore, he says that:

"It must possess eternal principles to regulate its effective life, for the eternal gives us a foothold in the world of perpetual change. Thus one has to properly understand both the need for permanence and necessity for change (Iqbal, 2012, P.76)."

Iqbal says that Islam has been static since 500 hundred years. Therefore, there was a fear of change but this is an essential for the balanced life in the new emerging society. He says that the early period of Islam like Abbasid Empire was totally mobilized and so much creative in the fields of philosophy, jurisprudence or theo-logical knowledge and natural science. At that time, Baghdad was considered as a hub of knowledge in all over the world (Iqbal, 2012, PP.76-79)(Ashraf, 1964, P.41)(Mir, 2006, P.31).

Then Iqbal raises a question that, in the nature of Islam, what will be the code of movement? And, this is ijtihad (اجتہاد). Its meaning is creativity, struggle and effort to extract new dimensions and patterns in the religion. According to Iqbal, this is the actual code or principle of movement in Islam. Although, rigid and conservative people have been closed the doors of Ijtehad but this is till opened (Iqbal, 2012, PP.76-79)(Mir, 2006, P.33)(Ashraf, 1964, PP.42-43).

This is very important point that ijtehad is an essential for both, the permanence and the change. In fact, the concept of Ijtehad is also derived from the Islamic principles. It is a serious research over the new needs of time under the light of Islamic teachings. But, traditions and customs had been forced to stop this procedure and it had been ignored since centuries (Ashraf, 1964, P.43)(Iqbal, 2012, PP.76-79)(Mir, 2006, P.34).

According to Allama Iqbal, this is fundamental duty of every Muslim to use himself as their forefathers utilized their selves regarding implicating Quranic teachings in daily routine life. And, this is an actual Ijtehad. The holy Prophet Muhammad PBUH also advised that the person who did Ijtehad and made a mistake, will obtain one reward but, the person, who does Ijtehad and get success, will obtain two rewards (Iqbal, 2012, PP.78-79). This hadith highlights the value and importance of Ijtehad in modern times as well.

Ijtehad is divided into three categories according to Allama Iqbal. These are:

1. absolute power in legislation which is basically confined to the initiator or founders of schools,
2. Relative power that is to be implemented within the boundaries of a particular school, and
3. Special power that communicates to determining of the law valid to a particular issue, left undetermined by the initiators or founders (Iqbal, 2012, PP.80-81).

Allama Iqbal is in favor of complete power and authority in Ijtehad. It must not be limited or conditional according to him. He is surprised to see that even Sunni sect of Islam is also favoring this, but practically, it always tries to deny since the establishment of this school of thought. And, such attitude is totally strange under the light of Quranic teachings that supported the needs of dynamic life (Ashraf, 1964, P.43) (Iqbal, 2012, PP.81-83) (Mir, 2006, PP.35-36).

So, this is observing that, Iqbal is strongly supporting Ijtehad according to the needs of modern times. He argues that, Islam has been ceased just due to banned process of ijtehad and people considered it a sin (Ashraf, 1964, P.44)(Iqbal, 2012, PP.81-83)(Mir, 2006, P.36).

According, Allama Iqbal says that Ijtehad is not a reason of infusing new things in Islam and it cannot be a reason of altering basic teachings of islam but it helps the society to change their attitude with the changing patterns of the world. On the bases of old ideas, Iqbal says that the current society can never be survived now. He says that Quranic values are universal and eternal, so these are helpful always in every age of development. He argues that it was Ibn-e-Taymia, who strongly favored Ijtehad and adopting modern developments of new age under the teachings of Islam. He was born just five years after the destruction of Baghdad, in 1263. Therefore, he was opposing rigid and orthodox attitude of the Muslims of that time which became a reason of their lost. He was punished for his new ideas and reformulations. In fact, he belonged to the Hambalite School of thought where ijtehad is one of the foremost element of Islam. On the other hand, he rejected the principles of analogy (قیاس) and consensus (اجماع) as practiced by hundreds of years and now, supporting by Hanafite School of thought (Ashraf, 1964, PP.45-46)(Iqbal, 2012, PP.83-84)(Mir, 2006, P.37).

Iqbal fnds ijtehad as only a resource of allowing liberalism in the Islamic world. This is reality that every society adopts creativity and developments when it has not any internal or external conflicts. That's the reason of developments during the Abbasids rule in Ottoman Empire, Safavids and Fatimids rule in West Asia, Ummayyad rule in Spain and Mughals rule in India. But, colonial period became a reason of vital change in thinking about rationalization and adopting Islamic modernity in different Muslim populated areas. And, still if the Muslim world is facing some challenges and problems, these are just due to avoiding ijtehad and not adopting modern technologies (Ashraf, 1964, PP.47-50)(Iqbal, 2012, PP.85-89)(Mir, 2006, PP.49-52).

Iqbal in fact, argues that life is so much complex and spiritualism is existed to recognize such complexity. But, he says that this is not an equal to the Christianity in which Church and state are considered to be separated. In Islam, State and religion have all the solutions in the religion. Although, he sometimes, emphasizes on theocratic state but on the other hand, he opposed tyranny or dictatorial form of government. There is no Islamic state on same patterns. Every state has adopted its own political system. Even Turkey, that was a central hub of Islamic rule, has left its religious ideology and adopted secularism (Ashraf, 1964, PP.51-54)(Iqbal, 2012, PP.90-92)(Mir, 2006, PP.55-56).

Therefore, Iqbal finds its solution in the relationship between spiritualism and materialism. He says that ultimate objective of every state must be spiritualism and for this purpose, ijtehad is one of the fundamental source of running the state affairs on modern approaches. This is only the way that we can fulfill our modern materialistic needs under the teachings of Islam (Ashraf, 1964, PP55-56)(Iqbal, 2012, PP.98-101)(Mir, 2006, PP.60-61).

The orthodox and conservative religious scholars of that time like Molana Suleman Nadvi were not happy regarding these lectures and even wished that Iqbal must never written such lectures. Even Iqbal was very much closed with these religious scholars for trying and taking initiative regarding reconstruction in religious thoughts. But, world has been stagnant. Although, Muslim world is facing huge socio-cultural and political problems within their folds, but they are not exercising intellectually. So, this can be concluded that if Iqbal's concept of ijtehad will be seriously adopted, it will make a creative and meaningful change, not only in the Pakistan but also in the Muslim world. And, this is only the way at the time of British rule as well as in the recent circumstances when Pakistan is suffering from militant attitude of several Islamic religious organizations, ijtehad can bring the prosperity and development in our society including socializing society to adopt modern technologies and patterns in running personal as well as state affairs.

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Relationship of Moral Judgment Competence with Cultural Conservatism, Basic Democratic Government Endorsement, Common Good Endorsement Test and National Militarism: A Case Study of Pakistan

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ABSTRACT: This study aimed to investigate the effects of cultural conservatism, basic democratic government endorsement, common good democratic endorsement and national militarism on the moral judgment competence. Data (N=96) of bachelor, master and m.phil students was collected from 2 universities and 1 postgraduate college in southern part of Punjab province, Pakistan. Culture conservatism scale, Basic Democratic Government Endorsement Scale, Common Good Democracy Endorsement Scale and National Militarism (War Politics) Scale were used for measuring cultural conservatism, basic democratic government endorsement, common good democracy endorsement and national militarism. The Urdu version of Moral Judgment Test was used to measure moral attitudes and moral judgment competence. The finding showed no relationship with cultural conservatism, basic democratic government endorsement and common good democracy endorsement, while there is a significant negative correlation with national militarism ($r = -.27$, $p < .05$) with moral judgment competence. The postconventional arguments also showed a negative correlation with moral judgment competence. These findings are discussed according to the prevailing political conditions in Pakistan.

KEYWORDS: Moral Judgment Competence, Cultural Conservatism, Basic Democratic Endorsement, Common Good Democracy Endorsement, National Militarism.

INTRODUCTION

The basic aim of this study was to determine relationship of moral judgment competence with cultural conservatism, basic democratic government endorsement, common good democratic endorsement and national militarism (war politics). The study of Darcia Narvaez, Irene Getz, James R.Rest and Stephen J.Thoma (1999) became the reason of investigate such relationship. This was a pilot study conducted on a small sample of 96 students in the southern part of Punjab province of Pakistan. This study was much more exploratory in kind to understand some core assumptions and to see whether the findings could lead to the development of some better theoretical framework in order to do some large scale work in the future.

To explain such relationships, firstly there are some theoretical descriptions about terms use in this study. These are as follows:

CONSERVATISM

Conservatism is an attitude reflective of close mindedness and aversion to any kind of change and innovation. Some scholars consider conservatives as reactionaries and intolerant of modern developments, while others consider them people who like stability and continuity within the system. For the Former chairman of British Conservative Party, Hailsham conservatism "is not so much philosophy as an attitude, a constant force, performing a timeless function in the development of a free society, and corresponding to a deep and permanent requirement of human nature itself" (Hailsham, 1959).

There are several forms of conservatism. Liberal conservatism merges conservative norms and values with classical liberal attitude (Lakoff, 2002). It is also called classical liberalism that shows economic liberalism at one end and respect of power, authority and socio-religious norms on the other hand. With the passage of time, liberal conservatism was converted into the term "conservatism" especially in the societies where free market economy was a tradition like United States of America. Furthermore, in Europe, conservatism developed with the amalgamation of less traditional or conservative views with the ideas of those who followed social liberalism (Lakoff, 2002). Conservative liberalism, that is another form of conservatism, was developed with the combination of liberal traditions and values with conservative attitude. Such form had developed from Germany to Italy in between the two World Wars (Lakoff, 2002). National conservatives concentrate more on national interests with keeping their ethnic and cultural identity (Mandal, 1999). Sieglinde Rosenberger says that, "national conservatism praises the family as a home and a center of identity, solidarity and emotion (Mandal, 1999)". This definition highlights the fact that national conservatism is another aspect of social conservatism (Mandal, 1999). Religious conservatism means to apply particular religious norms, values and teachings into politics (Anderse, 2006).

Cultural conservatives want to preserve their heritage as a nation (James, 1996). Some scholars argue that culture conservatism is related to attachment with any given language like Arabic or Chinese. Cultural conservatism is in fact, different from social conservatism. Social conservatives want to enforce social norms and traditional morality through civil laws while culture conservatives talk about preservation of heritage as one nation. Gregory Schneider defines American cultural conservatism in many ways like support of republicanism, respect of traditions, the rule of law and the Christian religion, and defense of western civilization from the rising challenges of modern culture and the totalitarian government (James, 1996).

DEMOCRACY

As the term "Democracy" is considered as "rule of people", Diamond (2004) defines it with four basic elements. These four elements of democracy are as follows:

1. A political system which is used for choosing and replacing government and government officials through free and fair elections.
2. People participate actively as citizens in political as well as in civic affairs.
3. Human rights must be protected for all the citizens.
4. A rule of law that must be applied equally for all citizens (Diamond, 2004).

Such elements of democracy become the cause of eliminating ethnic differences in any society. So, for creating a democratic society, there must be practiced these four elements.

MILITANT TENDENCY AND MILITARISM

Usually, militant means an aggressive person, but according to American Heritage Dictionary of the English Language, militant means a person having a combative character, aggressive, especially in a service of a cause (Ask.com).

This word is sometimes used for those groups that have no name and they do not describe themselves as militants, but they have adopted an extreme level of violence. Militant word is not directly associated with the military, but can refer to those individuals or groups displaying aggressive attitude or behavior. This is also used within some religious circles to symbolize continuous battle against sins. There can be Christian Church members or several Muslims ethnic groups as well. Such people argue that they are confronting with the world in darkness (Hibbard, 2010).

National Militarism not only means the government of military elites, but it describes a militaristic passion for the country resulting in an attitude that showing a keen desire of having military government or lavish expenditures on defense. Such people belief on war until the victory. They have willed to die in war for their country (Hibbard, 2010).

MORAL JUDGMENT COMPETENCE

Lind (2008) introduced a dual aspect theory which is based upon ideas provided by Kohlberg and Piaget. His dual aspect theory is basically defines morality as a unique function of cognitive and affective aspects working simultaneously to resolve moral problems. People base their judgments regarding certain moral issues on some pre-defined principles that have been found to be universal in almost all cultures. This aspect is termed as the affective aspect of any moral decision making. Side by side with this aspect, Lind introduced cognitive aspect as a construct termed as Moral Judgment Competence which is the ability to make quite an impartial objective and sensible judgment based on the affective dimension as the foundation for reaching at good moral resolution. For the measurement of both of these aspects, Lind (1978) introduced a moral judgment test (MJT) that has proved cross-culturally to be a very valid test as it has been validated in more than 39 countries so far.

CONSERVATISM IN PAKISTAN

There are number of researches on Pakistani societies which have proved intense level of conservatism in Pakistan. There are several socio-religious taboos which have been strong with the passage of time, and now the situation is, society is not allowed anyone to ignore or reject such taboos. In fact, Muslim society of Indo-Pak subcontinent is irrational in its attitude since the arrival of British East India Company during Mughal era. Rational approaches in any socio-religious issue is criticized and rejected by conservative ethos. Even such thinkers are usually called non-Muslim (Kafir) or western agent and religious orders (called fatwas) are issued against them regarding killing by several conservative theocratic religious scholars. Modern educational system including female education, marriage with female consent, female working, child abortion and several other female related issues are considered illegal according to such mindset (UNICEF, 2012). Yusuf (2008) defines some factors which are making Pakistani culture a purely contemptuous. These factors are:

1) Lack of expedient and ambience education in public institutions.
2) Lack of improving Madrassah education.
3) Syllabus is not revised according to modern yearn of time.
4) Educational institutions cannot reject socio-religious or cultural radicalization.
5) Economic activities are continuously disturbing since Soviet invasion of Afghanistan in 1979 due to militant activities in Pakistan.
6) Lack of employment opportunities.
7) Visa policy of several countries is complex for young Pakistani citizens belonging to lower socio-economic classes (Yusuf, 2008).

The research examines recent community-based conservation (CBC) efforts in Punjab and South Punjab, exploring a wide range of policies, practices, strategies and issues to participatory conservation. It provides a regional and global overview of the need for, and conceptual and practical issues facing community-based conservation.

Such factors are facilitating cultural conservatism that is further enhancing militant tendency in Pakistan. According to Population Division of the Department of Economics and Social Affairs of the United Nations Secretariat: World Population Prospects: The 2006 Revision: Pakistan is on second number in youth population after Yemen. Yemen, Pakistan and Bangladesh have 67.5, 59.3 and 55.5 percent youth population (below 24 years including children) (Yusuf, 2008). Although, these three countries are religiously conservative, Pakistan and Bangladesh have same history and culture till 1971, while Pakistan and Yemen are facing militancy of Al-Qaeda as well as experiencing U.S Drone attacks on their locations. Such attacks are making more aggressive attitude of these people due to lack of education and socio-economic infrastructure. Even several conservative religious scholars are also supported such attitude usually in youth rather than their moral socialization. Murder of Salman Taseer (Governor of Punjab province) and attack on Malala Yousafzai are the examples of culture conservatism in Pakistan (Yusuf, 2008).

According to UNICEF, all the four provinces of Pakistan, Punjab, Sind, Khyber Pakhtunkhwa and Balochistan along with administrative areas like Azad Jammu and Kashmir, Gilgit Baltistan and Tribal Areas are culturally conservative in several socio-religious and economic terms, and the basic reason of such conservatism is lack of education (UNICEF, 2012). The relevance of traditional and local knowledge; the legal and policy frameworks; gender and other equity issues; and benefit-sharing. These issues are then examined in a series of case studies from Pakistan, Punjab and its southern areas like Layyah, Bahawalpur, Rahim yaar khan. D.G Khan ,Lodhran, Multan, Khanewal and many other areas belong to Saraiki belt. The case studies have been selected to represent diverse situations such as state-controlled projects, community-controlled ones, and those which are jointly managed (Vandal, 2011).

The Saraiki speaking people follow many religions, among them mostly Islam but also some are Hindu. Many Siraiki speaking Hindus living in these areas migrated to India after the Sub-continental India divided into the modern day India and Pakistan in August 1947 (Vandal, 2011).

While during study of Southern Punjab, there is generally division among two major dialect communities: Saraiki and Punjabi. Although, there is a majority of Saraiki community but Punjabi community has also overwhelming population here. There is very little ratio of both the communities that is allowed to marry with each other. Even educated families do not want to associate their children with each other in terms of marriage due to cultural discrimination (Harry, 2012).

Many women in Pakistan were jolted out of their "dogmatic slumber" by the "Islamization" of the legal system which, through the promulgation of laws such as the Hadud Ordinance and the Law of Evidence (1984) as well as the threat of other discriminatory legislation (such as the Law of Qisas and Diyat or "blood-money"), reduced their status systematically -- virtually mathematically -- to less than that of men. It soon became apparent that forces of religious conservatism were determined to cut women down to one-half or less of men, and that this attitude stemmed from a deep-rooted desire to keep women in their place, which means secondary, subordinate and inferior to men. In this respect, Male chauvinism is the belief that men are superior to women. This is closely associated with sexism and misogyny, and other forms of believing that women are inferior to men, especially intellectually. Male chauvinism has been defined as a "blind allegiance and simple minded devotion to one's maleness that is mixed with open or disguised belligerence toward women. It is also usually associated with an unconscious ritual to ward off anxiety engendered by these same women." Same case is in saraiki belt the “Jagirdar” and “Waderey” (the traditional words for calling feudal lords) they are desirous, passionate in behavior show the voluptuous nature in marrying three ladies at a time describe their sensation and they are conservative so they behave variegated way, and their conservative behavior wrapped themselves in a restless slumber (Vandal, 2011).

Not only socially, but politically this trend has been observed that Saraiki community has felt hesitation during vote casting in favor of any Punjabi candidate besides the respect of any political party. But, this trend is not generally found in Punjabi community (Harry, 2012). Unlike liberal critics that have been pointing to deficiencies in the rule of law, the inadequacies of institutions, the lack of due process and the general devolution of Pakistani civic sensibilities, these Pakistani neo-conservatives want to edify our violent capabilities into moral superiority. The corrupt “Jagirdars” and “Waderas” of Saraiki belt who are responsible for depriving area of development is the major cause of conservatism (Vandal, 2011).

Lack of cohesive national spirit has created the conservatism of secession and insurrection, between saraikistan (a movement for separate province for Saraiki community within Punjab province) and punjabis and it would be fatal to divide the Nation into further units on the differentials of race, sects, language or culture. Ironically, it is indeed a tradition here, to distort facts to gain short-term political mileage even if the long-term consequences are disastrous for the country and its institutions. The hawkish rhetoric emerging from this new breed of Pakistani conservatives suggests that it may be reincarnated right here in Pakistan (Vandal, 2011).

DEMOCRATIC TRENDS IN PAKISTAN

Democracy is a system in which the people elect their through general elections that are held in a true democracy from time to time. The main object of political activists is the welfare, betterment and amelioration of masses of the country that elect them as their representatives and to whom they are answerable for their duties and responsibilities. In many parts of the world this form of government has been adopted very successfully. United States of America and India can be cited as two bright examples of democracy (Kalia, 2012).

It is true that the essence of the democracy lies in the well being of the masses and their participation in the functions of the government. But, it is a pity that in developing and under developed countries like Pakistan democracy is used as a weapon against the people. In these countries democracy has bred and encouraged hatred, hooliganism and witch hunting. Pakistani trend is being failure and the main cause of the failure of democracy in this country is that education is not common here. People are mostly illiterate and ignorant of their rights and responsibilities. The people they choose in elections as their representative rulers. In South Punjab, where it is viewed as an adversary to the idea of a new province, the trend is leading that upcoming party would be accelerate efforts to secure public support and woo influential politicians in the region. Sources say about the general trend of party leadership, after realizing its past mistakes, reviewed its policies and resolved to adopt a new approach to attract public support. The recent inauguration of the Nawaz Sharif Agricultural University in Multan without the completion of necessary requirements is seen as a step taken in haste to achieve the objective. The democratic tendency is after electing the nominated person is that usually the big landlords or industrialists who have no concern with independent thinking and pure patriotic feelings. They grab power with the sole aim of making

people their slaves so that they may multiply their wealth by fair or unfair means. The whim in south Punjab is power hungry mullahs (Islamic religious scholars) and Army Generals have been a great hindrance in making Pakistan a democratic state. Soon after the creation of Pakistan military Generals forgetting their duty of defending the borders of the country jumped into the arena of politics (Kalia, 2012) (Cohen, 2004).

Democracy can flourish only in those countries where people are literate and are fully aware of their rights and responsibilities. Pakistan can be a democratic country if there must be an education for all the citizens that make them able to distinguish between good and evil and courage them to fight against evils.

DEMOCRATIC ATTITUDE IN PAKISTAN

Abraham Lincoln once defined "democracy'" as "the government of the people, by the people for the people (Lincoln, 2004)". It means that in democratic form of government common man plays the pivotal role. The aristocracy, the landlords and the politicians have to work according to the wishes of the common man (Kalia, 2012).

The cynics in the country are watching in disbelief as democracy takes roots and Pakistan moves steadily towards the first ever democratic transition from one elected government to the next. The transition, though, does not involve on the part of the people a clear perception of what is good or bad. It used to be easier for them to decide on the basis of the candidates' attitude towards dictatorships. In Pakistan, Punjab and south area masses, as opposed to the elite, clearly demonstrated their preference time and again for democracy by voting against anti-democratic elements in previous elections. So, by enlightened their attitudes, they, however, probably lack tact to pick among political parties of proven democratic credentials. This could partially explain the lack of electrifying enthusiasm seen during previous elections that often signified a return to democracy after one subversion or the other of the process by the powers that be (Kalia, 2012).

Democracy in Pakistan can succeed on some condition first of all the people in general should be properly educated, secondly the people in general should be prosperous then their votes cannot be purchased, thirdly the people should enjoy the basic freedoms for example freedom of speech, freedom of publication, freedom to join a political party etc (Kalia, 2012).

MILITANT BEHAVIOR IN PAKISTAN

Pakistan is a country created on Islamic fundamentals as the basic ideological prerequisites. Since the invasion of Afghanistan by the United States and the global hysteria about 'terror' and 'terrorism', Pakistan has faced the greatest of existential challenges after its dismemberment in 1971. As a frontline ally of US in the war on terror, Pakistani society and polity have been engulfed by growing militancy and acts of violence commonly branded as homicidal (terrorism). Whilst there is no single definition of terrorism, have surely established murderous concepts as a major threat to domestic and regional peace in Pakistan, especially southern parts of Punjab province (Saddiqa, 2013).

Acts of premeditated and organized violence in India, Pakistan and Bangladesh have thus assumed a central place in discourse on regional cooperation or its converse: the rivalries between the constructed nation states and their irresponsible power-elites. In this milieu, the south Punjab citizens have been the victims of violence, uncertainty and acrimonies that have only led to exacerbation of poverty, inequality, ascendancy of militarism and war-mantra. Saraikis in Punjab are also ethnically separate and they have their sort of thinking in militant behavior (Saddiqa, 2013).

It was not difficult to confirm the presence of faith-based, militant organizations in southern Punjab. The picture was completed with a mention of the "relatively greater" lack of development and greater disparity between local people that southern Punjab suffered from as compared to the rest of the country. This, we were told, made it a fertile terrain for militancy (Saddiqa, 2013).

If the analysis was standard, the same old remedy was proposed; with the same old proviso was Pakistan ready to deal with the long-nurtured elements who now posed the country a grave challenge? This was in essence what the news stories sought to find out. The question had earlier been raised during the war on terror on either side of the Durand Line. Months down the road, we are still waiting for a decisive answer (Saddiqa, 2013).

Independent reports paint a somewhat different picture. The old sectarian and jihadi groups have a strong base in southern Punjab and are suspected of having provided some of the human bombs to the Taliban-Al Qaeda conglomerate. They have the ideology and, given their violent past, they have the expertise. Worst case scenarios say they do have the potential to challenge the writ of the state. In recent times, some of these rabid groups have been busy occupying mosques belonging to other sects in southern Punjab. They were also suspected to be behind recent attacks in the province and elsewhere (Saddiqa, 2013).

Short of being declared a separate province, southern Punjab districts have in fiscal documents been recognized as an entity worthy of a special development packages. Such development packages, the theory goes, will among other things also help in curbing tendencies that can lead to militancy (Saddiqa, 2013).

The provincial government earmarked some 50-odd billion rupees under a package for the southern districts. But, so great is the alienation in some circles in southern Punjab that the package has been dubbed a sop without substance. What`s more, the government has been accused of favoring certain southern Punjab areas. If that be a sign of relief for Lahore, the focus of some of the ire in recent times has shifted to the city of Multan which is getting "roads, bridges and universities" as its poorer neighbors that have been identified as the ideal nurseries for terrorism look on angrily (Saddiqa, 2013).

The official handling of the recent floods in Dera Ghazi Khan, Rajanpur and Layyah, etc is again being presented as an example of how difficult it is for the government to feel and provide for the needs of a region that is getting angrier with time. The cynical responses to the two instances related here are illustrative of the depth of the mistrust of the government, of how every time the people who are the most deserving of development feel left out, and how in this case it assumes the form of regional bias. There is a region-based trust deficit that can in turn bring all development and administrative initiatives into suspicion (Saddiqa, 2013).

Be it a flood or a proposed drive against militancy, the southerners have been reacting to situations with a skepticism that has over time become the hallmark of their relationship with authority. The distance can only be overcome by real devolution that goes beyond the idea of a smaller province right down to an autonomous town government. This shall also lead to effective monitoring and control of crime apart from facilitating other administrative working — that is, if our national interests allow it (Saddiqa, 2013).

Controlling the militants through administrative writ is not easy, especially since denial is quite often used as the simplest method of protection. After months of resisting what has been referred to as the designs of the evil media, the police department has willy-nilly made a list of madrassas which need to be watched closely out of thousands of seminaries in southern Punjab districts. The list has on it some 26 madrassas operating in southern Punjab districts such as Rahimyaar Khan, Bahawalpur, Dera Ghazi Khan and Multan (Saddiqa, 2013).

The exercise started with curious media men wanting to find out if the Pakistani establishment was prepared to hit the jihadis-turned-renegades indiscriminately and wherever they may be concentrated. It is where the situation still stands, at least vis-Ã -vis southern Punjab. The police force lacks the authority to act on its own if it sees something suspicious. Monitoring is the right word for the police`s working since all it can do is to report any suspicious activity to the politicians. The politicians are in power but again not empowered to move on such tip-offs (Saddiqa, 2013).

DR.MCCONOCHIE AND HIS PSYCHOLOGICAL SCALES

Dr.McConochie is an American psychologist and founder and president of Political Psychology Research, Inc. which is a non-profit corporation, dedicated to research in the public interest, especially on psychological traits, attitude, etc. related to government, politics, peace and empowering the people to have an effective voice on these issues. He is also a member of American Psychological Association, International Society of Political Psychology, Society of Industrial and Organizational Psychology and Lane County Psychologists Assn (McConochie, 2010).

On September 21, 2010, his research report was published by the Political Psychology Research, Inc. which measured sixty four psychological traits along ten dimensions of political discourse. These traits were showing expected correlation with conservative and liberal political preferences. Five item scales of primitive tribal views provide reliable measures predicted correlation among hypothesized political orientations. In fact, there were several writings on the concepts of conservatism and liberalism, which facilitate to design the culture-free scales but some symbolic items are related specific to the United States (McConochie, 2010). Some references of these research writings, according to Dr.McConochie, are as follows:

Jost, Kruglanski, Glaser and Sulloway (2003) have linked conservatism to the right wing authoritarianism, religious beliefs, anti-abortion attitude, pro-death penalty attitudes and uncertainty. Studies have shown conservative political agendas and related traits such as right wing authoritarianism to correlated with endorsement of social privilege or elitism, a preference for a hierarchical social community, social dominance, endorsement of large financial differences between social classes, desires for certainty, harsh punishment of deviants, fear of change, endorsement of aggression, fear of radicalism, promotion of war, idealization of authority figure, religious orthodoxy, opposition to civil rights and intolerance of ambiguity (McConochie, 2010). Frenkel Brunsik also described a theory of ambiguity intolerance (McConochie, 2010). While Wilson

hypothesized that conservatism is a mechanism for handling environmental uncertainty with activities including militarism (McConochie, 2010). Similarly, Rokeach focused on closed mindset as opposed to open mindset to characterize conservative thinking (McConochie, 2010). Tokins proposed a theory of left wing versus right wing, assuming that ideological predilections permeate nearly every domain of a person's life (McConochie, 2010). Kruglanski and Webster have focused on "need for closure". They posit that conservatives tend to engage in stereotyping resist persuasive influence and reject opinion deviates (McConochie, 2010). Altemeyer sees the social dominance orientation (SDO) as reflecting an alpha male orientation (McConochie, 2010). Jost et Al more generally postulate that human beliefs such as political philosophies are deduced from sets of underlying, more basic beliefs or premises and are related to psychological needs, values and motivations (McConochie, 2010).

Through analyze these and several other writings; he designed some cultural free psychological scales, which have 14 categories. Each category has several sub-scales but in the present study, cultural conservatism, basic democratic endorsement scale, common good democracy endorsement scale and national militarism (war politics) scale were used.

SAMPLE

The sample of the study (N= 96) consisted of Bachelor, Master and M.Phil degree programs from 2 universities and 1 postgraduate college from the southern areas of Punjab province, Pakistan. A non-random convenience sampling method was used for the selection of the sample. Most of the study was mainly belonged to the disciplines of English, Political Science, Public Administration and Psychology. The final data set on which all main analysis were done consisted of 96 participants including 50 (52.1%) male and 41 (42.7%) female. The mean age of respondents was 23.77 years (sd= 3.35). there were 66 (68.8%) students from the Islamia University of Bahawalpur, 9 (9.4%) students from Government Postgraduate College Bhakkar, 15 (15.6%) students from University of Sargodha (Bhakkar Campus) and 6 (6.2%) students from other institutions. Similarly, 13 (13.5%) students were from the discipline of Psychology, 10 (10.4%) students were from the discipline of Political Science, 24 (25%) students were from the discipline of English, 36 (37.5%) were from the discipline of Public Administration and 13 (13.5%) from other disciplines.

INSTRUMENTS

An Urdu Language certified translated version of Moral Judgment Test by Liaqat (2012) was used for measurement of moral competence and moral attitude of this study. And, for measurement its relation with cultural conservatism, democracy and national militarism (war politics), cultural free political psychological scales, designed by McConochie (2010) were used.

For measurement of cultural conservatism, the cultural conservatism scale was used, contained 11 items, 5 point likert type scale arranges from 1=strongly disagree to 5=strongly agree format. The reported Cronbach's alpha reliability is 0.85 by the author of the test (McConochie, 2010). In the present study on Pakistani sample, the Cronbach's alpha reliability came out to be 0.72. The test also showed moderate item-total correlation ranging from 0.42 to 0.58. This scale consists of statements measuring ethno-centric attitude, honoring in-group thoughts, economic liberalism, etc,.

For measurement of Basic Democratic Government Endorsement, the Basic Democratic Government Endorsement Scale was used, contained 5 items, 5 point likert type scale arranges from 1=strongly disagree to 5=strongly agree format. The reported Cronbach's alpha reliability is 0.91 by the author of the test (McConochie, 2010). In the present study on Pakistani sample, the Cronbach's alpha reliability came out to be 0.60. The test also showed moderate item-total correlation ranging from 0.47 to 0.69. This scale consists of statements measuring voting behavior, political socialization of citizens, political participation, awareness about political rights, etc,.

And, for measurement of Common Good Democracy Endorsement, the Common Good Democracy Endorsement Scale was used, contained 6 items, 5 point likert type scale arranges from 1=strongly disagree to 5=strongly agree format. The reported Cronbach's alpha reliability is 0.76 by the author of the test (McConochie, 2010). In the present study on Pakistani sample, the Cronbach's alpha reliability came out to be 0.78. The test also showed moderate item-total correlation ranging from 0.63 to 0.81. This scale consists of statements measuring awareness about common democratic rights and humanism. A positive correlation (r=0.31, p <0.01) between the two democracy scales was found providing an evidence of a construct validity.

For measurement of national militarism (war politics), the national militarism (war politics) scale was used, contained 21 items, 5 point likert type scale arranges from 1=strongly disagree to 5=strongly agree format. The reported Cronbach's alpha reliability is 0.90 by the author of the test (McChonochie, 2010). In the present study on Pakistani sample, the Cronbach's alpha reliability came out to be 0.77. The test also showed moderate item-total correlation ranging from 0.21 to 0.66. this

scale consists of statements measuring militant attitude as an individual and as a citizen of a state, militant tendency, aggressive behavior, war politics, dictatorial behavior, etc,.

RESULTS

Table 1. Overall Mean and SD of main variables used in the study

Moral Judgment Competence[a]		Moral Segmentation		Cultural Conservatism[b]		Basic Democratic Government Endorsement[c]		Common Good Democracy Endorsement[d]		National Militarism[e]	
(*n* = 77)		*(n = 75)*		(n = 95)		(n = 96)		(n = 96)		(n = 96)	
M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
13.95	11.64	-2.89	27.09	37.51	6.16	18.86	3.38	23.77	3.79	76.97	9.82

a. Score Range = 0-100
b. Total Score Range = 11-55
c. Total Score Range = 5-25
d. Total Score Range = 6-30
e. Total Score Range = 21-105

Table 2. Pearson Correlation of moral judgement competence with Cultural Conservatism, Basic Democratic Government Endorsement, Common Good Democratic Endorsement and National Militarism (N = 77)

		Moral Judgement Competence
1.	Cultural Conservatism	-.04
2.	Basic Democratic Government Endorsement	.12
3.	Common Good Democracy Endorsement	-.02
4.	National Militarism (War Politics)	**-.27***

**p*<.05

Table 2 shows a significant correlation (r = -.27, p < .05) between moral judgement competence and national militarism (war politics). All other variables appear to be unrelated to level of moral judgement competence.

Table 3. Correlation between 6 moral orientations and cultural conservatism, basic democratic government endorsement, common good democracy endorsement and national militarism (N = 77)

Transformational Leadership Style		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
1.	Cultural Conservatism	.17	-.05	.04	-.08	-.1	-.08
2.	Basic Democratic Government Endorsement	.00	.07	.09	.11	.03	.10
3.	Common Good Democracy Endorsement	-.04	-.09	.02	-.05	-.03	-.19
4.	National Militarism (War Politics)	.09	-.22	-.18	**-.29****	**-.27***	**-.23***

***p*<.01; **p*<.05

Table 3 shows a significant correlation between stage 4 and national militarism (r = -.29, p < .01), stage 5 and national militarism (r = -.27, p < .05) and, stage 6 and national militarism (r = -.23, p < .05)

DISCUSSION

This study was done in southern part of Punjab province in Pakistan mainly to investigate the relationship between moral judgment competence and moral orientations with cultural conservatism, basic democratic government endorsement, common democratic government endorsement and national militarism.

In comparison to many international studies (Gross, 1996; Saeidi-Parvaneh, 2011; Schillinger, 2006; Yang and Wu, 2011), the moral judgment competence came out to be very low (M = 13.95) which is consistent with earlier studies done by Liaquat (2011; 2012) in the northern parts of Pakistan.

Cultural conservatism in the present sample appears to be higher (M = 3.4) in comparison to normative data provided by Dr.McConochie (2010) consisting of students from USA with mean score of 2.59. In the present study, no significant correlation was found between moral judgment competence and cultural conservatism. It was suspected that some kind of negative correlation would be present between these two variables on the basis that some studies had already shown a relationship between moral judgment competence and dogmatic religiosity (Lupu, 2009; Saeidi-Parvaneh, 2011). The researchers implicitly assumed that there might be something common between dogmatic belief system and conservative thought. The study by Liaquat (2012) showed very high dogmatic religiosity in the Pakistani sample which led to the assumption that Pakistani sample would also show high conservatism as a related construct. To some extent, it was confirmed as conservatism was found to be relatively higher. This could be a reason of having no correlation between these two constructs as the data did not show enough variation.

Two types of democratic attitudes namely, Basic Democratic Government Endorsement and Common Good Democracy Endorsement (McConochie, 2010) were also correlated with moral competence. Both of the democratic orientations showed non-significant correlation (r = .123, p> .05 and r = -.025, p> .05 respectively) with moral judgment competence. This finding may support Lind's (2008) assumption that the preference of certain moral democratic principles does not necessarily result in higher moral competence.

National Militarism was another major construct that showed a significant negative correlation (r = -.27, p< .05) with moral judgment competence. Overall the sample showed high militarism (M= 3.7) in comparison to US normative group (M= 2.46) (McConochie, 2010). 6 moral orientations were also correlated with main variables of the study. Only stage 4, 5 and 6 were found to have significant negative correlation with national militarism (r= -.29, p< .01; r= -.27, p< .05, r= -.23, p< .05). Nowak and Lind (2009) had also measured moral competence in Poland, Slovenia, Netherland, Germany and Austria. The sample from Poland showed a relationship between moral competence score and military and democratic rules. During martial law period, a decrease in moral competence score was noticed, while increasing democratization led to gain in c-scores. Historically, Pakistan has faced political instability resulting in weak democratic governments and frequent military takeovers. Pakistan also had severe ties with India and engaged in four wars since its creation. Pakistan did not have ideal relations with other neighboring countries, especially with Afghanistan, and its involvement in war against terrorism facilitated militant ideals in Pakistani people. Pakistan had become a security state than the welfare state due to such geo-political reasons. And, therefore military institutions had acquired a vital status than the social welfare institutions. Most of the governments tried to adopt militaristic policies in this regard. Such over emphasis on military institutions and neglect of development of welfare institutions might be a reason that general people showed more concern for state security and need to strengthen military power more and more. This militaristic attitude is showing lack of moral competence among general people in the present study. The militarism has shown negative correlation with postconventional moral arguments as well, which is indicative of an attitude morally less mature and based on more self interests than regard for more humanistic approach toward life.

Some additional analyses were performed in order to get an in-debt understanding about the nature of data. Gender differences in moral judgment competence came out to be non-significant.

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Effect of Seaweed Liquid Extract of *Sargassum vulgare* on Growth of Durum Wheat Seedlings (*Triticum durum* L) under salt stress

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ABSTRACT: Salt stress is a major adverse factor that can lower seed germination and seedlings growth, leading to reduced plant growth and ultimately lower crop productivity in arid and semi arid regions of the world. In order to improve crop tolerance to this abiotic stress, many research studies have the importance of seaweed extract (SWE) in alleviating stress damage to plants. Seaweed extracts are used as nutrient supplements or biofertilizers in agriculture to increase plant growth and yield. In this study, we examined the effect of liquid seaweed extracts made from *Sargassum vulgare* on the germination and growth of durum wheat (*Durum triticum* L) (cv Karim) under salt stress in laboratory and greenhouse conditions using foliar applications. We assessed SWE at different concentrations (0.2, 0.5, 25 and 50 %) on germination parameters (percentage, mean time) and growth parameters (radicle length, shoot length, shoot fresh and dry weights) of durum seedlings. Our results indicate that seeds treated with SWE of *Sargassum vulgare* at lower concentrations (0.2 %) showed enhanced germination (better response in germination rate associated with lower mean germination time and consequently greater seedling vigor and greater radicle length). Furthermore, *Sargassum vulgare* was found to be more successful and better candidates for developing effective biostimulants to improve the growth of wheat plants under salt stress. This study provides important information on the identification and utilization of Tunisian seaweed resources for agriculture and is the first study to report on the uses of these seaweeds as a source of liquid extracts as biostimulants in agriculture.

KEYWORDS: Seaweed extract, wheat, seed germination, seedling growth, salt stress, *Sargassum vulgare.*

1 INTRODUCTION

Salinity is a major limiting factor in agriculture production affecting different plant growth stages. Germination is one of the most critical periods in life cycle of crop [1]. Salt stress affects germination parameters (total germination, germination rate and seedling growth) in different ways depending on plant species [2]. It was reported that maximum germination percentage was reduced with a high NaCl concentrations [1]. Excess salinity with the plant root zone has a deleterious effect on plant growth [3]. To limit the negative effect of salinity on plant growth, many methods have been used. A lot of research studies have shown the importance of liquid extracts obtained from seaweeds as foliar sprays for several crops to improve growth under adverse factors [4], [5]. SWE contains growth promoting hormones (IAA and IBA), cytokinins, trace elements (Fe, Cu, Zn, Co, Mo, Mn, Ni), vitamins and amino acids [6].

Wheat is a major cereal crop in many parts of the world, especially in both Tunisia and Morocco, and is commonly known as king of cereals. Globally, wheat is the second most produced food among the cereal crops after maize and rice. It is a moderately salt-tolerant crop and its yield is substantially reduced as the soil salinity level rises to 100 mM NaCl [7]. It is

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cultivated over a wide range of environments because of wide adaptation to diverse environmental conditions. As a result, it is a promising crop for cultivation in moderate salty soils of semi arid regions [8]. To produce satisfactorily wheat under saline conditions, seeds must germinate and seedlings must dynamically pass through the salty layer of the soil and survive [9]. Under such condition, vigorous seedling growth is very important for crop establishment. Rapid and uniform seed germination under saline condition not only increases early seedling but also has the advantage of higher salt tolerance [10].

Therefore the aim of the present study were to assess the impact of salt stress on germination and seedling growth parameters of wheat under laboratory and greenhouse conditions and to screen out the impact of seaweed extract of *Sargassum vulagare* application on wheat (cv Karim) tolerance to salt stress.

2 MATERIALS AND METHODS

2.1 COLLECTION OF SEAWEEDS

Seaweeds *Sargassum vulgare* (Phaeophyceae) used in the present study were collected from the coastal area of Chott Mariem, Tunisia (35.8° N and 10.6° E). Morphologically distinct thallus of algae were placed in polythene bags and transported to the laboratory. Samples were washed thoroughly using tap water to remove the salt.

2.2 PREPARATION OF LIQUID SEAWEED EXTRACT

Seaweeds were shade dried for four days, followed by oven dry for 12h at 60°C. Then the materials were hand crushed and made as coarse powder, was added with distilled in a ratio of 1:20 (w/v) and boiled at 121°C for 30 minutes. The hot extracts were filtered through a double-layered cheese cloth and allowed to cool at room temperature [11]. The resulting supernatant was taken as 100% seaweed liquid extracts. Seaweed liquid extracts were prepared with different doses: control (0%), 0.2%, 0.5%, 25% and 50%.

2.3 SEEDS TREATMENT

Ten Seeds of wheat were placed in 9 cm Petri dishes on a two layers of filter paper (Whatman # 41). Salt stress was induced by sodium chloride (NaCl). Three sets were treated with 0, 2 and 4 g/l of NaCl and were considered as control as they don't receive extract of *Sargassum vulgare*. Seeds under study were treated with salt at various concentrations (0, 2 and 4 g/l of NaCl) and each concentration was supplemented with seaweed extracts (SWE) separately at four different doses (S1: 0.2%, S2: 0.5%, S3: 25%, S4: 50%). All sets were labeled as control (non-treated seeds with seaweeds extract of *Sargassum vulgare*); S1 (Seeds supplemented with 0.2% of SWE); S2 (Seeds supplemented with 0.5% SWE); S3 (Seeds supplemented with 25% SWE); S4 (Seeds supplemented with 50% SWE).

Seeds were placed on top of the filter paper wetted with 5 ml of each different concentrations of SWE in the Petri dishes and were kept under photoperiod for 14 days. The culture room temperature was maintained at 25°C. Seed germination was recorded daily up to day 7 after the start of the experiment. After fourteen days, seedlings were taken for the observations. Parameters measured in this experiment were:

Total seed germination (TG) measured in the sixth day using the formula TG (%) = (total number of germinated seeds/ total seeds) x 100.

Mean germination time (MGT) calculated according the formula of Ellis and Roberts [12]. MGT= Σ (ni/di). With ni: number of germinated seeds and di: day of counting.

2.4 GREENHOUSE GROWTH BIOASSAY

Wheat plants were grown under greenhouse under 16-h light regime at 25 °C and 8-h dark regime at 18 °C. Seeds were sown in pots at a depth of 0.5 cm below the soil level and were allowed to germinate. After germination in each pot, five healthy plants were retained and other plants were removed. The experiment was made in triplicates. Plants were grown into plastic pots containing sand and peat (50% - 50%). They were also irrigated separately with saline water which was added with sodium chloride (NaCl) at different concentrations (0, 2 and 4 g/l) every third day. Potted plants were grown for 7 weeks in a greenhouse at ~25±2 °C, in 85 % relative humidity.

The experiment comprised of five treatments, (control, water spray), 0.2; 0.5; 25 and 50%; (volume/volume; v/v) of seaweed extract in water. Sprays of *Sargassum vulgare*-derived extract were applied, two times a week, at the seedling stage

(30 days after sowing) and for 7 weeks. Morphological characteristics such as shoot length, root length, total height, fresh weight, and dry weight were measured.

3 RESULTS AND DISCUSSION

3.1 LABORATORY CONDITIONS

3.1.1 TOTAL GERMINATION

Germination percentage was reduced in wheat seeds (*Triticum durum* L) in response to increasing concentration of NaCl in Petri dishes. When the treated seeds were supplemented with SWE (0.2; 0.5; 25 and 50%) along NaCl salt, the germination percentage was increased (Table 1). Total germination from both treated and non-treated seeds with SWE of *Sargassum vulgare* decreased significantly with increasing salt stress. However, this reduction in total germination was significantly higher for non-treated seeds, compared to treated ones. Data suggested a reduction of about 10% on total germination due to an increase in NaCl concentration from 0 to 4 g/l. Results indicated that application of seaweeds extract significantly increase germination in wheat seeds using respectively SWE S1 (0.2%) and S2 (0.5%) when compared to control seeds. For instance, total germination (TG) was optimal in S1 (0.2%) concentration of SWE in all NaCl concentration. In other concentrations such as S3 (25%) and S4 (50%) total germination decreased in comparison to control seeds. This may be due to the toxic effect of mineral contained in seaweed extract.

In general, increasing salinity causes a decrease in wheat germination; this may be due to the toxic effects of Na^+ and Cl^- in the process of germination [13]. It seems also that salinity stress affects seed germination via the limitation of seed water absorption [14], excessive use of nutrient pool [15] and creation of disorders in protein synthesis. Many authors have shown the positive effects of seaweed extracts on germination of various crops [16], [17]. This positive effect is due to many growth regulating substances contained in seaweed extracts like ethylene, kinetin and gibberellic acid which are involved on reversal of induced dormancy in seeds [18]. The ameliorating effect of SWE may also be due to the growth hormones available which would have triggered de novo the synthesis of hydrolytic enzymes [19]. Speer and Tupper [20] have indicated that seaweeds extracts induce leakage of inhibitors possibly absisic acid from the seeds which improve germination percentage. This present study is in accordance with the earlier results of Mohan et al. [21] and Johnsi Christobel [22].

3.1.2 MEAN GERMINATION TIME

Results showed that salinity significantly increase mean germination time (MGT) for both treated and non-treated wheat seeds with seaweed extract. However, treated seeds with *Sargassum vulagre* extract have lower MGT compared to control seeds. Data in Table 1 indicated that increasing salinity significantly delayed mean germination time of 1.21 days. However, application of SWE significantly shortened MGT when compared to control seeds (Table 1). According to Reinhardt and Rost [23], most plants are more sensitive to salinity during germination and seedling growth. This is in agreement with our study. The probable reason for early emergence of the seaweed extract treated seeds maybe due to the completion of pre-germination metabolic activities making the seed ready for radicle protrusion and the SWE treated seeds germinated soon after planting compared with untreated ones [24]. Furthermore, seaweed extracts contain various betaines and betaine-like compounds [25]. In plants, betaines serve as a compatible solute that alleviates osmotic stress induced by salinity stress. Those compatibles solutes have been shown to play a part in successful formation of somatic embryos from cotyledonary tissues and mature seeds of tea [26]. All that information supports our results about seed germination and improved mean germination time with SWE.

Tableau 1. Effect of Sargassum vulgare extract on germination behavior of wheat (cv Karim) under salt stress.

	0 g/l					2 g/l					4 g/l				
	Control	**S1**	**S2**	**S3**	**S4**	**Control**	**S1**	**S2**	**S3**	**S4**	**Control**	**S1**	**S2**	**S3**	**S4**
TG	99.8 ± 0.64	100 ± 0.84	98.6 ± 0.71	97.3 ± 0.69	96.4 ± 0.79	88.5 ± 0.77	91.7 ± 0.56	89.4 ± 0.42	86.7 ± 0.32	85.3 ± 0.61	63.4 ± 0.96	65.8 ± 0.66	64.3 ± 0.81	60.8 ± 0.73	58.1 ± 0.53
MGT	2.27 ± 0.53	1.86 ± 0.14	2.10 ± 0.11	2.68 ± 0.84	2.79 ± 0.75	3.16 ± 0.92	2.92 ± 0.61	3.07 ± 0.48	3.32 ± 0.95	3.58 ± 0.98	3.97 ± 0.82	3.76 ± 0.86	3.84 ± 0.46	4.13 ± 0.34	4.37 ± 0.62

3.2 GREENHOUSE CONDITIONS

3.2.1 RADICLE LENGTH

Radicle length in wheat seedling decreased significantly with increasing salinity for both treated and un-treated seeds (Table 2). However, this inhibitory effect was significantly less pronounced in seedlings from treated seed with *Saragasum vulgare* extract in comparison with control ones of wheat. The maximum length of radicle was observed in S1 seaweed treatment (0.2%) of *Sargassum vulgare* extract for all NaCl treatments. However, it was decreased in S3 and S4 seaweed concentrations treatments. Plants treated with S4 seaweed treatment showed very less value of radicle length in all salt treatments (Table 2). The application of SWE improved notably radicle growth. The increased in radicle length may be due to presence of some growth promoting substances such as IAA and IBA, Gibberellins, Cytokinins, micronutrients and amino acids [6].

3.2.2 SHOOT LENGTH

The results presented in Table 2 indicated that great reduction of shoot growth occurred with NaCl treatments. Decrease in length of shoot was more pronounced in all NaCl salt treatments in wheat. The shoot length showed that the maximum length was noticed in S1 concentration of SWE of *Sargassum vulgare* for all salt treatments, while the control plants showed the lowest plants shoot length. In other concentrations of SWE, better shoot length was noted in S2 and S3 treatments (Table 2).

According to He and Cramer [27], growth analysis is fundamental to the characterization of plant's response to an environmental stress. Bauci et al. [28] and Khosravinejad et al. [29] have noticed a significant decrease in shoot elongation in barley genotypes with increasing NaCl treatment. From our results, it is very clear that shoot length wheat was increased by 13.17% at 100 mM NaCl concentration while it was adversely affected by higher doses of salinity (Table 1). All the results obtained were statistically significant. From the present results, it can be seen that the shoot length of the grass species was stimulated at lower levels of salinity and it appears that the grass species studied exhibit a moderate salinity tolerance as far as linear growth is concerned.

Our findings are in accordance with earlier studies carried out on soybean [30] where there was an increase in vegetative growth by the application of seaweed extract.

The negative responses of increased concentration of seaweed extracts on vegetative growth plant can be attributed to presence of regulator hormones or high levels of minerals.
The enhancing of vegetative growth can be related to seaweed components such as macro- and microelement nutrients, amino acid, vitamins, cytokinins, auxins, and abscisic acid (ABA)-like growth substances affecting cellular metabolism in plants leading to enhanced growth [31], [32].

3.2.3 SHOOT FRESH AND DRY WEIGHTS

The increase in shoots characteristics might be due to the Auxins content in the seaweed extracts which have an effective role in cell division and enlargement. This leads to an increase in shoot growth and plant fresh and dry weights [33]. This positive effect might be due to the minerals Zn, Cu and B content in the seaweed extracts, which have a great role in cell division and enlargement [34], or might also due to the macronutrient content in seaweed extracts, which have a great role in plant nutrition like nitrogen, potassium and phosphorous, very essential for the growth and development of the plant [35].

Tableau 2. Effect of Sargassum vulgare extract on seedling growth of wheat (cv Karim) under salt stress.

	0 g/l					2 g/l					4 g/l				
	Control	**S1**	**S2**	**S3**	**S4**	**Control**	**S1**	**S2**	**S3**	**S4**	**Control**	**S1**	**S2**	**S3**	**S4**
RL	7.76 ± 1.23	8.23 ± 0.63	7.84 ± 1.03	6.52 ± 1.14	5.87 ± 0.84	7.05 ± 0.97	7.38 ± 0.72	7.12 ± 0.51	5.93 ± 0.89	5.12 ± 0.91	6.12 ± 1.01	7.04 ± 1.21	6.32 ± 0.53	5.32 ± 1.03	4.61 ± 1.11
SL	69.3 ± 1.19	76.1 ± 0.93	74.7 ± 1.23	72.5 ± 1.53	70.1 ± 0.94	61.6 ± 1.05	74.4 ± 1.08	69.1 ± 1.16	68.4 ± 1.19	67.3 ± 1.31	54.1 ± 1.27	69.3 ± 1.37	66.5 ± 1.41	61.3 ± 1.21	60.2 ± 1.03
SFW	5.78 ± 1.29	6.22 ± 1.08	5.93 ± 1.28	5.41 ± 1.37	5.01 ± 1.19	5.21 ± 1.14	5.76 ± 1.34	5.51 ± 1.13	5.09 ± 1.27	4.37 ± 1.33	4.81 ± 1.43	5.17 ± 1.04	4.97 ± 1.45	4.62 ± 1.26	4.09 ± 1.54
SDW	2.31 ± 0.33	2.52 ± 0.38	2.47 ± 0.39	2.28 ± 0.78	2.17 ± 0.27	2.02 ± 0.17	2.23 ± 0.29	2.18 ± 0.77	1.97 ± 0.58	1.86 ± 0.19	1.83 ± 0.48	1.96 ± 0.52	1.91 ± 0.47	1.76 ± 0.45	1.69 ± 0.44

4 CONCLUSION

We have observed in the present study that S1 (0.2%) and S2 (0.5%) concentrations of *Sargassum vulgare* extract applied at wheat plants showed higher germination and vegetative growth. The extract of this specie showed better result when they were applied at lower concentrations than more concentrated extracts (25%) and 50%). This shows that only a small amount of seaweed extract can be used to enhance plant growth under salt stress conditions.

The same result showed that SWE treatment reduced the water deficit effect which protected the plant against peroxidation imposed by salt stress. Consequently, the present findings encourage the application of such seaweeds as natural fertilizer in agricultural sector. As perspective, we opt to carry out more research including isolation, characterization and identifications of growth hormones and antioxidant substances in seaweeds extract.

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Dynamic Agro-commercial in the South East Mediterranean: Between the European Union and the new trading powers

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ABSTRACT: The South and East Mediterranean countries (SEMC) import huge food commodities that form the bulk of their food consumption. However, imports of basic products have been exposed to several hazards making it more difficult to improve agricultural performance and the satisfaction of the increasing demand due to population growth in the region. Indeed, political and social instability, the crisis in the euro area, food inflation and rising international prices of agricultural products only increase the import of food commodities prices.
Moreover, our work is to analyze the agricultural vitality for this region. To do this, it is called in the first place to meet the Euro-Mediterranean agro business dynamics as well as emerging countries, secondly see the relevance of agricultural policies being implemented and finally an econometric investigation for Tunisia on agricultural competitiveness is required. From the study of reaction of the agricultural trade balance to a depreciation of the exchange rate, a change in national GDP and abroad, a price change on imports (including tariffs on imports) and improved factors of non-price competitiveness; we could determine the effect of openness on foreign trade under free trade area between Tunisia and the EU and within a framework of MFN with some new trading powers.

KEYWORDS: Dynamic Agro-commercial, performance agricol, security food.

1 INTRODUCTION

Social and political stability in times of crisis depends on the ability of States to ensure a distribution of bread, milk, sugar or oil to domestic prices compatible with the purchasing power of the population. This finding remains a major problem in the air today. The South and East Mediterranean countries (SEMC) import huge food commodities that form the bulk of their food consumption. However, imports of basic products have been exposed to several hazards making it more difficult to improve agricultural performance and the satisfaction of the increasing demand due to population growth in the region. Indeed, political and social instability, the crisis in the euro area, food inflation and rising international prices of agricultural products only increase the import of food commodities prices.

Moreover, our work is to analyze the agricultural vitality for this region. To do this, it is called in the first place to meet the Euro-Mediterranean agro business dynamics as well as emerging countries, secondly see the relevance of agricultural policies being implemented and finally an econometric investigation for Tunisia on agricultural competitiveness is required.

Put agriculture in a country in the hands of the only global trade, at a time when financial speculation and market volatility are increasing, would be taking a risk inadvisable. For agricultural and rural development, the promotion of multilateralism, dialogue and regional cooperation, whether technical or political, should certainly be imposed on the Mediterranean scale.

What model of agricultural development? Getting all economic, commercial benefits but also social and even political diversity of farms and territories? In this perspective, what roles will the professional actors and local actors?

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We must therefore turn to other structural factors and in particular the withdrawal of Public policy of agriculture in many developing countries, such as Withdrawal of international donor agencies and bilateral donors, emphasized elsewhere in the Report on World Development 2008.

Nevertheless, the air of globalization many disadvantages and problems arise. Moreover, a careful analysis of regional agricultural trade flows with EU countries and major non-EU partners has to understand the dynamics of this sector.

2 TRADE FLOWS AND REGIONAL INTEGRATION

Trade in agricultural products is very complex. Indeed, the first committed infrastructure and logistics differentiated several speakers from different regions. Moreover, «border effects «which include all costs made to cross a border, integrates logistics performance and distance that encourage trade. However, low logistics performance SEMC and internal barriers in the destination country discourages the development of these countries' exports to the EU. The problem for these countries is the lack of structural reforms like the introduction of a system of financing the agricultural sector, which is consistent with the promotion of small-scale agriculture. Indeed, the latter anomaly advocated by the presence of tariff and non-tariff barriers, generated a development model based on high-value crops.

2.1 DYNAMICS AGRO COMMERCIAL EURO-MEDITERRANEAN

International cooperation and partnership is a tool to promote agricultural exports. Indeed, small producers SEMC are being sanctioned at the lack of investment and technology needed for the production of fruits and vegetables for export. However, companies and operators are associated with European companies with high capital intensity are able to adapt their production systems and export these products comply with European standards.

Moreover, the shelving of farms and operators of small and medium size limiting trade in agricultural products between the two shores of the Mediterranean, a factor of production shortfalls. However, outside Euromed agreements are a generator of exports South East Mediterranean countries to the EU, as is the case of Lebanon and Egypt. By focusing on the pattern of specialization of these countries, there is a strong export of fruits, vegetables, dates and olive oil. By analyzing the evolution of the balance of trade in agricultural products, for some countries SEMC with the EU, we find that the former is favorable to the EU, except for Morocco. Indeed, the EU trade balance recorded a deficit agro only with Morocco will turn -500 million in 2012 (Figure 1).

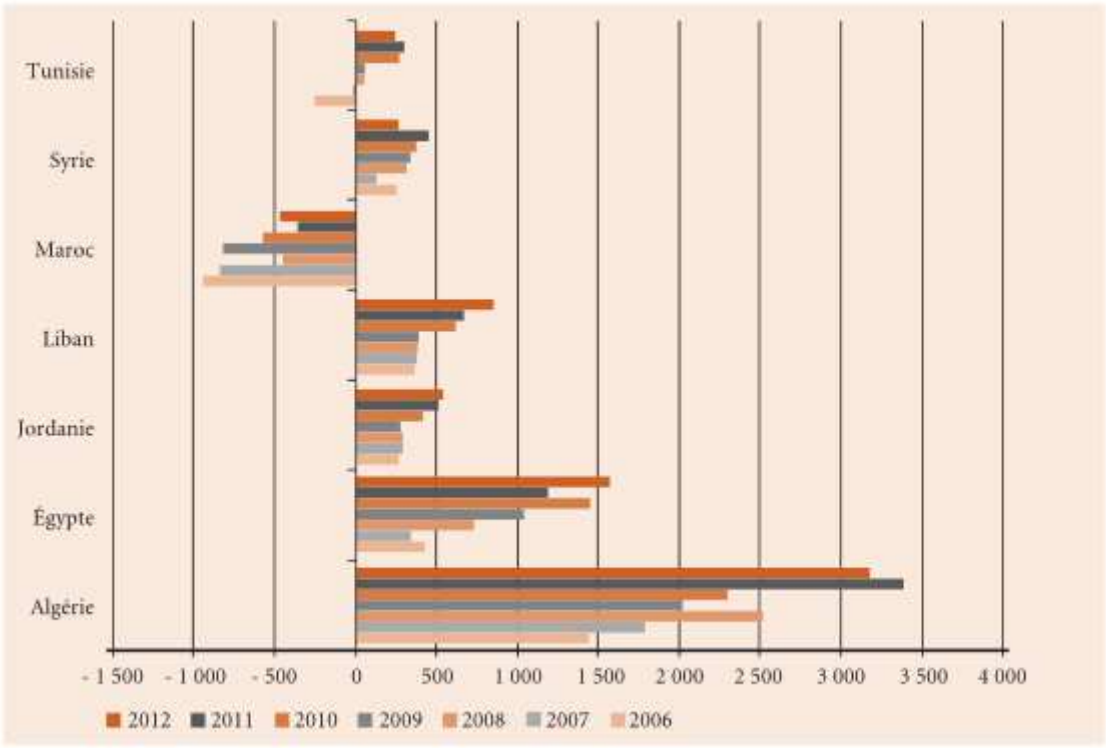

Figure 1: Agro-EU trade balance with the Arab Mediterranean countries (in millions of Euros)

However, with Tunisia, the main EU trading partner marks a deficit in agricultural trade balance in 2006, thus registering a favorable situation in Tunisia. Moreover, despite a lack of regulation in this sector, a remarkable lack of structural degradation and logistics performance and lack of innovation and use of new technology that counteracts the adverse effect of change climate, the deficit goes to a surplus in 2012, marking an average value of about 250 million Euros. By against Algeria reveals the most unfavorable situation. Indeed, there has been an ample surplus in 2012 agro commercial scale, of the order of 3.2 billion €, which was only 1500 in 2006. Moreover, it can't go unnoticed before this favorable situation for Morocco. This dynamism and competitiveness of agricultural exports is explained by the active policy for the sector and specifically by "Green Morocco Plan". This model develops a successful agricultural development that African countries can take as an example for their policies to promote the sector model.

This model coating a success thanks to its integrated and forward-looking approach, involving different actors and stakeholders in the agricultural sector. Certainly such an approach to succeed, the international political dreaming to achieve the green revolution to the SEMC action must be accompanied by an unpleasant international legal framework for the international community.

In Medays Forum (13-16 November), the director of the Foundation " Health of Mother Earth ," Nnimmo Bassey, has mentioned that the support for small farmers , enhancing their access to markets and agricultural infrastructure are determinants of the green revolution in Africa.

Indeed, the SEMC have an interest in redesigning their agricultural policies, taking into account the reality on the ground and especially encourage the fabric of small farmers. Nevertheless, mistakes means for some countries in the area, international cooperation should be imposed by international organizations and institutions, is to extend an aid to support these countries in their efforts to guarantee system security food . Moreover, imploring SEMC from the EU substantially coating the grains are twice as SEMC exports to the EU representing products with high added value (Mediterra 2014). The problem for the Maghreb countries is that more than 50% of cereals are grown in the arid and semi-arid triangle, and the extension of the sole grain is realized primarily in steppe areas or semi-steppe. SEMC beginning to diversify their sources of supply by diversifying their partners other than the EU and due to high prices in the EU.

Nevertheless, SEMC exports of agricultural products are very diversified. While the Maghreb countries are characterized by exchanges only with the Mediterranean European countries, Middle Eastern countries like Egypts and Lebanon have created trade relations with the countries of amplified Golfs. In 2009, 44% of Egypt's exports are destined for the Arab market and only 29% for the European market.

After the revolution, Tunisia and Libya experienced a strengthening of their trade being supported by preferential trade agreements since 2010. Libya was absorbed in 2011 nearly 6.9 % of total exports Tunisian, marking the second largest after the EU. Tunisian exports to Libya are diverse and consists mainly of food products, marking a 13% share of total exports in 2010 (African Development Bank, Quarterly Analytical Note for North Africa, July 2011). This leaves design an exchange within Arab countries, North Africa and Eastern important way, supported by the Council of Arab Economic Unity. So the first challenge is certainly necessary to develop trade in agricultural products between the SEMC and the neighboring Arab countries, because they do not prescribe restrictions in terms of quality and quantity. The second challenge is to free themselves from dependency on the outside as regards the supply of food staples and by focusing on structural reforms and the efficiency of the logistics system to boost sectors.

2.2 THE EMERGENCE OF NEW TRADING POWERS

Liberalization of the Mediterranean countries and specifically the Maghreb dependence with the EU, forcing their food security, must be resolved by the food supply by lower prices and fewer regulatory constraints. However, a business relationship outside the EU facing some countries in America and Asia do not she will be an alternative agricultural performance?

Brazil has become in a few years the first agricultural supplier of Mediterranean countries, with more than 7mil-lion. In 2010, this market power has increased its exports almost Mediterranean of 10 times or more than 2 times the global average rate. Egypt is the second commercial customer brazil with excess of a billion dollars, after Spain with $ 2.5 billion (Comtrade 2013). In the case of Brazil , among produce food exported to the Mediterranean countries, there has been a significant part to feed mainly Soybean meal , coffee and sugar, with respective shares of 26 %, 20 % and 18 % in 2011 (Comtrade 2013).

Moreover , exports of fruits and vegetables to the United States experienced a massive increase to the Mediterranean countries , not to mention the first product exported Cereals , marking a 12% share of total exports agricultural . Egypt , Turkey, Spain, Morocco , Israel and Italy covered a large part of total agricultural exports from the United States, with a share of 8%. Moreover , Brazil and the United States are the two big American suppliers Mediterranean Countries . Agricultural and

food imports from Mediterranean countries from the Asia Oceania Zone remain relatively low market share . Indeed , China has a by 1.5% , Indonesia 1.2% , Turkey 1.1% , India 1.1% , Thailand 0.9% , Vietnam 0.8% and Malaysia 0.7 % . China has a large supplier of the Mediterranean, this generates power in the Mediterranean countries more than $ 2.5 billion in turnover , which has tripled in the last decade . The main agricultural exports is coffee with a share of 15% , Oilseeds (18%), and fruits and vegetables (6 %). Apart from china, we note that Indonesia recorded a gap in agricultural exports to Mediterranean countries by establishing a model of industrial agro planting oil palm. Indeed, for the SEMC , 80% of agricultural imports from Indonesia are palm oil . The third Asian agro- exporters to the Mediterranean countries is occupied by Turkey (1.9 billion). Indeed, political instability marked in those countries made so that Turkey plays a political role for his government and economic experience. She recorded a record level of FDI for the food industry (IAA) , marking a second sector in terms of flows (€ 3.8 billion). While for the SEMC the agro-industrial complex (IAA and retail attracts a little over 8 % of total FDI (2.7 € billion).

In analyzing this sector in terms of FDI for the SEMC, there was a significant change from the first in the total FDI; in fact, in 2003 we recorded a share of 3.7% to 14.7% 2011 table 1.

Table 1: Evolution of FDI in IAA SEMC (in millions of Euros)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
IAA	354	288	249	2349	1052	1687	1206	264	3892	11 340
Total IDE	9 271	11 283	36 871	64 470	53 278	36 942	27 441	38 519	26 516	304 591
% IAA/total	3,7	2,6	0,7	3,6	2	4,6	4,4	0,7	14,7	3,7
Rang IAA/ 25 secteurs	8e	10e	13e	10e	9e	8e	5e	15e	2e	7e

Source: Comtrade 2013

This dramatic change in FDI is explained largely by the number of reported projects. Indeed, the countries of the region have a preferred destination for FDI agricultural and agro-food projects. Turkey is top of the list by scoring 88 projects, 72 Morocco, 44 for Egypt, Tunisia 33 and 29 in Algeria. To conclude, it is clear to note that recorded in terms of trade flows with countries outside the EC dynamism is accompanied by a lack of dynamism in terms of FDI. Indeed, trade flows are more dependent on political relations between countries rather than acting alone firms. In addition, a combination of geopolitical commercial strengthens commercial presence in emerging countries in MENA.

3 PERFORMANCE AGRICULTURAL AND POLITICAL PERSPECTIVES

Knowing that liberal agricultural reforms undertaken during the years 1994-1999 have not scored significant results, the governments of the Maghreb countries have maintained dice 2000, new strategies for agricultural and rural development aimed at strengthening policies agricultural modernization to ensure food security and to address social and territorial challenges. Across North Africa, rural populations and net predominantly combined with changes social urbanization and wage employment - population growth revolution was also the cause of an explosion of unprecedented demand for food in the history of SEMC. The break occurred in the early 1970s. Nearly all SEMC become, in this period, dependent on imports of food commodities for cereals, dairy products, sugar and edible oils. Consumption of soft wheat flour, unknown before the staple food colonization vigorously stimulate imports. Models of agricultural growth that are based on a growing mobilization of agricultural water development and equipment of land in difficult areas (Egypt desert or steppe zones , mountain or southern territories Maghreb) or development of intensive sectors (fruits, vegetables, olive oil or date) dedicated to export have reached their limits.

❖ In Tunisia, the year 2004 marks a departure of projects to integrated rural development , focusing on the conservation of natural resources and their better utilization , improved living conditions and income of rural populations and promotion rural Women's interventions in the areas of mobilization and exploitation of water resources , forests and rangelands , soil conservation and promotion difficult areas fit into the framework of the national program fight against

desertification. New generations of IRDP try insertion in regional development programs and allocate more resources to the protection of natural resources (conservation works water and soil, fight against desertification and land collective term).

❖ In Algeria, the National Plan for Agricultural and Rural Development (NADP) has been driven by 2000.Dans this context several actions were financed , as outreach projects for rural development, community projects and building projects the local economy (" mobilization of water resources", " development land and land improvement achievement plantation shares, deferred grazing and pastoral plantations ", " creation of livestock units and small farms. Politics rural renewal (PRR), adopted in 2005 (MARD , 2005), which specifically targets rural households in remote areas or isolated , is structured around four major programs.

❖ In Morocco, the registered agricultural performance is explained largely by the introduction of new dams and water mobilization techniques (drilling) during the last decades in all regions . Indeed, this initiative has resulted in land reclamation and expansion of export crops. In Egypt we see a mobilization of more than 3.5 million ha in 2010 thanks to the Aswan Dam . If the mobilization of new land, the extension of irrigation helped loosen the constraints and pressures on natural resources are very strong. In Morocco, the spread of poverty in rural areas, increasing social disparities between urban and rural areas, low labor productivity in smallholder agriculture and natural resource degradation are the central objectives of the 2020 Rural Development which adopts the country in the late 1990s strategy. This strategy mobilizes around projects in social, economic or environmental, as well as national resources of international cooperation and public assistance development. It was reinforced in May 2005 by the National Initiative for Human Development (NIHD), which still sets targets for the reduction of deficits in infrastructure in the poorest rural communities, and the promotion of economic activities generating income and employment.

If the food crisis of 2008 revealed the vulnerability of food SEMC and revived the need for relevant agricultural policies, changes that country in the region live call for revisions needed in the medium term and call for the implementation of measures to cushion impacts related to market volatility and ensure the safety of food supplies. If coverage targets domestic needs for commodities by a local agricultural supply remain a utopia, the SEMC are then required to prevent shocks to volatility in foreign markets and the volatility of world prices. In terms of public policy, it requires in the short term, the SEMC consolidate information on external and internal markets systems to ensure sound management of strategic stocks on food products. The development of infrastructure to improve storage capacity is a priority. In the medium and long term, the SEMC must finally initiate a revision of their model of agricultural growth. The model used as a reference today to be revised and reconstructed as face of demographic challenges that lie ahead, the pattern of agricultural growth based on intensive exploitation of water resources and soil entrusted to a " capital pole" may not be or face the challenges of climate change, or that of protection to the fine food security largely degraded natural resources, or in.

In addition to better understand agricultural performance, we are called to investigate the multilateral context. To reform the trading system in agriculture, developing countries are faced with five types of problems [Josling.T and Tangerman.S, 2000]. The first problem is evident in the fact that some developing countries have preferential access to protected markets of industrialized countries. While liberalization and reforms in this sector are beneficial to all countries in the long run they prove harmful to developing countries benefiting from preferences. Indeed, the liberalization measures pursued via a drop right MFN is eroding trade preferences granted by industrial countries to developing countries [Kura M. Reynolds, 2005]. Agriculture is a sector in which there is the most tariff peaks and tariff escalation. Despite the concessions made by developed countries in the negotiations of the Uruguay Round countries, protection remains high in this sensitive area, where preferential access to agricultural markets of developed countries by developing countries that are able to create significant economic benefits.

Furthermore, after discussing agricultural performance in the SEMC and the commercial agro dynamism with EU countries and some countries outside the EC, in what follows we will analyze econometrically the performance. Indeed, the competitiveness of the agricultural sector being detected by the trade balance is responsive to a number of economic variables. This work will be applied in the case of Tunisia, since it has a relatively low agricultural potential. It will be a political tool to leverage the most telling factors.

4 COMPARATIVE STUDY BETWEEN THE AGRICULTURAL TRADE BALANCE WITH THE EU AND WITH COUNTRIES OUTSIDE THE EC: AN INVESTIGATION INTO TIME SERIES FOR THE CASE OF TUNISIA

The reduced form of the equation of the trade balance is: B = B (REER, Yw, Yd, t, Pm, IPC, R & D GFCF). The structure used to explain the external deficit assumes that foreign and domestic products are perfect substitutes.

$$B_{it} = \beta_0' - \beta_0 + \beta_1'\log(Yw)_{it} - \beta_1\log(Yd)_{it} + \beta_2'\log(TCER)_{it} + \beta_2''\log\left((1+t)_{it}\, Pm/IPC\right)_{it}$$

$$+ \beta_3''\log(R\,\&\,D)_{it} + \beta_4''\log(FBCF)_{it} + \varepsilon_t$$

From the study of reaction of the trade balance to a depreciation of the exchange rate, a change in national GDP and abroad, a price change on imports (including tariffs on imports) and an improvement factor of non-price competitiveness; we could determine the effect of openness on foreign trade under free trade area with the EU and within a framework of MFN. In our econometric analysis, the data are taken annually from 1990 to 2011. The long-term results are more relevant when the length of the sample is large with a sample of high frequency, effectively Narayan (2004) maintains that the increase in the number of observations by the use of semi-annual or monthly data adds no reliability analysis results of cointegration , since the interest of such analyzes is the duration of the sample period . The data used in this empirical application from the CD ROM IFS , National Institute of Statistics, Office of Trade, Ministry of Scientific Research and Technology and financial statistics of UNCTAD. The first step in this work is to establish the time series properties of the variables used in the analysis, it is to test the non- stationarities of the variables and their order of integration using the Dickey Fuller test increased.

4.1 STUDY OF THE ELASTICITIES OF THE TRADE BALANCE WITH THE EU

External constraint imposed Tunisia depends of course on the evolution of its manufacturing trade , but a more detailed analysis by major sector (excluding services) shows that commercial results reflect the changes in the sectoral specialization. The results of the estimation of the function of the trade balance for agricultural products and fisheries are as follows:

$$B = 1.445\log(Yw) - 1.575\log(Yd) + 1.212\log(TCER) + 0.175\log\left[\frac{(1+t)\,Pm}{IPC}\right] + 0.098\log(R\,\&\,D) - 0.997\log(FBCF) + \varepsilon_t$$

(2.60) (-3.57) (4.75) (-1.61) (0.39) (4.02)

R^2 = 0.66, DW=2.4

The coefficients of the independent variables show the sensitivity of the trade balance to changes in relative prices on import, domestic and foreign GDP, exchange rate of expenditure on research and development effort and investment. Price elasticities and GDP are expected sign and statistically significant. According to the long-term equation , an increase of 10 % of the real exchange rate , ie a 10% devaluation of the Tunisian Dinar produces an improvement in the trade balance of 12 .2 %, which is consistent with economic theory which postulates that a devaluation improves the trade balance. Indeed , the sum of elasticities - prices of imports and exports in the estimated model is greater than unity (1.21 + 0.17) . It is thus obvious that the trade balance responds positively to any depreciation of the national currency and any impairment in relative prices. At the same time, the relatively low value of the sum (1.38) requires Tunisia do not forget the other demand factors (non - price) which in turn seem to play a role in determining the extent of trade bilateral. The elasticity of the gross domestic product of the EU in this activity is positive and statistically significant. In the long run a 10% increase in the GDP of the European Union would improve the balance of trade in agricultural products 14.45 %; strong economic growth in the EU would lead to a promotion of local exports and the same attenuation of the trade imbalance. Furthermore, the relative price elasticity of imports is positive sign but this variable is not significant (Student's t equal to -1.6). Indeed, a decrease in relative import prices might include a reduction of the tariff on imports would lead to a deterioration of the trade balance. Thus, we demonstrate that the long-term effect of trade policy on the competitiveness of the agricultural and fishing is insignificant. The balance of trade in agricultural products is significantly related to national economic activity, long-term effect this first deteriorates 15.75 % when the national GDP of the industry increased by 10% ; economic growth produces an increase in demand for domestic and foreign products causing increased imports and reduced exports.

During the last decade, agricultural products and fisheries recorded a deterioration of its competitive position manifested in the trade exceeding degradation. The main exports in this sector are fish, shellfish and other animal products and the main products imported fish and shellfish, milk, butter, cheese, eggs and honey . The resumption of foreign sales of fish,

crustaceans and mollusks recorded despite the decline in production was due to the strengthening of external demand. In addition, rising import prices is due to high tariff protection, which explains the evolution of imports and the trade balance. The agricultural products are primary products with low technological content including adverse weather conditions, insufficient agricultural production and higher international prices contribute to the weakness of their price elasticities.

However, the relatively small size of the domestic production has made suppliers unable to monitor progress towards the retail facing client countries. The price elasticity of the trade balance is highly significant (t -statistic equal to 4.75), this shows that Tunisia is specialized in a number of productions where price competition is strong. Indeed, the price elasticities are higher when one is specialized in technology goods low and medium level.

The estimation results show the lack of spending on R & D effort in Tunisia over the past two decades, their influence on the trade balance thus remains very limited. The investment effort seems to contribute to the deterioration of the trade balance with an effect that remains somehow quite small but significant (coefficient of -0.99 negative sign and t greater than 2 student). The investment in agriculture and fishing effort is not sufficient to allow Tunisia to materialize export opportunities. Therefore, this indicator does not answer the question of the quality of the Tunisian offer and the leadership role of intangible investment in competitiveness gains [Mzoughi. N, 2000].

4.2 STUDY-ELASTICITIES OF THE TRADE BALANCE WITH NON-EU COUNTRIES

The successful model has the same explanatory variables as those presented in the model with the European Union. It allows estimating the price elasticity and revenues by sector over the United States, China and India. The goal is to guide trade policy and exchange rate policy that the monetary authorities should adopt. The results of the estimation of the function of the trade balance in agricultural and fishing products are as follows:

$$B = \underset{(2.74)}{0.464}\log(Yw) - \underset{(-2.65)}{0.484}\log\log(Yd) + \underset{(2.37)}{1.157}\log(TCER) + \underset{(-2.16)}{0.541}\log\left(\frac{(1+t)Pm}{IPC}\right) + \underset{(-0.002)}{0.252}\log(R\,\&\,D) - \underset{(0.99)}{1.381}\log(FBCF) + \varepsilon_t$$

R^2=0.69, DW=1.62

The elasticity of the average GDP abroad for agricultural products is low and the variable is statistically significant. Indeed, a 10% increase in the average gross domestic product Etas States, India and China would improve the trade balance of 4.64% , agricultural products and fisheries are a vulnerable sector in terms of exports to these countries . In terms of imports, there has been a significant source of products of animal origin from China and cheese, milk, eggs from the United States, which explains the deterioration in the trade balance in this sector of 9.3 % in 2003 and 12.9 % in 2005. Elasticity of the national gross domestic product is significant but low. An increase of 10 % of the national gross domestic product this sector would lead to a deterioration of the trade balance of 4 .84 % , which is due to geographical distance, transportation costs, supply costs and storage costs . The price elasticity for imports is correct and statistically significant sign, a decrease of 10% relative price induces a deterioration of our competitive position 5 .41%. Moreover, the effect of long-term protectionist trade policy on the competitiveness of this sector is significantly negative. High MFN tariff rate for agricultural products hinder the growth and productivity of this sector.

In the long run, a 10% devaluation of the dinar generates an improvement in the trade balance of 11.5%, however, trade with the EU in this sector are less price elastic than those with non-EU countries. In the medium and long term, the SEMC must finally initiate a revision of their model of agricultural growth. The model used as a reference today to be revised and reconstructed as face of demographic challenges that lie ahead, the pattern of agricultural growth based on intensive exploitation of water resources and soil entrusted to a " capital pole" may not be or face the challenges of climate change, or that of protection to the fine food security largely degraded natural resources, or in.

CONCLUSION

Thanks to our paper , we have deduced that the liberalization of the Mediterranean countries and specifically the Maghreb dependence with the EU , forcing their food safety is addressed through the food supply by lower prices and less normative constraints. However, a business relationship outside the EU facing some countries in America and Asia it is an alternative agricultural performance. Through our analysis of reaction of the trade balance to a tariff deprotection and a depreciation of the Tunisian dinar , we demonstrated that in the long term these determinants are likely to improve the trade balance with more pronounced for countries coefficients EU compared to countries outside the EU, while being

superior long term and short term. In the short term, the price elasticity of the trade balance with the EU is higher than the price elasticity of the trade balance with countries outside the EU. This allows to foresee the long -term effects of a policy of openness are more important on the trade balance with respect to short-term effects . Moreover , a decrease of tariff and a depreciation of the Tunisian Dinar in a framework with the EU are higher on the trade balance that lower MFN and a depreciation of the Tunisian Dinar in a multilateral framework. This result can be explained by the fact that the absence of a free trade area between Tunisia , the United States , India and China with preferential rules of origin, Tunisian exports remain modest. It could also justified by the fact that neighboring countries are favored in providing products within very short delivery and low cost storage even if wages and manufacturing costs are higher than those in countries away . Therefore, to improve competitiveness and reduce the trade imbalance for all sectors of the economy, we should adopt measures to rapid effects by applying a zero MFN tariff on imports of raw materials and negotiating rules ' more liberal origins with the EU , the U.S. , China and India to provide an opportunity for companies in the sector to make a tradeoff between the cost of inputs and good quality from the EU and cheap inputs U.S. , India and China; easing customs procedures through the removal of various technical inspections and routine control on imports and the reduction of import formalities and the number of documents required for import and export .

As for delayed effects, it is to reduce transaction costs on trade logistics and deepening integration with the EU through the acceleration of the implementation of the programs of the new neighborhood policy of the EU.

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Breaking silence: Documenting individual experiences based on visitors 'book of Kigali Genocide Memorial Centre, Rwanda

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ABSTRACT: This study explored the individual experiences based on more than 1000 records collected from the 2012 visitors' books of Kigali Genocide Memorial Centre, 872 of which were analyzed through the lens of gender. There serve as memory which is a component of transitional justice in post-genocide Rwanda. The main method is the content analysis. The study used also quantitative technique in data entries and classification of themes. The analysis has pointed out who are the visitors, interpretation of their messages and their addressees. The emerged themes of comments are: prayers, lessons, recommendations, remorse and emotions of grief, healing and sympathy. Furthermore, gender and continent of origin have influenced the content of the messages. Based on these findings, the study identifies the need for further research in the field of memory transmitted by genocide memorial sites.

KEYWORDS: addressee**,** Kigali Genocide Memorial Centre, memory, individual experiences, visitors' book.

1 INTRODUCTION

In 1994 there occurred the genocide perpetrated against the Tutsi in Rwanda, which was qualified as the fastest and most vicious genocide recorded in human history (Human Rights Watch, 1996). The remembrance of this genocide are present in everyday life for Rwandans, thus in the geographical space, with various memorial sites in countrywide.

This study is performed in the context of post genocide period of Rwanda occurred in 1994. In this regards, everyone who read Romeo Dallaire's Shaking Hands with the Devil will recall the failure of international community to save Rwandans amidst the fire (Dallaire, 2003). Post-genocide Rwanda has attracted the attention of the media, researchers, human rights activists and international development practitioners. A lot of changes has taken place such as the creation of the National Commission for Unity of Reconciliation (NURC) established by the law Nº03/99 of 12/03/1999, the National Commission of Human Rights (NCHR) established by the Law Nr 04/99 of 12/O3/1999 modified and completed by the Law Nr 35/2002 of 31/12/2002. This law was finally replaced by the Nr 30/2007 Law of 06/07/2007 that rules the organization and functioning of the National Human Rights Commission according to the Constitution of Rwanda dated June 4th 2003. The GACACA courts established in 2001 and other tribunals have also been engaged in trials and intend to promote reconciliation and advance justice for both perpetrators and survivors. The National Commission for the Fight against Genocide (CNLG) was established in 2008 to keep the respect of human rights and fight against genocide ideology and thus help make the now infamous "never again" a reality. These various ways and efforts put in place to manage the post genocide period are parts of

transitional justice package that combines both retributive (conventional justice) and restorative justice (Gacaca). These measures include criminal prosecutions, truth commissions, reparations programs, and various kinds of institutional reforms (Villalba, 2011). Generally, in the wake of violence and repression, countries rebuild memorials, museums and places of memory where the past is confronted and injustice can be addressed (Hamber, 2010). In that way, in Rwanda, many genocide memorial sites are still being built twenty years after the genocide. Moreover, they are also often inaugurated during the commemoration period of 100 days. In that way, memorial sites serve as places of remembrance, commemoration and burial for the remains of the victims of genocide against the Tutsi (Lakin, 2013).Memorial sites are thus also a way to manage the period after violence.

In this regards Kigali Genocide Memorial (KGM) Centre is one of the memorial sites constructed in Kigali, Gasabo District at Gisozi sector and inaugurated in 2004. KGM centre is deemed as museum and plays a role of conservation and memory of the history of genocide. The memorial comprises three exhibition spaces: the main historical exhibition, a Children's Memorial exhibition and an exhibition on comparative genocide, called "Wasted Lives". Most of the time, visitors to KGM centre are tourists who come to Rwanda to see the flora and fauna, animals, and the nature. As an illustration, Aegis Trust attendance statistics show that more than 40,000 foreigners visited Kigali memorial in 2012 (Gasana, 2012).

Authors and researchers such as Berliner (2005), Halbwasch (1950), Durkheim (1967), and Laverne (2005) worked on memory and defined it as the assemblage of what we remember, and gives us the capability to learn and adapt from previous experiences as well as to build relationships. In that way, they state that memory becomes collective when it is shared by a group of people. They therefore draws the conclusion that memory processes involve both the individual and the social group (Laverne, 2005). In this regards, museums are conventionally viewed as institutions dedicated to the conservation of valued objects and the education of the public (Crane, 1997). Some memorial sites for genocide are also qualified as museums and play the triple function of conservation, education and commemoration. Therefore, they serve as tools of memory. Elsewhere, different societies who have experienced genocide, have built and instituionalised memorial sites and museums for history education and commemoration such as YadVashem, the first holocaust site of commemoration inaugurated in 1961, the Armenian Genocide Martyrs' Memorial in Deirez-Zor completed in 1990 in eastern Syria dedicated to the memory of the victims of the Armenian Genocide, the Smithsonian's Air and Space Museum in USA, the holocaust Memorial Museum in France, the Kigali Genocide Memorial centre in Rwanda (The Holocaust and the United Nations Outreach Programme, summer 2010). Those various memorial sites are visited by men or women organised in group or individually. Usually, they leave comments in visitors 'books which are also called guest book, visitor log, and visitors' album. Visitors write their names and addresses, and sometimes remarks, observations and feelings. In reference to communication studies, visitors'books are deemed as medium of communication. interlocutors are the addressor and addressee. According to the dictionary (LoveToKnow Corp, 2014) an addressee is the intended recipient of something or the person to whom a verbal or written statement is to be delivered. the addressors are visitors. In the context of this study and communication sciences, recipient is the equivalent of addressee.

Those comments are somehow kind of individual experiences for each visitor who wrote in the book. Otherwise, they are their memory. Generally,messages left in visitors'book are the result of interaction with the exhibits in the memorial, artifacts and personal experiences of visitors. In this study, individual experiences are the real testimonies or comments written by each visitor. Because of the diversity of visitors and their provenience, they are consequently international and constitute the memory itself.

However, it is interesting to analyse those comments through the lens of gender which is the social and cultural significance attached to those presumed biological difference (WHO, 2014). For example, the names given to babies classify them as girls or boys (Butler, 1990) and permit to recognise who is man or woman through their naming. In addition, the study performed by Frauhammer (2009) on guest books for pilgrimage sites in Hungary where she explores religious practice in visitors books, she states that guests books are called also memory books. In some places, visitors'books contain also drawing or poetry. With the lens of gender, the study pointed out the leading role for women in pilgrimage sites of Hungry.

As such it is important to notice that in Rwanda that many people (both Rwandans and non-Rwandans) make efforts to visit the different genocide memorial sites in the country. These sites play a healing role but they also reflect the real history of the country (Micomyiza, 2012). By examining the KGM's visitors book, this study will discuss how men and women's comments about genocide memorial site differ through visitors'book records.

The objectives of this study are 3: the first is to identify visitors of KGM centre in terms of gender, continent of origin and their occupation. The second is to analyse the content of the messages left by visitors and their recipients and the third one dedicated to examine the correlation between visitors' identities (gender, continent of origin and occupation) and the content of their messages in the visitors' books.

2 METHODOLOGY

According to the review done by Carlos Nunes (2008) on Marshall's work (2006) this study is mainly exploratory and qualitative. Purposeful sampling technique is used. It is based on more than 1000 records, which have been collected from visitors' book at the Kigali Genocide Memorial Centre. We considered only the visitors' books for 2012. Only the visitors whose names show their gender were considered in this study.

For data collection we used document analysis, and systematically reviewed and analysed the visitors' books for 2012 available at the Kigali Genocide Memorial site. The choice for one year is justified by the importance or records available in visitors 'books by year. This instrument is not obtrusive and helps to gather a large amount of data at the same time (Bowen, 2009). Observation and interview of some visitors has been used to collect additional information on the existing records.

The major method used in analysis is qualitative content analysis. Rather than being a single method, current applications of content analysis show three distinct approaches: conventional, directed, or summative. All three approaches have been used, especially the conventional content analysis and the summative one in coding and assessing the kind of messages left in the book (Pax Americana Institute, 2012). Comments were organised into themes, to show common aspects of their experiences in visiting KGM centre. They have been helpful to interpret the meaning from the content of text data and thus adhere to the exploratory paradigm.

3 STRENGTHS AND LIMITATIONS

This study has strengths in using unobtrusive data from the visitor's books. It has used statistical methods to examine the relevance of some comments and the proportion in relation to men and women visitors, their occupation and continent of origin. Out of 1014 visitors recorded, we have considered 872 visitors identified as men or women by their names, which constitute a good number for this study. However, we met some constraints in processing the data entries. Some comments were in a language not familiar to us and have not been used. Also, visitors not identified as men or women by naming were not considered. Thus, visitors who were visiting the KGM in groups or family could not be identified. Because of the importance of records in visitors' book, we have considered only one year (2012 records). We consider that the information from 2012 records is limited and not extendable to other years.

4 FINDINGS AND DISCUSSION

From the multiple readings of the messages written in the visitor's book, different themes emerged, these included: gender of visitors and their position, their origins, kind of messages such as remorse, prayers, recommendations, emotions of grief, appreciation and addressees.

4.1 GENDER OF VISITORS AND THEIR INVOLVEMENT IN VISITING KGM CENTRE

According to the book, visits recorded are 1014. This section gives a concise report on the visitors and describes the way visiting is organized, whether as individuals, groups, families and couples. Men and women who visited as individuals are 872. They have different occupations and are from different countries the whole world over. However, 35 individuals are not classified because their names did not identify their gender. The majority of the visitors, who wrote in the book, came as individuals and few have visited in groups of friends, as couples, families, working organizations and classmates. In statistical language, records equal N=1014 .

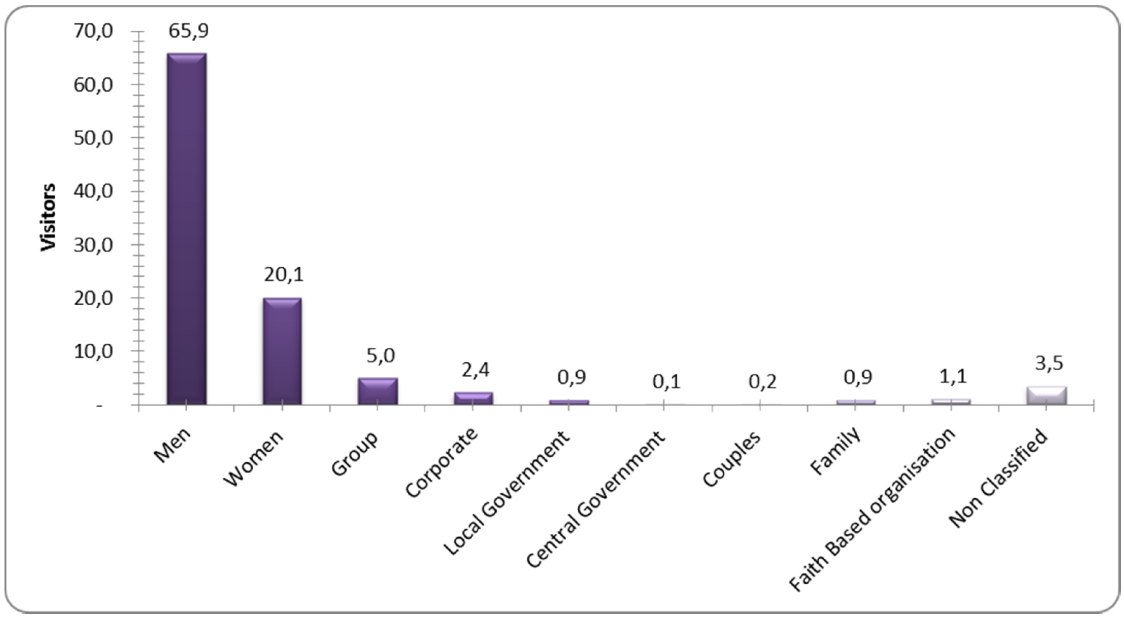

Figure 1. Classification of visitors

Source: made based on the visitors' book 2012 records

Through analysis, the readings show that, out of 1014 visitors recorded, 668 men have visited the memorial, which represents 65.9%. Women visitors have been 204 all the year, which means 20.1% of all visitors. They represent one third of male visitors. Even if visitors came by groups, couples or families, faith-based organizations of men or women, the analysis could not identify who and how many they were. All groups (107) represent 10.5% of all visitors. Lastly, 35 individuals out of 1014 records have not been classified as men or women (3.5%). Briefly, there are more men than women who visited the memorial in 2012. Bearing in mind that in this study we considered only men and women visitors recognised by their names, the figure below details the frequency of women and men visitors along the year.

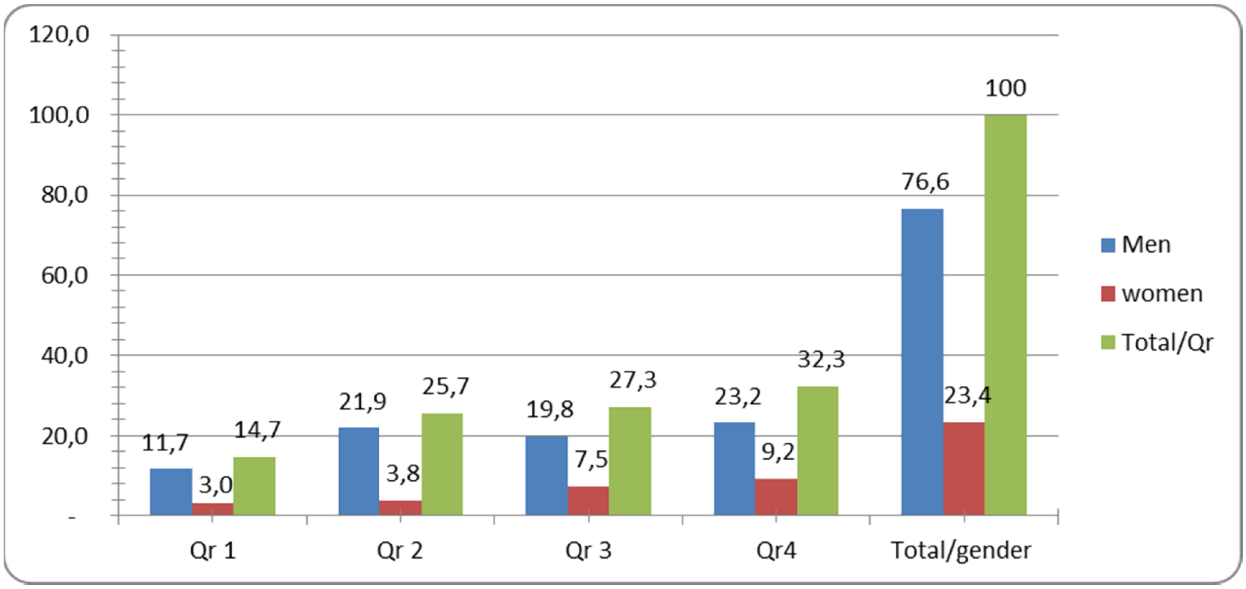

Figure 2: distribution of visitors by the year

Source: based on visitors'book 2012 records

The distribution of visitors along the year goes in a growing order from quarter one up to the end of the year. In that way both women and men visitors became numerous in quarter two, three and four. Quarter 2 starting in April counts the double of visitors came in quarter 1. The reason is that it encompasses the day of national commemoration beginning on April 7th with the flame of hope lit by His Excellency the President of the Republic of Rwanda, Mr. Paul Kagame. Some foreigners are invited to commemorate with Rwandans whereas others come due to their own commitment. Of cause the men visitors (21.9%) are more than women (3.8%) because of their positions in various organisations they represent. The periods of June, July and August, are the period of summer holidays for various European and American countries and thus tourists are many during this period. The continual increase of visitors in quarter 4 seen in October is generally observed among African, European and American visitors. This may be in correlation with the period of autumn holidays for some visitors and the wonderful climate in Rwanda, which attracts many tourists and the KGM historical centre because it is one significant tourist destination. The following section identifies visitors by their continent of origin.

4.2 ORIGINS OF VISITORS BY CONTINENT

Visitors of Kigali Genocide Memorial (KGM) Centre come from all over the globe. The KGM is open 24hours the whole week. After visiting the memorial, the visitors' book is presented to whoever is interested in delivering a message. In analysing the origin of visitors, we have grouped them according to continents. African visitors outnumber other visitors. 48.4% are african men whereas 12.7% are women. UN personality who visited the memorial are only men and have not indicated their country from. In every continent the number for men visitors is superior to that of women. The figure below illustrates where they came from.

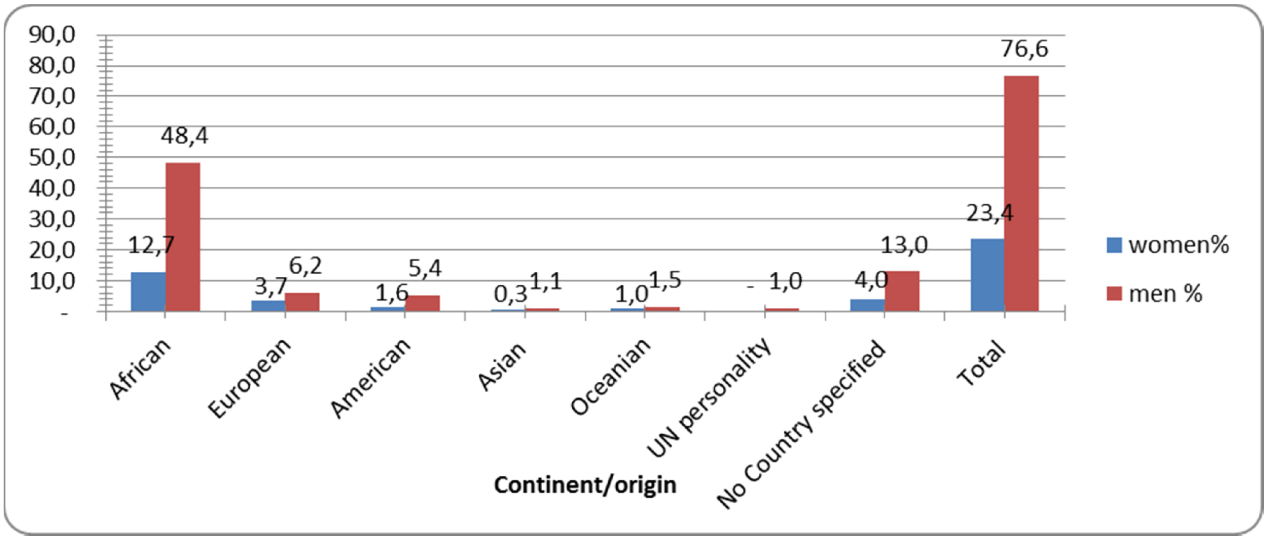

Figure 3: Gender visitors by origin

Source: Based on visitors'book 2012 records

The predominance of African visitors is showed by the analysis among women and men. Men visitors are 48.4% whereas women are 12.7%. They are from Kenya (101), South Sudan (27) Nigeria (15) Ethiopia (14), Uganda (15). Western Africa is represented by Cote d'Ivoire, Senegal, Guinée Equatorial, Guinée Conakry. Rwandan visitors are only 75 including those working in different organisations or ordinary people. The continents less represented is Asia, Oceania and America especially for women (only1.6% from America, 0.3% from Asia and 1% from Oceania). However 13.0% of men and 4% of women have not indicated their country of origin. The proportion of american(5.4%) and european(6.2%) men visitors is almost similar whereas european women were more than american women. Briefly, in every classification women visitors are less than men.

4.3 OCCUPATION/PROFESSION FOR VISITORS

Readings the figure, sum up all occupations of visitors. There are many but not limited to UN position, security agent, pastors, local government, legislature, judiciary, corporate and people working in learning institution. See the figure below.

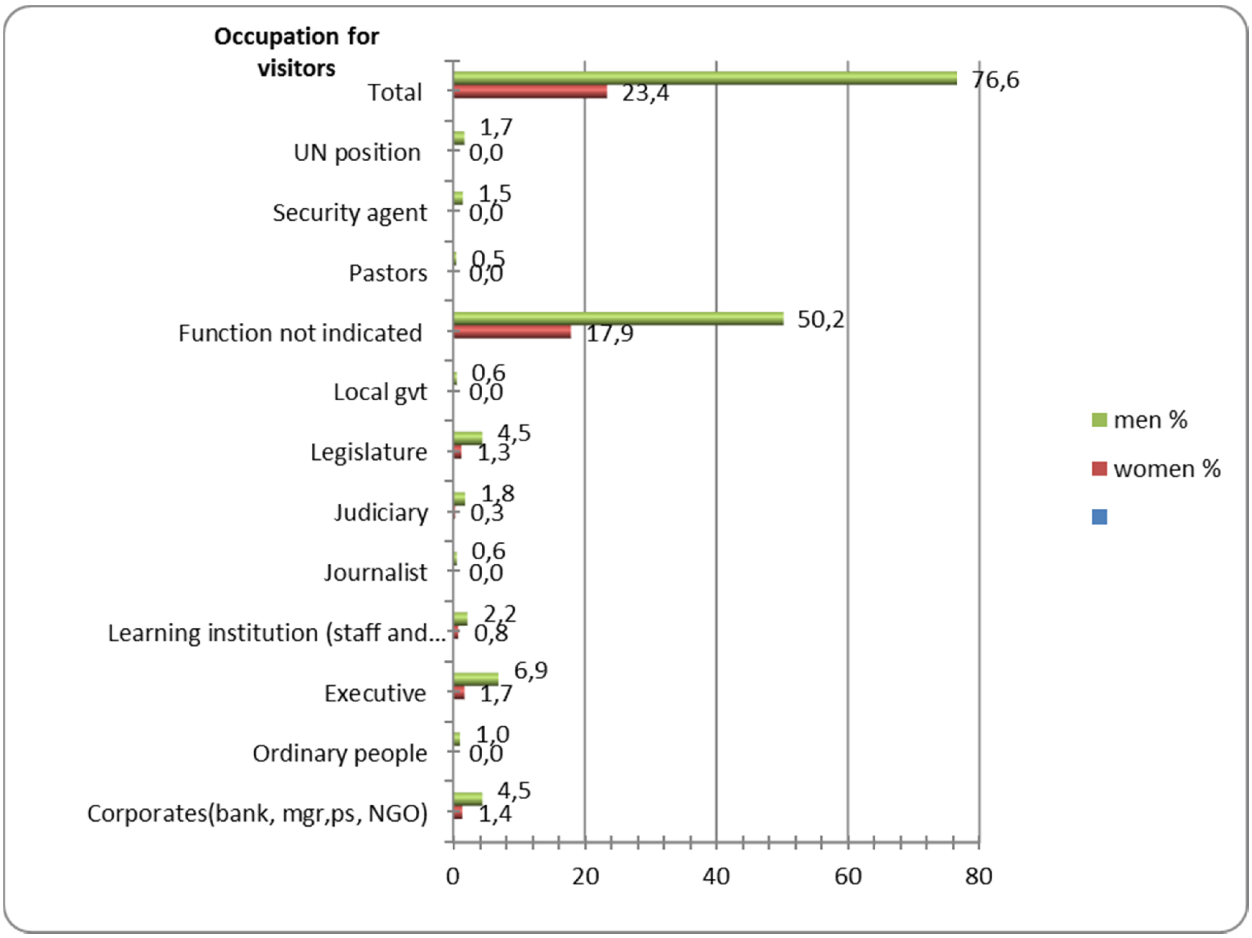

Figure 4: Occupation for visitors

Source: Based on the visitors' book 2012 records

In the visitors' books it is required to indicate the occupation or function when visitors write their comments. Unfortunately, many of them have not indicated their function or position. 50.2% of men and 17.9% of women did not. This attitude for not indicating their function or position is observed on both women and men. However, few of them mentioned their function or position. Through analysis, we found out that, men visitors are well positioned in the executive field (6.8%) and law (4.4%), whereas women are respectively 1.7% and 1.2% in those fields. In the executive field, the positions occupied are often ministers or state ministers and ambassadors. In the legal field, the positions mentioned are members of parliament, speakers or assistants in his/her own respective parliament.

However, some visitors who wrote something in the place for occupation or position indicated only their working organizations or employers and not their exact function. These are mostly men visitors who work at the UN, ordinary people, security agents, people from learning institutions, international NGOs and regional organizations, journalists, and other people from the private sector. In addition, there are also some women who visited the memorial who work in regional organizations such as Mothers of Africa involved in educational charity and midwifery from Ghana; and other women who work in banks and business like Organization of East and Southern African Insurance (OESAI).

This situation of predominance of male visitors appears whereas in Rwanda women have a majority in Parliament, with 51 out 80 seats in the Chamber of Deputies, which means 64% of seats. Beyond reconciliation and politics, women in Rwanda, nowadays occupy significant positions of leadership in business, education, health and other sectors affecting the everyday lives of Rwandans (James, 2013.

4.4 CONTENT OF MESSAGES IN VISITORS' BOOK

As pointed out by Falk and Dierking (2000), the visitor's experience is not just the result of interactions with the exhibits, but the sum total of his/her constructed personal, social and physical contexts. Visitors do not catalogue visual memories of objects and labels in an academic order, conceptual schemes, but absorb events and observations in mental categories of personal meaning and character determined by events in their lives before and after the visit.

In that way, messages left in visitors'book are the result of interaction with the exhibits in the KGM, artifacts and personal experiences of visitors. Through the analysis of their content, we found that some are expressing heartfelt emotions while others are evaluating the exhibit. The same trend of messages has been observed in analysing Visitor Impression Books at the Bosnian Historical Museum in Sarajevo (Lawnicki,2013).

In the context of this study, the analysis highlited a dozen of items and the last classification includes a blank category which mean there is no message or is a signature in the place of message. The graphic below is illustratiing this picture.

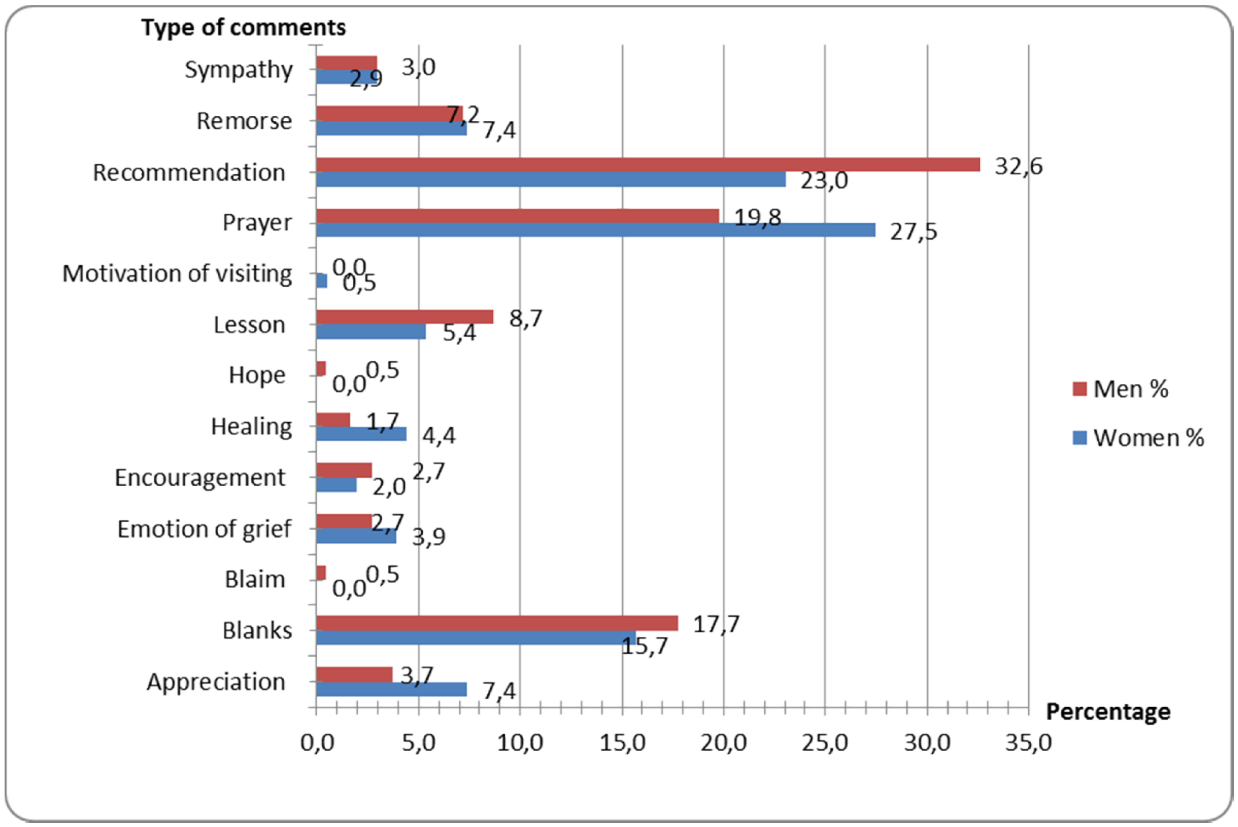

Figure 5: Classification of messages' content by gender

Source: Based on visitors'book 2012 records

This chart illustrates all messages written in visitors book by visitors identified as men and women.

According to guides of KGM centre, it is required to complete the book and give remarks. However, it is not imperative to write in the book and the comment depends on personal experience and interest. Moreover, the visitors' impressions are the result of personal interests, needs, abilities, seen exhibitions and physical environment. Here we see for example that women

visitors mostly expresse prayers whereas men make recommentations. According to Halbwachs, memory became collective when it is shared by a group of people(Halbwachs,1950). By this sociological theory, The KGM Center is itself a collective memory for humankind because of what the nature of genocide means to humanity.

In reference to the study performed by Bealby (2014), museum visitors are the focal point in his book working on identity and museum visitor experience. The author's main goal is to provide a practical model that encourages museum institutions to interact with visitors in a manner that is adapted to their needs and identity. Four years after the publication, Falk's model has been applied in museums across the world in the spirit of satisfying visitors' interests (Bealby, 2014). Among individual experiences highlited in this study are prayers, recommendations, Lessons, remorse sympathy,…

4.4.1 PRAYERS

Out of all emotions expressed by women 27.45% are prayers, whereas in men's expressed emotions only 19.76% are prayers**.** In other words, women's most important messages are prayers**.**

Usually, prayers are performed in churches or other places dedicated of worship. In assessing the content, the influence of religion is seen through prayers formulated by visitors. By analysing the content of those prayers we realiazed that visitors'beliefs are mainly of christian and muslim inspiration. Their prayers focused on the resurection of victims; peace; harmony and forgiveness from God for sins and wrongs for genocide. The examples are the following*: "Where was the rest of the world when Rwanda was in turmoil? May God forgive us from our sins and help us heal and live at peace with one another"* (a man's prayer). Other examples focusing on victims and survivors: *"Lord Jesus Christ remember the innocent deaths of your people.May their souls rest with you in peace. Bless Rwanda."* The other weman prayed for Rwandans in that words*: "My God give you the ability to forgive*"(woman prayer). Other woman prayer is expressed in the words below*: "May the Lord grant all victims the ability and strength to put this behind you. God bless Rwanda."*also, a man visitor says*:* "Never! Never again! May Allah bless the souls". Through these prayers, visitors expressed the best wishes to victims who died and survivors, to all Rwandans and all humanity. Also, the above prayers tend to reveal religious beliefs. They portray the Christian and Muslim influences. In this regards, Religion plays a significant part in sculpting social behaviours for people in various ways. As showed in the study performed by Fam(2004), in Islamic countries, both men and women must cover their torso and upper legs at all times and in the case of women only their faces may be exposed.

Other prayers focus on encouragement for those still living so that they can move on.

Examples: "*My God give you the ability to forgive*"(woman visitor); "*Where was the rest of the world when Rwanda was in turmoil? May God forgive us from our sins and help us heal and live at peace with one another" (*man prayer*);*

I pray God for never again in Rwanda even in the whole world (man prayer).

the prayers show that the solution to prevent any such atrocity and to live in post genocide period should be possible with the help of God. Prayers expressed by men and women are a little different. Women's prayers are focusing mostly on restoration of love among people, blessings to Rwandan people; forgiveness; support to orphans and widows; and a strong wish that genocide should not happen again.

Men's prayers are almost similar to those formulated by women. Men ask God to give to Rwandans and their leaders the courage and strength to fight against and prevent any other genocide. Example*:" This is the greatest disaster record I have ever seen. May God give us leaders with wisdom to manage our people/land for the benefit of all humanity, Amen."* (man prayer).

The second is expressed in the following words*:" If we had done something very early, this would have been avoided. God bless Rwanda to be strong and move for warm ."*Through these prayers, the constation is that men propose concrete action in which they are co-actors with God whereas women express their deep rooted wishes with a full trust in God's capacity and power to handle the situation. This trend to address the straggles to God is observed in the study conducted by Frauhammer(2009) on the guest books of Hungarian pilgrimages, where visitors formulated their wishes showing their struggles. Records clearly showed that not only the holy day of the shrine attracted visitors but also people used to come there around the same time as tourists. Findings also showed the leading role of women in pilgrimage using their numbers and testimonies (Frauhammer, 2009).

4.4.2 RECOMMENDATIONS

After the crimes of the Holocaust became internationally known, the world vowed it would never happen again. But history since 1945 has shown that the international community has stood by, again and again, as genocide unfolds. From

Bangladesh to Darfur, humanity is still struggling to end what Winston Churchill once called a "crime without a name"(Lamb, 2005).

In completing the visitors'book, visitors left some recommendations.

32.6% of the men messages are recognized as recommendations whereas women recommendations are 23.04%. In this regard, recommendations have different emphasis but all are converging to prevent genocide or any other atrocity in the world. It is expressed via different ways which are shaped in the following order.

On one hand, many recommendations are expressing a "never again" wish.

After the Holocaust, the world united behind two simple words: Never Again. These words represent a promise to the past and that future generation will do everything to ensure the horrors of the Holocaust are not repeated. 50 years later, it happened in Rwanda. Many worried people are working every day to prevent it. In that way, every single day, the United States Holocaust Memorial Museum works to fulfil this promise (United States Holocaust Memorial Museum, 2013). In this study, the following recommendation expresses the same idea: *"Never again and vigilant memory"*(man visitor).

On the other hand, the recommendations propose the actions to be taken to prevent any conflict and thus genocide.

In this regards, some messages from the visitors' book recommended that the world ensures that perpetrators are held accountable and reparation is distributed to survivors.

the message below portrays that view: *"genocidaires should be brought to justice wherever they are. Please let us help survivors of genocide"(* a man's recommendtion).

Other recommendations focus on unity and harmony to grant peace and prevent any atrocity in the world and construct a better future. The example is below*: "Never again" and may peace and reconciliation reign in this blessed land* (a woman visitor).

Through reading the records, we foundout that the KGM centre is deemed as a cultural memory and it contributes to enhance the awareness and forester the effectiveness of never again. The following recommendation is the model: "*This is the first time I have visited a Genocide Memorial. In Zimbabwe, we have had our shave of political killings /massacres. My sincere hope is that never ever …. Africa, and indeed the whole world be subjected to such sensitiveness. It is necessary, …… establish a similar memorial in our country and say "NEVER EVER"* (an african man visitor).

Women are advancing learning from the past to build a better future. The example is the following: *"Memory night help to build on a better future".*the other is sayed in the following words: *" Speechless and horrified! Let us never forget what happen in the past. Learn from it and never let it happen again. My heart is with the victims of this times of cruelty".*

4.4.3 BLANKS

Blanks messages are the absence of comments or signatures only in the place of comments. This categorization is borrowed from the study conducted by Lawniki (2013) on the impression of visitors at the Historical Museum of Bosnia and Herzegovina in Sarajevo.

This analysis came out with 17.7% of men blanks whereas women's blanks were 15.7%. In trying to decipher the meaning of blanks messages, we have made an interview with visitors in April 2014 with the assumption that maybe visitors were too shocked. With this interview, we found out that visitors finished visiting the genocide memorial shocked and speechless. In this mood, some visitors prefer not to make a comment or leave their signature only. Women and men have showed the same attitude of not writting a comment or signature only.

4.4.4 LESSONS

8.68% of men messages show that they learnt something from the KGM centre whereas 5.39% of womens'messages focus on what is seen in the memorial and adressed to Rwandans, Africans and all of humanity.

All lessons are highliting the fragility of humanity. For women it is important to preserve and educate youth on what happened and to contribute to world peace. With reference to gender theory that we become men or women through socialisation as the society expects, thus, women lessons suggest that the education is their core task to avoid genocide (Jenkins, 2004). Some lessons are given below: "*A lesson to learn that human rights must always be respected if we do not want a repeat"*(a woman visitor).an other comment expresses that:

"It was an extremely sad experience of how hate and disunity can lead to so much hatred and inhumanity. God heal Rwanda and the children" (a woman visitor). In the same way: *"It is really hurting and every one who saw this should be a peace maker"*. (man visitor)

Briefly, each lesson emphasized living in peace, and reminded us that all people are equal. Men and women views are converging in that they both insist on keeping peace and some actions are proposed to make this lesson of peace effective.

4.4.5 REMORSE

Remorse as a personal regret, is closely linked to guilt and self-directed resentment (Flammarion, 1931). The remorse expressed here are the feeling of visitors who consider that the world failed to protect the humanity. 7.35% women and 7.19% men expressed remorse. Visitors expressed regrets after seeing the reality at the memorial. What is common is that all remorse is the reaction to what is seen in the KGM. Some blame some groups such as western people. The telling in the book reveals that it is:" a *shame on the western world!!?!*"(European visitor).

Also, the remorse pointed out the sadness felt by visitors as it is stated in the following comment:*" I am now crying. The words don't exist to describe the unthinkable."*

Moreover, some visitors felt guilty even if they are not perpetrators of genocide again the Tutsi. The following illustration explains more the feeling:" *very moving. A guiltily feeling on my part as we could have stopped this! The west is guilty..."*

In this regards, remorse is again expressed in term of failing to protect human life such as this passage: **"***May the memories remind the world what "we" failed to do, protect human life. The world watched this sorry. Thx*".

4.4.6 APPRECIATION AND ENCOURAGEMENT

Visitors also appreciated the place which gathers the history of the horrific tragedy of 1994 and congratulated the Rwandans for efforts made to end genocide and rebuild the country. Women visitors are more appreciative of this effort than men. 7.35% women expressed their appreciation whereas only 3.74% of men did the same.

However the words used to express it are the same. They encouraged Rwandans to keep it on. Furthermore, they expressed congratulations to the government of Rwanda, to the President, to RDF and Rwandans in general. This appreciation focuses on peace and cohabitation prevailing in the country. *"A beautiful memory of loved ones and a fitting encouragement to us all to strive for peace and a sustainable world."*

In this regard, visitors are recognizing the effort made by the government of Rwanda and consider this memorial as a reminder and a tool to help prevent genocide as revealed in this message: "*I have no words. I am so sorry we didn't help. Thank you for building this memorial to remind us and hopefully prevent this from happening elsewhere in the world again*".

4.4.7 HEALING AND EMOTIONS OF GRIEF

After visiting the memorial 8.33% of women visitors and 4.34% men visitors come out full of emotions of grief and are speechless. Some expressions illustrate grief: *"I don't ever know what to say".* Other visitor wrote this: "*No words in any language I know is sufficient to explain the sorrow I feel".*

Most visitors expressing healing are Rwandans. It is expressed by remembering the victims forever. The sample is: "*We will not forget our brothers and sisters*."

The healing message also expresses the relationship with victims and the commitment for the visitor. The following comment is the prototype: *May their souls rest in peace! We loved them; we lost them at inappropriate time. We will not forget them. Never again!*

In the same way, other visitors find solution for what happened in God who can grant peace forever*: Only God will sweep all his children tears. Peace forever!*

The other solution is love and forgiveness. *"The truth will set you free! Love and forgiveness overcome all."* Many of the messages of healing are monologues.

4.4.8 SYMPATHY

3% of the messages expressed sympathy from both women and men. It went to victims, survivors, and Rwandans in general. Most of the time, the sympathy is expressed in communicating to others what happened to victims and love to survivors in the following words: "We *now have a new understanding of the past, our heads cry out for the victims and we reach out with love to the survivors. Our prayer is a total healing of the great Lord of Rwanda*!"

Moreover, the sympathy is mixed with the visitor expressing love to survivors and recommending it as a way to overcome everything. The example stating that is: *"Life is bigger than death. Love overcomes evil. Thank you for ministering, remain strong as you are. I love you all*."

Through sympathy, we find that visitors put themselves in the shoes of the people who suffered, especially mothers**.** An example **:***"As a human being and a mother, I am sorry for this happened. I pray it never happens again."*

4.5 KIND OF AADDRESSEES

An addressee is the intended recipient of something or the person to whom a verbal or written statement is to be delivered (LoveToKnow Corp, 2014). We found out that comments are addressed to various people including the staff of KGM centre. The problem is that, those recipients don't have a medium to receive those messages. In this order, the study performed by Noy (2008) states that visitors' books are dynamic spaces of articulation and display that serve as channels of communication between various social actors and entities both concrete and abstract. Hence, the presence of the book implies that the visitors' opinions are considered important and useful.

In that way, comments left by visitors of the KGM center are adressed to a diverse audience.

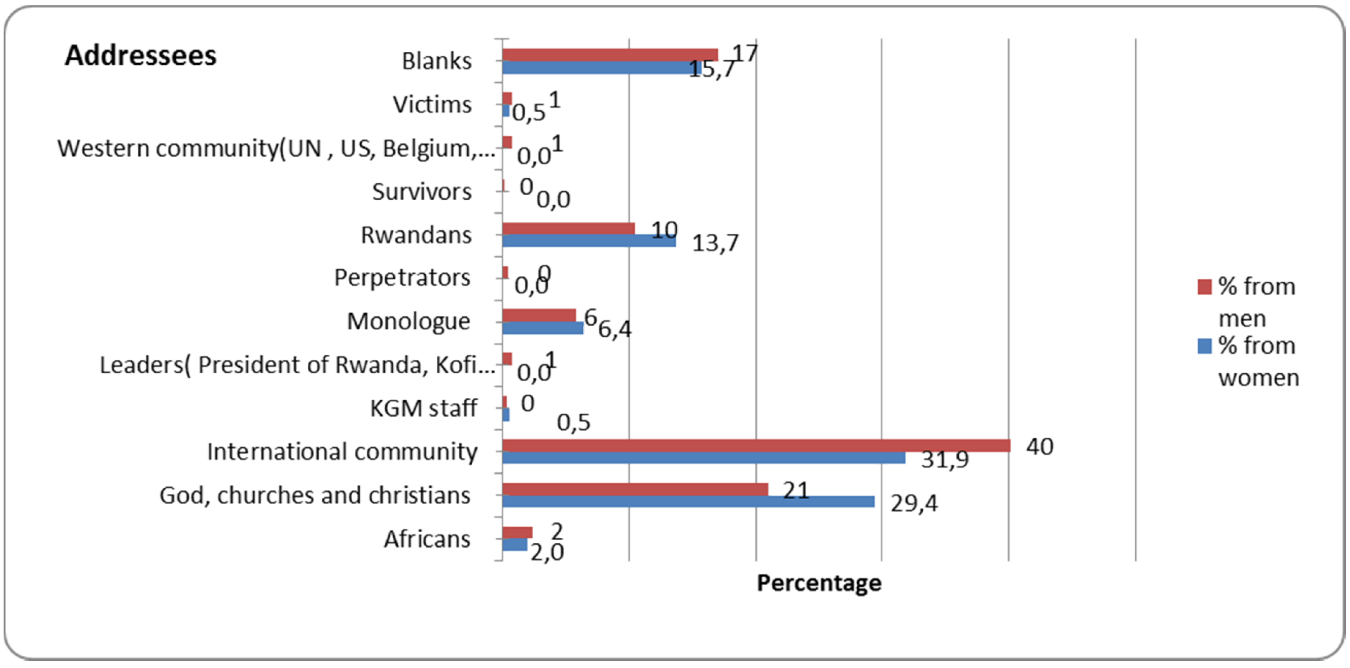

Figure 6: Addressees

Source: Based on visitors book 2012 records

The most important addressee is the International community with 31.46% from women and 40.12% from men.

The focus of the international community messages is often recommendations in various forms of "never again", lessons of what happened and remorse. There are two kinds of remorse in this book. One is adressed to the French governement of the time (1994) and another to the international community. For example a visitor is not proud of being french because the French government did not protect people (Tutsi) and prefers to be a citizen of the world working for a better future.

The second addressee is God with 20% of men visitors and 29% for women have formulated a prayer to God in reaction to what happened in Rwanda. They asked Him to support survivors, to rest the victims in peace and forgive the perpetrators.

Beside the international community and God as first adressees, there are other important adressees who are Rwandans in order of 10% from men and 14% from women. The important messages given to them are encouragement to keep what they have done and reconciliation and build the future. This includes appreciation of the place, keeping memory and peace for the nation. They also mentionned the recommendation for "never again" and sympathy to survivors. In this regard, the decent remembrance for victims has been prized. The fact that the people have come together to forget and forgive is strongly admired.

To Rwandans as "addressees" some messages are specific to the government of Rwanda, to the Rwanda Defence Force (RDF) to Rwandan youth, survivors, and the KGM staff for their excellent job.

However, some messages are Monologue. The term monologue used here, is also employed in cinema and refers to a play for one actor. It may be an entire play or film in which only one actor appears and speaks. In that way, in the field of performing arts for comedian, the term monologue refers to a set of jokes or humorous stories following one another without a break told by a solo entertainer (Microsoft® Encarta® (2007). In that light, in literature and drama, the term monologue means an extended speech by one person (Encyclopedia Britannica, 2013). In this study, the term "monologue" is used to refer to a piece of comment written in the visitors 'books not addressed to anyone. The visitor seems to be a solo entertainer. Other, than the comment, there is no specific addressee evocated.

Monologue addresses include messages such as emotions of grief, healing and remorse. The examples are: "uw!!" "I am crying!!", "God bless Rwanda!" "speechless!!". Most of the time visitors who came out of the KGM centre with emotions were speechless. Those who could express what they saw expressed emotions of shame, pain or both to describe what has been done. The interaction is reflexive or turning on oneself according to their personal experiences and the physical environment visited.

4.6 THE CORRELATION BETWEEN VISITORS 'MESSAGES AND THEIR IDENTITIES

The messages are reflecting the influence of what is seen in the KGM to visitors themselves. On the other hand it is also true that visitors' interpretation of what they see at the memorial depends on their personal background, experiences, gender and occupation. As showed by Noy (2008), entries inscribed in visitors' books include highly charged emotions from visitors and suggestions to prevent genocide.

Through analysis, men outnumbered women to visit the KGM centre, even if women were more than men in formulating prayers addressed to God (above 30% from women) and they were worried by the living conditions of genocide orphans and widows whereas men left recommendations focusing on never again with their main addressee as the international community (more than 40% from men). More women than men expressed appreciation for the KGM, the exhibitions and a healing message.

Considering the continent of origin, we noticed that some Africans addressed their messages to other Africans especially those in troubled and war situation whereas some visitors from the western continent expressed shame at the failure of the western to stop the genocide perpetrated against Tutsi in 1994.

Rwandan visitors were numerous to express a kind of healing, hope, and sympathy message to both survivors and victims of the genocide perpetrated against Tutsi in 1994.

5 CONCLUSION

Two main conclusions are highlighted by the findings. This article is performed in the field memory and gender studies. Visitors' books seem to be a store of various comments where content is diverse. They were never used as source of research work until today. This study found out that information to be recorded in visitors' books is incomplete.

It is highlighted that gender identity and continent of origin played a role in determining the content of messages and their recipients. Some recommendations are identified such as: to revise and adjust the format of visitors' books and preserve enough space to write comments; to conduct more studies on other Genocide Memorial sites; Create a room to exhibit women suffering in order to ensure their memory including rape and different ways of torturing.

6 ACKNOWLEDGEMENTS

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CONTRIBUTION TO THE TEMPORAL ASSESSMENT OF RELEASES PROVINCIAL HOSPITAL (SIDI KACEM, MOROCCO)

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ABSTRACT: Environmental concerns require a certain dynamic to basic safeguarding ecosystems against any type of pollution. Studies can guide practice and the development towards better environmental management. This study has considered making a physicochemical characterization of samples collected during one year (11.01.2012 to 7.1 . 2013) at 8h, 10h, ,12h , 14h, 16h and 18h from the collection of effluent hospital revealed the following results:
The temperature varies between 15.75 °C and 20.21 °C, the acid pH. The electrical conductivity of the samples studied is between in 4444 and 7135µS/cm, BOD5 is between 74mg/ld O_2 and 688mg/ld O_2 (BOD_5 is blocked by antibiotics), suspended matter is 233 mg/l, COD between (112 and 622 ppm), MES is between 163 and 257 mg / l, dissolved Oxygen is between (1.7 and 3.14 mg / l), chlorine is between (0.07 and 0.11 mg /l). Analyses show a variation of at least some important parameter. In general, the values obtained are higher than the discharge standards recommended by WHO (1989) and CNS (1994) for urban wastewater. At the end of this research, it was found that wastewater from the provincial hospital in Sidi Kacem are of very poor quality.

KEYWORDS: Physico-chemical; wastewater; pollution; hospital; Sidi Kacem; Morocco.

1 INTRODUCTION

Wastewater from the hospital represent a small fraction of the volume of water used in morocco but their quality, more or less poor, requires treatment before discharging them at crude state in the receiving environment. Depending on the nature and concentration of its constituents, hospital's wastewater can cause a number of diseases and other effects on the hydrosystem , There is no clear correlation between the consumption of specific hospital and size hospital ([1]; [2]; [3]; [4];[5]; [6]; [7]; [8]; [9]. Guidelines of Regione Emilia Romagna, Italy, 2009; [10]In presenting the physico- chemical characteristics of raw provincial hospital of Sidi Kacem wastewater. The use of characterization parameters of urban effluents is a good way to give the quality degree of theses urban wastewater, this research aims to inform us about the degree of physico-chemical raw sewage pollution of Sidi kacem provincial hospital.

The purpose of this study and make physicochemical analyzes is to assess the risk of hospital waste to human health.

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2 METHODOLOGY

MIDDLE OF STUDY

Sidi Kacem is a medium-sized city of northwestern Morocco and capital of the province of the same name. Its inhabitants are the number of 74,062 (RGP, 2010). On axes of Meknes (45km), Tangier (210km), Fez (85km) and Rabat (120km) (Fig.1), it is located where

R'dom's river leaves the heights of Meknes tableland plateau of to engage in large and fertile plain of Gharb. Its climate is continental with hot summers and cold winters that invade the province.

The provincial hospital in Sidi Kacem has a theoretical capacity of 210 beds. Its technical platform consists of an operation which contains three central blocks and 2 blocks, maternity rooms, rooms with standard radiology and imaging table and a digestive mobile device. Hemodialysis contains 5 generators, the number of patients reached 104/day.

The wastewater collection was selected to cover almost all the sanitation hospital network before discharge into the sewage of the city of Sidi Kacem networks during the 6 sampling periods (8h -10h - 12h- 14h-16h -18h). Samples are taken monthly 2 times for a period of one year (from 01/11/2012 to 7-1 - 2013) and 12 consecutive samples during the working days where activity is high (Monday - Tuesday- Wednesday - Thursday- Friday) and 12 samples during the holidays with less activity (Saturdays, Sundays and holidays). We try identifying the different sources of pollution for each sampling period.

Figure 1: Map locating the hospital in Sidi Kacem (Morocco)

METHODS OF STUDY

Measurements of temperature, pH and electrical conductivity were carried out in situ. The temperature of the water analyzed is measured with a thermometer. The pH determination was performed using a pHmeter model HANNA. The conductivity was measured by a conductivimeter cond312i. Matter suspended solids (MSS) and biological oxygen demand for 5 days (BOD_5) was analyzed in the Laboratory of Environment in Faculty of Kénitra. BOD_5 per Oxitop BODmeter and the suspended material is determined by filtering a volume of water on cellulosic filter 0.45 µm. COD, dissolved O_2 and chlorine carried out using a multi-parameter bench photometer.

3 RESULTS AND DISCUSSION

The physico-chemical characteristics of raw sewage of provincial hospital of Sidi Kacem are showed by Figures 2 to 9.

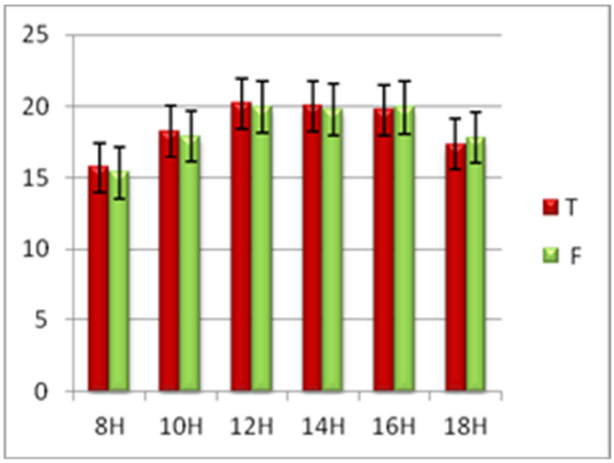

Figure 2: Temporal variation of temperature of hospital wastewater

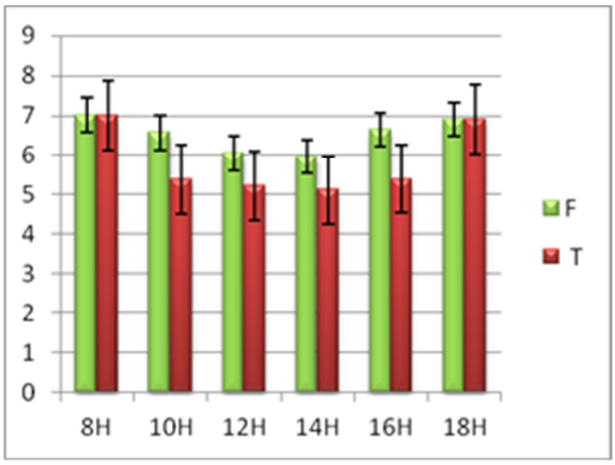

Figure 3: Temporal Variation of pH of wastewater

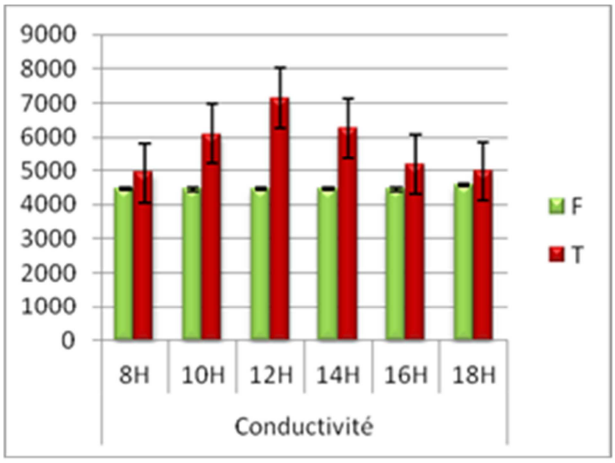

Figure 4: Temporal variation of EC of wastewater

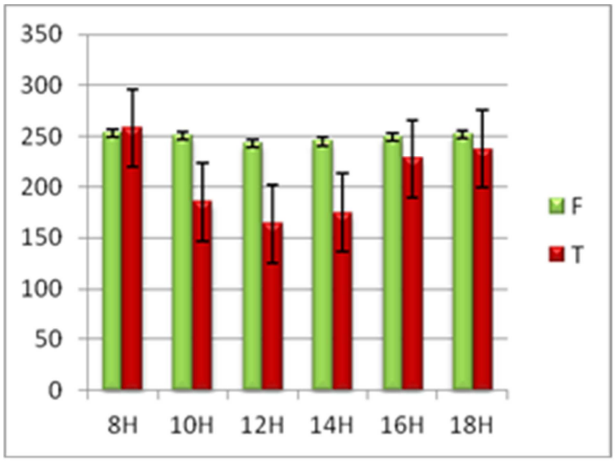

Figure 5: Temporal Variation of hospital wastewater

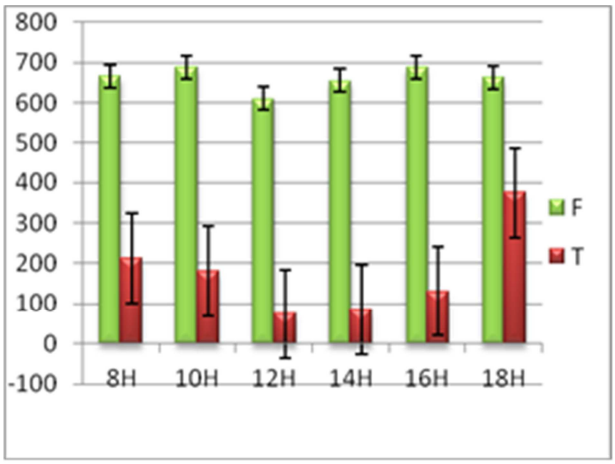

Figure 6: Temporal variation of BOD_5 wastewater

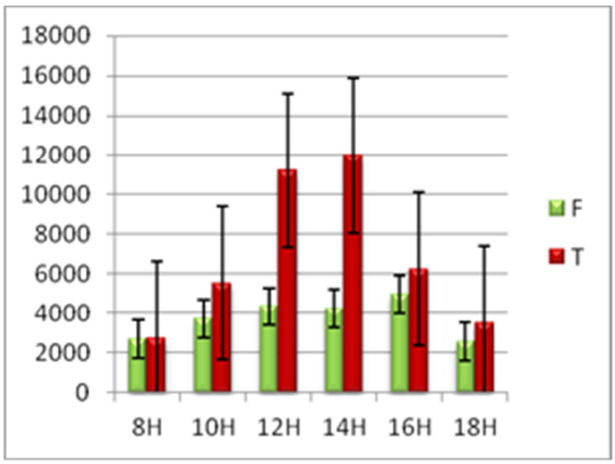

Figure 7: Temporal variation of COD wastewater

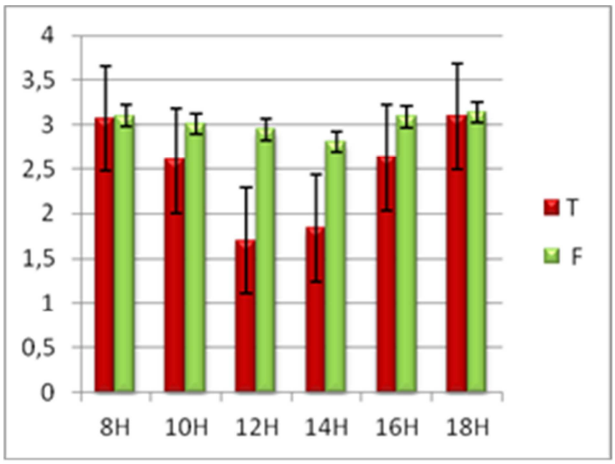

Figure 8: Temporal variation in O_2 wastewater

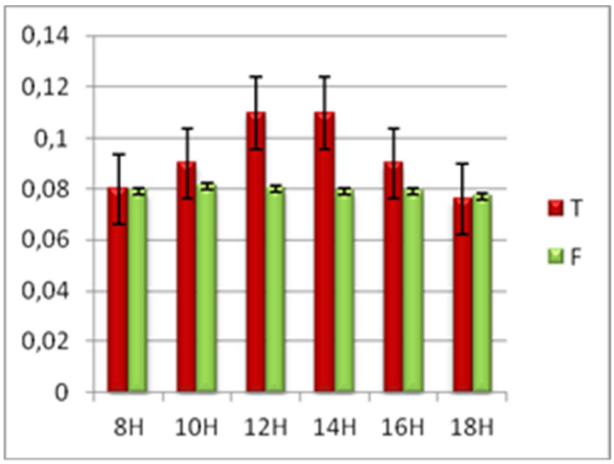

Figure 9: Temporal variation Cl.lib wastewater

The temperature measurement is required for each analysis of wastewater. The averages and extremes of wastewater temperature during periods vary between 15.75 °C and 20.21°C (Figure 1) with an average value of 18 °C for 55 working days and 18.47 °C for the holidays.-There is not much difference in temperature between workdays and holidays, they are below 30 °C which means that theses wastewaters are acceptable for irrigation and indirect discharges in the receiving environment. Our results are consistent with Elguamri et al,[11] in Kénitra.

The pH is an indicator of the pollution by excellence; it varies following the nature of the acid or basic effluents. For four sampling times (10h, 12h, 14h, 16h) of the hospital wastewater is acidic, causing the acidity is due to the use of disinfectants and detergents, they use during activities of medical diagnosis and bacterial fermentation which tends to acidify the medium (Finance, 1985). These releases are slightly lower than the WHO standards that admit a pH range of 6.5 to 8.5. The average pH value of six periods is 4.53; it does not meet the standards of water quality for irrigation (CNS, 1994). Several authors ([12]; [13]; [14]; [15]; [16]) connect the wastewater pH variations with biological and biochemical activities, including photosynthesis. The pH is in the WHO standards, and meets the standards of water quality for irrigation ([17]).

The conductivity reflects the amount of ionizable salts dissolved, the content of the electrical conductivity of the waste water, is mainly the result of the presence of sodium chloride and calcium bicarbonate as reported by Torrens et al., 2010. The curve time variation of the electric conductivity shows that during workdays there is an increase in conductivity in comparison with the less active days. There is also a variation between periods of work, the most active are 10h, 12h, 14h and 16h and the least active are 8h and 18h. The maximum value of the electrical conductivity is 7052.08 µS/ cm recorded at 12h.

Suspended solids are all mineral and organic particles in the wastewater and vary between Working and rest days. There is a decrease during the most active periods 12h, 14h, 16h. It is due to high water use. But the period of 18h and 8h like rest days, usually the average value of the suspended matter is stronger because there is a high use of detergents for infections and for cleaning operating rooms.

The Biochemical Oxygen Demand (BOD_5) expresses the amount of oxygen required for the degradation of biodegradable organic matters through the development of micro-organisms, under given conditions (5 days at 20 °C, protected from light and air). The recorded values of BOD_5 during the study are very low for days of work; they are between 97.5 mg O_2/l and 275.85 mg O_2/ l (Fig.5), with an average value of 176.34 mg O_2/l for working days. This value beyond that assigned by Moroccan standards that set the rejected quantity of biodegradable organic matter to 100 mg O_2/l. The maximum value reached 658.56 ± 19.03, which exceeds the normal range of urban wastewater (200-400mg O_2/ l). This requires the treatment of the wastewater prior to discharge into the waters of the sanitation of the city. BOD5 hospital wastewater days of work are less than the holidays, this decrease is due to the wide variety of chemical compounds used in the hospital and especially in work days, these chemical compounds are antibiotics, cytostatics, disinfectants, contrast, other drugs (hormones, statins...).

Chemical Oxygen Demand (COD) is a measure of the amount of oxygen required to chemically oxidize the total organic matter in the water, COD measured in hospital effluents days of work is very high compared to holidays the average value of COD periodic work days is 6865.3 ppm, and holidays is 5752.2 ppm (Figure 6).The two values are generally much higher than those allowed by the French standards (150ppm), WHO (<80ppm) and Tunisian standards (<90ppm). There is a variation between 12h and 14h COD because there is a high organic load during this period which is the most active period and this shows that the decrease in values of BOD5 is due to blockage of bacteria by antibiotics.

The Dissolved oxygen is an important factor in the distribution, species composition and abundance of the biological community. Examination of the vertical profiles of dissolved oxygen (Figure 7) shows poor oxygenation of the water in the work days as well in non working days, with maximum levels of 2.75 mg /l observed in waters surface. The comparison of these values with the grid of wastewater discharge, they are poor than the minimum recommended $5<O_2<8$. We find that in both periods (12h and 14h) there is a significant decrease in dissolved oxygen levels indicating increasing pollution at this level due to the use of toxic products.

Chloride ions are negative chlorine anions, this element is very abundant in the environment, it is present in water, soil, rocks, and in many foods. In working days the amount of free chlorine remains variable during the most active periods and less active periods, the amount of free chlorine exchange between a minimum value of 0.076 mg/l and a maximum value of 0.11 mg/l. The maximum value is recorded at 12h and 14h of the two most active periods (Fig. 8), this increase is due to the high use of chlorine in cleaning products especially to sterilize everything that are hospitable tools. But none works days the amount of chlorine remains stable for all periods it the limit of direct discharges [17].

4 CONCLUSIONS

This study aims to evaluate the degree of Sidi Kacem Provincial Hospital wastewaters by the realization of physicochemical analyzes the course of a year. This can be concluded that the studied waters are very bad quality. This requires the treatment of the wastewater prior to discharge into the water network sanitation of Sidi Kacem city. We hope in the light of results from this study have led to a real awareness of the competent authorities on the need to develop in the region works for the treatment of wastewater.

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RELATIONSHIP BETWEEN PERCEIVED ORGANIZATION SUPPORT AND AFFECTIVE COMMITMENT OF HOSPITAL NURSES IN PAKISTAN: A MEDIATIONAL MODEL

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ABSTRACT: The purpose of the study was to examine the relationship of perceived organization support, affective commitment and organization based self esteem of public sector nurses in Pakistan. The research was conducted in twin cities Islamabad and Rawalpindi, Pakistan. The primary data was collected with the help of survey through personally administered questionnaires from 300 respondents in a non-contrived environment during January 2013, it was a cross sectional study. Both male and female respondents were included in the study.
Results of this study revealed that perceived organizational support has a significant positive association with both affective commitment and organizational based self esteem. Meanwhile, organization based self esteem perform a mediation role between perceived organizational support and affective commitment.

KEYWORDS: perceived organizational support, organizational based self esteem, affective commitment.

1 INTRODUCTION

In early 1990's perceived organizational support was not focal point for researchers but from last few years the research on this topic has been flourished [1]. But some researchers have presented in mid 1980s' the organizational support theory focus on perceived organization support as a felt obligation [2]. The perception that the organization worth one's contribution and is concerned about one's well-being manifest the needs for esteem, membership, emotional support and endorsement [3]. These emotional rewarding practices may lead workforce to recognize the organizations' welfare with their own and believe to be emotionally committed to the organization. The model of perceived organizational support refers to the extent to which its employees contribution are being valued by the organization [4] and concerned about the welfare depict the social exchange link between the company and the workers. Absenteeism and turnover [2] was negatively associated with perceived organizational support. In early 1950s organizational commitment was commenced in the field of organizational behavior and since now it is the most interesting topic for researchers [5]. Fredrick Herzberg two factor theory of motivation regarding commitment was noteworthy [6]. Previous work in this field found that managers' beliefs that the organization identify their involvement and could be dependent on to complete promises were optimistically connected with affective commitment [7]. Recently Cohen [8] revealed that organizational dependability increases affective commitment. This emotional involvement emerges from equality, support from senior employees' and social group moreover value individual worth and participation [9]. Individuals' recognition and participation in the organization emphasizes on affective [10]. Employees with the positive affective commitment prolong work in organization as they are willing to do so [11]. Pierce et. al [12] classified organizational based self-esteem as the extent to which employee believes he/she to be competent, considerable and valuable as a member of organization.

Purang [13] examined the relationship of perceived organizational support and organizational commitment through organizational based self-esteem from a social identity perspective. The focus of this study is to find out the relationship between perceived organizational support and affective commitment and the mediating role of organization based self-esteem on private sector nurses of Pakistan. The main focus of this research is that, less work has been done in this field. Researchers have mostly worked on organizational commitment whereas this study focuses on one component of

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commitment that is affective commitment. Lee and Peccei [14] stated that there is a significant and positive relationship between organizations based self-esteem and commitment and they also argued employees are more committed when their self esteem is at higher level than those who have low level of self esteem. Lynch, Eisenberger and Armeli [15] stated that positive mood can mediate the relationship between perceived organizational support and affective commitment. Judge and colleagues [16-17] have mentioned in recent years that self-esteem mediates the relationship of employee motivation and satisfaction and suggested to research more by taking commitment as a dependent variable instead of job satisfaction.

Perceived organizational support is significant for organization in terms of achievement and commitment of employees [18]. The recent research [19] recommend to conduct research in the area of perceived organizational support and affective commitment relationship, which is limited until now and also recommend future studies to examine other tools through which perceived organizational support influence affective commitment such as felt responsibility. However, present literature showed that organizational based self-esteem mediates the relationship between perceived organizational support and organizational commitment [20]. Social exchange theory support organization based self esteem in a way that employees are satisfied with their jobs [21]. Stinglhamber and Vandenberghe [22] revealed affective commitment of employees is strongly influenced by perceived organizational through three methods. First, perceived organizational support constructs sense of accountability of employees' to realize organization goals and objectives and oblige stronger commitment and involvement. Secondly, perceived organizational support influences affective commitment of employees' by satisfying their shared emotional needs as a result employee feels a part of organization. Thirdly, perceived organizational support encourages the constructive emotional awareness for employees to acknowledge their abilities with the help of co-workers' support. However, this positive emotional understanding is directly linked to organization and therefore boosts organizational commitment of employees'. Rhoades and Eisenberger [23] found after reviewing more than 70 articles that perceived organizational support had strong association to affective commitment, job satisfaction, retention of employees, pleasant atmosphere at work and turnover intentions. On the other hand perceived organizational support had average relationship with stress, attachment with the job and absenteeism, and had little relationship with other types of performance, turnover and continuance commitment. Korman stated that workforce with high level of self-esteem have positive attitudes towards their organization and perform more efficiently as compare to workforce having low level of self-esteem. Dulac and Shapiro [24] found, perceived organizational support as a strong mediator which results positive feeling towards workplace in terms of affective commitment and when leader's support is high the intention to leave decline. Similarly, [25] examined the role of perceived organizational support which produce positive attitude towards organizational commitment during her studies on university teachers.

2 LITERATURE REVIEW

2.1 PERCEIVED ORGANIZATIONAL SUPPORT

Perceived organizational support is the employee perception that to what extent organization values them and is concerned about them [26]. When individuals' perceive that organization is valuing their contribution and viewing concern about their interests, the individual will oblige to be committed and this commitment will be defined through work efforts [27]. When employee gets familiar with organization interests, appreciation and esteem this will result in positive outcomes [28]. Previous research shows that there is a positive and strong affiliation between perceived organizational support and organizational commitment [29]. Perceived organizational support shows employees' emotional response or feedback towards their job, as well as positive mood and job satisfaction. Pos influence employee participation and their behavior towards their role [30]. Satisfaction, organizational commitment and organization support have strong relationship with motivation and performance [31].

According to Organization Support Theory, positive relationship exists among employees and the organization, when people of the organization perceive support from supervisors. Perceived organization support generate the sense of obligation through which organization's objective is achieved, it increase affective commitment and hence performance is enhanced. Organizational support theory state that through organizational roles and rewards, support from supervisors and perception of fairness pos can be increased [31]. Perceived organization support is based on give and take relationship, employers' show concern about employees' commitment and employees' expect to be recognized as a part of organization. Organization can show their concern by valuing employees and by awarding incentives and medical benefits [32]. Research on Perceived Organization Support (POS) is based on the reciprocity norm of managers showing concern for employee's commitment to the organization and employees focus on the organization's commitment to them. Employees expect to derive socio emotional resources, such as esteem and concerned and tangible benefits, such as wages and medical benefits from the organization.

The conception of perceived organization support emerges from the social exchange theory and the organizational support theory. According to Lew [33] perceived organizational support is the norm of reciprocity and the commitment of organization to its employees. Some researchers argue that perceived organizational support is based on organization support theory and organization can enhance employee performance by valuing their contribution and focusing on the wellbeing.

According to Eisenberger [2] perceived organizational support is based on favorable behavior of the organization with employees. Perceived supervisor support is another antecedent which state that employees' perceive that their supervisors value their contribution and are concerned about them. High flexible procedures by organizations have better effect on employees' perceived commitment which create strong psychological bond [34]. Employees perceiving high support have strong association and are more committed to the organization [35].Rooted in set, organization support theory believe that employee and organization affiliation can be reinforced by encouraging trade outcomes between employees and their organization [3]. In view of organizational support theory, perceived organization support directs to perceive felt obligation which helps organization to fulfill its objectives by contributing in extra-role activities like helping other employees [36].

H1: Perceived Organizational Support is significantly and positively related to Affective Commitment.

2.2 AFFECTIVE COMMITMENT

The root of commitment identifies the individuals' emotional attachment, devotion and sense of responsibility [37]. Organizational commitment is viewed as the values and goals of the organization, willingness to act on behalf and wish to remain part of the organization [38]. Ahmad and Gelaidan [38] gave the conception that organizational commitment can be categorized into behavior and attitude, therefore commitment is viewed as more dynamic and constructive attitude towards the organization. Allen and Meyer [39] categorized organizational commitment into three components: affective, normative and continuance commitment which leads to desire, need and requirements to stay in the organization. According to the researchers organization commitment is the bond and reliability of an individual to engage with an organization. It is found that affective commitment is more valuable than job satisfaction because it influence the service quality of workforce. Due to skillful employees the decision making power reduces, and service quality of employees is affected by lack of affective commitment [40].

Another study examined that affective commitment have direct impact on citizenship behaviors. The affection and contribution of a person towards the organization and the belief to be the part of organization leads to positive emotions [41]. Employees with high level of affective commitment have faith in organizational goals and desire to sustain their attachment with the organization. When employees are skilled in performing their tasks and are satisfied with their job thus the sense of affective commitment is developed [42]. When an employee is recognized by its organizational values in a corporate culture then he/she is found to be more committed towards an organization which results in high level of job satisfaction. On the other hand, employees with low commitment are less satisfied with the job [43]. To attain affective commitment employer must value employee contribution in the organization, when employee perceive that they are being valued then there will less turnover intention [44]. Affective factor is a result of employees' willingness to stay with the organization. Employees having strong affection and loyalty with the organization are more committed [45].

Emergence of organizational commitment is not new. Many researchers have dedicated several years to this field. According to the current study, researchers argue that there is a strong relationship between high level of commitment and positive outcomes of organization [46]. Some researchers have discussed that those employees are beneficial to organization whose level of affective commitment is high than the employees with continuance or normative commitment [47]. Organizational commitment is employees' emotional connection with the organization which results from the working environment. Here supporting theory is two factor theory of Herzberg have two factors one is hygiene and other is motivators, here motivators are those factors which motivate employees during work. The perception of employees that organization is valuing their contribution will motivate them which result in affective commitment and the eventually performance will be enhanced [6]. When employees feel motivated by their employers this will create a bond between them and employees tend to be committed as employer value the participation. So motivation and commitment have a strong relationship because it binds to parties together to achieve the common objective.

Many authors have done research on organizational commitment and the focal point of their study was affective commitment as it is considered to be the most reliable predictor which results in employee retention [48]. In early research, organizational commitment is linked with exchange theory, the exchange of hard work and loyalty for monetary rewards and profit which shows employee commitment to an organization [49]. Some researchers relate commitment with performance, strong emotional attachment enhance performance and exhibit high productivity [50].

H2: Affective Commitment is positively and significantly related to Perceived Organizational Support.

2.3 ORGANIZATION BASED SELF ESTEEM

It is the degree to which employee's feels that their contribution is being valued and they feel as a member of an organization. Organization based self esteem depicts the perceived value of employee that they are important for an organization and a sense of satisfaction from the job in the past [51]. It is found that individuals who receive high pay feel valued by the organization and employees who feel high organization based self esteem are good performer [52]. A lot of researchers have examined the moderating role of organization based self esteem. They found that organizational based self esteem moderates the relationship between two variables; the individuals having low organization based self esteem are more reactive environmental changes than the individuals having high organization based self esteem [53].

Some researchers argue that organization based self esteem is influenced by organizational care and sense of perceived organizational fairness. Perceived fair treatment will give positive signals to the employees that they are esteemed and precious for the organization [54]. According to conventional approach employees with low self esteem expected to engage in aggressive behavior, people with high self esteem feel good about themselves as compare to the ones with low self esteem [55]. Self esteem is a significant emotional contract because it is the essential element of daily experiences of individuals, it reflects the individual perception what they feel about themselves and how they react within a specific situation or environment [56].

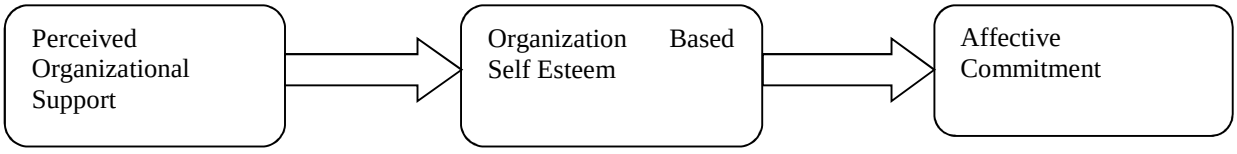
The conception of self esteem has been observed in a proper interpersonal perspective [57]. Esteem is an attitude of satisfaction or dissatisfaction of individual and they develop self assessment based on those attitudes [58]. Researchers found self esteem has a strong relationship with happiness. Self esteem is considered to be the reality rather than perception. It is the individual faith that either he or she is competent or not [59].

Exchange theory focuses on socio emotional aspect of employment relationship. Employees with self esteem having perception of fairness and being valued by the organization are more emotionally attached to the organization as compare to the employees with low self esteem. It is a give and take relationship if organization will care about individuals' esteem this will lead to the commitment [60]. Here social exchange theory supports that when organization value the contribution of employees this will leads to a commitment to perform well. When individual perceive that organization values his/her opinion and feels supported by organization or by supervisors he/she will be engaged in fulfilling the obligations [61].

Employees having high level of self esteem accept challenges from the organization and have tendency to accomplish goals. Self esteem refers to perception, how an individual value himself and what is the value in his own eyes or the level of gratitude, assessment and evaluation [62]. To enhance performance within the organization, support plays an important role [63].

H3: Organization Based Self Esteem mediates the relationship between Perceived Organizational Support and Affective Commitment.

2.4 RESEARCH MODEL



3 METHODOLOGY

This study checked the association of perceived organizational support, affective commitment and organizational based self esteem of public sector nurses in Pakistan. The purpose of this paper was specific context exploratory research. Data was then analyzed and hypotheses were tested using SPSS 20.

3.1 QUESTIONNAIRE

The variables which are being taken can be seen in theoretical framework. Perceived Organizational Support is the independent variable. Affective Commitment is the dependent variable whereas Organizational based Self Esteem is the mediating variable.

In order to examine the response rate from all the respondents 8 items of perceived organizational support were adopted from Survey of Perceived Organizational Support, University of Delaware (1984). 8 items of Affective commitment were adopted from Original Commitment Scale Items of [39] and 10 items of organizational based self esteem were taken from [53].

Questionnaire was based on 5-point scale i.e. 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. Questionnaire included four sections. First section asked questions related to independent variable which was perceived organizational support. Second section was about dependent variable i.e. affective commitment. Third section was based on questions related to organizational based self esteem which was the mediating variable and last demographic.

3.2 RELIABILITY ANALYSIS

Variables	Items	Cronbach`s Alpha
Perceived Organizational Support	08	.779
Affective Commitment	08	.761
Organization Based Self Esteem	10	.717

4 ANALYSIS AND RESULTS

4.1 DESCRIPTIVE ANALYSIS

	Mean	Standard Deviation	N
Perceived Organizational Support	3.5228	.93163	300
Affective Commitment	3.4435	.56630	300
Organization Based Self Esteem	3.8140	.49436	300

4.2 CORRELATION ANALYSIS

	POS	AC	OBSE
Perceived Organizational Support	1		
Affective Commitment	.409**	1	
Organization Based Self Esteem	.295**	.328**	1

** Correlation is significant at the 0.01 level (2-tailed)

4.3 REGRESSION ANALYSIS OF POS, OBSE AND AC

Predictor	Mediator Variable: OBSE			Dependent Variable: AC		
	β	F-value	R2	β	F-value	R2
Main Effect: POS						
Step 1						
Control Variable						0.007
Step 2						
POS				0.409**	61.157	0.167
Main Effect: POS						
Step 1						
Control Variable			0.005			
Step 2						
POS	0.295**	29.123	0.087			
Mediation: POS						
Step 1						
Control Variable						0.005
Step 2						
OBSE				0.328**	36.691	0.107
Step 3						
POS				0.342***	41.379	0.214

*p<0.05, **p<0.01, ***p<0.001

4.4 RESULTS DISCUSSION

The current study shows, significant positive association between Perceived Organizational Support and Affective Commitment, Perceived Organizational Support and Organization Based Self Esteem, Organization Based Self Esteem and Affective Commitment, Organization Based Self Esteem partially mediate the relationship between Perceived Organizational Support and Affective Commitment.

The realistic information revealed that a significant positive association between Perceived Organizational Support and Affective Commitment. Indeed, a Perceived Organizational Support has become very important for any organization. When single employee perceive that organization is valuing his/her role and viewing concern about their wellbeing, the individual will oblige to be committed and this commitment will be defined through work efforts [27].The present results linked with the results of (e.g. [3],[31], [33], [38], [50]). These researchers have been found a positive association between Perceived Organizational Support and Affective Commitment.

More results examined that a significant positive association between Perceived Organizational Support and Organization Based Self Esteem. Some researchers argue that organization based self esteem is influenced by organizational care and sense of perceived organizational fairness. Perceived fair treatment will give positive signals to the employees that they are esteemed and valuable for the organization [54]. Self esteem is a significant emotional contract because it is the vital part of daily experiences of individuals, it reflects the individual perception what they feel about themselves and how they react within a specific situation or environment [56]. The present results linked with the results of (e.g. [55], [52], [58]). These researchers have been found a positive association between Perceived Organizational Support and organization based self esteem.

It confirmed that Organization based self esteem and affective commitment has significant positive relationship after resulting. It is found that individuals who receive high pay feel valued by the organization and employees who feel high organization based self esteem are the good performer [12]. The present results linked with the results of (e.g. [57], [58], [59], [61]). These researchers have been found a positive association between organizations based self esteem and affective commitment.

The main results discovered that organizations based self esteem partially mediates the association between Perceived Organizational Support and affective commitment. In Pakistan, organizations based self esteem trend has been establishing gradually but in smooth way and efficiently but it need to be faster.

5 CONCLUSIONS

The results indicate that there is a positive relationship among perceived organizational support and affective commitment. Results from this study also reveal that perceived organizational support has a statistical significant positive association with organizational based self esteem and affective commitment. The lack of affective commitment among employees, particularly, is a threat to any organization at a period of intense competition. Managers perception that the organization worth their contribution and concern regarding their well-being have been found associated with subordinate perceptions of support from the manager, which, in turn, was associated with a perceived organizational support subordinates performance in role and extra-role performance. The survey revealed to what extent perceived organizations support contributes to affective commitment. It also helps nurses in recognizing their value and also encourages them to achieve the organizational goals.

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Comparison of the effects of the fungus *Trichoderma viride* and *Trichoderma harzianum* on the biochemical pigeons birds

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ABSTRACT: The objective of this research is to evaluate the effect of feed of poultry on wheat processed with *Trichoderma viride* and *Trichoderma harzianum*. The results show that significant [p≤0.05] increase serum AST in first treated group only compared with control group, but second groups shows non significant increase, significant [p≤0.05] increase in ALT serum in two studied group compared with control group also there is significance [p≤0.05] change found in bilirubin and total protein of serum in all group only when compared with control.The cholesterol, Triglyceride and LDL shows significant [p≤0.05] increase in all treated groups when compared with control. HDL and VLDL appears significant [p≤0.05] increased in the first treated group only the second group shows no significance [p≤0.05] compared with control.

KEYWORDS: *T. harzianum , T.viride*, pigeon, AST, ALT, Billirubin, Total protein, cholesterol, Triglyceride, HDL, LDL, VLDL.

1 INTRODUCTION

Trichoderma spp. are fungi that are present in nearly all agricultural soils and in other environments such as decaying wood. The antifungal abilities of these beneficial microbes have been known since the 1930s, and there have been extensive efforts to use them for plant disease control since then. These fungi grow tropically towards hyphae of other fungi, coil about them in a lectin-mediated reaction, and degrade cell walls of the target fungi by the secretion of different lytic enzymes. This process [mycoparasitism] limits growth and activity of plant pathogenic fungi[Ilan et al.,2006].

Trichoderma species are ubiquitous saprophytic fungi commonly found in soil worldwide. Classically, nine species aggregates have been described as members of this genus [Rifai, 1969], with four different species of *Trichoderma* identified as causes of human disease. Although only rarely pathogenic in humans, *Trichoderma* spp. have been reported to cause a pulmonary mycetoma [Escudero *et al*., 1976], peritonitis [Loeppky et al., 1983][Ragnaud et al., 1984,][Tanis et al.,1995], infection of a perihepatic hematoma [Jacobs et al.,1992], a brain abscess [Seguin et al.,1995], and disseminated disease [Gautheret et al.,1995].

Trichoderma viride is the most common of the *Trichoderma* species, which are saprophytic filamentous fungi found around the world. They are widely used in industry to obtain mold-derived enzymes and in agriculture they serve as biofungicides.

Only a few cases of infection due to *Trichoderma* species and *T viride* in particular have been reported[Chouaki *et al*., 2002]. *T viride* has been found in high concentrations in dust collected in the bedrooms of children with asthma living in waterdamaged homes [Vesper *et al*., 2006].

Alicia *et al*.,2009 said that 45 years old woman suffer from Hypersensitivity pneumonitis caused by *Trichoderma viride* had not been exposed to any obvious source of organic dust, except pigeons nesting on balconies near her house [Alicia *et al*.,2009]. *Trichoderma* spp. Are recognized as human pathogens with increasing frequency, particularly for immunocompromised patients, and should be considered in the differential diagnosis of fungal infections in the pediatric population[FLOR *et al*., 1997].

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Six species of the genus *Trichoderma* [*T. harzianum*, *T. koningii*, *T. longibrachiatum*, *T. pseudokoningii*, *T. citrinoviride*, and *T. viride*] that have been identified as etiologic agents of infection in immunocompromised hosts[Christina et al.,2006].

2 MATERIAL AND METHODS

Nine pigeons used in this experiment in which divided into three groups [three in each group] one of them control [Group 1] and the other two groups as treatment groups, All groups feed on wheat for 30 days.

The wheat of treated groups processed with *Trichoderma harzianum* [Group 2]and *Trichoderma viride* [Group 3] but the wheat of control group is clear.

T. harzianum and *T.viride* added to wheat in ratio 1 ml of spores suspension to 5 ml of water and added to 1 kilo of wheat, each pigeon eat 70 grams of food during the period of experiment.

The blood collected before and after experiment with anticoagulant tube, the blood centrifuged to obtain plasma to measure the AST, ALT, Total protein, Billirubin, Cholesterol, Triglyceride, and High Density Lipoprotein [HDL].

LDL and VLDL calculated by Iranian index.

BIOLABO kit [made in france] is used to measured the studied parameters.

3 RESULTS

Table 1. show effect of wheat processed with T. viride and T. harzianum on AST, ALT, Billirubin and Total protein [n=3]

	AST IU/L	ALT IU/L	Total protein g/dl	Billirubin mg/dl
Group[1]	209.1b	100.1b	8.8c	10.9c
Group[2]	245.3a	146.6a	21.3a	23.0a
Group [3]	230.8ab	126.4a	15.0b	16.7b
LSD	28.1	20.8	4.4	3.7

The different letters refer to significant differences between groups at level of [p≤0.05].
n=Number of specimens

Table [1] shows the effect of feeding of wheat processed with T. viride and T. harizanium on some biochemical parameters [AST, ALT, Billirubin and Total protein] in pigeon serum. The results shows significant [p≤0.05] increase of AST, Total protein and Billirubin in Group 2 but there is no significant [p≤0.05] change in the Group 3.

ALT shows significant [p≤0.05] increase in the Group 2 and 3 compared with control.

Table 2. show effect of wheat processed with T. viride and T. harzianum on Cholesterol, Triglyceride, HDL, LDL and VLDL [n=3]

	Cholesterol mg/dl	Triglyceride mg/dl	HDL mg/dl	LDL mg/dl	VLDL mg/dl
Group[1]	628.0c	95.6c	132.0b	476.8c	19.1b
Group[2]	992.9a	141.0a	162.3a	800.2a	30.3a
Group[3]	849.5b	120.3b	148.3b	677.1b	24.0b
LSD	130.8	15.8	18.2	107.1	5.3

The different letters refer to significant differences between groups at level of [p≤0.05].
n=Number of specimens

Table [2] show effect of feed of wheat processed with *T. viride* and *T. harzianum* on Cholesterol, Triglyceride, HDL, LDL and VLDL in which there is significant [p≤0.05] increase in all treated groups with concerned with cholesterol, Triglyceride, and LDL concentration when copared with control group.

HDL and VLDL concentrations appears significant [p≤0.05] increase in group 2 comparing with control but no significant [p≤0.05]increase showed in group 3according to control group

4 DISCUSSION

There are significant increase in the concentration of AST and ALT in treated groups when compared with the control group and this is due to ALT and AST are present in high concentrations in the cytoplasm of the liver, kidney, and myocardial and skeletal muscle and occur in other organs at lower activities. There is also a mitochondrial form of AST. The biochemical function of aminotransferases is to transfer an amino group from an α-amino acid to an α-ketoacid with pyridoxal phosphate [vitamin B6] as a cofactor. This reaction is an important step in intermediary metabolism. Non liver causes for increases in AST include damage to cardiac or skeletal muscle cells and hemolysis[Smita et al.,2009].

Plasma total protein represents a complex mixture of proteins of different structural and functional properties. The major plasma proteins include albumins, globulins, fibrinogen, nucleoproteins and conjugated proteins,such as lipoproteins and seromucoid proteins [Gentry, 2005]. In birds, the bulk of plasma proteins consist of albumin which constitute about 40-60% of the total protein [Campbell and Coles, 1986]. Alteration of plasma protein contents in disease can ultimately affect its nutritive, physicochemical or transportive functions [Gentry, 2005] and this explanation agree with increase of total protein of serum of treated pigeon by effect of fungal treated of wheat.

Lipid profile increased and this is may be due to the type of diet in which the wheat has high level of lipids so there is significant increase in all lipid parameters Steven and Richard, 1988 said that Animals were fasted overnight prior to obtaining blood for lipoprotein isolation. Pigeon P-VLDL and hypercholesterolemic LDL were obtained from pigeons that were fed a cholesterol-containing diet for at least 3 months. Pigeon normolipemic LDL and high density lipoprotein [HDL] were obtained from pigeons consuming a cholesterol-free pelleted grain diet.

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Study of Surface Photo voltage for monocrystalline silicon solar cell fabricated at BAEC solar cell lab.

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ABSTRACT: Surface photovoltage (SPV) method is a contactless technique for non-destructive characterization of Si wafers and monocrystalline Si solar cells, mainly for minority carrier diffusion length determination. The minority carrier diffusion length, *L* is a critical factor impacting the conversion efficiency and spectral response of the monocrysyalline Si solar cell and it is also essential for evaluation of the quality and transport properties of the P-type Si wafer. In 1961, A. M. Goodman showed that, under certain assumption, by making measurements of SPV as a function of wavelength, the minority carrier diffusion length can be determined. Therefore a simply steady state SPV method has been developed to determine the minority carrier diffusion length as well as lifetime of monocrystalline Si solar cells. In Bangladesh for the first time "Bangladesh Atomic Energy Commission (BAEC)" has set up a laboratory to fabricate and diagnosis of monocrystalline Si solar cell. This paper focused on the study of surface photvoltage (SPV) and determination of minority carrier diffusion length, *L* and lifetime, τ of monocrystalline Si solar cell. By calculating the experimental data obtained from monocrystalline Si solar cells measurements, minority carrier diffusion length and lifetime were derived and it was 81.5µm and 2.5µsec respectively.

KEYWORDS: P-type Silicon, Minority Carrier, Diffusion Length, Carrier Lifetime, Doping concentration.

1 INTRODUCTION

A photovoltage (PV) arises whenever light-induced excess charge carriers (electron-hole pairs) are separated within the space charge region (SCR) which exists inside the p-n junction (in the case of a solar cell) or in spontaneously created SCR under a free semiconductor surface [1]. The surface photovoltage (SPV) technique utilizes the change of the electrochemical potential in the space-charge region of a semiconductor during excess carrier generation due to illumination of the sample with light of suitable wavelength and intensity [2]. The SPV method is significantly cheaper and more reliable in comparison with other contactless methods such as EBIC (Electron Beam Induced Current) and µ-PCD method [1]. The SPV produced when some of the minority carriers that drift around in the bulk reach the surface. The statistical distance that carriers travel in the bulk before they recombine is the diffusion length [3]. Thus some of the minority carriers recombine before they reach the surface. In steady – state situation the generation and recombination rates are perfectly balanced [4]. According to Goodman assumption, by measuring of SPV as a function of wavelength, the minority carrier diffusion length can be determined [10]. Therefore, the primary of the SPV technique is the determination of the diffusion length of minority carriers in the region of essential light absorption inside solar cells and wafers under dc conditions [5].

2 THEORY

Electrical properties of a free semiconductor surface are mainly determined by surface-localized electronic states within the semiconductor band gap or double layer of a charge, known as a surface dipole [1]. The charge transfer between bulk and surface induced by the appearance of surface-localized electronic states results in a non-neutral region named surface space charge region. If light falls on the pn-junction, the photons create electronhole pairs separated by the space charge.

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Thus, in p-type silicon the majority carriers are holes, the charge in the depletion region is negative, and the electric field in the depletion region forces electrons to the surface, creating a surface photovoltage[10]. Photons are absorbed not only in the pn-junction but also in the p-type area. The electrons produced are minority carriers in those areas and their concentration is greatly reduced by recombination. The n-layer must therefore be sufficiently thin for the electrons of diffusion length *L* to pass through the n-layer.

i.e, L >> t,

Where t = thickness of n-layer [8].

When a typical 300 µm thick silicon wafer is illuminated by strong sunlight of irradiance 1000 mW/cm2, electrons and holes are generated at a rate of 9×10^{18} cm^{-3} s^{-1} [6]. The electric potential and the charge distribution are related to each other through the Poisson equation and the experimental value of the photovoltage coincides with the change of the surface potential [7]. Minority carriers that drift around in the bulk either eventually recombine with majority carriers, or they reach the surface, where they produce a surface photovoltage. The shorter the diffusion length, the less likely minority carriers will make it to the surface to cause surface photovoltage. Longer wavelength light penetrates deeper into silicon than short wavelength light. Therefore, if we compare the SPV signal produced by pulses of two different wavelengths of light (Fig. 1),[10] each containing the same number of photons, then the longer wavelength will penetrate more deeply into the silicon, the minority carriers created will be more likely to recombine before they reach the surface and the longer wavelength light will produce a smaller SPV signal than the short wavelength light [9].

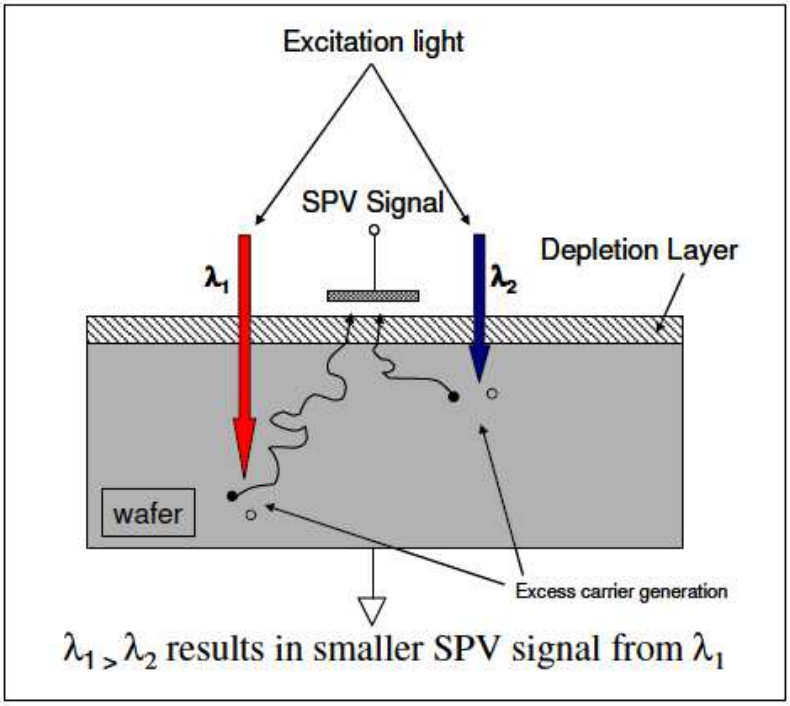

Fig. 1. SPV Signal Changes with Penetration of incident light and wavelength λ.

One can determine the diffusion length by comparing these two SPV signal produce by the two different wavelengths.

If we plot the light flux, Φ, divided by the SPV signal V_{SPV} (Fig.2) for each wavelength, as a function of the penetration depth into silicon of that wavelength, the result is a straight line whose Y intercept tells the diffusion length L.

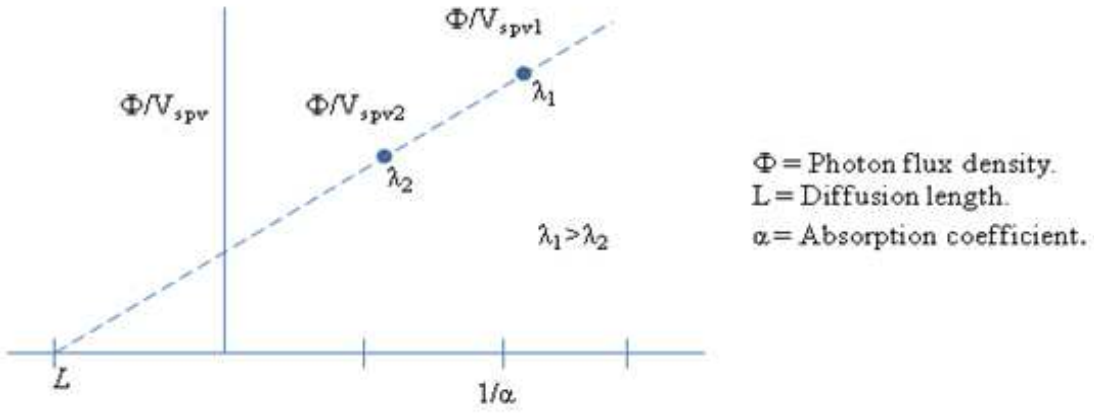

Fig. 2. Graphical Calculation of Diffusion Length via SPV Signals

3 METHODOLOGY

A simple, computer-controlled, normal incidence measurement system was designed for SPV measurements of minority carrier diffusion length and lifetime of Si solar cell. Measurement system is based on a mini monochromator driven with a stepper motor to vary wavelengths in 400-1200-nm spectral range. Light-induced surface photovoltage (SPV) is measured as a function of the wavelength. SPV is measured using a Stanford Research 510 lock-in amplifier. This system can be modified to measure SPV as a function of wavelength as well as a function of flux density at fixed wavelength. A LabVIEW interface is used for system control and data acquisition.

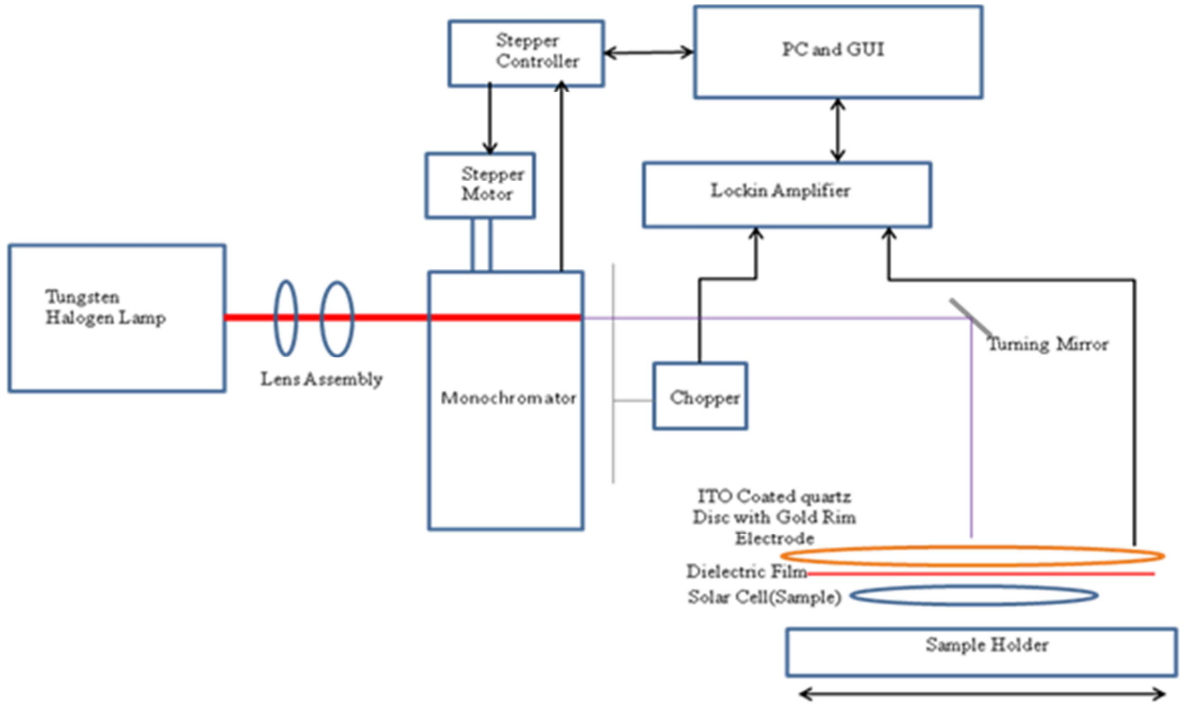

Fig. 3. The Schematic Diagram of Minority Carrier Diffusion Length measurement system.

Figure 3 and 4 describes detailed system schematics of the minority carrier diffusion length and lifetime measurement system. Light from a tungsten-halogen lamp is focused onto the entrance slit of the monochromator. Light from the exit slit of the monochromator is guided to the solar cell at normal incidence. Stepper motor is used to vary monochromator output

wavelength. A light chopper is placed at the exit slit of the monochromator to provide reference signal to the lock-in amplifier to ensure all the stray light is rejected by the system and enhance system sensitivity from nano-volt to mV range.

Fig.: 4. Picture of SPV Measurement system.

Capacitive SPV voltage is measured by placing an ITO/Au coated quartz plate on top of the solar cell to be measured. A thin-sheet of Teflon film is placed between the top glass electrode and the solar cell to create electrical isolation. The bottom electrode is connected to the Si solar cell and is Au-coated to provide reduced contact resistance. The lock-in amplifier output and stepper motor are controlled by a PC using a LabVIEW interface. The system wavelength range is from ~ 400-1200-nm. All data is written to a file in text form for subsequent plotting and processing.

4 RESULTS AND DISCUSSIONS

For SPV measurement system we were used Laboratory fabricated silicon solar cell (which was fabricated in our BAEC Lab.) Fig.5 shows a typical light current-voltage (I-V) measurement of fabricated mono-crystalline silicon solar cell under 100 mW/cm2 xenon- arc light illuminations. The LIV curve also represents the quality of fabrication process and the efficiency of a solar cell. The open circuit voltage (V_{oc}) and short circuit current (I_{sc}) obtained from this measurement were 0.56V and 18A respectively. Small values of short circuit current (I_{sc}) indicate the efficiency of fabricated cell is low but the appearance of LIV curve looks like a standard curve.

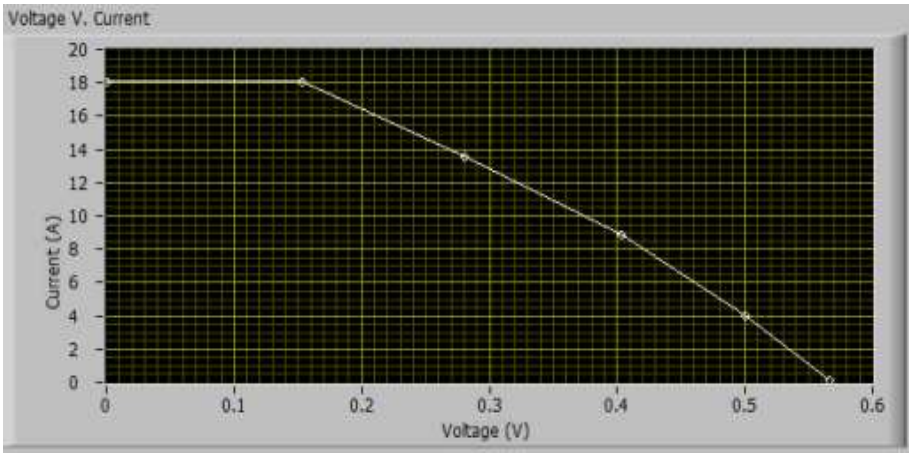

Fig. 5. LIV Measurement of Laboratory Fabricated Silicon Solar Cell

Surface photo-voltage measurements have been carried out to determine minority carrier diffusion length from front surfaces of silicon solar cell; detailed description of the method is provided in the previous section. Fig.6 plots SPV measurements as a function of wavelength from the front surfaces of a mono-crystalline silicon solar cell. The peaks in the

SPV signal at ~ 700 nm and 975 nm are system related. This system-related artifact can be removed by taking a ratio of the SPV signal from front and rear surfaces.

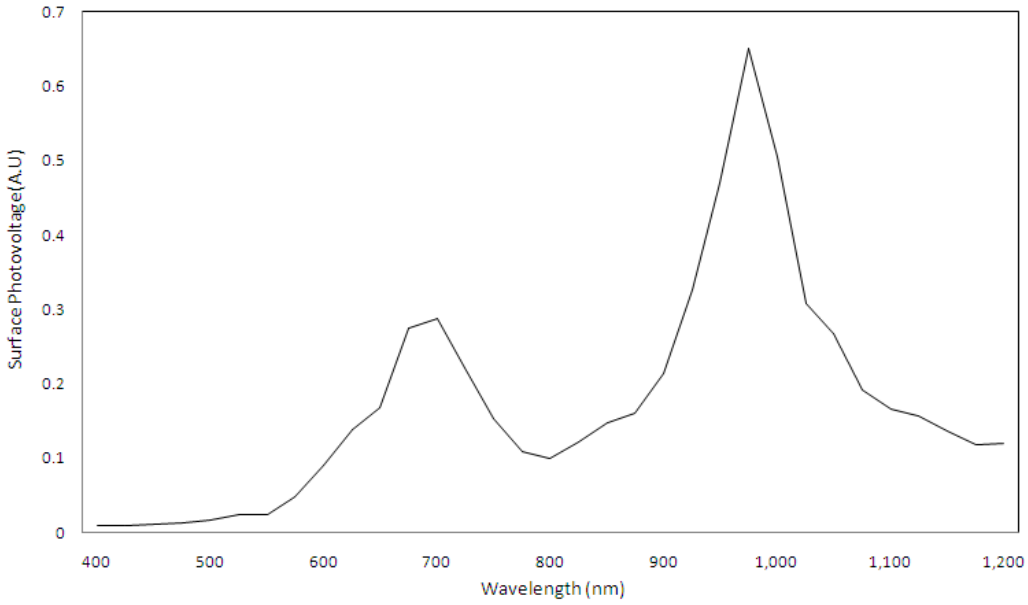

Fig. 6. Surface Photovoltage Measurement of Different Wavelength for Lab. Fabricated silicon solar cell.

From the SPV data, minority carrier diffusion length from front surfaces can be estimated. The measurement can be made using three wavelengths of light. Using additional wavelengths, and determining the best-fit straight line, can result in a measurement that is more accurate [11]. The SPV data was plotted as a function of penetration depth 1/α for front surfaces (Fig. 7). The minority carrier diffusion length and lifetime was derived and it was 81.5µm and 2µsec respectively.

Since the difference of penetration depth value 1/α between the wavelength 700 nm to 750 nm is too small rather than the value between 975 nm to 1025 nm so we use three different wavelength (975, 1000, 1025 nm) starting from 975nm to determine minority career diffusion length and lifetime.

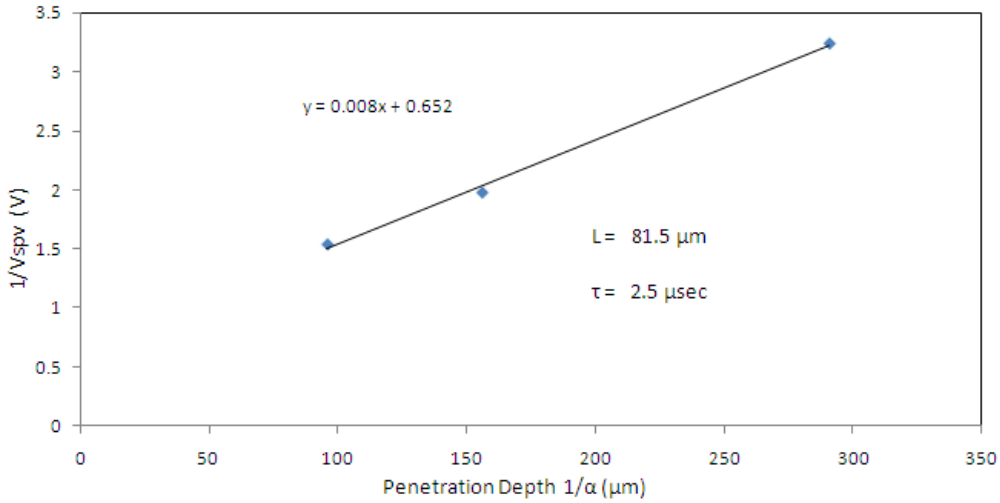

Fig. 7. Measured Minority Carrier Diffusion Length and Lifetime of Silicon Solar Cell.

5 CONCLUSIONS

In Bangladesh for the first time a laboratory has been set up by "Bangladesh Atomic Energy Commission (BAEC)" to fabricate and diagnosis of Si solar cell. Surface photo voltage method has been determined to be low-cost, non-destructive

and process monitor for solar cell research environment in comparison with other contactless methods such as EBIC (Electron Beam Induced Current) method. The diffusion length of Si solar cell has been determined through SPV method. In silicon, the lifetime can be as high as 1 msec and for a single crystalline silicon solar cell; the diffusion length is typically 100-300 μm [11]. It was found that the small value of diffusion length at the front surface shows that more recombination occurred at that surface. It may be happened due to the variation of doping concentration of the front surface. To optimize the flow rate of $POCl_3$ and additionally the doping concentration have to be further optimized and carefully characterized we can get more improvement. Our future research will be optimizing all of the challenges and increase diffusion length to get more efficient solar cell.

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Possibility of benefiting from the impact of chemical treatments for fabrics in fashion design

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ABSTRACT: Appeared in the present era processing fabrics with some chemical treatments for improving properties of functional or to enable some to gain new properties or superficial different, which is usually after the completion of the stages of the weaving or knitting, where intervention fabrics in the process of treatment in many ways followed in many cases, either the process of dyeing or printing. Fabrics to gain the same kind of aesthetic decoration without recourse to the printed other techniques that use other decorative to give in the end aesthetics acceptable and appropriate clothing for the consumer. May, therefore, research focused on the possibility to take advantage of these processors in the work of the special effects on fabrics and what happens it changes the properties of these fabrics in terms of aesthetics, the purpose of career and then employ them for women after such treatments.

Is determined by the research problem in the study of the changes the properties of fabrics after chemical treatment, in order to benefit from the resulting impact on those fabrics and employment in the clothing to meet the requirements of the aesthetic and functional purpose of comparing the results of tests for the properties of fabrics before and after treatment to determine which properties can benefit from them and using them as clothing.In this reseach, Were identified fabrics under consideration by choosing the most widely in Global fashion trends for woman clothing and used among consumers in the market and appropriate clothing for the women's outer wear,we used eight types of fabrics (polyamide and cotton – polyester - cotton and polyester- viscose and polyeaster - viscose , polyeaster and polyamide- silk and polyester – wool and poly acrylic- viscoce and polyester), has been testing properties to be studied, a "% Loss in weight -% Loss in thickness- crease recovery- Stiffness " where such tests are conducted on fabric "before / after" treatment.

It has been possible to find a suitable materials and determine the suitability for use after processing, and design proposals appropriate to the properties of these materials in terms of aesthetic and functional purpose to produce as clothing women's outer wear.

KEYWORDS: burn out, crimping, crackle effect, Fashion trends, collections.

1 INTRODUCTION

Textile direction like naturally inspired,cloque jacquard,sheer sucker and crinkle effects,porous elements,fraying and fading,climatic cast,devastated and flawless we can do this effects by many methods of printing.[1,2,3] show figures(1,2,3,4)

Cotton is the purest from of natural cellulose, like all the vegetable tissues it, containts a small amount of minered matter that is left as an ash after cottonis burned. The amount of ash is about 1-1.5%. The mineral matter in cotton consists of chlorides, carbonates of potassium, calcium and magnesium. A large variation is observed in the amount coloring matter found in cotton. [4] , Some of the important vegetable fibers like flax,cellulose is the material that provides the thread- like molecule and fibrillar structure.differences in the properties of natural fibers of similar chemical constition.[5]

The effects of alkali and acid treatment on the mechanical ptoperties of coir fibers are reported tenacity and extension-at-break decrease with chemical treatment and ultraviolet radiation,where as an increase in initial modulus and crystallinity is observed with alkali treatment wool fibers can be stretched up to 30% without rupturing and still bounce back.wool and

silk can destroy the cross-links so that the molecules are free to stay in the new positions that they reach when the fibers are stretched.[6]

Fabric made up of amixture of fiber is also often carried out. There are some very elaborate an alytical instruments that can be used to identify the chemical composition of materials and fibers in most circumstance. [7]

In the solvents natural fiber could be distinguished from the synthentic fiber fairly well.thermoplastic fibers may dissolve in a common solvent like acetone.also some highly semi-crystalline like nylon and polyester will dissolve only in solvents like formic acid or boiling dimethyloformamide.natural fibers are thermosetting polymers,they are found to dissolve chemically in strong acid or base solutions.[4]

Natural disasters, crime, terrorist threat, and economical decline being the reoceurring focus of media, it isquestionable as to whether we are becoming too accustomed to such life changing, threatening events. [8, 9]

PROBLEM STATEMENTS

The research problem in the study of the changes the properties of fabrics after chemical treatment, in order to benefit from the resulting impact on those fabrics and employment in the clothing to meet the requirements of the aesthetic and functional purpose of comparing the results of tests for the properties of fabrics before and after treatment to determine which properties can benefit from them and using them as clothing**.**

THE AIMS OF THE RESEARCH

To find a suitable materials and determine the suitability for use after processing, and design proposals appropriate to the properties of these materials in terms of aesthetic and functional purpose to produce clothing for women.

THE RESEARCH APPROACH

The research follows the experimental and analysis approach.

THE LIMITS OF SEARCH

A source of inspiration for the designs of the proposed research is fashion trend of spring/Summer 2012/2013, that will earry you through to Autumn/Winter.

Fabrics Looks like this polyamide and cotton –polyester - cotton and polyester- viscose and polyeaster - viscose, polyeaster and polyamide- silk and polyester – wool and poly acrylic- viscoce and polyester.

THE RESEARCH HYPOTHESES

The research has been possible to find a suitable materials and determine the suitability for use after processing, and design proposals appropriate to the properties of these materials in terms of aesthetic and functional purpose to produce as clothing women's outer wear.

1.1 THE EFFECTS

1.1.1 BURN OUT

Printing a chemical paste, which burns away one of the fibers in a mixed fiber cloth when subjected to heat.this created patterns of open or translucent areas.contrasting with unaffected solid fibers,it is known as burn-out styles [9,10] There are principally two types of burn-out pastes namely an acid and an alkali paste.The former destroy cellulosic fibers,nylon,cellulose acetate.While the second destroy the protenic fibers[11].

1.1.2 THE CRIMPING

The criming printing a chemical paste, which causing shrink and pucker,imitating the qualities and effect of awoven and knite seersucker.[9] there are several important effects of crimp on Fabric Properties: abrasion Resistance: If crimp percentage

is high then the resistance of the fabric will be higher, shrinkage: If crimp percentage is high then the shrinkage of the fabric will be lower. Handle Properties: when the crimp percentage is higher, the softness of the fabric will be fiber. Simultaneously stiffness of the fabric will be lower, Fabric design: required extensibility is achieved by controlling crimp. [7, 9]

1.2 FASHION TRENDS

Fashion trends are the styling ideas that major collections have in common. They indicate the direction in which fashion is moving. Fashion forecasters look for the styles they think are prophetic, ideas that capture the mood of the times and signal a new fashion trend. Several designers may use a similar fashion idea because they have been inspired by common sources. The trend may appear in a fabrication, a silhouette, or another design element that appears in several collections. Very often, a new trend appears in small doses until it spreads to other collections. As the press notices similarities between collections and highlights them, the media exposure also helps establish the trends.

After Japan encountered such a powerful earthquake and Tsunami in March of 2011,one news channel broadeast the latest video footage,complete with fade in technique and doomsday type accompanying music .[10]

Only a tiny minority of us workwide actually encounter first hand such some form of disaster,could it be that it is becoming increasingly difficult for others to truly empathize,and understand the impact of these occurrences .are devastating events becoming normalized by their constant involve with the media.[11,12]

Disaster dramatics explores the concept of hype that is today created around disaster ,and the almost glamorous effect portrayed by the media disaster dramatics is accepting to the natural world which we may have learnt to hate and celebrates positive realism in the world prior to devastation ,glances of destruction,wear and corrosion will be communicated by this trend through use of fabric, colouring technique, and construction,with headlines sure to swirl in 2012/2013 over predictions of an impending Apoca lypse this is a such a highly prominent trend of Spring/Summer 2012/2013, that will earry you through to Autumn/Winter.[13,14]

Cracks in garments and crackling effects will be a key theme, with already existing crackle effect nail polish being the perfect subtlety, or finishing touch to an outfit.clothes that appear to have had a longer history than you are the ideal base with an eclectic mix of styles of period leather and denim.providing a narrative behind this trend , motifs reformed from nature, from the vines and plants that take over a damaged infrastructure to the elements of the earth. The essence of growth and development which is encouraged by disaster will be demonstrated through delicate reconstructions and manipulation of natural products.the palette for this trend is natural, sun drenched yet subdued, with play upon gradient. [15, 16, 17]

2 EXPERIMENTAL

Designed a group of sketches the final program to employ chemically processing materials adopted to benefit a certain amount of shape and decorative materials for woman clothing fashion to carry the aesthetic and functional values, and the simplicity of decorative techniques based on effects and chemical treatments for materials processing to research and special women's outer wear for a modern fashion design inspired by those processors and chemical effects and as adopted designs for women's outer wear searching on those materials chemically processing with mix them lines structural and decorative fashion trends of the modern Global trends of Fashion. It was accessed as follows:-

2.1 Choose the themes of fashion trends for women's outer wear, the most prominent and pervasive themes "I-Dent and Disaster Dramatics Mood Boards", shown figures (1, 2).

2.2 Look and Choose the silhouettes, materials, colors, decorative, and details for use in inspiration for the preparation of designs for women's outer wear's and special searching ,shown figures (3,4) to preparation of the proposed designs.

2.3 Select colors from Pantone pallet through the most prevalent raw materials in fashion trends of inspiration for clothe for women's outer wears for women's.

Fig. 1: Shows I-dent Mood board, Fashion elements as samples of textiles, colors, Details, Decorations, and Chemical Processors

Fig. 2: Shows disaster Dramatics Mood board Fashion elements as samples of textiles

Fig. 3: Shows Fashion elements and as samples of textiles, Decorations, and Details

Fig. 4: Shows samples of textiles, Decorations ,and Details

2.4 Specification of materials for this research and testing before the tribal chemically processed and then make chemical treatments and then testing a posteriori, and finally evaluate them from the point of view the arbitrator's gentlemen through the following

Steps:

2.1.1 FABRIC SPECIFICATIONS

Eight types of fabrics (polyamide and cotton –polyester - cotton and polyester- viscose and polyeaster - viscose , polyeaster and polyamide- silk and polyester – wool and poly acrylic- viscoce and polyester). The following table (1). Illustrates the tested fabrics specifications.

Table (1): Specification of Tested Fabrics

Fabric Number	Fiber Content	Weave Construction	Density	
			warp/inch	weft/inch
1	100% polyester	Plain	24	30
2	50% polyester, 50%cotton	Plain/twill	32	36
3	65 % cotton, 35% polyester	Plain/twill	33	36
4	40%silk , 60% polyester	Plain	22	29
5	100% polyester	Plain	24	30
6	85% wool ,15% acrylic	Knit Single jersey	wales 21	courses 24
7	60% viscose , 40% polyester	Plain	13	15
8	60% viscose , 40% polyester	Plain	13	15
9	50%viscose, 30%polyester, 20% nylon	Plain	32	37
10	50%viscose- 30%polyester- 20% nylon	Plain	32	37

2.1.2 THICKENING AGENT

Commercial Mypro GumNP-16(Meyhall), which is a non-ionic thickkenhng agent based on modified plant seeds gum was used at a concentration of 8%.

2.1.3 CHEMICALS

Show in table(2)

Table (2): Specification of chemicals used with Fabrics.

Suitable fiber combinations	chemicals	Concentration in the printing paste g/ kg.
Cotton/polyester	metacryzol	20
Cotton/nylon	Aluminium sulphate	25
Viscose/polyester	Acetic acid or sodium hydrogen sulphate	25
Viscose/polyester/nylon	metacryzol	30
Polyester/silk	Sulfuric acid	20
Wool/acrylic	Nitric acid	30
polyester	Acetic acid-sodium hydrogen	30

2.1.4 TECHNICAL PROCEDURES

2.1.4.1 PRETREATMENT

The fabrics were soaked for 30 minutes at 70^0C in a solution containing 15% of a cationic agent namely (Tanafix SR) adjusted at ph 7.at the end, the treated fabrics were subjected to washing using running water and finally air dried.

2.1.4.2 PRINTING

The fabrics were subjected to printing using printing paste contain effect agent, Mypro gum (8%) 500 g, water,urea and glycerine.

The printing paste was applied to the fabrics as per the flat screen printing technique.after printing the fabrics were subjected to complete drying before steaming .in all cases steaming was carried out at 120^0 C for 15 minutes.

2.1.4.3 WASHING OFF

The fixed printed samples were washed off as follows:

- Rinsing with running cold water.
- Soaping with warm at 60c using (3 gm/l Hostapal CV-ET) for 15 minutes.
- Rinsing with warm and running cold water.

2.1.5 MEASUREMENTS [18]

2.1.5.1 LOSS IN WEIGHT:

A.S.T.M.Standards .D1910-64(1970).

2.1.5.2 LOSS IN THICKNESS

ISO 5084

2.1.5.3 CREASE RECOVERY

A.S.T.M.D3937 (07.02)

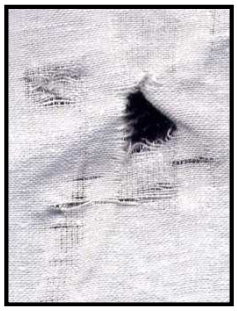
2.1.5.4 STIFFNESS

A.S.T.M.1388-96(2002)

2.2 EVALUATION THE MATERIALS TREATMENT

Evaluation materials processing and proposed research in from the aesthetic and functional purpose of which and shown on figure (5) order of display on the gentlemen the arbitrators of the professors in the field of each of the textile as **appendix this research no (1)** , textile printing and dyeing, finishing and the Department of Apparel and And specialists the Apparel industry to determine the best of those materials processing, and their suitability for women's clothing outer wear through the questionnaire and shown in the table (3), (4).

1-burn out the color in specific places



2- burn out the cotton in specific places

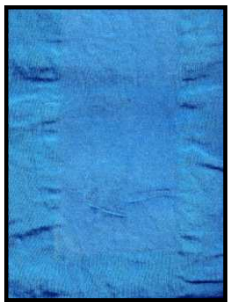
3- Crimp all the fabric.

4- Crimp all the fabric and burn out the nylon in specific places

5-burn out the color in specific places

6-burn out acrylic in specific places

7- burn out polyester in specific places



8-crimp in specific places

9- burn out polyester in specific places

10- Crimp all the fabric.

Fig. 5: the samples after treatment of this research designs used

Table (3): Evaluation form for the processing materials aesthetic

Items axes		Materials processing																								
		First					Second					Third					Fourth					fifth				
		Degree					Degree					Degree					Degree					Degree				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Achieve processing chemical form aesthetically material proposed																									
2	The effect of chemical processing on the material																									
3	Appropriateness of chemotherapy used with material																									
4	Appropriateness of the processing effect to fashion trends																									
5	Appropriateness of the material processing for women's clothing																									
6	Free aesthetic appeal of the severity of the defects after processing																									
7	Change the form of material chemical processing used																									

Table (4): Evaluation form for the processing materials purpose of functional

Items axes		Materials processing																								
		First					Second					Third					Fourth					fifth				
		Degree					Degree					Degree					Degree					Degree				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Affected by the properties of the material used for processing executed																									
2	The quality of the processing carried out on the material used																									
3	Affect the texture of material processing used																									
4	Affect the durability of the processing on the material used																									
5	The quality of the processing carried out on the material																									
6	Change the form of material chemical processing used																									
7	Affect processing on the color of the material used																									

2.2.1 THE PREPARATION OF THE PROPOSED DESIGNS

Preparation designs for women's outer wear inspired by global fashion trends and special Themes of natural disasters such as earthquakes, which lead to cracks and the effects of linear Earth-like effects of the contract and to link the output of the dyeing of fabrics in addition to the technology of chemicals that occur effects aesthetic, making the top fashion designers have focused on trends and which has been deployed in the world and use it aesthetic and decorative, and their clothes are designed so different styles of clothing on the basis of materials chemically processing "under the study" as shown on figures (6-15) The following:-

- **structural analysis of the design:-**

set for Women is composed of two pieces, namely:-

The first piece: - "Blouse" cutting curved the chest, and Sleeve a kimono cut at the Line elbow.
The second piece: - "Trousers" Takes the body shape long, and cut it down the horizontal line.

- Design lines: - Depends on the straight and curved lines to pronounce the aesthetics.
- A source of inspiration: - I-Dent Mood board.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after change the color of material, circles the Material with Emergence of knitted stitches are clear after the melt acrylic by.
- Materials used: - Code 1 the first piece to material, and code 6 the second piece to material.
- Colors used of Pantone pallet: - Yellow 140756Tpx, Red 18-1763Tpx, blue18-3949Tpx.
- Chemical processing of materials: - burn out the color in specific places in the first piece of Material, burn out acrylic in specific places the second piece of Material.

Fig. (6) the first design

- structural analysis of the design:-

Set for Women is composed of two pieces, namely:-

The first piece: - "Corset" Strapless and aperture Neck a deep.
The second piece: - "Skirt" Descends Wide down and length up to knee line Slantwise.

- Design lines: - depended on the straight lines, curved, and slashes to pronounce the aesthetics.
- A source of inspiration: - Disaster Dramatics Mood board.
- Decorative techniques to design: - depends on the final shape to Material of chemically processed after "change the color of the raw material, Chopping / rupture in material".
- Materials used: - code 1 the first piece to material, and code 9 the second piece to material.
- **Colors used of Pantone palle**: - Yellow 140756Tpx, Red 18-1651Tpx, blue18-3949Tpx.
- Chemical processing of materials: - burn out the color in specific places in the first piece of Material, burn out polyester in specific places second piece of Material.

Fig. (7) the second design

- structural analysis of the design:-

Set for Women is consists is the dress.

The upper part of the dress: - Neck deep aperture -shaped "V" and without sleeves, and has a slanting cut starting from the bottom of the chest and ends near the end of the dress.
The lower part of the dress: - Descends wide down, and end top-line knee, the compound he layers of the Material.

- Design lines: - depended on the straight lines and slashes lines to pronounce the aesthetics of the Material processor.
- A source of inspiration: - I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - depends on the final shape to Material of chemically processed after to craship in the Material and riven by cutting.
- Materials used:- code 9 the upper part of the dress to material, and code7 the lower part of the dress to material
- Colors used of Pantone palle: - blue18-3949Tpx, Red 18-1651Tpx.
- Chemical processing of materials: burn out polyester in specific places the upper part of Material; - burn out polyester in specific places the lower part of Material.

Fig. (8) the third design

- Structural analysis of the design:-

Set for Women is consists is the dress.

The upper part of the dress: - "Corset" slot neck is circular in shape and deep, without sleeves, and Cut out a contiguous starting from the neck line and ends waist line.
The lower part of the dress: - Starts from the waist line Cut out slashes to install the materials parts in consecutive layers over each other different lengths and materials to be the lower part of the dress.

Design lines: - Depended on Straight lines, Hunched and slanted to - pronounce the effect of chemical processor on the materials used to design.
- A source of inspiration, I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after Chopping Material, and the presence of the registry along the Material.
- Materials used: - Code7 the upper part of the dress to material, and code 9 the lower part of the dress to material,
- Colors used of Pantone palle: - Red 18-1651Tpx, blue18-3949Tpx
- Chemical processing of materials: - burn out polyester in specific places the upper part of Material, burn out polyester in specific places lower part of Material.

Fig. (9) the fourth design

- Structural analysis of the design:-

Set for Women is consists is the dress

The upper part of the dress: -"Corset" Slot the neck of a circular shape and a very deep cut and inclination out riding and external layer and ends in length down the waist line, without sleeves and one-shoulder and Strapless.
The lower part of the dress: - "Skirt" showed a bottom line Cut out waist occasional install with four consecutive layers and different sizes on top of each other to be the lower part of the dress ends and top of the line knee length, and install wide belt over the waist down those cuts.

Straight lines and Hunched to - **Design line**s: - Depended on pronounce the effect of chemical processor on the design.
- **A source of inspiration: -** I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after "Cutting material and the presence of light a cloth".
- Materials used: - Code 1 the upper parts of the dress to material, and code2 the lower part of the dress to material. "
- Colors used of Pantone palle: - White 11- 0608Tpx/ Bell Flower 18-3628Tpx"."
- Chemical processing of materials: - burn out the color in specific places the upper part of Material, burn out the cotton in specific places lower part of Material.

Fig. (10) the fifth design

- Structural analysis of the design:-

Set Women are consists of two pieces,namely:-

The first piece: - "blouse" without sleeves, slot the neck of a deep circular shape, and ends down the waist line, and consists of two parts the first ends cut slashes down the line of the chest, and the second ends with the bottom line of the waist.
The second piece: - "skirt" descends wide down, the top of the line ending knee, It consists of several layers and overlapping slashes on top of each other.

Straight lines, slashes and hunched to - **Design lines**: - depended on pronounce the effect of chemical processor on the design.
- A source of inspiration: - I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - depends on the final shape to Material of chemically processed after "crease, wrinkled material, and the existence of the registry along the material
- Materials used: - code 6 the first piece to material, and code 8 the second piece to material.
- **Colors used of Pantone palle: -** black 19-0608/ white 11-0605/ blue 19-9353.
- Chemical processing of materials:- burn out acrylic in specific places the first piece of Material, burn out polyester in specific places the second piece of Material.

Fig. (11) the sixth design

- Structural analysis of the design:-

Set for Women consists of two pieces, namely:-

The first piece, "Jumper" slot the neck of a square shape, long and up to the end of the hip line, without sleeves, and cut slashes at the center line of the front, and close buttons.
The second piece, "Trousers" long descends wide down, Ends with at the line of foot.

. Straight lines, and slashes to - **Design lines**: - depended on pronounce the aesthetics of fabrics processing design.
- A source of inspiration: - I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after Crease, wrinkled material, and the existence of the registry along the material
- Materials used: - Code7 the first piece to material and code 9 the second piece to material.
- **Colors used of Pantone palle**: - Sweet Potato 18-1655Tpx/ blue18-3949Tpx.
- **Chemical Chemical processing of materials**: - burn out polyester in specific places the first piece of Material; crimp in specific places the second piece of Material.

Fig. (12) the seventh design

- Structural analysis of the design:-

Set for Women is consists is the dress.

The upper part of the dress: - slot the chest deep of a circular shape, and cradles, contains three layers slashes overlapping with each other.
The lower part of the dress: - cut down the waist line and installing them skirt external open from front center line and ends long before the knee line.

- Design lines: - depended on Straight lines, curved and slashes to pronounce the design aesthetics.
- A source of inspiration: - I-Dent, and Disaster Dramatics Mood boards.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after "wrinkled material, and the presence of distortions direction warp of the material".
- Materials used: - Code8 the upper part of the dress to material, and code10 the lower part of the dress to material.
- **Colors used of Pantone palle**:- Sweet Potato 18-1655Tpx, Red 18-1763Tpx
- Chemical processing of materials: - crimp in specific places the upper part of Material; Crimp all the fabric the lower part of Material.

Fig. (13) the eighth design

- **Structural analysis of the design:-**

Set for Women consists of three parts, namely:-

The first piece: - "Jacket" with Collar is open from center line front, and ends a length when the hip line, and the sleeves up to the line of carpal.
The second piece: - "Top" slot the neck of a circular shape, without sleeves, and ends a length when the line the abdomen.
The third piece: - "Trousers" descends wide down, and decorated with ribbons ends with at the line of Line after the knee, and provider of a wide belt at the waist line.

- Design lines: - depended on Straight lines, and curved to pronounce the design aesthetics.
- **A source of inspiration**: - Disaster Dramatics Mood boards.
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after "tentic or chopping material and the presence of a length of material the Registry".
- Materials used: - Code2 the first piece to material and code 9 the second and third piece to material.
."White 11-0605Tpx, blue18-3949Tpx" **- Colors used of Pantone palle**:-
- Chemical processing of materials: - burn out the cotton in specific places the first piece of material; burn out polyester in specific places the second and third piece of Material.

Fig. (14) the ninth design

- Structural analysis of the design:-

Set for Women consists of two parts, namely:-

The first piece: - "Cardigan" slots the chest deep of a circular shape, without sleeves, and closes buttons at the center line of front, and a compound with two pockets.
The second piece: - "dress" slot the chest of a circular shape, without sleeves, descending to the bottom wide, ends the hip line of the knee, the provider belt at the buttocks,
Cut and has a diagonal length of the dress And ends its end opening.

- Design lines, depended on Straight lines, and curved to pronounce the design aesthetics.
- A source of inspiration: - Disaster Dramatics Mood boards.-
- Decorative techniques to design: - Depends on the final shape to Material of chemically processed after "Chopping and wrinkled or Crease of material"l.
- Materials used: - Code9 the first piece to material and code4 the second piece to material.
- Colors of Design pantone:-"black 19-0608/ white 11-0605/ blue 19-9353","blue18-3949Tpx.
- **Chemical processing of materials**: - burn out polyester in specific places the first piece of material, Crimp all the fabric and burn out the nylon in specific places the second piece of Material.

Fig. (15) the tenth design

2.2.2 EVALUATION THE DESIGNS

Evaluation of the proposed searching designs respectively to display according to the gentlemen of the arbitrators professors that specialize in the field of each of the Apparel designs, textile, textile printing, the dyeing and finishing industry in addition to the Staff in the field of clothing industry through a questionnaire specific to this search, "search tool", and the number (10) a variety of designs the styles own for clothes women's outer wear. Through the questionnaire proposed searching "search tool" The shown table (5). Evaluated by number 25 arbitrator professors industrialists. Some expressions was modified in favor of the questionnaire from their point of view and have agreed on the evaluation suitability of the designs by a percentage 80% .This consists of a number five- axes to measure the suitability of each axes for the designs of the proposed research.Where each axes consists of the number seven and phrases to be the final score of each phrase is five degrees So grades is calculated to know the total aggregate each design individually as follows.The number of arbitrators × degree each item axis (25 × 5) = 125 and bringing each item questionnaire = 125 .Degree one item questionnaire × number of items all axesquestionnaire (125 × 35) = 4375, a total degree or total aggregate each design alone. The gentlemen Ptqmimha arbitrators in accordance as **appendixes of this research no (1, 2)** with the following elements: -

1- The suitability of the proposed questionnaire for evaluation by a percentage 77.39%.
2- The logical sequence of items per axes inside questionnaire by a percentage 77.39%.
3- Suitability questionnaire axes of the proposed idea by a percentage 80.87%.
4- The clarity of the expressions used questionnaire items by a percentage 79.13%.
5- The clarity of the objectives of the axes of the questionnaire by a percentage 80.00%
6- The clarity of instructions the answer to questionnaire by a percentage 86.09%.
7- The extent of the coverage of the axes evaluation questionnaire by a percentage 79.13%.

Thus, evaluatedquestionnaire and is ready to achieve the objectiveof which the the survey and evaluation from which to select the best designs of the proposed research, with the highest ratings.

Table (5): Evaluation scale for Designs proposed form "questionnaire"

axes	Items		The proposed designs																								
			First					Second					Third					Fourth					fifth				
			Degree					Degree					Degree					Degree					Degree				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
The first **design elements**	**1**	Harmony lines structural and decorative design of the proposed																									
	2	Lines correspond to the proposed design with materials processing																									
	3	Takes the form outside of the distinctive design																									
	4	Appropriateness lines haircuts internal design																									
	5	Design spaces highlight the appearance of diverse																									
	6	Linked to structural and decorative lines with each other																									
	7	Color consistency of the proposed design																									
The Second **Design Principles**	**1**	Realized the foundations of the design of the proposed design																									
	2	Emphasizes design lines on the aesthetic appeal of the severity of																									
	3	Highlights the material rhythm design																									
	4	Appropriateness and proportionality ratio of material materials used to design																									
	5	The proposed design achieved unity																									
	6	Suitable material materials used to design the proposed																									
	7	Equilibrium materials processing design proposed																									
The Third **Innovation and modernity**	**1**	Design achieves a kind of contemporary																									
	2	Lines are consistent with the structural design of the current global fashion trends.																									
	3	Achieve innovative design in the field of																									

		design women's clothing																								
	4	Appropriateness aesthetics of the severity of the outside form of the design																								
	5	Successful recruitment of material processing design proposed																								
	6	Add material processing distinctive design of the proposed																								
	7	Appropriateness of the proposed design for the processing of severe																								
<u>The Fourth</u> **Marketing Design**	**1**	Appropriateness of the proposed design for the production of																								
	2	The proposed design is suitable for marketing																								
	3	Design fits taste in the Egyptian market.																								
	4	Design helps innovation in helping to speed commercialization.																								
	5	Achieve aesthetically design helps to speed buy it.																								
	6	Achieve the functional design helps to speed buy it.																								
	7	The uniqueness of the design from other similar designs.																								
<u>The fifth</u> **suitable design**	**1**	Appropriateness of the proposed design for the classic daily wear for women's.																								
	2	Appropriateness of the proposed design for normal daily wear for women's																								
	3	Appropriateness of the proposed design for evening wear for women's																								
	4	Appropriateness of the proposed design for evening wear for women's																								
	5	Appropriateness of the proposed design of the clothes Foreign																								

		Women																								
	6	Fit the proposed design sportswear for women																								
	7	The proposed design fit the age group of 18-25 years																								

3 RESULTS AND DISCUSSION

3.1 RESULTS OF MATERIALS PROCESSING AND PROPOSED RESEARCH

Results of experimental examination on the produced samles are presented in the following tables and graphs.results was statically analyzed for data listed.

Table (6).the results of the thickness and weight applied to the samples Before /after treatment, produced in this research,this table shows effect of treatment on the loss of weight and thickness which results show in figure (16,17) . The percentage the loss was calculated according to equation in Technical procedures part.

Table (6): The thickness and weight applied to the samples before /after treatment and %the loss of weight and thickness.

The test Sample code	Weight (g/m^2)		The loss% weight	Thickness(m.m)		The loss% thickness
	Beforetreatment	after treatment		Beforetreatment	aftertreatment	
1	140	138	0.014	30.22	30	0.007
2	140	195	0.392	30.22	37	0.220
3	197	82	0.583	49	48	0.020
4	73	75	0.027	18.2	34	0.868
5	73	89	0.219	18.2	23	0.263
6	101	117	0.158	21.5	20	0.069
7	197	244	0.137	37.5	56	0.493
8	158	162	0.025	27	26	0.0370
9	79	66	0.164	24.5	20.3	0.171
10	112	56	0.5	92	61	0.337

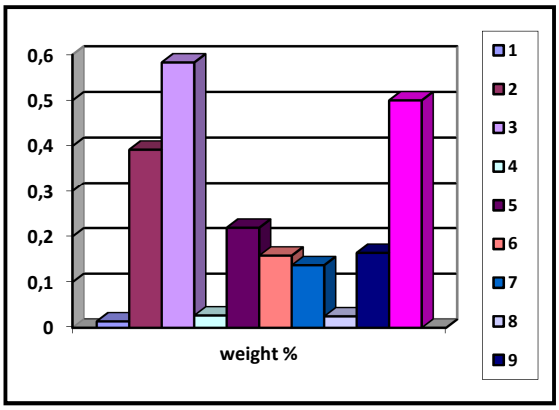


Fig. 16 Effect of treatment on the loss of weight

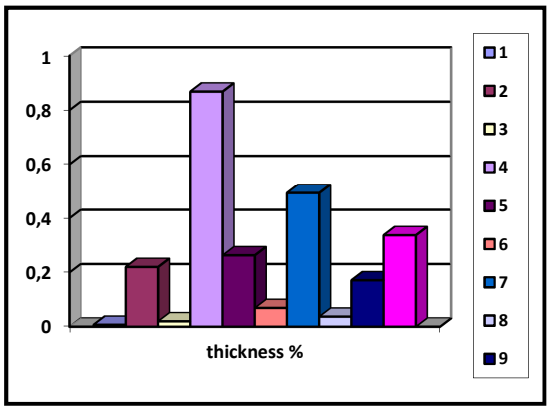


Fig. 17 Effect of treatment on the loss of thickness

THROUGH PREVIOUS TABLES AND FIGURES, IT WAS REACHED TO THE FOLLOWING RESULTS

The results obtained with respect to the percent %loss in weight and thickness are represented in figures (16,17),the percent loss depends on the nature of the blend ,the nature of the treatment on material,the concentration of the used material,and on the ratio of the components of the blend.

These results are expected since these salts as an acid and alkali which burn away cellulosic fabric which burn away protenic fabric,and this explains why the high percent of cellulose and proten in blend are the most affected one in the loss in weight and thickness.

In all cases, treatment with metacryzol, Aluminium sulphate, Acetic acid, sodium hydrogen sulphate, Sulfuric acid and Nitric acid cause a % loss in

Weight follows the order: 3> 10> 2> 5> 9> 6> 7>4>8>1. The treatment cause a % loss in thickness follows the order: 4>7>10>5> 2 > 9> 8>6>3>1**.**

Where used chemical metacryzol and Nitric acid burn out polyester cases the less loss in weight and thickness for the fabric: cotton/polyester, Viscose/polyester/nylon and polyester in specific places, leave the other fabric.

But used chemicals Aluminium sulphate, Sulfuric acid give crimp effect on the anther fabric, cases the great loss in thickness for the fabric: cotton/polyester, silk/polyester, viscose/polyester and Viscose/polyester/nylon.

Fabric polyester is the less loss in thickness and weight cause treatment by Acetic acid, sodium hydrogen sulphate burn out the color only without solve the fabric.

The cellulosic long chain turn into hydrocellulose of very short chainswhich can be removed on washing and viscose have free hydroxyl groups and amorphous regions greater than that of the cotton,so viscose fabric has a great % loss as wool and cotton,but synthetic fabrics like nylon and polyester have crystilline regions greater than that of the cotton and wool.

Table (7): The results of the crease recovery (warp and weft) and the stiffness before/after treatment, applied to the samples, produced in this research.

The test	Crease recovery( )^0				Stiffness (m.g/cm)	
	warp		weft			
Sample code	Before treatment	after treatment	Before treatment	After treatment	Before treatment	after treatment
1	82	89	83	76	0.84	0.40
2	82	97	83	69	0.84	0.58
3	70	87	90	90	0.97	0.59
4	70	116	73.5	79	0.22	0.24
5	72.5	68	73.5	131	0.22	0.27
6	69	108	91	97	0.35	0.42
7	77	105	92	179	1.16	1.17
8	53	172	69	107	0.36	0.49
9	138	106	124	94	0.19	0.14
10	89	91	90	89	0.25	0.81

Through previous table (7) and figure (18), it was reached to the following results, the notic, there are the different effects of treatments on the fabrics between decrease /increase for stiffness, where burn out the fabrics give decrease the result of stiffness by metacryzol and Nitric acid, while sodium hydrogen sulphate, Sulfuric acid and Nitric acid cause increase stiffness fabrics which give crimping effect.

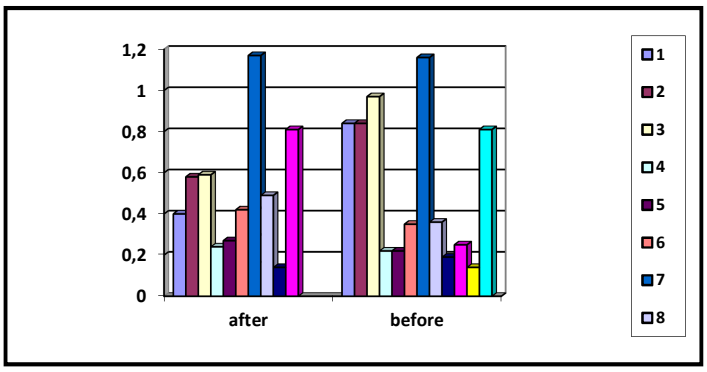


Fig. 18 Effect of treatment on the stiffness

In table 7 and figure (19,20), it was reached to the following results , there effects of treatment by chemical on the fabrics increase for crease recovery in warp, while treatment with, sodium hydrogen sulphate, Sulfuric acid and Nitric acid cause decrease crease recovery in weft: Polyester/silk- polyester- - Viscose/polyester- Viscose/polyester/nylon.

But treatment with metacryzol, Aluminium sulphate, sodium hydrogen sulphate cause increase crease recovery fabrics Polyester- Cotton/nylon- Viscose/polyester

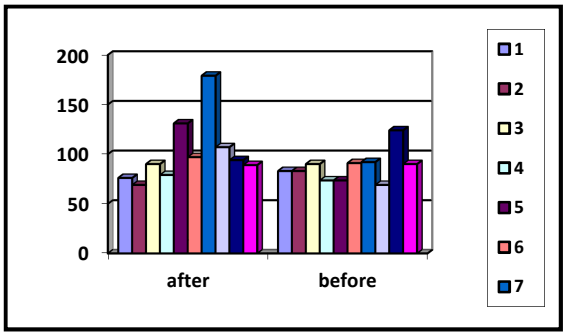


Fig. 19 Effect of treatment on crease recovery in weft

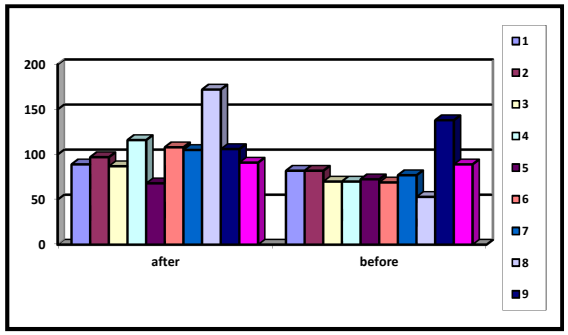


Fig. 20 Effect of treatment on crease recovery in warp

Table (8): Regression equation and correlation coefficient for the effect of before /after treatment on weight, thickness, stiffness and crease recovery in warp/waft.

Significance level	Wilcoxon Z	Significance level	Degrees of freedom "d f"	t-test	error Coefficient	Standard deviation	Average	Numbers	Variable
.759	.306	.673	9	0.436	.1496	.4730	1.270	10	Weight B.T
					.18276	.57794	1.2044	10	Weight A.T
.799	.255	.874	9	.163	7.00607	22.15514	34.8340	10	Thickness B.T
					4.690	14.830	35.53	10	Thickness A.T
1.000	.000	.756	9	.320	.11687	.36956	.5400	10	Stiffness B.T
					.0957	.3027	.511	10	Stiffness A.T
.057	1.988	.072	9	2.042	7.124	22.528	80.25	10	crease recoveryin warp B.T
					12.932	40.896	113.30	10	crease recoveryin warp A.T
.635	.474	.451	9	.787	4.886	15.450	86.90	10	crease recoveryin waft B.T
					5.504	17.407	92.90	10	crease recoveryin waft A.T

Where: B.T=before treatment, A.T= after treatment.

As for the item **weight** and calculates the value of the (T) TEST degrees between the treatment group (before\after) and found that the value of T (T TEST) The calculated = 0.44, and comparing the value of (T) The calculated which is equal to 0.44 Spreadsheet (T) warden which is to = 2.26 at the level of significance 0.05, and to = 3.25 at the level of significance 0.01 and when the degree of freedom 9, found that the value of v The calculated less than T. spreadsheet at level of significance 0.05 if there is no essential difference between the middle the two groups.

To confirm the test was used Wilcoxon (W) statistics Allabarmitry the value = 0.827 It means that there is no essential difference between the middle two groups, the same result the previous as shown table (8).

As for the item **thickness** and calculates the value of the (T) TEST degrees between the treatment group (before\after) and found that the value of T (T TEST) The calculated =0.16 and comparing the value of (T) The calculated which is equal to 0.16 Spreadsheet (T) warden which is to = 2.26 at the level of significance 0.05, and to = 3.25 at the level of significance 0.01 and when the degree of freedom 9, found that the value of v The calculated less than T. spreadsheet at level of significance 0.05 if there is no essential difference between the middle the two groups.

To confirm the test was used Wilcoxon (W) statistics Allabarmitry the value = 0.697 It means that there is no essential difference between the middle two groups, the same result the previous.

As for the item Stiffness and calculates the value of the (T) TEST degrees between the treatment group (before\after) and found that the value of T (T TEST) The calculated = 0.32, and comparing the value of (T) The calculated which is equal to 0.32 Spreadsheet (T) warden which is to = 2.26 at the level of significance 0.05, and to = 3.25 at the level of significance 0.01 and when the degree of freedom 9, found that the value of v The calculated less than T. spreadsheet at level of significance 0.05 if there is no essential difference between the middle the two groups.

To confirm the test was used Wilcoxon (W) statistics Allabarmitry the value = 0.614 It means that there is no essential difference between the middle two groups, the same result the previous.

As for the item **crease recovery in warp** and calculates the value of the (T) TEST degrees between the treatment group (before\after) and found that the value of T (T TEST) The calculated = 2.042, and comparing the value of (T) The calculated which is equal to 2.042 Spreadsheet (T) warden which is to = 2.26 at the level of significance 0.05, and to = 3.25 at the level of significance 0.01 and when the degree of freedom 9, found that the value of v The calculated less than T. spreadsheet at level of significance 0.05 if there is no essential difference between the middle the two groups.

To confirm the test was used Wilcoxon (W) statistics Allabarmitry the value = 3.517 It means that there is no essential difference between the middle two groups, the same result the previous.

As for the item **crease recovery in waft** and calculates the value of the (T) TEST degrees between the treatment group (before\after) and found that the value of T (T TEST) The calculated = 0.79, and comparing the value of (T) The calculated which is equal to 0.79 Spreadsheet (T) warden which is to = 2.26 at the level of significance 0.05, and to = 3.25 at the level of significance 0.01 and when the degree of freedom 9, found that the value of v The calculated less than T. spreadsheet at level of significance 0.05 if there is no essential difference between the middle the two groups.

To confirm the test was used Wilcoxon (W) statistics Allabarmitry the value = 3.096 It means that there is no essential difference between the middle two groups, the same result the previous.

In figures (21, 22) which show evaluation treatment fabric, produced in this research for aesthetic and functional goal.fabric number 10 (50%viscose/30%polyester/ 20% nylon) is the best, which treated by metacryzol.the effect of treatment on a fabric is crimp.

In figure (23), which show evaluation the designs . The design number 8 is the best, which consist of dress and skirt.the dress made from 60% viscose /40% polyester treated by Acetic acid; the effect of treatment on a fabric is crimp.

But the skirt made from 85% wool/15% acrylic treated by Nitric acid, the effect of treatment on a fabric is burn out the acrylic in specific places in the fabric. **The hypothesis authenticity is verified your Chemical treatments for fabrics.**

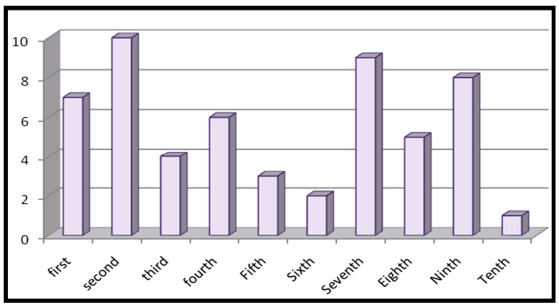


Fig.21: evaluation treatment fabric, produced in this research for aesthetic goal.

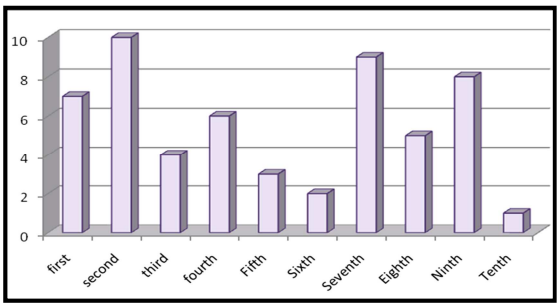


Fig.22: evaluation treatment fabric, produced in this research for

3.2 RESULTS OF DESIGNS PROPOSED RESEARCH

Results of experimental examination on the produced Designs are presented in the following tables and charts.results was statically analyzed for data listed.

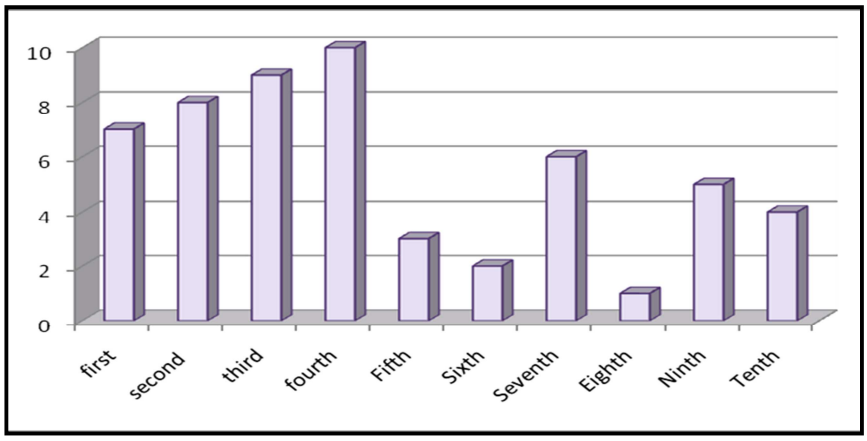


Fig 23: the evaluation the designs.

Shown in the figure (23) Arrangement designs proposed research and resident and according to the viewpoint gentlemen arbitrators have been designs with the highest grades are respectively eighth, sixth, fifth, tenth and ninth. And designs which depend on a certain amount of shape diversity woman clothing according to fashion themes inspired of which adopted as aesthetically or decorative designs on **the effect of chemicals on materials as follows**:- wrinkled material, and the presence of distortions direction warp of the material, cutting material and the presence of light a cloth, crease, the existence of the registry along the material, tentic or chopping material and the presence of a length of material the Registry, Chopping and wrinkled or Crease of material.**And Codes of materials used** (8,10,6,1,2,9,4).

With regard to with the designs on the lower grades, respectively, are the fourth, third, second, first, and seven. And adopted these designs on the diversity of form inspired a certain amount of themes adopted as global fashion decorative shape on **the effect chemicals on those materials used as follows**:- Crease, wrinkled material, and the existence of the registry along the material, Chopping Material, and the presence of the registry along the Material, craship in the Material and riven by cutting, change the color of the raw material, Chopping / rupture in material, circles the Material with Emergence of knitted stitches are clear after the melt acrylic by. **And Codes of materials used** (7, 9, 6, 1).

Table (9): correlation the axes for the questionnaire evaluation of the research design.

	First	Second	Third	Fourth	Fifth
First	1				
Second	.769**	1			
Third	.811**	.910**	1		
Fourth	.532	.860**	.767**	1	
Fifth	.628	.890**	.732*	.888**	1

Seen from the table (9) correlation between axes and questionnaire for the evaluation of the proposed research designs. A strong correlation at level of significance (.01) between each of the first axes and the second, first and third. When a strong correlation at level of significance (0.01) between each of the second and first, second and third, second and fourth, and when the average correlation between the second and fifth A strong correlation between each of the first and third axes, and the third and the second, third and fourth, and the average correlation at level of significance (0.05) between each of the third and fifth. When a strong correlation at level of significance (0.01) between each of the fourth axes and the second, fourth and third, fourth and fifth. When a strong correlation at level of significance (0.01) between each of the fifth axes and the second, fifth and fourth, and the average correlation at level of significance (0.05) between each of the third and fifth axes.

Therefore it is evident from the table that there is a link between the axes of the questionnaire arbitrator by the designs of the proposed research from the viewpoint of gentlemen professor's arbitrators and then it achieves its objective in the research.

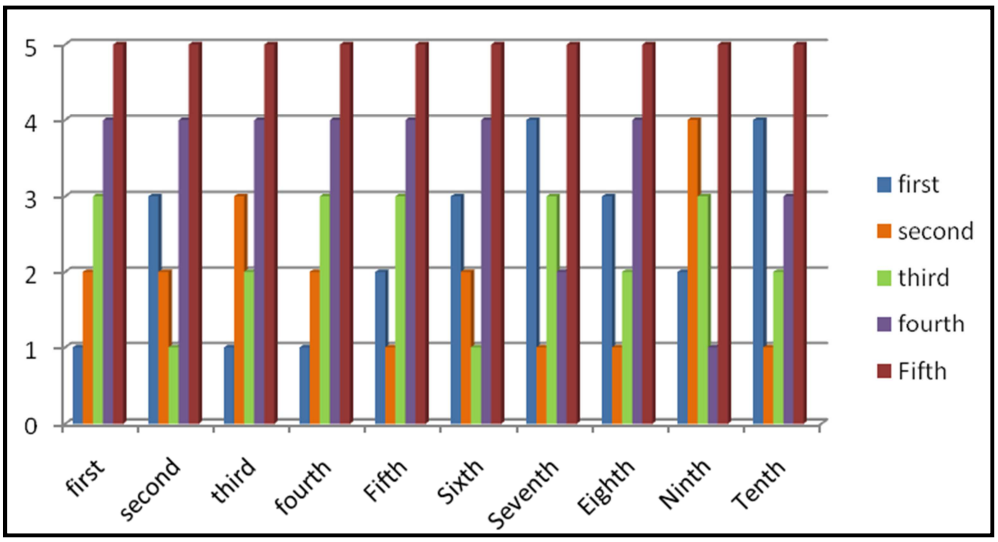


Fig. (24): Shows arrangement axes questionnaire for each design proposal separately

Table (10): Shows the final evaluation of the designs, and the Arrangement of axes for designs.

The proposed designs				Arrangement the axes of the evaluation questionnaire for proposed designs				
Design		The percentage%	Arrangement	Design elements	Design Principles	Creativity and modernity	Marketing design	suitability of the design
				degre				
				1	2	3	4	5
1	First	72.64%	Seventh	1	2	3	4	5
2	Second	71.04%	Eighth	3	2	1	4	5
3	Third	66.81%	Ninth	1	3	2	4	5
4	Fourth	66.35%	Tenth	1	2	3	4	5
5	Fifth	77.21%	Third	2	1	3	4	5
6	Sixth	77.55%	Second	3	2	1	4	5
7	Seventh	72.8%	Sixth	4	1	3	2	5
8	Eighth	78.01%	First	3	1	2	4	5
9	Ninth	73.78%	Fifth	2	4	3	1	5
10	Tenth	76 %	Fourth	4	1	2	3	5

Shown in the figure (24) and table (10) arrangement tha proposed designs, the percentage%, arrangement the axes of the evaluation questionnaire for proposed designs and of reacher. And evaluate them was as follows:-

1- Design 8:- Obtained an arrangement the second by a percentage 78.1%. And the best axes for the design of the respectively, is the axis fifth, fourth, third first, and second.

2- Design 6:- Obtained an arrangement the second by a percentage 77.55%. And the best axes for the design of the respectively, is the axis fifth fourth first second and third.

3- Design 5:- Obtained an arrangement the third by a percentage 77.21%. And it was the best themes for the design of the respectively, is the Axis fifth, third, fourth, first, and second.

4- Design 10:- Obtained an arrangement the fourth by a percentage76 %. And the best axes for the design of the respectively, in the order is the axis Fifth, first, fourth, third, second.

5- Design 9:- Obtained an arrangement the fifth by a percentage 73.78%. And the best axes for the design of the respectively, is the axis, Fifth, second, third, first, and fourth.

6- Design 7:- Obtained an arrangement the second by a percentage 77.8%. And the best axes for the design of the respectively, is the axis, fifth, first, third, fourth, and second.

7- Design 1:- Obtained an arrangement the seventh by a percentage 72.64%. And the best axes for the design of the respectively, is the axis, fifth, fourth, third, second and first.

8- Design 2:- Obtained an arrangement the eight by a percentage74.04%. And the best themes for the design of the respectively, is the axis fifth, fourth, first, second, and third.

9- Design 3:- Obtained an arrangement the Ninth by a percentage81.66%. Ana the best themes for the design of the respectively, is the axis second, third, fourth, fifth, and the first.

10- Design 4:- Obtained an arrangement the tenth by a percentage 66.35%. And the best themes for the design of the respectively, is the axis fifth, fourth, third, second, and first.

There are significant differences between the scores of the proposed designs of the women's outer wears and arrangement the axes of the evaluation questionnaire according to the views of gentlemen of the arbitrators. The highest questionnaire axes respectively fifth axis is the fourth third, second and finally first. This means that the research designs the most they agreed with the fifth axis and your suitability for the clothing designs of State for Women and the most widespread and classic, a daily and evening and evening and the age group of 18-25 years, followed by the fourth axis and the possibility of private production and marketing of these designs have been proposed to search the arbitrators agreed with this axis on the possibility of its production and marketing because of the aesthetic effect of chemicals on the proposed

designs diverse materials as these are limited to Iiothirat varied little from raw materials such as jeans, Followed by the third axis and private Creativity and modernity of the designs of the proposed research it was agreed by the gentlemen of arbitrators for a large number of designs that out Creativity in terms of the diversity of ideas and model design clothes for women diversified and places of employment of materials and distribution of chemically processing to confirm the philosophy of their own design making use of natural disasters such as earthquakes occurring cracks and the effects of sin and what looks like a variety of wrinkled and cut fabrics, these lamentations or aesthetic values may be found in the specific materials including cloth Jeez, and highlight the impact of materials processing by aesthetic design in addition to the use of other materials with use as reinforcement or lining them to make the old consumer, like other materials untreated and this confirmed by functional tests of raw materials after processing the differences between the before / after differences are very simple. Followed by the first and second axis, respectively, and are the the basis design, design elements and assured Gentlemen arbitrators as the availability of design elements with a large number of designs for the foundations of the design which is suitable raw material used for the design, highlighted the raw design lines and details, colors and spaces. Which confirmed that it can take advantage of chemical treatments for fabrics ladies of the aesthetics in the field of fashion design. **The hypothesis authenticity is verified your proposed designs.**

4 CONCLUSION

- Treatment with metacryzol, Aluminium sulphate, Acetic acid, sodium hydrogen sulphate, Sulfuric acid and Nitric acid cause a % loss in weight and thickness
- There are the different effects of treatments on the fabrics between decrease /increase for crease recovery and stiffness.
- Treatment with metacryzol, Aluminium sulphate, sodium hydrogen sulphate, and Nitric acid cause burn out,but Acetic acid and Sulfuric acid cause crimp on the fabric.
- Fabric number 10 (50%viscose/30%polyester/ 20% nylon) is the best, which treated by metacryzol.
- The design number 8 is the best made from 60% viscose /40% polyester and 85% wool/15% acrylic treated by Acetic acid and Nitric acid, the effect of treatment on a fabric is crimp and burn out.
- The work has demonstrated the possibility of creating fashion design trends based on the the effects by treatment.

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Helwan University

Faculty of Applied Arts

Department of Apparel Design & Technology

Research appendixes

Dear

Pro. Dr.\.....

Researchers\

Ass.Pro / Ghada Abdullah El. Elkholy, Department of Apparel Design & Technology - Faculty of Applied Arts - Helwan University

Dr / Shereen Saied Mohammed Hassan, Department of Apparel Design & Technology -Faculty of Applied Arts- Helwan University, is studying entitled:

Possibility of benefiting from the impact of chemical treatments for fabrics in fashion design

The researcher has prepared this form for collecting data that helps on completing the applied side of her scientific research. You are kindly required to read this form and express your point of view through putting before the appropriate level from your point of view, with taking into account that No. (5) Is the highest level and No. (1) Is the lowest level. The researcher extends to you her deepest thanks and appreciation for your highly appreciated cooperation in completing the scientific research.

Thank for your best cooperation

Researchers

APPENDIX: (1): EVALUATION QUESTIONNAIRE

Elements of evaluation		Degree				
		1	2	3	4	5
1	The validity of the proposed questionnaire for the calendar					
2	The logical sequence of items per axis within the questionnaire					
3	Suitability questionnaire axes of the proposed idea					
4	The clarity of the expressions used questionnaire items					
5	The clarity of the objectives of the axes of the questionnaire					
6	The clarity of the instructions to answer the questionnaire					
7	The extent of the coverage-resolution					

APPENDIX (2) THE NAMES AND PROFESSIONS OF THE ARBITRATORS GENTLEMEN DOMAIN OF ACADEMICS AND INDUSTRY SPECIALISTS

Name		Profession	Materials	Designs
1	Pro. DR Ahmed Hosny	:-Professor in Clothing Technology at Apparel Design & Technology Department- Faculty of Applied Arts- Helwan University.	✓	✓
2	Pro. DR Nermin Abdel Basset	: - professor in Fashion Design at Department of Clothing and Textiles - Faculty of Home Economics Helwan University.	✓	✓
3	Pro. DR Sharif Hassan	: - Assistant professor in Department of textile printing and dyeing and finishing- Faculty of Applied Arts- Helwan University.	✓	✓
4	Pro. DR Dalia Fekry	:-Assistant professor in Department of textile printing and dyeing and finishing- Faculty of Applied Arts- Helwan University.	✓	✓
5	Ass. Pro Emad sayed gohr	: - Assistant professor in Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	✓	✓
6	Ass. Pro. Rania Mostafa Kamel	: - Assistant professor in Department of Clothing and Textiles Department - Faculty of Home Economics Helwan University.	✓	✓
7	Ass. Pro. Nahla Abdel-Mohsen	:-Assistant professor in Department of Textile- Faculty of Applied Arts- Helwan University.	✓	✓
8	Ass. Pro. Bahirh Gabr Gebali	:-Assistant professor in Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	✓	✓
9	Ass. Pro. Manal Saif	:-Assistant professor in Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	-	✓
10	Ass. Pro. Nasrin Nasr	:-Assistant professor in Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	-	✓
11	Dr. Shahira Mahmoud Hefny	: - Lecturer - Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	✓	✓
12	Dr.Ghada Abdel-Salam Barakat	: - Lecturer - Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	-	✓
13	Dr. Wafa Abdel Rady Qureshi	: - Lecturer - Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	✓	✓
14	Dr. Mohamed Mahmoud Afifi	: - Lecturer - Department of textile printing and dyeing and finishing- Faculty of Applied Arts- Helwan University.	✓	✓
15	Dr. Mona Abu Taleb	: - Lecturer - of Department of Textile- Faculty of Applied Arts- Helwan University.	✓	✓
16	Dr. Wdiane Talaat	: - Lecturer - Faculty Department of Apparel Design & Technology - Faculty of Applied Arts- Helwan University.	✓	✓
17	Iman Adel Abdel Samie	National Research Centre, Department of Research and knitted garment industry	✓	✓
18	Sheri Abdul Latif Ashour	National Research Centre, Department of Research and knitted garment industry	✓	✓
19	Iman Zaher	Teaching Assistant of Department of Textile- Faculty of Applied Arts- Helwan University.	✓	✓
20	Marwa Mustafa	Teaching Assistant of Department of Textile- Faculty of Applied Arts- Helwan University.	✓	✓
21	Ghada Abdel-Mohsen	PhD, Doctoral student of Department of Textile- Faculty of Applied Arts- Helwan University.	✓	✓
22	Amr Mohamed Abdullah	Manager grille of international Company Clover Brooke for textiles and dyeing for clothing	✓	✓
23	Wissam Metwally Barakat	Sports wear Accent Manager Company Clover Brooke for textiles and dyeing	✓	✓
24	Sarah Beltagy	Engineer of Company Clover Brooke for textiles and dyeing for clothing	✓	✓
25	Mina Edouard	Engineer of Company Clover Brooke for textiles and dyeing for clothing	✓	✓

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Automated Wireless Fingerprint Attendance System

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ABSTRACT: Apart from traditional wired attendance systems or paper based attendance system a automated wireless fingerprint attendance system based on ZigBee technology is proposed. The system includes independent fingerprint acquisition module and attendance management module in computer. System realizes various functions such as information acquisition of fingerprint, processing, wireless transmission, fingerprint matching, and attendance management. Automatically considering topology of ZigBee network, the system uses wireless local area network. System comprises various wireless fingerprint attendance functions, which could be used for public/private institutes or schools.

KEYWORDS: ARM7 LPC2138, Fingerprint, Keyboard, Microcontroller, Time attendance, Visual basic 6 software, Zigbee network.

1 INTRODUCTION

Time attendance policy is a very important part of enterprises and public institutions, industry, etc. Card clocking and other traditional clocking ways once enhance working efficiency, leads to immeasurable economic loss. Fingerprint time attendance is developed according to fingerprint's uniqueness and invariance, one person, one fingerprint. So avoid fake attendance, and attendance management people do not feel awkward, so company, friend and employee are all happy finally. The Fingerprint time attendance consist of fingerprint capture and transfer, fingerprint image processing and wireless transfer of data in a server-client system.

Biometrics fingerprint recognition is universally applied. The student attendance system is very relevant in an institute like ours since it aims at eliminating all the hassles of roll calling and malpractice and promises a full-proof as well as reliable technique of keeping records of student's attendance. Once student attendance is scan by finger print scanner, it is recognized. ZigBee network, the system uses wireless local area network for transferring finger image via ARM7 LPC2138 [1], [2], [3] microcontroller and LCD. LCD is used for viewing fingerprint success or fail. All students make use of Fingerprint time attendance. Finally daily and monthly student attendance is created by using Microsoft excel sheet. Defaulter student parent's gets SMS from college uses ZigBee network. Keyword Fingerprint time attendance, ZigBee network, ASCII value of that key is provided to the microcontroller via software.

2 SYSTEMS IMPLEMENTATION

System is fully automatic gives various outputs like database is created, Daily attendance monthly attendance created and SMS is sent to parent mobile no.

2.1 BLOCK DIAGRAM DESCRIPTION

KEYPAD

Keypad is basically used to provide the input to the microcontroller. The keypad consists of micro switches which are connected to the microcontroller pins in a matrix format. Each key is assigned with the special character or symbol or digit. When user presses the key the respective assigned.

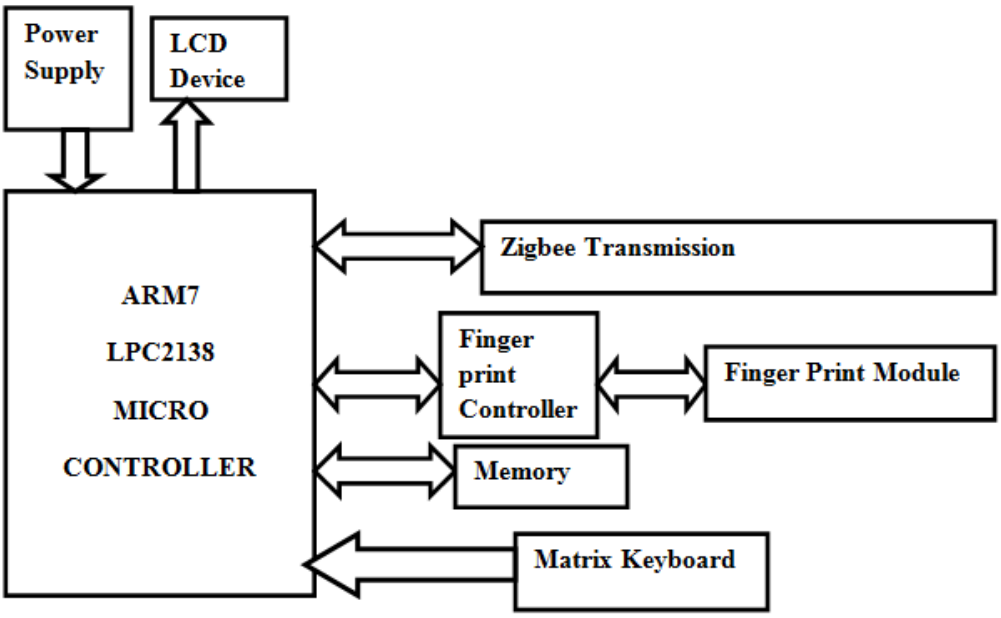


Figure 2.1 Block diagram of fingerprint wireless monitoring system

2.2 LIQUID CRYSTAL DISPLAY

LCD is used in a project to visualize the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows [4], [5]. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD. LCD can also used in a project to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

2.3 MEMORY

The FM24C256/C256L/C256LZ devices are 256 Kbits CMOS nonvolatile electrically erasable memory. These devices offer the designer different low voltage and low power options. They conform to all requirements in the Extended I^2C 2-wire protocol. Furthermore, they are designed to minimize device pin count and simplify PC board layout requirements. The entire memory array can be write disabled (Write Protection) by connecting [2] the WP pin to VCC. Functional address lines allow up to eight devices on the same bus, for up to a total of 2 bit address space. The I^2C communication protocol uses CLOCK (SCL) and DATA I/O (SDA) lines to synchronously clock data between the master (for example a microprocessor) and the slave EEPROM device(s).Fairchild EEPROMs are designed and tested for applications requiring high endurance, high reliability, and low power consumption. Extended Operating Voltages C256: 4.5V - 5.5V C256L: 2.7V - 5.5V, C256LZ: 2.7V - 5.5V, Low Power CMOS, 1mA active current typical, C256/C256L: 10µA standby current typical, C256LZ: less than 1µA standby current, 2-wire IIC serial interface, 64 byte page write mode, Max write cycle time of 6ms byte/page, 40 years data retention, Endurance: 100,000 data changes, Hardware write protect for entire array, Schmitt trigger inputs for noise suppression, Electrostatic discharge protection. 8-pin DIP and 8-pin SO (150 mil) packages. Contact factory for CSP package availability the various features that we are going to develop along with various Technologies that we will learn to develop the Project are here I use VB6 based software control, for serial communication between Finger Print Module & PC, PCB Making & Assembling. 230 V Power Supply Designing, Serial Communication Protocol. Interfacing LCD with Microcontroller.

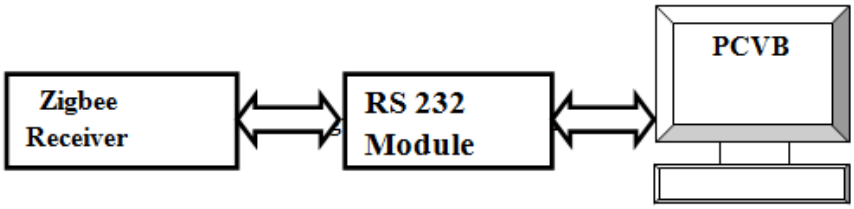


Figure 2.2 Unit on table in HOD's cabin

Here as we can see from the block diagram figure 2.1 & figure 2.2 there are 2 different units:

1. Unit in the class room
2. Unit on table in HOD's cabin

2.4 UNIT IN THE CLASS ROOM

Following are the different section of above mentioned hand held unit Here the classroom unit is placed in the classroom [1], [8]. The teacher will enter the teacher ID first then the subject ID. Then microcontroller will display the teacher name and the subject name on LCD. After this the students have to press the finger on fingerprint unit.

2.5 FINGER PRINT READER UNIT

This unit is interfaced to the microcontroller and is situated in the classroom of the school or college. As soon as the student presses the finger the reader will recognize the fingerprint and store the attendance record on serial memory .All the attendance records will be stored in the memory. At the end of lecture the microcontroller will send the attendance records to PC via ZIGBEEE based RF module. For wireless transmission we are using Zigbee module which works at 2.4 GHz and a range of 30 meters. The fingerprint can recognize up to 200 fingerprint ID's. All these ID's are stored in the fingerprint module. This unit or setup is placed in classroom or worker room. Consist of various components like power supply used for supplying the power 5 volt to supporting IC and 3.3 volt to [1],[6],[7] ARM LPC2138 Microcontroller, LCD device for display the student information to read the figure print information like pass or fail, Zigbee transmission is used for transmitting micro controller information to unit placed in Manager's or HOD's cabin also Zigbee work as trans receiver means it can work as receiver it also receives information from unit placed in Manager's or HOD's cabin, finger print controller and finger print module. Finger print module is the sensor which senses the student finger and gives output to finger print controller and finger print controller converts this output in digital form and gives output to ARM7 LPC2138 microcontroller. Memory & Key board.

2.6 PC UNIT

The PC received the Fingerprint information wirelessly from classroom unit from the student compares it with the database of the students stored in the PC. It then sends an SMS to the concerned parents that the particular student has entered the school premises with in time of entry. Similarly this unit will send a SMS as soon as the student exits the school .In this way the parents get intimation during in time and out time of the respective student. Thus every parent will get an SMS that the student has reached the school in time. In case any parent doesn't get the SMS in time they can enquirer about student [9], [10]. The SMS is sent using the dedicated mobile connected to the school PC using AT commands. In this unit various components are connected. This Unit placed in HOD / Manager's cabin. Graphic user interface (GUI) has been prepared using Visual Basic 6 keil 'C' compiler is used to compile embedded 'C' programming Other components like RS 232 Module which is used for converting 9 volt from PC to 5 volt which is the voltage of Zigbee is receiver. So this voltage conversion is carried out by RS 232. Zigbee receiver which receives student information is transreceived in between finger print reader and PC via zigbee modules and microcontroller.

3 ABOUT GUI

Visual basic software version 6 is used in my project. Here Visual Basic software is taken as front end and excel sheet taken as back end. Other details use of visual basic is shown in figure 4.1 and 4.2.

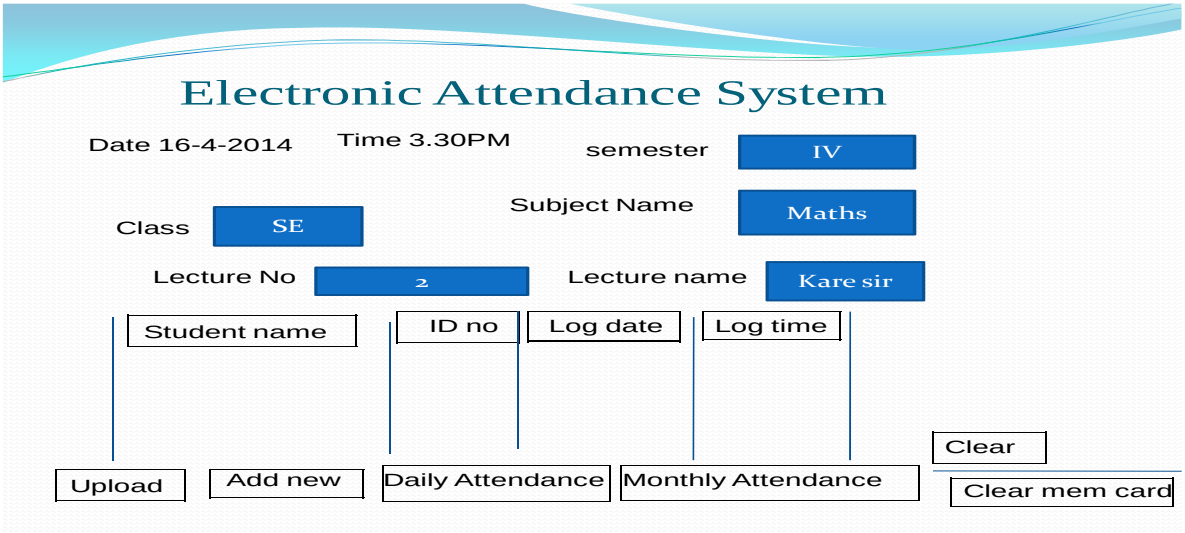


Figure 4.1 Visual basic attendance function windows on pc in cabin

Figure 4.1 shows visual basic attendance function windows on pc in HOD cabin. In this figure we can upload student information, make defaulter of student, make student mark list, add new student and clear or delete student information [11], [12] .All these functions are making possible with the visual basic software in PC.

Figure 4.2 Visual basic attendance function windows in class room

Here upload button is used for filling the student information in the flux grid. Student information is filling the student name, his/her ID, in date and in time. Add new button is used for filling or updating new student information like student name and his/her ID is shown in figure 4.2. Daily attendance button is used for taking student attendance for particular date and stored in excel sheet; Monthly attendance button is used for same. Clear button is used for removing the student information in the flux grid. Clear memory card used for removing the stored student information. Faculty or Staff must fill information about semester is going on, which classroom is used for conducting lecture, Subject name, Lecture number and e faculty name.

Figure 4.1 and figure 4.2 shows visual basic attendance function windows in class room. In this figure 4.2 we can add details, adding student ID, adding student name etc.

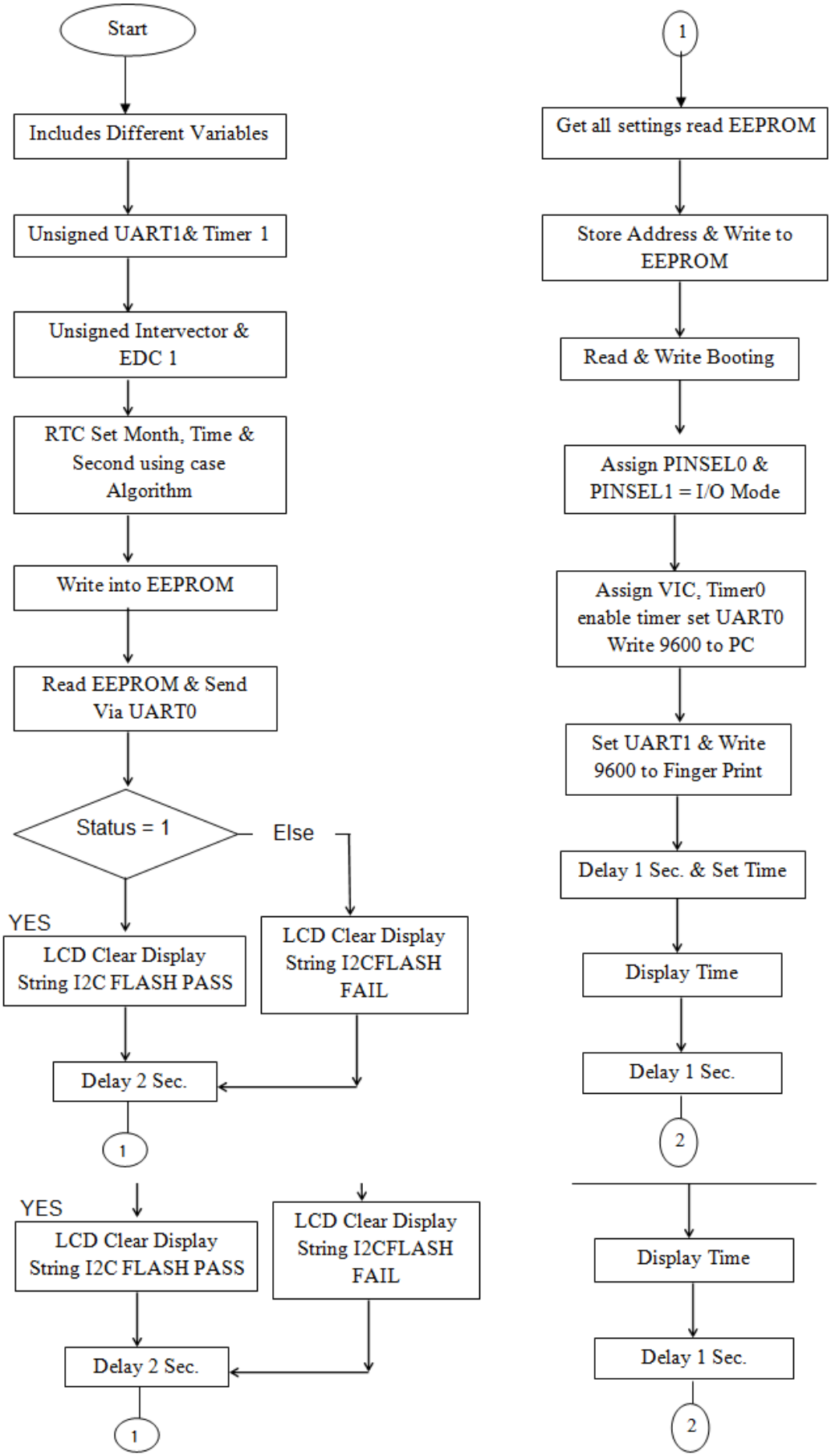
FLOWCHART

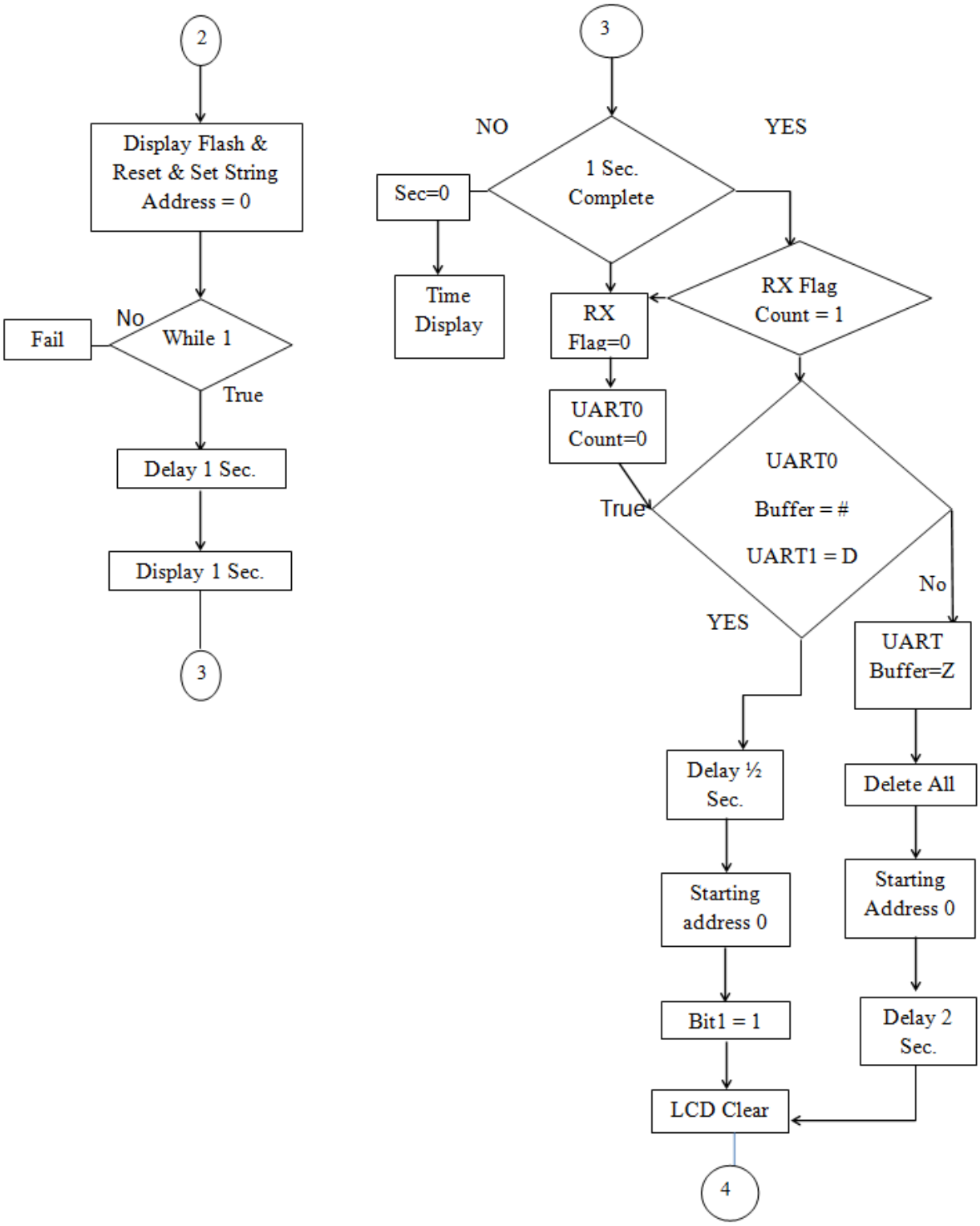
Flowchart explains how electronics attendance system as shown in figure 4.3.

Initial assign all different variables like UART1,UART 0 , Timer1, Intervector ADC1, RTC month, day, hour, minute, second using Case statement Write into EEPROM using following command ,I^2C serial bus and flash pass. And flash fail. I^2C is used to . Transmit this string via UART1 though ZIGBEE device to LCD. Check for Master Mode Character 7E in the data buffer and 4 locations in flag register is 1 and 8 location in flag register is 1 then and then master mode is successful. For all other location

in flag register master mode is fail. As master mode is successful User is registered Set proper password, set ID, enter ID. Check for Key pressed, if no then cancel out. If yes enter password, verify password, Identify ID, Verify ID.

Student information receiving flowchart is shown in figure 4.4. This flowchart giving details like how to work wit software. We use visual basic version 6 it works on windows XP or other windows platform. Initial open V.B. software c attendance file then select Hardware = 1 to 16 and Mobile = 1to 16 V.B. not support after 16 signals. Click ok then form open if click on add new button then form 3 opened. This add new button used for filling or updating new st information like student name and his/her ID is shown in figure 4.2 After filling student information if you click on exit b then form 2 will open, So form 2 is main form where click on upload button & edit MS comm. output = #D & data v saved otherwise check Binging of file & end of file click on clear button = #Z & data will be erased. Take Counter =. Fielc set bit 1 = true then data saved if set bit 1 = false data deleted. Click on daily attendance button upon filling inforn output excel sheet is created & we gate detailed report of students as shown in figure 4.4 In form 2 click on m attendance button Upon filling all the information output excel sheet is created & we get required data as shown in figu For defaulter students Lect. No. = # Lect. Conducted = # % attendance = lect. conducted / lect. no. * 100. If % attendanc then send SMS to the parents mobile no. Attendance displayed on LCD by using Zigbee trans receiver same informatio to ARM7 LPC2138


Start
Includes Different Variables
Unsigned UART1& Timer 1
Unsigned Intervector & EDC 1
RTC Set Month, Time & Second using case Algorithm
Write into EEPROM
Read EEPROM & Send Via UART0
Status = 1
Else
YES
LCD Clear Display String I2C FLASH PASS
LCD Clear Display String I2CFLASH FAIL
Delay 2 Sec.
1
YES
LCD Clear Display String I2C FLASH PASS
LCD Clear Display String I2CFLASH FAIL
Delay 2 Sec.
1
1
Get all settings read EEPROM
Store Address & Write to EEPROM
Read & Write Booting
Assign PINSEL0 & PINSEL1 = I/O Mode
Assign VIC, Timer0 enable timer set UART0 Write 9600 to PC
Set UART1 & Write 9600 to Finger Print
Delay 1 Sec. & Set Time
Display Time
Delay 1 Sec.
2
Display Time
Delay 1 Sec.
2


2
Display Flash & Reset & Set String Address = 0
No
While 1
Fail
True
Delay 1 Sec.
Display 1 Sec.
3
3
NO
YES
1 Sec. Complete
Sec=0
Time Display
RX Flag Count = 1
RX Flag=0
UART0 Count=0
True
UART0 Buffer = # UART1 = D
No
YES
UART Buffer=Z
Delay ½ Sec.
Delete All
Starting address 0
Starting Address 0
Bit1 = 1
Delay 2 Sec.
LCD Clear
4

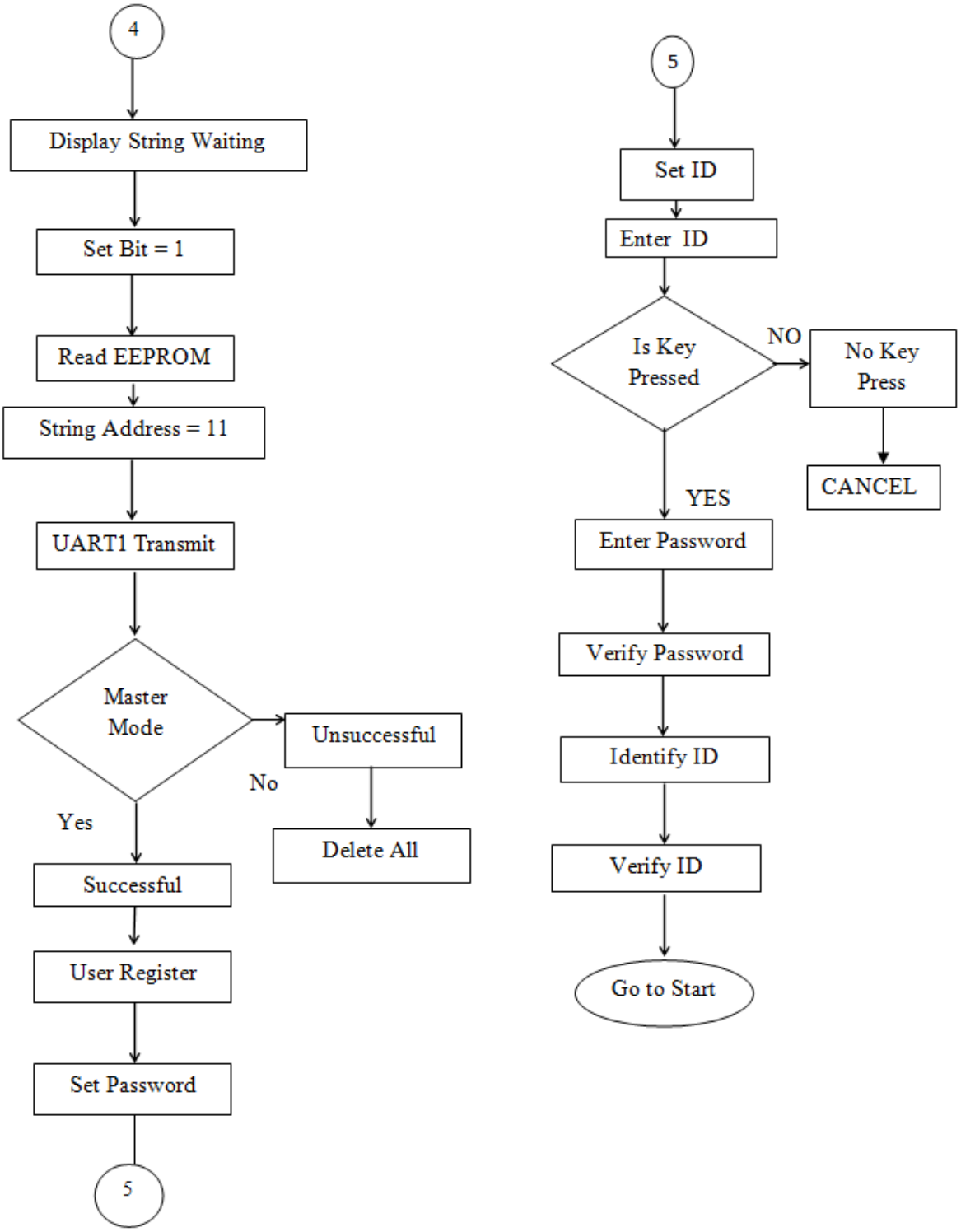
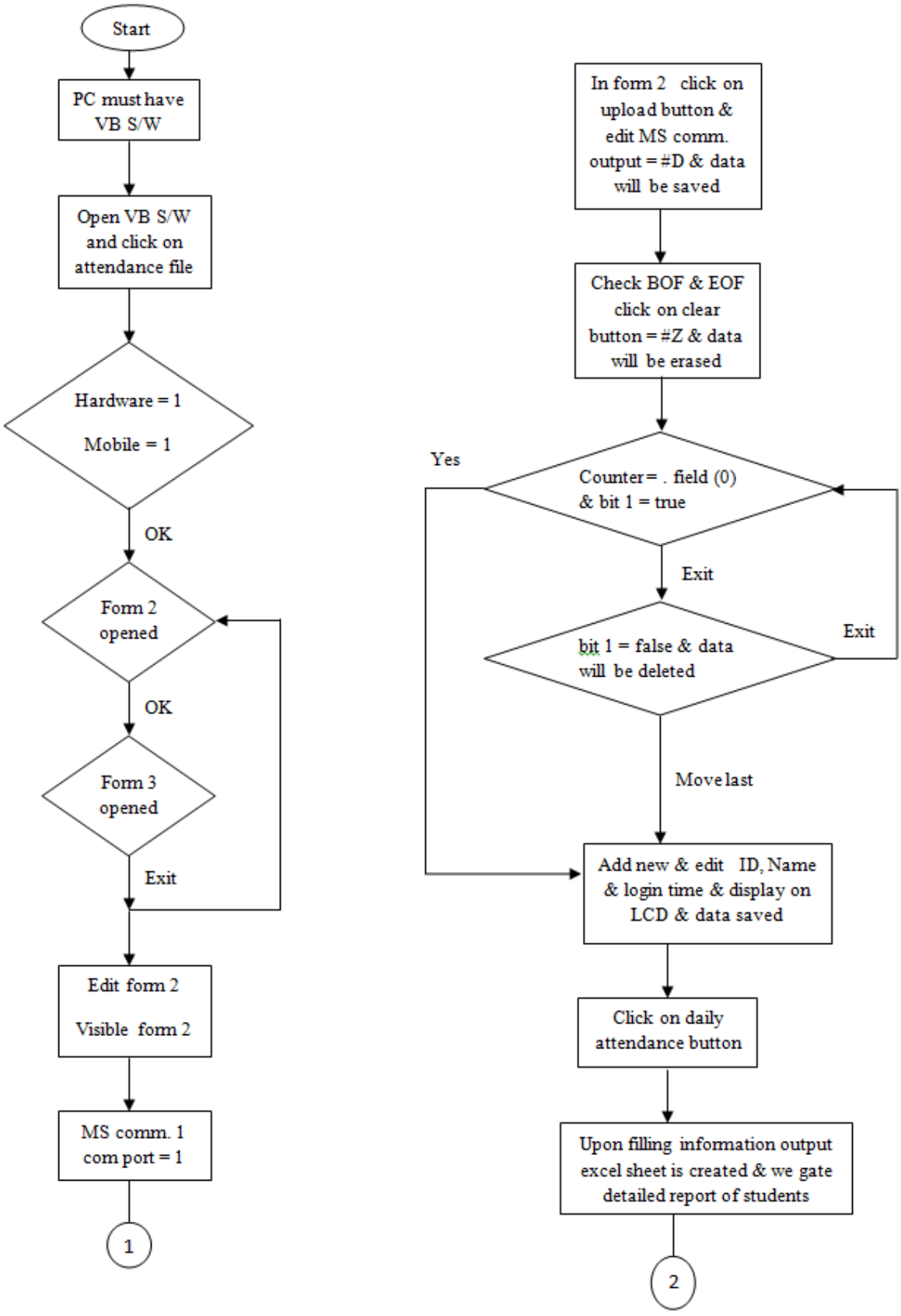


Figure 4.3 Flowchart for electronics attendance system functionality


Start
PC must have VB S/W
Open VB S/W and click on attendance file
Hardware = 1
Mobile = 1
OK
Form 2 opened
OK
Form 3 opened
Exit
Edit form 2
Visible form 2
MS comm. 1
com port = 1
1
In form 2 click on upload button & edit MS comm. output = #D & data will be saved
Check BOF & EOF click on clear button = #Z & data will be erased
Yes
Counter = . field (0) & bit 1 = true
Exit
bit 1 = false & data will be deleted
Exit
Move last
Add new & edit ID, Name & login time & display on LCD & data saved
Click on daily attendance button
Upon filling information output excel sheet is created & we gate detailed report of students
2

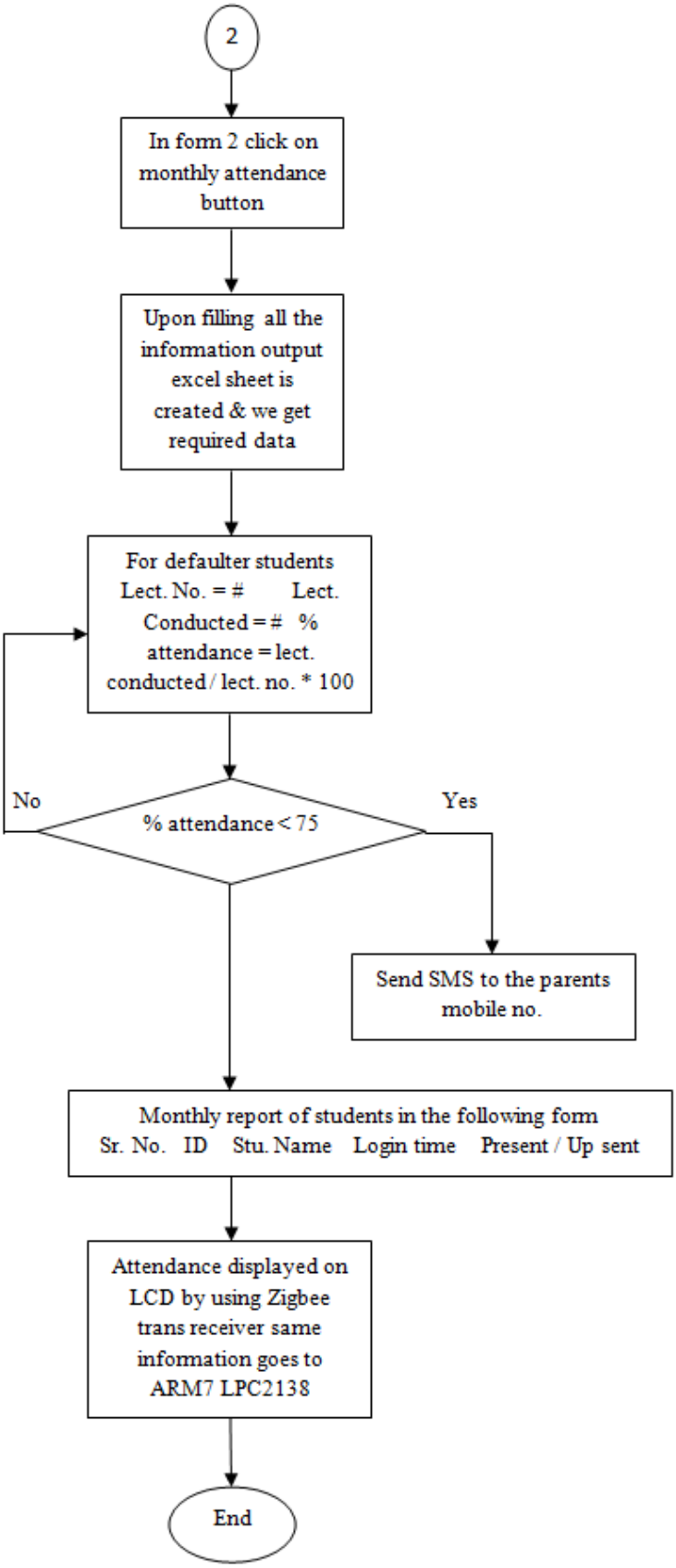


Figure 4.4 Student information receiving flowchart

4 RESULT

The result of electronics attendance system is shown below. Daily attendance is shown in fig 4.4 which is excel sheet in details. The Daily attendance includes column name like this sr.no, student name, ID No, Lecture No, Student in time, and present/absent. Below these columns we get details of every student

Monthly attendance is taken after 30 days excel sheet is show in the fig 4.5 Monthly attendance includes column name like ID, student name, Lecture attended, % attendance. Below 75% attendance or absent student will get SMS to parent mobile number

Table 4.4 Daily attendance details report

ATTANDDANCE DETAILS					
	DATE 7.4.14		**Time 12.00 am**		
	Lectures Name Wale S.G.				
	Class B	**SEM IV**	**Subject Name MCN**		
Sr.No	**Student Name**	**ID.No**	**Lecture no**	**InTime**	**Present/Absent**
1	Kakade Pritee	3431	1	11.55	Present
2	Jadhav Prasad	3432	1	11.55	Present
3	Jadhav Pankaj	3433	1	11.55	Present
4	charankar shobharaj	3442	1	11.55	Present
5	Dange Suraj	3439	1	11.55	Present
6	chavan shubhabgi	3440	1	11.55	Present
7	chavan Madhuri	3441	1	11.51	Present
8	Shikargar Himayatuddin	3409	1	11.51	Present
9	Bhosle Rohit	3443	1	11.51	Present
10	bandal Madhuri	3444	1	11.51	Present
11	Angarkhe Netradip	3446	1	11.51	Present
12	Pawar Saraswati	3418	1	11.51	Present
13	Patil sagar	3419	1	12.01	Present
14	Mane suhant	3425	1	12.01	Present
15	Khochare Nikhil	3426	1	12.01	Present
16	Khmbhar Vikas	3427	1	12.01	Present
17	Karape Sambhaji	3428	1	12.01	Present
18	Kalkure Bhagyeashti	3429	1	12.01	Present
19	Gadave Kiritika	3435	1	11.55	Present
20	Desai Pradhnya	3436	1	11.49	Present

Table 4.5 Monthly attendance details report

Attendance List for month : May 2014			
Date:	30-05-2014	Time	11.02 am
Class:	3rd		
Subject:	MCN		
Lecturer Name	Mr. Wale S.G.		
Lectures Allotted	15	Lectures Delivered	10
ID	**Student Name**	**Lecture Attended**	Attendance (%)
3414	Raut Neha	5	50
3415	Raut Aniket	5	50
3416	rane ankit balu	5	50
3417	Pawar Yogesh	5	50
3418	Pawar Saraswati	5	50
3419	Patil sagar	5	50
3420	Patil Pradnya s	10	100
3421	Patel Afsana	10	100
3422	omkar mhetar	10	100
3423	nilima sale	10	100
3424	Nangare Arti	10	100
3425	Mane suhant	5	50
3426	Khochare Nikhil	5	50
3427	Khmbhar Vikas	5	50
3428	Karape Sambhaji	5	50
3429	Kalkure Bhagyeashti	5	50
3431	Kakade Pritee	5	50
3432	Jadhav Prasad	5	50
3433	Jadhav Pankaj	5	50
3434	Ghadage sweta	2	20.45
3435	Gadave Kiritika	3	27.89
3436	Desai Pradhnya	3	27.89
3437	Deokar Anil	3	27.89
3438	Deepak Baburao Pakhare	3	27.89
3439	Dange Suraj	3	27.89
3440	chavan shubhabgi	3	27.89
3441	chavan Madhuri	3	27.89
3442	charankar shobharaj	3	27.89
3443	Bhosle Rohit	0	0
3444	bandal Madhuri	0	0
3446	Angarkhe Netradip	2	20.45

SOFTWARE

LPC2138 microcontroller is used for programming at base station using visual basic (6.0). It gives advantages like efficient way for attendance monitoring, less time delays, quick response time fully automate system,[9],[10] robust system, low power. Applications attendance monitoring system can be used for offices, institutions etc can be used for wireless hazardous areas such as oil rigs, mines etc.

5 CONCLUSION

It can be concluded from the all above discussion that a se-cure, fast, reliable and an efficient system has been developed replacing a manual and unreliable system. The fingerprint sensor successfully captured new fingerprints to be stored in the database; fingerprints placed on the device sensor [13], [14] and compared them with those stored in the database

successfully. The system successfully took the attendance both at lectures and examinations. The prototype successfully captured new fingerprints to be stored in the database; scanned fingerprints placed on the device sensor and compared them against those stored in the database successfully. The performance of the system was acceptable and would be considered for full implementation especially because of its short execution time and reports generation. Everyone who tested the system was pleased and interested in the product being developed for use in schools.

ACKNOWLEDGEMENT

I express my deep sense of gratitude to my guide Prof**. (**Dr.) S. A. Patil **[**Guide, Head Electronics and Telecommunication Engineering Department] for their impeccable guidance, unflinching encouragement, keen interest, painstaking corrections and constant criticism throughout the course of study. This work would not have taken a desirable shape without their untiring efforts and great pains that they have taken in the conduct of the entire studies. Their truly scientific intuition has inspired me for my work.

I would like take this opportunity to thanks to Prof. (Dr.) P. V. Kadole, Principal of D.K.T.E.Society's Textile and Engineering Institute, Ichalkaranji for their valuable support and guidance.

I am extremely thankful all the faculty and staff members of the Department, especially Prof. Dr. (Mrs.) L.S.Admuthe, (Vice Principal, Head Electronics Engineering Department), Mrs. V. Jayshree, I would also like to thanks to my friends and colleague, without their support it was not easy to complete this dissertation work. It is hard finding words to express my gratitude to my parents for continuous encouragement and inculcating the right spirit of mind. Without their positive, kind and silent support this work neither has been possible nor could it have been completed. Last but not least, this acknowledgement would be incomplete without rendering my sincere gratitude to all those who have helped me in the completion of this dissertation work directly or indirectly.

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[12] XBee, "www.sparkfun.com/datasheets/Wireless/.../XBee-Datasheet.pdf" File Format: PDF/Adobe Acrobat Sep 23, 2009 – *XBee® and XBee-PRO® a*re registered trademarks of Digi, Inc. Technical ... The XBee and XBee-PRO RF Modules were engineered.

[13] Digi, "www.digi.com/pdf/ds_xbeemultipointmodules.pdf"*Multipoint RF Modules - Datasheet* - Digi International File Format: PDF/Adobe Acrobat The XBee family of embedded RF modules provides OEMs with a common XBee multipoint RF modules are ideal for applications requiring low latency.

[14] XBee, "www.digi.com*", RF Modules Bee 802.15.4* (formerly Series 1) OEM 2.4 GHz modules are ideal for low-cost, low-power

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Assessment of awareness about HCV mode of transmission and implementation rate of preventive measures in different literacy groups in Bahawalpur, Punjab, Pakistan

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ABSTRACT: Our project comprises of assessment of awareness about HCV modes of transmission & implementation rate of preventive measures to prevent hepatitis C in different literacy groups. We want to find out the reason of spread of hepatitis C either there is lack of awareness or there is lack of follow up of precautionary measures. In this regard, we designed a questionnaire according to WHO guidelines & got it filled from different education levels. We also gave the awareness about the disease to the general public. After the survey we analyzed & calculated the percentages of awareness about Hepatitis C & follow up rates of precautionary measures in the individuals. We assessed that the literacy group of primary level had lowest awareness with lowest follow up rates. And the literacy group of under-graduate level had maximum awareness & follow up. Thus there is a need of awareness about the disease at primary level in order to minimize the risk of getting Hepatitis C as the incidence of Hepatitis is increasing due to negligence in implementation of preventive measures.

KEYWORDS: mode of transmission, Implementation, follow up, modes of transmission, implementation rate.

1 INTRODUCTION

Hepatitis C is an infection caused by virus. It causes the inflammation of liver which is the vital organ of body. Causative agent is Hepatitis C virus which is RNA virus (1). In Pakistan HCV is spreading frequently particularly by sharing needles & transfusion of infected blood mostly. Approximately 10 Million people have been infected with HC The most of patients have acquired their infection by unsafe injections, reuse of syringes and needles and community barber shops used for face and armpit shaving (2). Problem may be due to lack of awareness or lack of follow up of precautionary measures. Our main focus in the project is to assess the awareness & follow up of the disease by the educated persons of different academic levels according to WHO guidelines so effective efforts should be made to minimize chances of spread of disease.

2 OBJECTIVES OF STUDY

- To find the rate of awareness in different educational groups.
- To find the rate of follow up of precautionary measures to avoid hepatitis C.
- To find that very group which lacks both or one of these two aspects.
- To find difference between awareness and follow up in these groups.

3 MATERIAL & METHOD

In this first of all we made six literacy groups. I.e. Primary level, Middle level, SSC level, HSC level, Undergraduate level, Postgraduate level.

Then we designed a questionnaire to assess the awareness and follow up rates about modes of transmission of HCV among these groups. Data was collected, evaluation was done and finally result was made in the form of table and graph.

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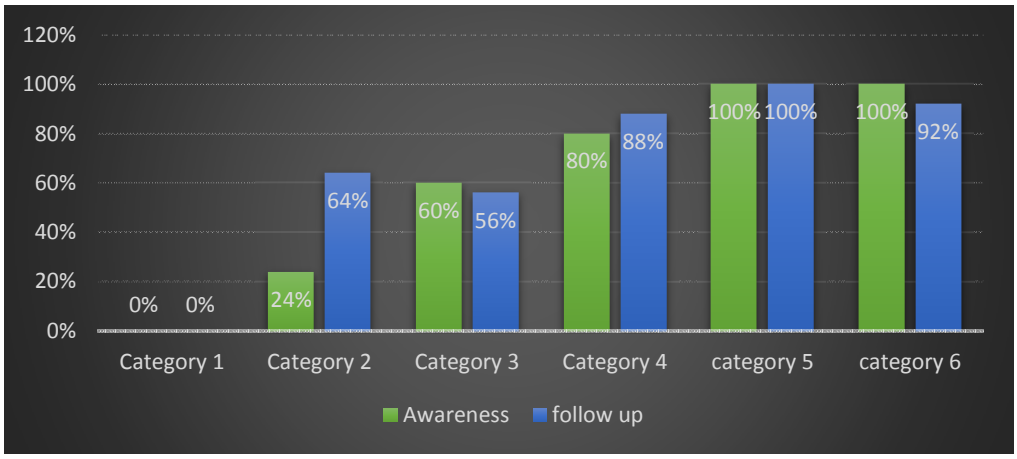
4 RESULT

After evaluation of data following results are as follow:

Table 1: shows awareness and follow up percentage in different age groups.

Literacy group	Awareness percentage	Follow up percentage
Primary level	0%	0%
Middle level	24%	64%
SSC level	60%	56%
HSC level	80%	88%
Undergraduate level	100%	100%
Postgraduate level	100%	92%



Graph: Shows percentage of awareness and follow up in different literacy groups.

Table 2: shows lack of awareness and lack of follow up percentage in different literacy groups.

Literacy groups	Lack of Awareness	Lack of Follow up
Primary level	100%	100%
Middle level	76%	36%
SSC level	40%	44%
HSC level	20%	12%
Undergraduate level	0%	0%
Postgraduate level	0%	8%

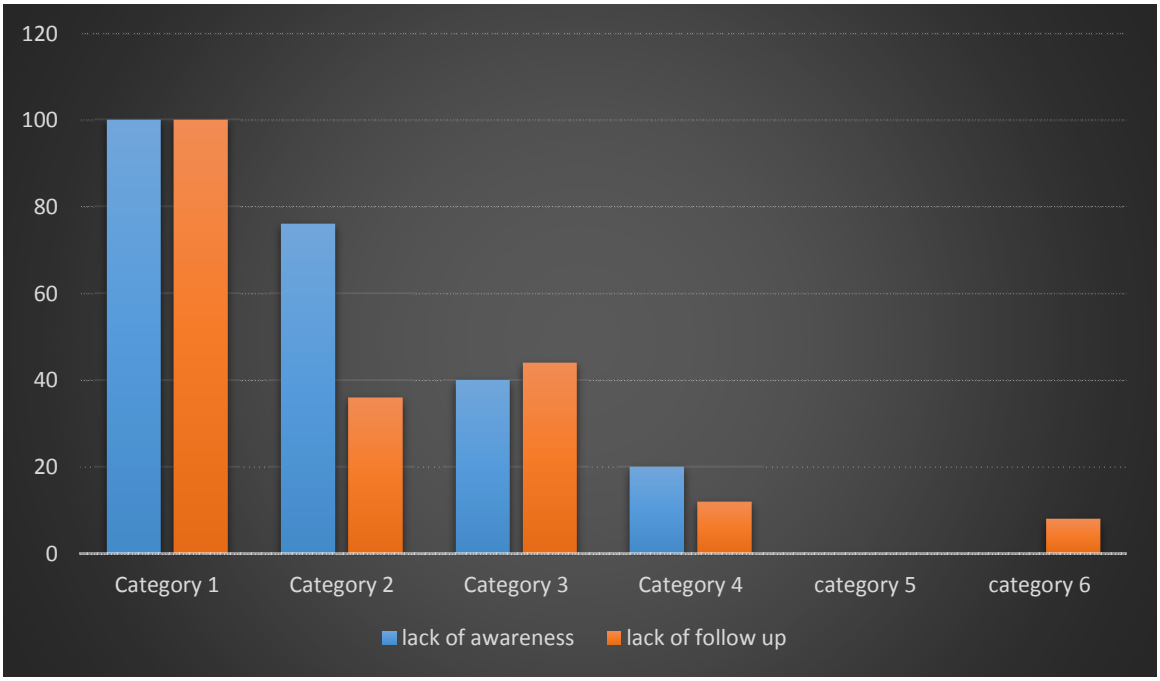


Fig2: lack of awareness and lack of follow up percentage in different categories of literacy groups.

5 DISCUSSION

Hepatitis C is a common problem of our community which is spreading day by day due to several factors like blood transfusion, unsterilized syringes & their reuse. Most of the people don't follow precautionary measures & don't take care of hygienic conditions.

Even most of our qualified population know about HCV but still they don't follow precautionary measures and behave like illiterate persons. So our main aim behind this project was to aware the general public and to assess that whether the persons who are educated and have knowledge about HCV; follow these precautions or not.

For this we distributed pamphlets in general public & filled Performa's from six different literacy groups & from those we calculated the %ages of awareness & follow up.

6 CONCLUSION

From results it was concluded that primary level had no awareness and follow up. Middle level had 24% awareness & 64% follow up. SSC level had 60% awareness & 56% follow up. HSC level had 80% awareness & 88% follow up. Undergraduate level had 100% awareness & follow up. Post graduate level had 100% awareness & 92% follow up. It shows that primary level had minimum awareness & follow up while Undergraduate level had maximum awareness & follow up.

7 RECOMMENDATIONS

It is clear that primary level has lowest awareness thus there is no follow up in this group. So, here our main target should be this group because in young children chances of spread of HCV are more as they don't take care of hygienic conditions, have no knowledge about the disease and lack proper guidance.

By knowing the above facts we recommend that there should be proper guidance for young children not only at homes but also in schools. A part of their science book should be comprised of general knowledge about HCV & its modes of transmission. There should be seminars & animated movies to boost their level of awareness about the disease. Teachers should tell them about hygienic conditions and consequences of disease as children pay a lot of attention to their teachers. There should be health care teams that should visit the educational institutes & also our rural areas to increase awareness in our community.

Awareness programs should be there to educate our people. There should be commercial advertisement about the disease from govt. to general public. LHV's should aware the females to avoid pregnancies while they are suffering from HCV & limitize the sexual contacts (limited to spouse). Literacy rate should be increased.

So, we believe that by following preventive measures and these recommendations risks of getting HCV can be minimized and we can move towards a healthy Pakistan.

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The effect of Paraquat and Fipronil on the soil and rhizosphere microflora of tea (*Camellia sinensis* (L) O. kuntze)

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ABSTRACT: The effect of two pesticides Paraquat and Fipronil on the soil and rhizosphere microflora of tea (i.e. fungi, actinomycetes and bacteria) was studied. The experiment was conducted over a period of 65 days and the observations were made at different interval of days (5, 20, 35, 50 and 65 days) respectively for both the rhizosphere and non rhizosphere soil. Paraquat and Fipronil had a transient negative effect on the rhizosphere and non rhizosphere soil microorganisms, however the negative effect was observed at the initial stage only. The dehydrogenase and phosphatase activity in the said soil also showed an inhibitory response at the initial stage but was able to recover with time.

KEYWORDS: Actinomycetes, Bacteria, Dehydrogenase activity, Fungi, Pesticide, Phosphatase Activity, Rhizosphere.

1 INTRODUCTION

The constant and widespread use of pesticides has resulted in the pollution of the environment. These chemicals not only affect the target organisms but also the microbial communities of the soil [3]. Maximum microbial population is found in the plant roots or rhizosphere [15]. However, the rhizosphere communities differ significantly from the bulk soil communities. Observations on the microbes isolated from the soil and rhizosphere reveal that the rhizosphere bacteria are physiologically more active than the soil bacteria [15]. Apart from quantifying the microbial population as an indicator of the effect of pesticides in soil, the effect of pesticide application on the soil enzyme study is also a good indicator of the degree of damage caused to the ecosystem.

Two of the most commonly used pesticides in tea agroecosystem of Barak Valley is Paraquat and Fipronil. Paraquat is one of the most widely used herbicide in the world to control broad leaf weeds and grasses [5]. It does not harm mature bark and is thus widely used for weed control in tea and coffee plantations [14]. Fipronil is an insecticide that belongs to the phenylpyrazole chemical family [13]. It is mainly used to control termites in tea agroecosystem. Termites are a very destructive pest of the tea plantations of Barak Valley, South Assam.

Enzymes have been considered as markers of soil environment purity [9]. Therefore in the present investigation, the effect of Paraquat and Fipronil on the total fungal, actinomycetes and bacterial population in the soil and tea rhizosphere and also on the dehydrogenase and phosphatase activity of the tea soil have been studied.

2 MATERIALS AND METHOD

Soil and tea saplings were obtained from the agricultural field (i.e, tea agro ecosystem) nursery of Rosekandy Tea Estate. The soil was sieved prior to the treatment with Paraquat and Fipronil. Soil @ 5 kg per earthen pots was taken and aqueous solution of Paraquat and Fipronil was applied at 10 ppm, 100 ppm and 1000 ppm concentration. Healthy seedlings of tea were planted in each pot. Soil and rhizosphere soil samples for analysis were collected at 5, 20, 35, 50 and 65 days interval

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after the application of the said pesticides. Three pots were taken for each treatment and control. To obtain the rhizosphere samples, the complete root system of the tea plant was dug out and put in the polythene bag where it was tapped gently to remove loosely attached soil. The root with attached rhizospheric soil was transferred to a 500 ml conical flask and mixed with distilled water for 10 minutes. Serial dilution was prepared from this suspension. Corresponding non rhizosphere soil samples were also collected. Serial dilution was prepared from this sample for determining the rhizosphere and non rhizosphere fungal, bacterial and actinomycetes population. The total number of microorganisms was determined using the dilution plate method [11].

The number of colony forming units (CFU) in a gram of sample was calculated by the formula given by Angle et. al [17]. Nutrient Agar medium was used for determining bacterial population while Rose Bengal Agar and Starch Casein Agar were used for fungal and actinomycetes population, respectively.

The dehydrogenase and phosphatase activity of soil microbes was assayed by the method as described by Casida *et.al*. [7] and Tabatabai *et.al*. [10] respectively.

3 Results And Discussion

3.1 Effect of Paraquat and Fipronil on the tea rhizosphere and soil microflora

The fungal population of the rhizosphere was significantly inhibited on the 5^{th}, 25^{th} and 35^{th} day after the application of Paraquat (Fig .1). With time, the population recovered from the initial inhibitory effect. The non rhizosphere fungal population was also inhibited by the treatment with paraquat as compared to control soil (Fig.1).

The rhizosphere and non rhizosphere actinomycetes population were able to overcome the initial deleterious effects of Paraquat (Fig.2). The bacterial population of the rhizosphere was significantly affected at the initial stages of the observation (Fig.3). However the inhibition was overcome and the population remained constant until the last observation on the 65^{th} day after the application of Paraquat. However, the population of bacteria in the non rhizosphere soil was stimulated by Paraquat (Fig.3).

Fipronil also had a significant inhibitory effect during the initial observation on the 5^{th} and 25^{th} day after the application on the rhizosphere and non rhizosphere fungal population (Fig. 4). However, they were able to overcome the adverse effect with time and maintained a constant population.

The actinomycetes population also showed varied response to Fipronil. Both the non rhizosphere and rhizosphere population were observed to overcome the initial adverse effect of the pesticide treatment (Fig.5). Fipronil was seen to be most effective which adversely affected the bacterial population of both rhizosphere and non rhizosphere soil (Fig 6). The effect was significant throughout the course of the study.

3.2 Assessment on the rhizospheric effect (R/S Ratio)

A considerable amount of change was observed in the rhizosphere of the plants grown in the Paraquat and Fipronil treated pots (Table 1&2). Compared to control, the treated soil showed a marked stimulatory effect on the fungal population. In case of actinomycetes also, treatment with both the pesticides had stimulatory effect. However, inhibitory effect was observed during the subsequent observations. The R/S ratio for bacteria shows that Paraquat and Fipronil also had an inhibitory effect on the bacterial population compared to control (Table 1&2).

3.3 Effect of Paraquat and Fipronil on the dehydrogenase and phosphatase activity of tea soil

The results of the dehydrogenase and phosphatase activity of tea soil as influenced by Paraquat and Fipronil are presented in Fig. 7, 8, 9 & 10 respectively. Dehydrogenase activity in soil treated with Fipronil was recorded to be lower compared to control, while the Fipronil treated soil showed inhibition of dehydrogenase activity at the initial stage. However, the activity increased after 35 days of treatment (Fig. 7). The highest dehydrogenase activity was observed on the 65^{th} day after the application of Fipronil (665 µg TPF g^{-1} dry soil 24 h^{-1}).

Paraquat also showed a similar effect on the dehydrogenase activity in the experimental soil (Fig. 8). The effect was inhibitory at the initial stage and the activity increased with time, till the last observation i.e after 65 days of treatment.

The phosphatase activity was observed to be lower compared to control soil (Fig. 9) in the soil treated with Fipronil. It showed an inhibitory effect up to 25 days following the pesticide application but the activity increased gradually and maintained a constant value until the last observation made on the 65th day.

In the soil treated with Paraquat, inhibition of the microbial population was recorded on the 5th and 25th day after application of the pesticide. However the inhibition was found to have reduced during the subsequent observations (Fig.10). The control soil showed a gradual increase in phosphatase activity with time.

Similar consistent result was also seen in which the soil was treated with three pesticides to observe their effect on the total viable bacterial population [2]. The pesticides were found not to have any inhibitory effect on the total microbial population. An experiment was conducted to observe the effect of four insecticides HCH, Phorate, Carbofuran and Fenvalerate on the growth and development of bacteria, actinomycetes and fungi in the treated soil. The applied pesticides were found to have increased the population of the microorganisms in soil significantly, which showed that the microorganisms are not so sensitive to the said insecticides and they utilized the released nutrients and increased in numbers [1]. It was indicated that greater utilization of insecticidal residues as well as their degraded products by the soil microorganisms to derive energy and other nutrient elements for their cellular metabolism and survival [18].

A study on the effect of a fungicide Chlorothalonil on the population of soil microorganisms showed that after initial population variations, soil bacteria, fungi and actinomycetes adapted gradually to Chlorothalonil and the negative effect became transient in the subsequent observations [8]. Similar findings were also reported in which tests were conducted to determine the effect of four nematicides on the microbial activities in loamy sands. It was observed that the bacterial and fungal population initially decreased with the nematicide treatments, but recovered rapidly to the level similar to those in control [4].

Stimulation in phosphatase activity under the influence of Paraquat, Trifluralin, Glyphosate and Atrazine was reported [6]. The effect of the pesticide Brominal and Secleron on the soil was studied [16]. They reported that acid and alkaline phosphatase activity has been accelerated by the treatment.

The effect of fungicide Mancozeb on the enzyme activities in a silty loam soil of Kashmir was studied [12]. It was observed that the phosphatase activity increased by 41 % after fourteen days of incubation. The dehydrogenase activity is measured to evaluate the microbial activity. The activity was observed to have been stimulated in response to different concentrations of the said fungicide treatment.

4 CONCLUSION

The result of the present study suggests that the pesticides Paraquat and Fipronil had a transient negative effect on the rhizosphere and non rhizosphere microflora. The dehydrogenase and phosphatase activity are indicative of the physiologically active microorganisms, which recovered with time from the initial inhibitory effect of the above mentioned pesticide treatments. Therefore, they seem to be fairly safe to be used in the tea agroecosystem at large.

Table no.1: Rhizosphere effect of the fungal, bacterial and actinomycetes population in the tea soil rhizosphere treated with Paraquat.

Days	Rhizosphere effect in the tea soil treated with Paraquat					
	Rhizosphere microorganisms in thousands per gram of dry soil			Rhizosphere effect *(R.S/C.S)		
	Fungi	Actinomycetes	Bacteria	Fungi	Actinomycetes	Bacteria
5	5	106.6	10.6	1.66	1.18	0.41
20	4.3	128	118.6	0.44	1.60	2.06
35	13	266.6	240	2.16	0.86	2.27
50	17.3	273.3	245.3	1.73	0.85	2.16
65	27.6	278.6	336	1.62	0.84	2.11

**Rhizosphere soil/Control soil.*

Table no.2: Rhizospheric effect of the fungal, bacterial and actinomycetes population in the soil rhizosphere treated with Fipronil.

Days	Rhizosphere effect in the tea soil treated with Fipronil					
	Rhizosphere microorganisms in thousands per gram of dry soil			Rhizosphere effect *(R.S/C.S)		
	Fungi	Actinomycetes	Bacteria	Fungi	Actinomycetes	Bacteria
5	5	294.6	49.3	0.48	1.57	0.68
20	5.3	27.6	27.6	1.47	1.93	1.22
35	15.3	129.3	23.3	2.42	0.95	1.07
50	17	161.6	40.3	1.88	1.10	1.02
65	17.3	164	41.6	1.73	1.09	1.02

**Rhizosphere soil/Control soil.*

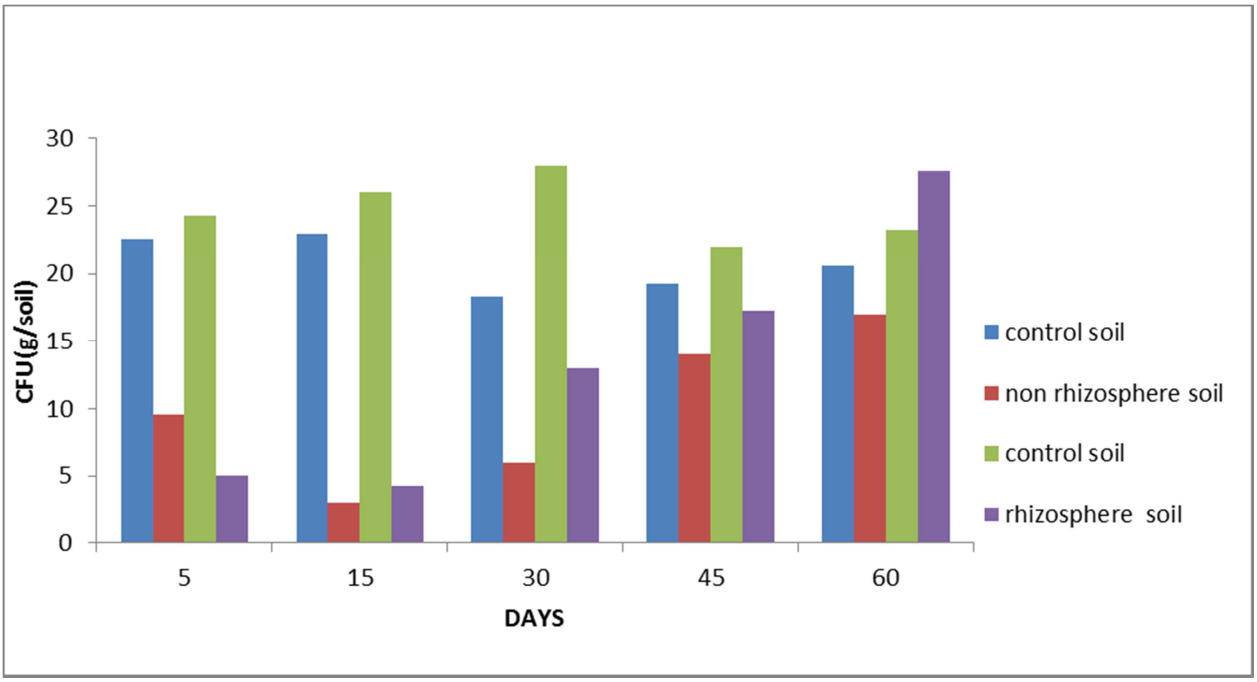

Fig.1: The effect of Paraquat on the non rhizosphere and rhizosphere fungal population.

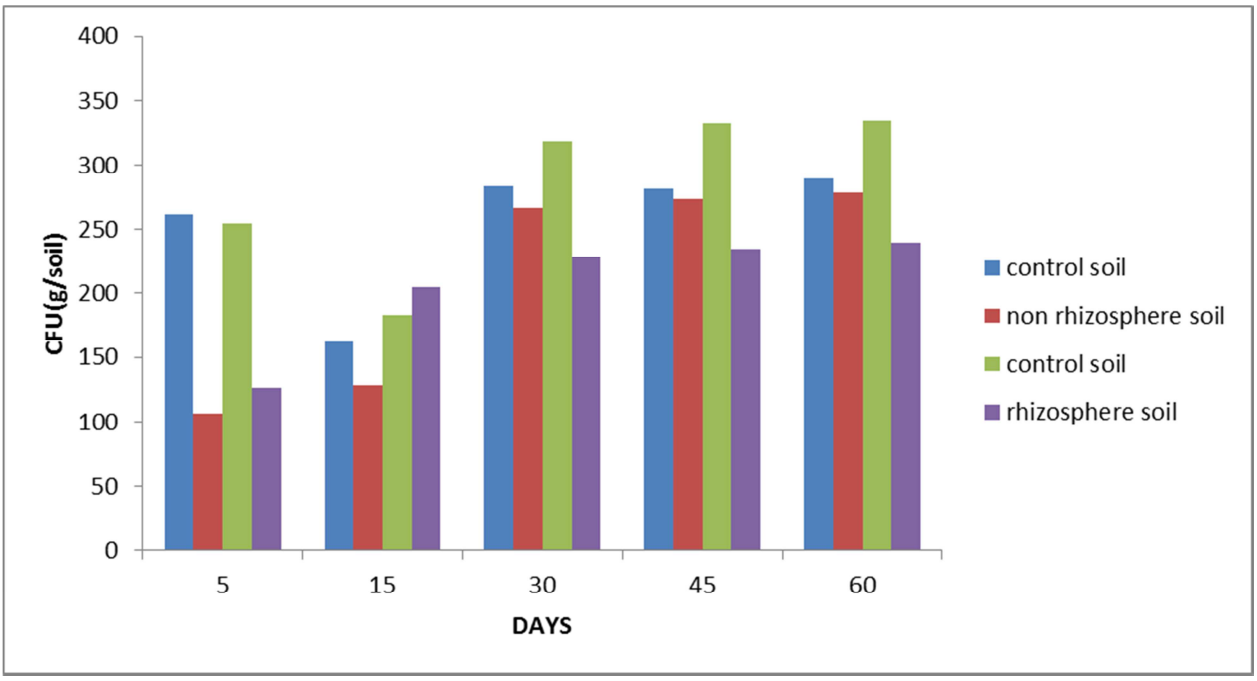

Fig.2: Effect of Paraquat on the non rhizosphere and rhizosphere actinomycetes population.

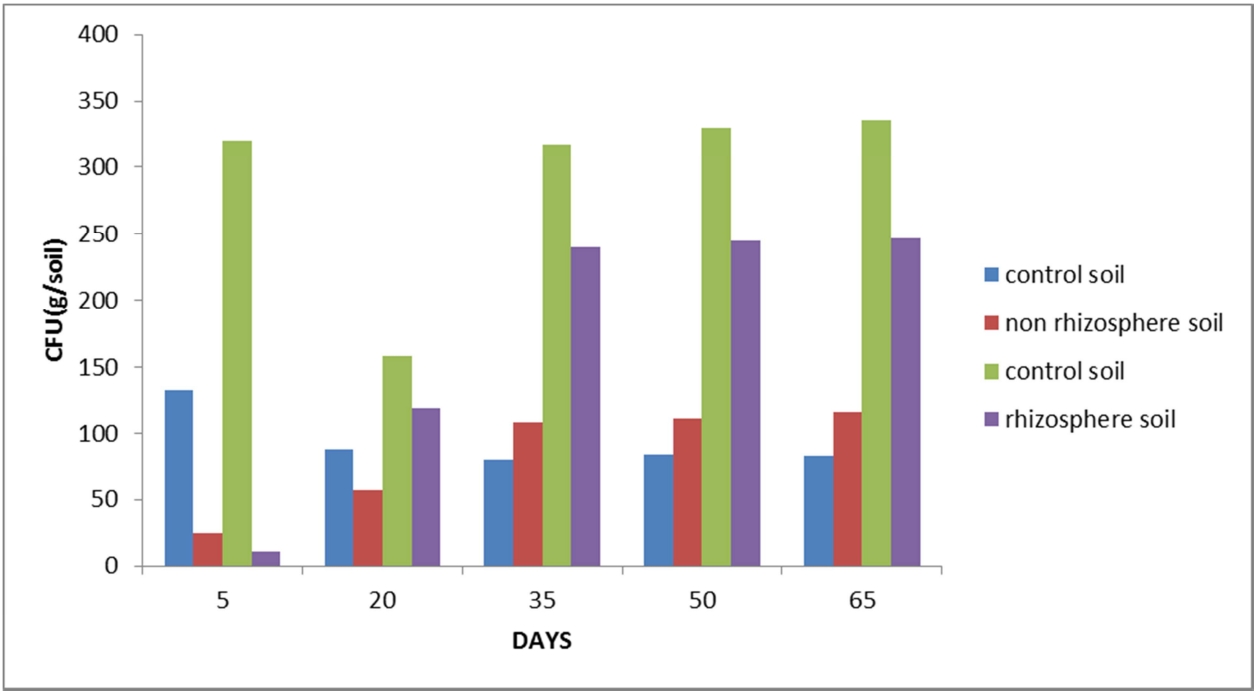

Fig.3: Effect of Paraquat on the non rhizosphere and rhizosphere bacterial population.

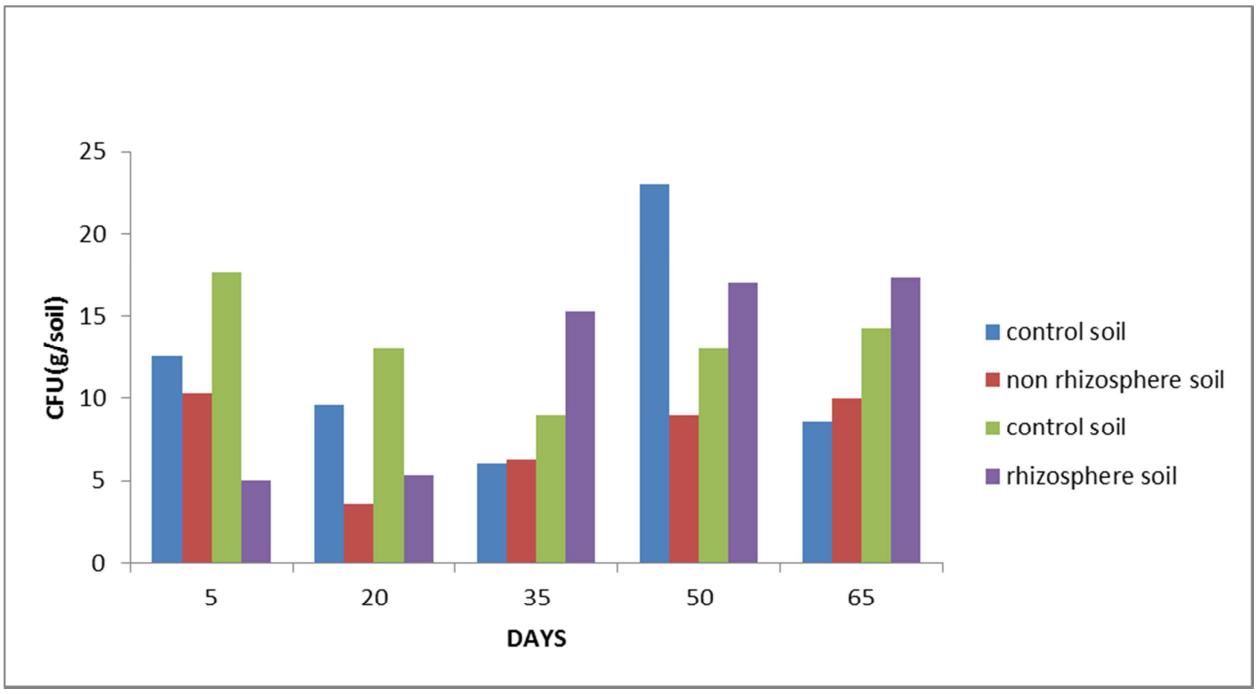

Fig. 4: Effect of Fipronil on non rhizosphere and rhizosphere fungal population.

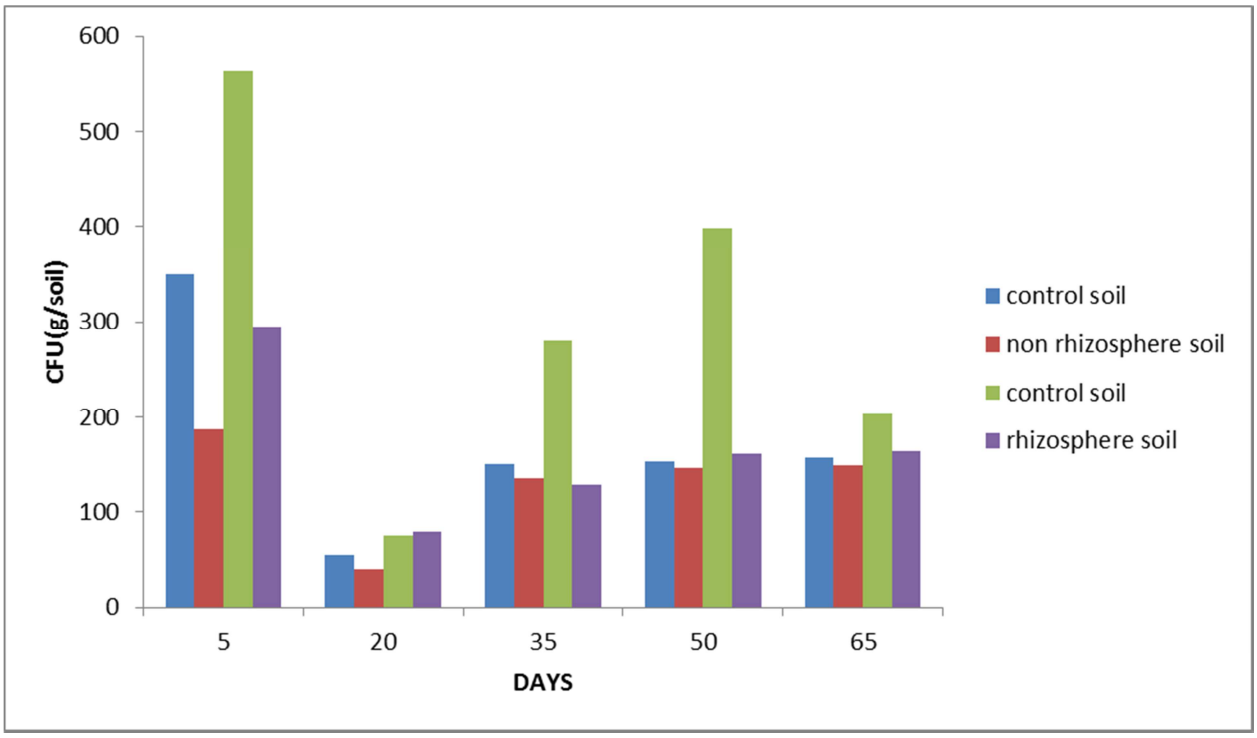

Fig. 5:Effect of Fipronil on non rhizosphere and rhizosphere actinomycetes population.

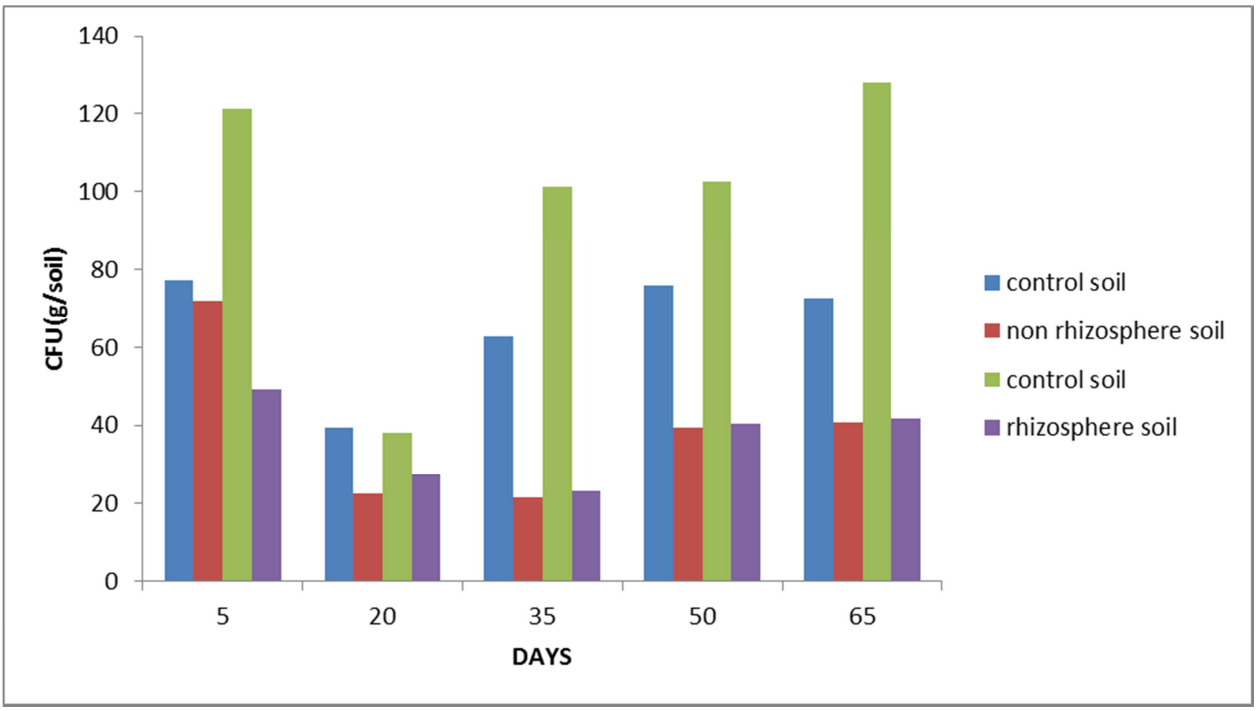

Fig. 6: Effect of Fipronil on non rhizosphere and rhizosphere bacterial population.

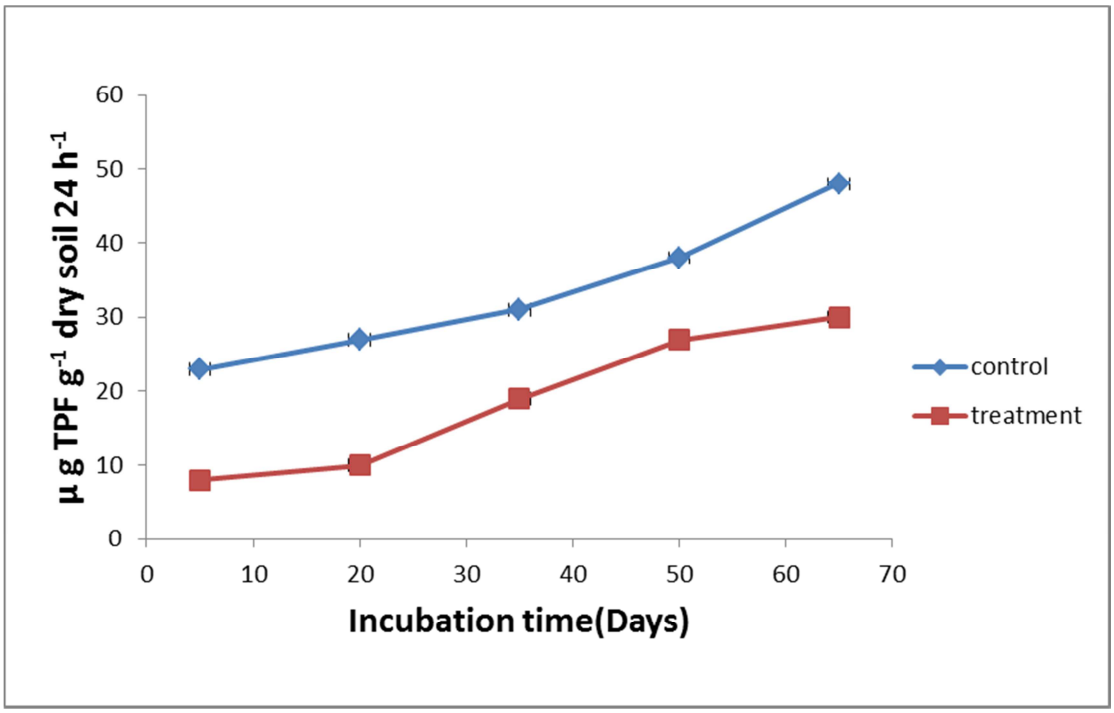

Fig.7: Effect of Fipronil on the dehydrogenase activity of soil.

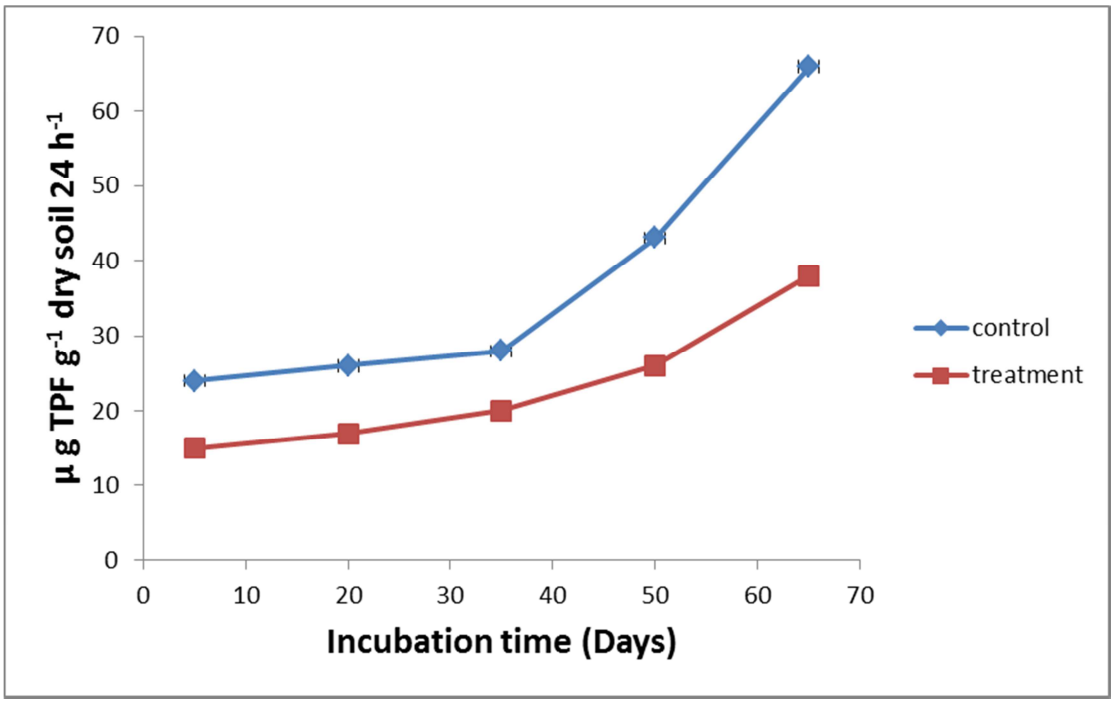

Fig.8: Effect of Paraquat on the dehydrogenase activity of soil.

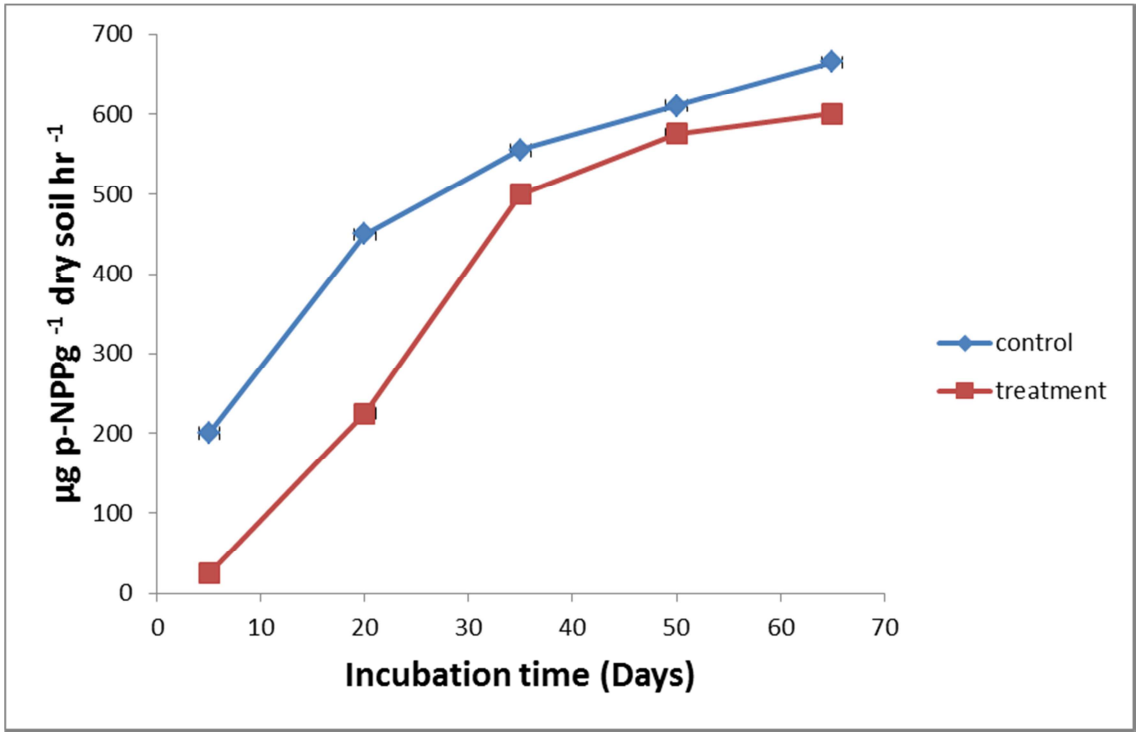

Fig.9: Effect of Fipronil on the phosphatase activity of soil.

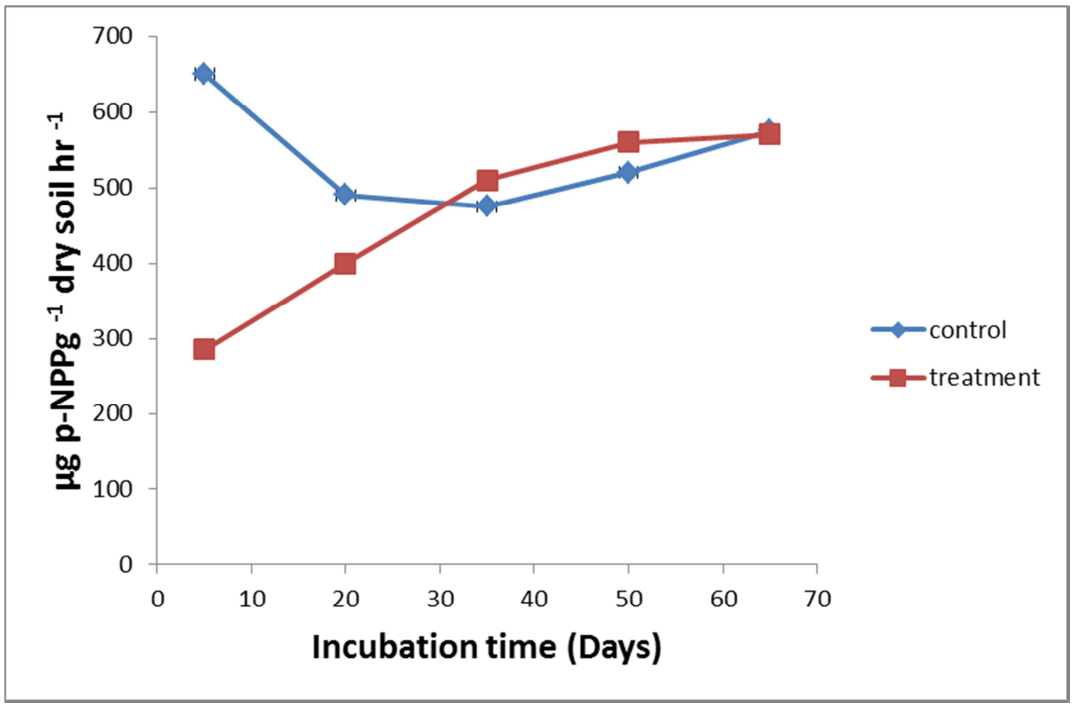

Fig.10: Effect of Paraquat on the phosphatase activity of soil.

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Investigation de cas groupes de grippe a (H1N1) chez des marins pêcheurs à bord d'un bateau au port Dakhla (Maroc), 2013

[Investigation of clustered case A (H1N1) in fishermen aboard a boat in the port of Dakhla (Morocco), 2013]

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ABSTRACT: *Introduction* On 8 February 2013, a cluster of influenza AH1N1 in a fishing boat docked at the port of Dakhla was reported to the Regional Health Directorate of Oued Ed-Dahab Lagouira. An epidemiological investigation was conducted to identify the source of infection, control the outbreak and prevent its extension.
Methods: The investigation of this case grouped AH1N1 began on 12 February. It involved 26 fishermen aboard a boat docked at the port of Dakhla. Data were collected using an individual questionnaire.
*Results***:** The occurrence of cases occurred between 1 and 10 February. The age of cases ranged from 26 to 55 years with an average of 40 (+ / - 8 years). Depending on the date of onset of symptoms, the first case dates back to February 1, 11 days before the start of the investigation. Among the 14 cases, 2 were confirmed for the AH1N1 virus. The last case dating back to February 10, and the epidemic peak was reached on February 4. Cases were all presented with fever, cough and ache. The overall attack rate was 14/26 (53.8%). Attack rate vary by age and disease and was significantly higher in the age group of 36-45 years.
*Conclusion***:** This investigation allowed us to document the AH1N1 outbreak in a fishing boat and the importance of early implementation of control measures at the onset of the first case in a community.

KEYWORDS: Influenza A(H1N1), group cases, epidemiological investigation, boat, Dakhla, Morocco.

RESUME: *Introduction :* Le 8 février 2013, un cas groupés de grippe AH1N1 dans un bateau de pêche accosté au port de Dakhla a été signalé à la Direction Régionale de la Santé d'Oued Eddahab Lagouira. Une investigation épidémiologique a été menée pour identifier la source de l'infection, contrôler cette épidémie et prévenir son extension.
Méthodes : L'investigation de ce cas groupé H1N1 a débuté le 12 février. Elle a concerné 26 marins pêcheurs à bord d'un bateau accosté au port de Dakhla. Les données ont été recueillies à l'aide d'un questionnaire individuel.
Résultats : La survenue des cas s'est produite entre le 1 et le 10 février. L'âge des cas varie entre 26 et 55 ans avec une moyenne de 40 (+/- 8 ans). Selon la date d'apparition des symptômes, le premier cas remonte au 1 février, soit 11 jours avant le déclenchement de l'investigation. Parmi les 14 cas, 2 ont été confirmés pour le virus AH1N1. Le dernier cas remonte au 10 février et le pic épidémique a été atteint le 4 février. Les cas avaient tous présenté la fièvre, la toux et la courbature. Le taux

d'attaque global était de 14/26 (53,8%). Les taux d'attaque varient selon l'âge et la maladie était ainsi significativement plus élevée chez la tranche d'âge de 36-45 ans.
Conclusion : Cette investigation nous a permis de documenter cette épidémie de grippe AH1N1 dans un bateau de pêche et l'importance de la mise en place précoce de mesures de contrôle dès la survenue du premier cas dans une collectivité.

MOTS-CLEFS: Grippe A(H1N1), cas groupés, enquête épidémiologique, bateau, Dakhla, Maroc.

1 INTRODUCTION

1.1 CONTEXTE

La grippe est une infection respiratoire aigüe d'origine virale très contagieuse qui peut toucher l'Homme et plusieurs espèces animales notamment les oiseaux et le porc. Elle est due aux virus Influenzae qui se répartissent en trois types : A, B et C. Les virus A et B sont à l'origine des épidémies saisonnières, tandis que le virus C occasionne des cas sporadiques. Seul le virus A est à l'origine d'épidémies exceptionnelles par leur extension et leur gravité telles que les pandémies de 1918, 1957, 1968 et 2009 [1].

Le virus A (H1N1) pandémique s'est propagé rapidement à travers le monde après la flambée survenue au Mexique en avril 2009. Il s'agissait de la première pandémie grippale majeure depuis 1969 [2].

Au Maroc, la surveillance épidémiologique de la grippe se fait à travers deux systèmes complémentaires, La surveillance virologique conduite par le laboratoire de virologie de l'Institut National d'Hygiène (INH) depuis la saison 1995/1996, à travers un réseau de médecins volontaires du secteur libéral et la surveillance clinique à travers 379 centres de santé sélectionnés au niveau de chaque province et préfecture depuis 2004.

La surveillance des cas groupés d'infections par le virus grippal A(H1N1) apporte des informations sur la circulation du virus dans la communauté. Elle permet la mise en place précoce de mesure de contrôle et éviter la dissémination de l'infection.

Cet article décrit une investigation de cas groupés d'infection par le virus A(H1N1) survenue dans un bateau qui a accosté au port de Dakhla le 08 février 2013 suite au décès d'un marin pêcheur à bord.

1.2 SIGNALEMENT

Le médecin du Bureau communal d'hygiène (BMH) de la ville de Dakhla a été averti, le 08 février 2013, par la gendarmerie royale, pour la levée de corps d'un membre de l'équipage du bateau de pêche Liwa composé de 26 marins pêcheurs, qui est décédé au large de la ville de Dakhla le 8 février 2013. Le bateau était en provenance de la ville d'Agadir et a quitté le port le 30 janvier 2013.

Le procès verbal, réalisé par le médecin du BMH, afin d'éclairer les circonstances du décès avait montré que la personne décédée était de sexe masculin, âgé de 40 ans et avait présenté le 3 février 2013 un syndrome grippal fait d'asthénie, de toux, de fièvre et de diarrhée. Le 7 février 2013, son état s'est aggravé avec apparition de saignement des gencives et d'épistaxis suivi du décès le 8 février à 2 h du matin.

Par ailleurs, lors de la levée du corps, le médecin du BMH a remarqué l'existence de syndrome grippal chez de nombreux membres de l'équipage, ce qui l'a poussé à alerter l'autorité locale (wilaya) et la direction régionale de la santé d'Oued Eddahab Lagouira (DRS-OEL) sur l'éventualité d'une épidémie de grippe.

1.3 GESTION DES CAS

Devant la suspicion des cas groupée de grippe, des mesures de quarantaine ont été prises et une enquête a été menée par l'équipe régionale et a révélé les résultats suivants :

Le premier cas était le capitaine du bateau qui a présenté le 1 février un syndrome grippal fait de fièvre, de céphalée et de courbatures.

Le 2 février, deux autres cas se sont déclarés présentant la même symptomatologie accompagnée d'une toux dont l'un a évolué vers le décès le 8 février 2013.

Le 4 février, quatre autres cas ont présenté les mêmes signes.

La diarrhée était inconstante et apparaissait ultérieurement après le début des autres signes cliniques déjà mentionnés

Des prélèvements nasaux ont été effectués et envoyés à l'Institut Pasteur auprès de 14 personnes dont 11 malades qui présentaient une symptomatologie de grippe, la personne décédée et deux personnes non malades.

L'Ecole Nationale de Santé Publique (ENSP) a dépêché l'envoi d'une équipe de quatre épidémiologistes de terrain (FETP) au niveau de la ville de Dakhla le 11 février 2013 pour l'investigation de cet événement.

1.4 OBJECTIFS DE L'INVESTIGATION

Les objectifs de l'investigation sont :

- Déterminer la nature de cet évènement (épidémie, cas groupés)
- Rechercher la source de transmission à l'origine de cet évènement
- Contrôler cet évènement et prévenir son extension
- Déterminer les caractéristiques cliniques, biologiques et épidémiologiques de la population d'étude
- Identifier les facteurs de risques associés aux cas
- Communiquer les rapports aux différents publics cibles

2 MATÉRIEL ET MÉTHODES

2.1 POPULATION D'ÉTUDE

La population d'étude a été définie comme tous membre d'équipage du bateau Liwa composée de 26 marins pêcheurs.

2.2 DÉFINITION DE CAS

Trois niveaux de définition de cas sont proposés en fonction de la présence et des caractéristiques des signes cliniques et des résultats des analyses virologiques [3].

– un **cas possible** de grippe A(H1N1) a été défini comme tout marin pêcheur du bateau Liwa ayant présenté l'association d'au moins un signe général (fièvre ou courbatures) et au moins un signe respiratoire aigu (toux ou dyspnée).

– un **cas probable** a été défini comme un cas possible ayant eu un contact étroit avec un cas confirmé, entre les 24 heures précédant le début des symptômes de ce cas confirmé et sept jours après la survenue des symptômes de ce dernier ;

– un **cas confirmé** a été défini comme une personne dont l'infection était confirmée biologiquement par PCR spécifique grippe A(H1N1).

2.3 INVESTIGATION VIROLOGIQUE

Des prélèvements nasaux ont été réalisés pour 14 marins pêcheurs le 08 février, le jour où le bateau a accosté au port de Dakhla. La décision de réaliser le prélèvement était laissée au jugement du médecin consultant et selon la disponibilité logistique du moment. Les prélèvements ont été envoyés pour confirmation à l'Institut Pasteur de Casablanca.

2.4 INVESTIGATION DE L'ÉTENDUE DE L'ÉPIDÉMIE

Un autre cas groupé suspect de grippe a été signalé dans un autre bateau nommé Ilyass qui a accosté le 13 février au port de Dakhla et il y avait 23 marins pêcheurs à bord. Une investigation des membres d'équipage de ce bateau a été faite le 14 février. La recherche des cas lié à cette épidémie de grippe a été aussi faite dans les 4 centres de santé qui desservent la population de laville de Dakhla (Massira, Bir Inzarane, Al Wahda et Moulay Rachid).

2.5 COLLECTE DES DONNÉES

L'investigation de ce cas groupé A (H1N1) du bateau Liwa a débuté le 12 février. Les données ont été recueillies à l'aide d'un questionnaire individuel structuré. Il est rempli en administrant des questions face à face avec les 26 membres d'équipage du bateau Liwa. Ce questionnaire comporte les variables suivantes: les informations sociodémographiques (nom, âge, adresse, profession), symptômes, dates de début et de fin des signes cliniques, antécédent de maladie chronique, personne contact présentant des signes cliniques de grippe 1 à 7 jours avant la date de début de signes, personne contact 1 jour avant et 7 jours après le début des signes, prélèvements pour analyse virologique et statut final, le traitement curatif, le traitement prophylactique antiviraux et la vaccination.

Ce même questionnaire a été administré aux 9 membres de l'équipage du bateau Ilyass.

Une fiche de recueil des données au niveau des registres des centres de santé et de l'hôpital Hassan II a été élaborée à la recherche et l'identification des cas de grippe lié à cette épidémie.

2.6 ANALYSE DES DONNÉES

Les données des questionnaires ont été saisies, nettoyées et analysées à l'aide du logiciel Epi-Info version 3.5.3 pour Windows (CDC, Atlanta, GA, USA).

La population de l'étude a été décrite en termes d'âge, de signes cliniques et d'évolution. Cette analyse nous a permis de calculer le taux d'attaque global et le taux d'attaque spécifique par tranche d'âge. En outre, cette analyse nous a permis d'établir la courbe épidémique selon la date d'apparition des symptômes et la définition de cas. Une analyse uni et bivariée a été réalisée pour mettre en évidence l'existence ou non d'une association statistiquement significative entre la maladie et certaines variables notamment tranche d'âge, antécédent de maladie chronique.

La signification des facteurs de risque associés aux cas a été vérifiée avec le test exact de Fisher. Une valeur p inférieure ou égale à 0,05 a été considérée comme statistiquement significative.

3 RÉSULTATS

3.1 ENQUÊTE ÉPIDÉMIOLOGIQUE

Au total, 25 marins pêcheurs du bateau Liwa ont répondu au questionnaire, soit un taux de participation de 96%. L'âge de la population étudiée varie entre 21 et 55ans, avec une moyenne de 41 ans (+/- 9,2 ans). Tous ont bénéficié d'une consultation médicale le jour du signalement de l'épidémie à bord du bateau.

Quatorze marins répondaient à la définition de cas (probable et confirmé). Parmi ces malades, un cas âgé de 40 ans et a présenté les premiers symptômes le 03 février (fièvre, toux, courbature, dyspnée, maux de gorge) et est décédé la nuit du 08 février alors que les autres cas ont évolué favorablement.

La survenue des cas s'est produite entre le 1 et le 10 février. L'âge des cas varie entre 26 et 55 ans avec une moyenne de 40 (+/- 8 ans). Selon la date d'apparition des symptômes, le premier cas remonte au 1 février, soit 11 jours avant le déclenchement de l'investigation : il s'agit du capitaine du navire chalutier Liwa ayant fait l'objet de l'alerte du 08 février. Parmi les cas, on a recensé 2 cas confirmés et 12 cas probables. Le dernier cas remonte au 10 février et le pic épidémique a été atteint le 4 février. (figure 1).

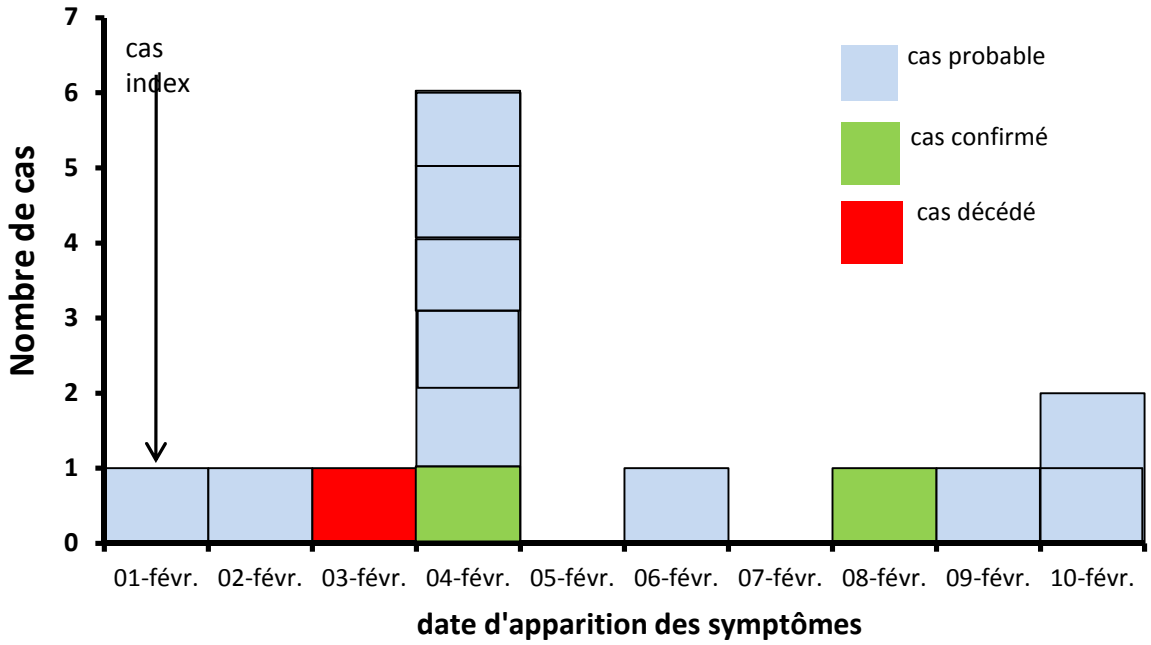

Fig.1. Courbe épidémiologique de cas groupé de grippe H1N1, bateau Liwa, Dakhla, février 2013

100% des cas ont présenté les symptômes toux, fièvre et céphalées, les pourcentages des autres symptômes ont oscillés entre 21 et 78% (Figure 2).

Le taux d'attaque global était de 14/26 (53,8%). Les taux d'attaque varient selon l'âge et la maladie était ainsi significativement plus élevée chez la tranche d'âge de 36-45 ans (Tableau 1).

3.2 ETENDU DE L'ÉPIDÉMIE

L'investigation a été faite au niveau du bateau Ilyass le 14 février. Neuf des 23 marins pêcheurs à bord ont répondu au questionnaire, soit un taux de réponse de 40%. Deux personnes répondaient à la définition de cas suspect de la grippe A(H1N1) présentant les mêmes symptômes (fièvre, toux, courbature) et aucun prélèvement pour confirmation biologique n'a été effectué.

L'investigation au niveau des Etablissements de Soins de Santé de Base (ESSB) a été réalisée également le 14 février. Deux des quatre ESSB disposaient de l'information mentionnant les signes cliniques des patients qui consultent. L'exploitation des registres de consultation a enregistré 21 cas de cas suspect de grippe du 01 au 15 février 2013. Neuf cas au niveau de l'ESSB Bir Inzarane (42,9%) et 12 cas au niveau de l'ESSB Massira (57,1%). 19 cas soit 90% sont notifiés du 11 au 14 février.

3.3 RECHERCHE DE LA SOURCE DE TRANSMISSION

Avant son départ le 30 janvier, le bateau Liwa a accosté auparavant au port d'Agadir pendant 5 jours du 25 au 30 janvier 2013. Malheureusement, au cours de l'investigation, les marins pêcheurs n'ont pas rapportés des informations concernant leurs contacts à Agadir qui pourraient nous permettre d'identifier avec précision la source de transmission.

Un cas probable, qui est le capitaine du bateau, peut être considéré comme le premier cas attribuable à cette épidémie (cas index) avec une date de début de signe le 1 février. Il a présenté tous les symptômes d'un syndrome grippal (Fièvre, toux, céphalée, courbature, maux de gorge). Le test, fait le 08 février, était négatif pour la grippe A (H1N1).

Deux cas ont présenté les symptômes d'un syndrome grippal le 4 et le 8 février, leurs prélèvements ont été révélé positifs pour la grippe A (H1N1) (Figure 1).

La pertinence de recherche de la source de contamination a été néanmoins réduite du fait de l'impossibilité de suivre les contacts à Agadir.

4 DISCUSSION

Il s'agit d'un des premiers épisodes de cas groupés de grippe A(H1N1) survenu à bord d'un bateau de pêche ayant fait l'objet d'une investigation approfondie au Maroc.

L'investigation a permis de documenter la survenue d'une épidémie de grippe A(H1N1) à bord du bateau Liwa entre le 01 et le 10 février, avec 14 cas recensés, pour un taux d'attaque global de 54%.

L'identification du cas index, présentant les premiers signes cliniques au sein du bateau Liwa, a fait état d'une contamination extérieure au bateau sans qu'il ait été possibilité d'en préciser l'origine puisque aucun contact n'a été rapporté chez ce dernier. Ce contact a pu probablement survenir soit dans sa famille soit au niveau du port d'Agadir.

L'investigation biologique a montré que sur les 14 cas possibles prélevés, 2 étaient confirmés biologiquement pour la grippe A(H1N1). Elle a également montré que pour78 % (11/14) des marins pêcheurs répondant à la définition de cas probable, le portage du virus A(H1N1) n'a pas été retrouvé.

Différentes hypothèses sont possibles : la circulation concomitante d'un autre virus grippal, un délai trop important entre la date de début des signes et le prélèvement, ou encore la moindre sensibilité du prélèvement nasal superficiel par rapport au prélèvement nasopharyngé [4]. L'homogénéité de la distribution des cas dans le temps permet d'écarter la première hypothèse. Il est en effet peu probable qu'un second virus grippal ait pu circuler avec la même dynamique au sein du bateau.

La littérature sur le sujet tend plutôt à montrer que le portage du virus grippal classiquement ne dépasse pas 8jours, y compris dans le cas du virus A (H1N1) [5], [6], [7]. Le test fait pour le cas index était révélé négatif pour la grippe A(H1N1). Probablement, le manque de la sensibilité du test pourrait être expliqué par le délai entre la date l'apparition des symptômes (1 février) et la date de la réalisation du test (8février).

Les prélèvements nasaux effectués sont moins sensibles que les nasopharyngés recommandés pour le test de confirmation du virus A (H1N1) [8]. Ceci pourrait également expliquer le pourcentage élevé de test négatif et à ceci s'ajoute d'éventuelles conditions de transport non optimales affectant la qualité des prélèvements.

L'investigation a montré que tous les marins pêcheurs étaient non vaccinés contre la grippe AH1N1. Il semble important de s'interroger sur l'absence de vaccination de cette catégorie des travailleurs surtout du fait d'un risque accru de dissémination virale au sein de cette communauté

D'après l'investigation du 2ème bateau Ilyass, il s'est révélé qu'il existe un lien épidémiologique direct entre les deux bateaux Liwa et Ilyass du fait qu'ils étaient accostés côte à côte au port d'Agadir pendant 5 jours ce qui a permis probablement des contacts étroits entre les marins pêcheurs.

L'investigation au niveau des ESSB n'a pas pu établir de lien épidémiologique de cas suspect de grippe de la population de Dakhla et le cas groupé étudié. En effet, la non disponibilité des coordonnées des cas sur le registre de consultation n'a pas rendu possible le suivi de l'enquête.

Par ailleurs, les données de surveillance de la grippe des cinq dernières années auraient pu être utiles si nous disposions des données de tous les ESSB et voir si le seuil d'alerte épidémiologique a été dépassé.

Notre investigation aurait du être élargie au port d'Agadir, lieu provenance des deux bateaux, à la recherche de l'origine de la source de la transmission du virus de ce cas groupé si les marins pêcheurs avaient rapportés des informations concernant leurs contacts au port d'Agadir.

5 CONCLUSION

Cette étude a permis de documenter l'épidémie de grippe AH1N1 dans un bateau de pêche, elle souligne également l'importance de la mise en place précoce de mesures barrière dès la survenue du premier cas dans une collectivité.

La finalité de la surveillance des foyers de cas groupés de grippe AH1N1 était de les détecter afin de permettre la mise en place des mesures de gestion (isolement des cas, mesures d'hygiène, traitement antiviral préventif et curatif conformément aux recommandations), pour contrôler l'épidémie au sein des collectivités touchées et retarder la diffusion de l'épidémie dans la population générale.

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TRAITEMENT BIOLOGIQUE DE L'EFFLUENT LIQUIDE ISSU DE L'INDUSTRIE LAITIERE PAR DES CHAMPIGNONS EXOGENES

[BIOLOGICAL TREATMENT OF LIQUID EFFLUENT RESULTING FROM THE DAIRY INDUSTRY BY EXOGENOUS FUNGI]

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ABSTRACT: Discharges from dairies are very rich in organic matter. 900 m^3/d of liquid waste is discharged daily by the milk processing unit of the City Rabat / Salè. They are a formidable source of pollution because they contain microorganisms, lactose, protein, vitamins and mineral, in addition the management of these effluents concerned producers and actors of the environment.

This work is primarily concerned to the biodegradation of dairy effluent by treatment with fungi. A reactor in batch culture was used in order to study the growth of fungi and removal organic matter. The inoculation is carried out by amplified fungi of the effluent and with unamplified fungi. And to improve the treatment efficiency, the biodegradation was coupled by a buffer reagent LDC_7.

The results show that using amplified fungi in presence of LDC7 reagent induces a high decrease of COD with a percentage of 85%.

In conclusion, the biodegradation of the effluent from the dairy industry using fungi coupled to LDC7 is a very promising biotechnological process, which is simple, economical and environmentally friendly and can contribute to the treatment of liquid waste and reduce polluting factors.

KEYWORDS: Dairy effluent, pollution, biodegradation, fungi.

RESUME: Les rejets des industries laitières sont très riches en matière organique. 900 m^3/j de déchets liquides sont rejetés quotidiennement par l'unité de transformation de lait de la Ville Rabat/Salè. Ils constituent une source de pollution redoutable par sa richesse en microorganismes, lactose, protéines, vitamines et sels minéraux, en plus la gestion de ces effluents préoccupe les producteurs et les acteurs de l'environnement.

Ce travail s'intéresse essentiellement à la biodégradation de l'effluent laitier par traitement avec des moisissures. Un réacteur en culture batch a été utilisé dans le but d'étudier la croissance des mycètes et d'éliminer la matière organique. L'inoculation est réalisée par des champignons amplifiés sur l'effluent lui-même et par des champignons non amplifiés. Et pour améliorer le rendement de traitement, la biodégradation a été couplée par un réactif tampon le LDC_7. Les résultats

montrent que l'utilisation des champignons amplifiés en présence du réactif LDC_7 induit une forte diminution de la DCO avec un pourcentage de 85 %.
En conclusion, la biodégradation de l'effluent de l'industrie laitière par l'utilisation des mycètes couplée au LDC_7 est un procédé biotechnologique très prometteur, simple, économique et respectueux de l'environnement qui contribue au traitement des rejets liquides et diminue les facteurs polluants.

MOTS-CLEFS: Effluent laitier; pollution; biodégradation; champignons.

1 INTRODUCTION

Ces dernières années, le Maroc est devenu un grand producteur et consommateur de lait et de ses dérivés. Selon le Ministère marocain de l'Agriculture et du Développement Rural, la production annuelle est encore en augmentation [1]. En plus, les rejets de l'industrie laitière constituent non seulement une perte importante de source organique valorisable mais engendrent également un problème de pollution pour l'environnement [2;3;4;5]. Cependant, le traitement de ces résidus est une préoccupation majeure des industriels qui sont soumis à une réglementation de plus en plus exigeante [6]. Et de ce fait, l'élimination ou le traitement des effluents représente une part importante du budget consacré à l'environnement.

En effet, l'effluent rejeté est riche en matières organiques et en bactéries en plus de la variabilité de son acidité [2;4]. Différents types de déchets liquides sont produites au cours de la transformation de lait, on trouve les eaux usées issus des nettoyages de l'équipement et des tuyaux, l'eau de refroidissement, les eaux usées domestiques, le lactosérum acide et sucré [5;7]. Le lactosérum forme l'effluent le plus polluant des déchets des industries laitières. Il est saturé en matière organique présenté essentiellement par le lactose, les protéines, les acides aminés comme la lysine et le tryptophane, les vitamines du groupe B tel que la thiamine et la riboflavine en plus des micro-organismes. Cependant, il est d'une importance indéniable et peut être valorisable à forte valeur ajoutée pour les industriels [2;8;9].

Généralement, plusieurs techniques de valorisation ou de traitement des effluents sont utilisées, mais le choix de la technique dépend essentiellement des caractéristiques physicochimiques et biologiques des rejets et de la nature des milieux récepteurs [8;10]. Au Maroc et dans la plupart des cas, ces effluents ne sont ni traités, ni valorisés, par contre ils sont déversées directement dans les milieux récepteurs [6].

Afin de valoriser l'effluent laitier de LVRS par des procédés biotechnologique, nous avons réalisé des études qui se sont intéressés à la production des sucres simples à partir du lactose issu de lactosérum [4] et au traitement de cet effluent par des procédés physicochimiques [10] et des procédés biologiques pour la production de bioéthanol et de biométhanol [2,4].

Ce travail est une suite de ces travaux et il a pour but la caractérisation qualitative et quantitative de l'effluent laitier global brut de la Ville Rabat/Salè suivie par un traitement biologique innovant de l'effluent laitier en utilisant une biomasse fongique spécifique permettant de réduire davantage la pollution carbonée sans augmenter la production de boues. Les champignons ont été amplifiés dans un bioréacteur sur l'effluent lui-même, en plus les facteurs influençant ce type d'épuration ont été déterminé et le procédé de traitement a été optimisé en plus l'efficacité de différents tests a été contrôlée.

2 MATERIEL ET METHODES

2.1 SUBSTRATS ET CARACTÉRISATION DE LACTOSÉRUM

Le substrat utilisé est le rejet de l'industrie laitière de la Ville Rabat / Salè. Il est collecté pendant plusieurs périodes de l'année. Les échantillons de l'effluent brut total (ELT) ont été mélangés et conservés à 4°C jusqu'à usage. L'échantillonnage et la conservation ont été faits selon le guide général pour la conservation et la manipulation des échantillons [12].

Pour se rapprocher aux conditions naturelles, aucune stérilisation des effluents n'a été effectuée. La caractérisation et l'analyse physico-chimique de l'effluent ont été réalisées selon les normes [12].

Et pour les analyses bactériologiques, le dénombrement des streptocoques fécaux ont été effectué sur gélose incubés à 37°C et la numération des coliformes fécaux est réalisée par la méthode du nombre le plus probable après culture sur bouillon de lactose incubés à 44,5°C [13].

2.2 PROCÉDÉ DE TRAITEMENT BIOLOGIQUE

2.2.1 SOUCHES UTILISÉES

Dans ce travail, nous avons utilisé un mélange (Asn-Muh-Gag) de trois souches de champignons *Aspergilus niger*, *Mucor hiemalis* et *Galactomyces geotrichum* fourni par le laboratoire biotechnologique de la Faculté des Sciences Dhar Mehraz (FSDM), Fès, Maroc (figure 1).

Les mycètes ont été conditionnées dans un bidon opaque de 5L sous forme d'un mélange liquide d'inoculum en présence d'un milieu nutritif à base de lactose.

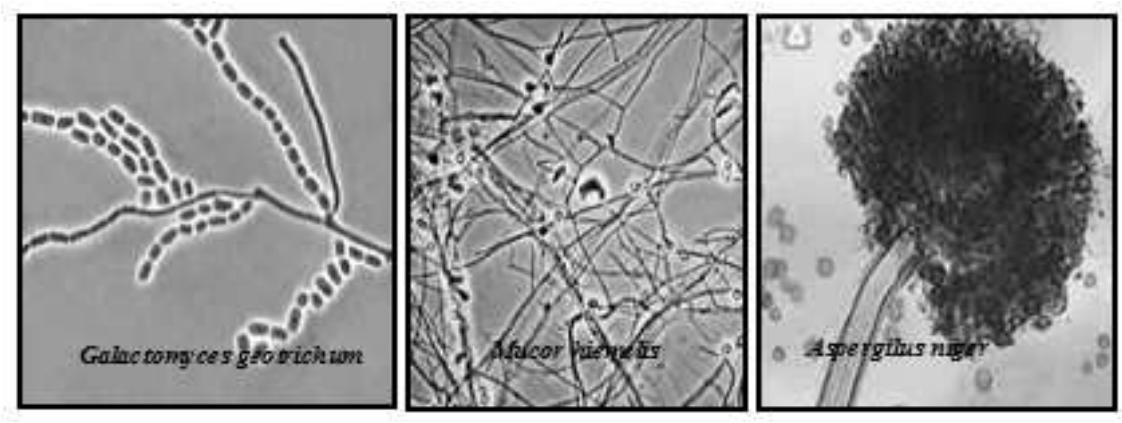

Fig. 1 : Le mélange fongique (Asn-Muh-Gag) utilisé dans le traitement biologique

Les photos sont prises par microscope électronique à balayage de laboratoire

2.2.2 CONDITIONS DE CULTURE

30 mL de mélange fongique par litre ont été ajoutés au milieu de culture dans des béchers de 2 litre. Pour la biodégradation de l'effluent laitier, ce dernier est inoculé par 30 mL par litre de champignons amplifiés ou non amplifiés. L'inoculum est amplifié sur lactosérum doux ou directement sur l'effluent (ELT) lui-même.

Dans les mêmes conditions, des témoins ont été préparé pour étudier le comportement des bactéries endogènes et l'effet des champignons exogènes.

Ainsi, tous les milieux de culture ont été séparés en deux série égales, la première série est inoculée par le mélange alors que la deuxième série n'est pas inoculée. Les différents milieux de culture ont été incubés à température ambiante et agités sur shaker rotatif. Tous les milieux ont été oxygénés par une pompe à l'air (figure 2).

Fig. 2 : Bioréacteur utilisé pour la biodégradation de l'effluent laitier

2.2.3 ANALYSES DE LA CROISSANCE MYCÉLIENNE

Durant le traitement, la croissance mycélienne (CM600) est déduite par la différence des mesures de turbidité à 600 nm (spectrophotomètre UNICO 1100). La lecture a été réalisée sur l'effluent brut (CM600bt), puis sur le surnageant (CM600st) après centrifugation de 40 ml d'échantillon (centrifugeuse JOUAN R412) pendant 15 min à 4.000 tours/min et à 4 °C.

La CM600 est calculés selon la règle suivante : **CM600 = CM600bt - CM600st.**

L'évolution de la matière organique est suivie par mesure de la DCO soluble qui est mesurée selon la méthode Hach, la lecture est effectuée au spectrophotomètre Hach DR/2010.

Pour améliorer l'abattement de la DCO, nous avons adopté le réactif LDC_7 qui est très utilisé pour le traitement des effluents agroalimentaire. Aussi, il a la particularité d'avoir un fort pouvoir tampon [13]. Pour cela, nous avons ajouté 7,5 ml de LDC_7 dans les préparations.

3 RESULTATS ET DISCUSSION

3.1 CARACTÉRISATION DE L'EFFLUENT

Généralement au Maroc, la production laitière connaît deux périodes; une haute lactation (de mars à septembre) et une basse lactation (d'octobre à février). La moyenne annuelle du volume des déchets liquides rejetés par LVRS est 900 m^3/j (dont 7,5 m^3/j de lactosérum) avec 4,7 litre d'effluent liquide / litre de lait traité. Le tableau 1 montre la composition de l'effluent.

Tableau 1: Composition physico-chimique moyenne de l'effluent laitier (LVRS) pendant les deux périodes de l'année (basse et haute lactation)

	MES $g.L^{-1}$	DCO $g.L^{-1}$	DBO_5 $g.L^{-1}$	P $g.L^{-1}$	NTK $g.L^{-1}$	MG $g.L^{-1}$	pH
Basse lactation	**2,8**	**10,7**	**5,5**	**0,13**	**0,44**	**13**	**6**
Haute lactation	**4,1**	**11,29**	**6,3**	**0,34**	**1,36**	**18**	**9**

***MES**: Matières en suspension ; **DCO**: Demande Chimique en Oxygène; **DBO_5**: Demande biologique en Oxygène pendant 5 jours; **NTK**: Azote Kjeldahl; **P**: Phosphore; **MG**: Matière Grasse.*

Les résultats obtenus montrent que la charge polluante de l'effluent laitier est très variable. Cela est du à sa composition principale en eaux blanches de rinçage des opérations et de nettoyage en place avec un volume total de 60 à 90 % et aussi à la présence de 1 à 3 % de produits laitiers perdu au cours de la transformation du lait.

Le tableau 2 présente les caractéristiques de différents constituants de l'effluent laitiers de LVRS selon les différentes étapes de transformation.

Tableau 2 : Composition physico-chimique moyenne de l'effluent laitier (LVRS) pendant les deux périodes de l'année (basse et haute lactation)

Type d'effluent	pH	Volume par litre de lait	DCO (g/L)	DCO/DBO$_5$	NTK (g/L)	MES (g/L)	P (g/L)	Graisse (g/L)
Eaux blanches	5	3,8	3	2,1	0,2	1	0,18	0,4
Lactosérum produit lactique	4,5	1,2	50	1,7	2,1	3,5	0,4	0,6
Lactosérum pattes pressées	7,1	0,91	75	1,4	1,1	10,4	0,3	0,4
Mélange Eaux blanches et lactosérum	4 à 6	3,9	11	1,3	0,5 à 1	1,3	0,3	0,2

***MES**: Matières en suspension ; **DCO**: Demande Chimique en Oxygène; **DBO$_5$**: Demande biologique en Oxygène à 5 jours; **NTK**: Azote Kjeldahl; **P**: Phosphore total; **MG**: Matière Grasse.*

Les valeurs enregistrées de MES, DCO, DBO$_5$, Azote total Kjeldahl et Phosphore total ainsi que les valeurs de pH et de température dépassent largement les valeurs fixées par les normes marocaines [15]. La composition de ces effluents s'apparente à celle du lait plus ou moins dilué. Les rapports DCO/DBO$_5$, sont compris entre 1,5 et 2, ce qui confère à ces effluents une bonne biodégradabilité [4, 13]. De plus, le ratio moyen DBO/NTK/P de 100/6/4 est satisfaisant par comparaison aux besoins du traitement biologique (100/5/1), avec cependant un léger excédent de phosphore. Il convient toutefois de s'assurer de la disponibilité de ces éléments pour les micro-organismes épurateurs [2, 14, 16].

Aussi, la moyenne annuelle du volume des déchets rejetés par LVRS est légèrement élevée en comparaison avec une autre étude [7]. Il serait donc nécessaire au cours de la transformation du lait, de réduire les volumes d'eaux résiduaires rejetées pour se situer dans les normes entre 1,5 et 2 litre d'effluent par litre de lait traité et aussi de recycler et réutiliser les eaux non polluées comme les eaux de refroidissement et de condensats [3, 7, 17, 18].

Tableau 3 : Composition biologique moyenne de l'effluent laitier (LVRS) pendant les deux périodes de l'année (basse et haute lactation)

	Coliformes fécaux (UFC/ml)	Streptocoques fécaux (UFC/ml)
Basse lactation	$1,9 \times 10^5$	$2,3 \times 10^5$
Haute lactation	$3,4 \times 10^5$	$3,9 \times 10^5$

Le tableau 3 présente les caractéristiques bactériologiques de l'effluent total rejeté par l'unité LVRS. Le rapport coliformes fécaux / streptocoques fécaux est inférieur à 1, ce qui témoigne d'une contamination fécale d'origine animale (streptocoques fécaux) des échantillons étudiés.

Finalement, les résultats du tableau 1 et 2 montrent l'importance de la quantité de matière organique valorisable dans l'effluent étudié et qu'il est nécessaire de le traiter avant tout rejet ou utilisation éventuelle.

3.2 ÉTUDES DU DÉVELOPPEMENT DES MYCÈTES SUR LE LACTOSÉRUM DOUX ET SUR L'EFFLUENT (ELT)

3.2.1 BIODÉGRADATION DU LACTOSÉRUM DOUX

Dans un premier temps nous avons étudié le développement des champignons *Aspergilus niger*, *Mucor hiemelis* et *Galactomyces geotrichum*, dans une solution de lactosérum déshydraté à différentes concentrations en lactose: 5; 15 et 30 $g.L^{-1}$. Tenu compte de sa concentration élevée en DCO (environ 6 g $DCO.L^{-1}$), le lactosérum représente la majeure partie de la charge polluante émise (80 à 85 %) par les industries laitières [10]. La figure 3 désigne la croissance mycélienne sur le lactosérum à différentes concentration de lactose.

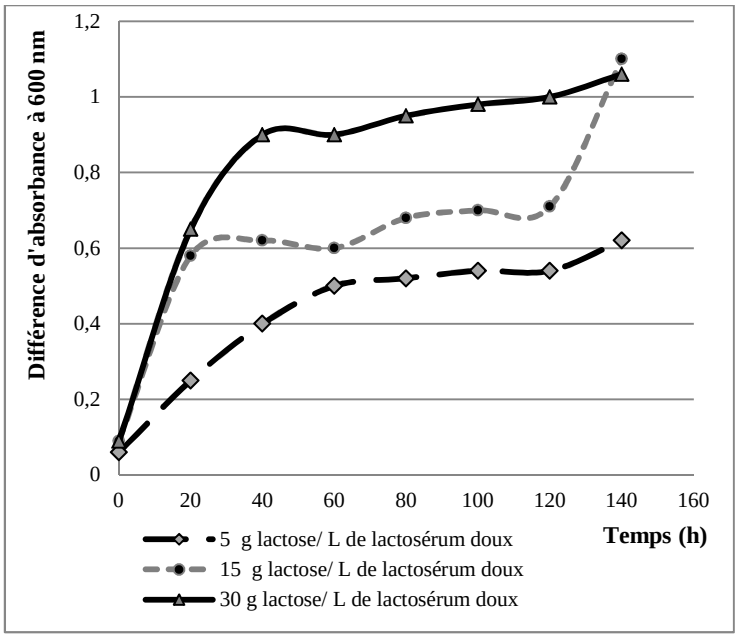

Fig. 3: Croissance mycélienne sur le lactosérum doux à différents concentration de lactose

La concentration du lactose dans la composition de lactosérum semble être un paramètre important dans le développement de la biomasse fongique spécifique puisque la croissance des champignons augmente avec l'augmentation de la concentration en lactosérum. On peut conclure que les champignons étudiés ont la possibilité d'utiliser le substrat carboné (lactose) contenu dans le lactosérum pour se développer.

Des études ont montré que ces organismes sont en général résistants au pH acide (pH de lactosérum et même de l'effluent laitier total), ils peuvent se développer à des températures variantes (de 0°C à 50°C) et supportent souvent des activités de l'eau faibles dans des milieux ayant une forte pression osmotique. Ils sont capables de produire des enzymes hydrolytiques (lipases et protéases utiles dans la biodégradation d'effluents d'industries agroalimentaires). En plus, ces champignons se multiplient par des spores formés à partir du mycélium qui sont des organes de résistance servant à la propagation. En conditions favorables d'humidité les spores peuvent germer et redonner un mycélium qui pourra à son tour sporuler et contaminer un autre milieu. Ces particularités leur confèrent une forte compétitivité, notamment avec les levures et les bactéries, et une large gamme d'utilisation en industries agroalimentaires [7, 14, 16].

3.2.2 BIODÉGRADATION DE L'EFFLUENT DE L'INDUSTRIE LAITIÈRE (ELT)

Dans un deuxième volet, la biodégradabilité de l'effluent laitier total (ELT) par le mélange fongique utilisé, a été étudié. Dans cette partie du travail, le pH a été ajusté à 7 puisque le pH de départ est de 3,5 sauf pour les essais contenant du LDC_7 à 3,5 $g.L^{-1}$ qui joue le rôle de tampon. Le volume d'effluent est de 1 litre.

Les résultats obtenus sont représentés dans les figures 4 et 5.

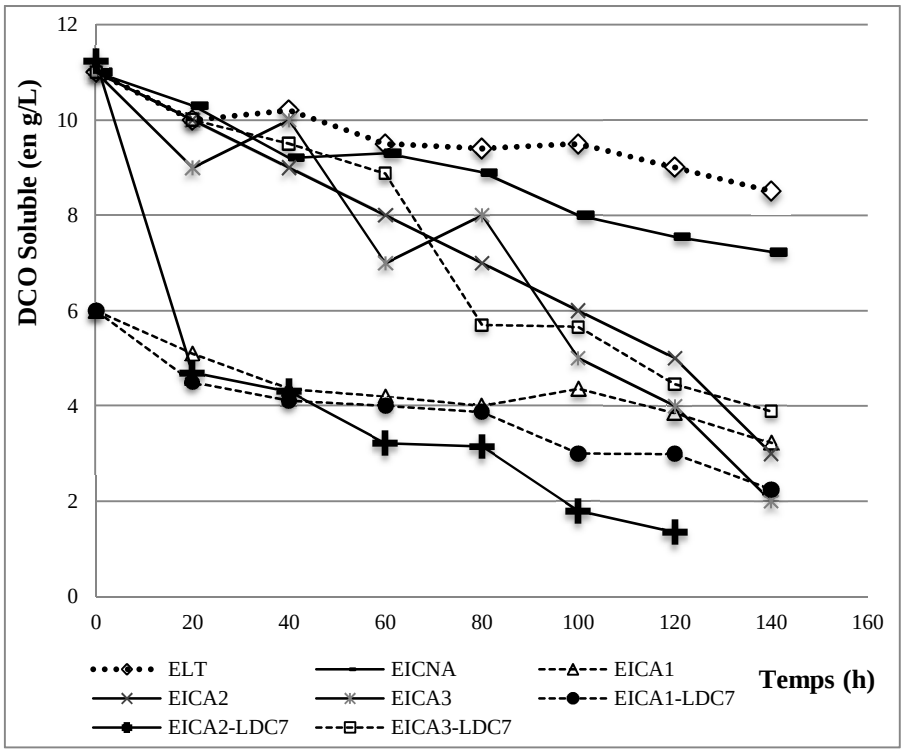

Fig. 4 : Suivi de la DCO soluble sur les différents essais de l'étude

***ELT** : Effluent laitier total sans inoculation. **EICNA** : Essai inoculé avec les champignons non amplifiés. **EICA1**, **EICA2** et **EICA3** : Essais par les champignons amplifiés pendant 65 heurs réalisés respectivement sur le lactosérum à 5 g/L de lactose, sur effluent laitier total et sur l'effluent laitier total après ajustement du pH à 7 avec KOH 10 M. **EICA1-LDC$_7$**, **EICA2-LDC$_7$** et **EICA3-LDC$_7$** : Essais additionnés avec LDC$_7$.*

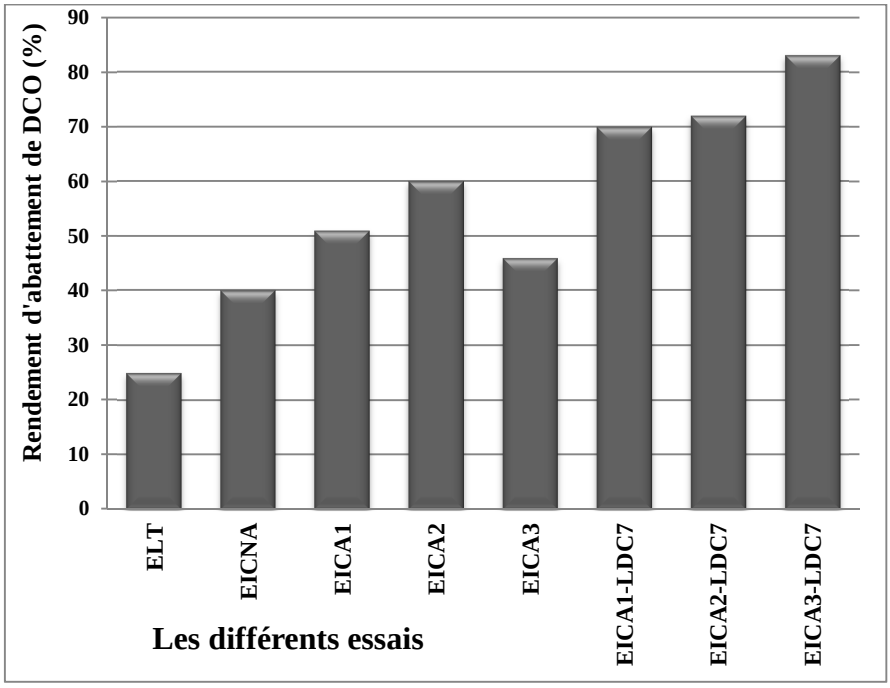

Fig. 5: Rendement de l'abattement de la DCO soluble au bout de 150 h de traitement.

Les tests préliminaires indiquent que les champignons ont la possibilité de se multiplier et de se développer activement sur l'effluent. Ce résultat peut être expliqué par le fait que l'effluent ELT est non seulement riche en lactose et en protéine mais aussi en matières minérales. Les vitesses de développement sont maximales pour les essais avec LDC_7 dès les premières heures de culture et ceci pour les différents essais amplifiés (EICA1-LDC_7, EICA2-LDC_7, EICA3-LDC_7). On remarque aussi qu'il est préférable d'amplifier au préalable les champignons sur l'effluent lui-même pour avoir une bonne croissance.

La figure 5 montre le rendement de l'abattement de la DCO soluble au bout de 150 h de traitement. Le premier résultat a permis de visualiser le rôle de la flore endogène. En effet, on constate que le fait d'aérer et d'agiter l'effluent permet aux micro-organismes présents naturellement dans l'effluent de se développer. Toutefois l'ajout de mycètes amplifiés permet d'augmenter le rendement final de l'abattement de la DCO qui atteint environ 83 %. Pour les essais sans LDC_7 il est préférable d'amplifier les mycètes sur l'effluent lui-même pour obtenir des rendements supérieurs à 70 %. L'abattement de la DCO par la flore endogène est assez élevé mais cela ne se produit jusqu'à la fin de traitement, alors que pour les essais inoculés avec les champignons amplifiés sur l'effluent, la DCO diminue dès les premières heures de traitement. Ainsi, l'utilisation d'une flore exogène spécifique comme le mélange de mycètes (Asn-Muh-Gag) permet de travailler avec des temps de séjour plus courts dans le bassin biologique de la station de traitement des effluents.

4 CONCLUSION

Dans cette étude nous avons essayé d'améliorer le traitement d'effluents de l'industrie laitière par l'utilisation des mycètes spécifiques dans un mélange. Les conditions optimales de croissance ont été déterminées et le traitement de lactosérum et de l'effluent laitier ont été réalisé. Les résultats montrent que les champignons spécifiques se multiplient et se développent en diminuant la DCO avec des rendements de plus de 70% pour le lactosérum et de 83 % pour l'effluent laitier total. Il est préférable d'amplifier les champignons sur l'effluent lui-même afin de les adapter au substrat carboné avant l'étape de biotraitement. La présence d'un garnissage comme le LDC_7 permet d'augmenter les rendements de biodégradation sans influencer la multiplication cellulaire et permet de maintenir le pH par son effet tampon. La présence de sels minéraux dans l'effluent à traiter joue un rôle prépondérant dans le développement des mycètes (Asn-Muh-Gag) et dans l'abattement de la DCO. La mise en commun de deux procédés, l'utilisation de champignons spécifiques amplifiés sur l'effluent lui même et le garnissage LDC_7 permet de traiter les effluents de l'industrie laitière sans augmentation excessive des boues.

Dans les perspectives, ces résultats obtenus permettent d'envisager des recherches plus approfondies pour valoriser la biomasse fongique produites dans la production des protéines d'organismes unicellulaires. Ainsi, ils peuvent améliorer les revenus des unités industrielles agroalimentaires.

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Indice MASI: une tentative de modélisation par les modèles ARIMA et GARCH

[MASI index: an attempt of modeling using ARIMA and GARCH models]

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ABSTRACT: In this article, we'll try to propose a modeling of the Moroccan stock market performance. To do this, the MASI, aggregate index representing Casablanca stock exchange, will be modeled from the method "ARIMA - BOX-JENKINS ', then by a GARCH model. This note is endeavoring to first present a brief overview of the theoretical framework of both models: ARIMA and ARCH, then an analysis of serial MASI, then searching of the ARIMA model most appropriate for the MASI(identification and validation of models to reproduce the series), and finally the choice of the most suitable GARCH model based on statistical criteria. The data available are 494 daily values of the evolution of the MASI, from 21/12/2009 to 18/12/2012. Software used are SPSS 17 and Eviews 6.

KEYWORDS: Masi stock index, volatility, stationarity, ARIMA_BOX-JENKINS, GARCH model.

RESUME: Dans cet article, on essaiera de proposer une modélisation de la performance du marché boursier Marocain. Pour ce faire, l'indice MASI, agrégat représentatif de la place Boursière Casablancaise, sera modélisé, à partir de la méthode « ARIMA - BOX-JENKINS », puis par un modèle GARCH. Cette note s'attèlera à présenter en premier lieu un bref rappel du cadre théorique des deux modèles : ARIMA et ARCH, puis une analyse de la série MASI , ensuite la recherche du modèle ARIMA le plus approprié au MASI (identification et validation des modèles susceptibles de reproduire la série) , et enfin le Choix du modèle GARCH le plus approprié sur la base de critères statistiques .Les données à disposition concernent 494 valeurs journalières de l'évolution du MASI, du 21/12/2009 au 18/12/2012. Les logiciels utilisés sont le SPSS 17 et l'Eviews 6.

MOTS-CLEFS: L'indice Masi, volatilité, stationnarité, ARIMA_BOX-JENKINS, modèle GARCH.

1 INTRODUCTION

La modélisation de la volatilité est devenue, partout dans le monde, un enjeu financier de grande envergure. Cette importance a été amplifiée par la montée du risque et de l'incertitude dans les marchés boursiers internationaux, de telle sorte que la position réelle d'un portefeuille ne peut s'effectuer sans tenir en compte le phénomène de la volatilité.

Le modèle autorégressif à hétéroscédasticité conditionnelle, introduit par ENGEL en 2002 [1], fournit un cadre approprié pour modéliser la volatilité des marchés financiers. Depuis l'apparition du modèle ARCH, plusieurs développements ont été faits, pour améliorer les caractéristiques de ce nouveau cadre et modéliser les faits stylisés des rendements financiers. Des

extensions importantes du modèle ARCH, comme le modèle GARCH [2] et le modèle EGARCH [3] ont été par la suite mises en œuvre, afin de répondre aux nouvelles spécificités des modèles financiers. La forme originale de ces modèles suppose une distribution gaussienne des innovations.

L'objectif de cette étude est de proposer une modélisation de la performance boursière nationale. Pour ce faire, l'indice MASI, agrégat représentatif de la place Boursière Casablancaise, sera modélisé, à partir de la méthode « ARIMA - BOX-JENKINS », puis par un modèle GARCH.

Cette note s'attèlera à présenter les points suivants :

- Un bref rappel du cadre théorique des deux modèles : ARIMA et ARCH
- Une analyse de la série MASI ;
- Recherche du modèle ARIMA le plus approprié au MASI (identification et validation des modèles susceptibles de reproduire la série) ;
- Choix du modèle GARCH le plus approprié sur la base de critères statistiques ;

Les données à disposition concernent 494 valeurs journalières de l'évolution du MASI, du 21/12/2009 au 18/12/2012. Les logiciels utilisés sont le SPSS et l'Eviews.

2 CADRE THEORIQUE : UN BREF RAPPEL

2.1 MODÈLES ARIMA

La modélisation ARIMA, proposée par Box et Jenkins [4], est généralement préconisée pour modéliser les séries ou variables à stationnarité stochastique. Cette méthodologie fait appel au processus ARMA, avec une partie autorégressive notée AR, et une partie moyenne mobile, notée MA.

Dans un processus autorégressif stationnaire d'ordre p, l'observation présente Y_t est générée par une moyenne pondérée des observations passées jusqu'à la $p^{ième}$ période sous la forme suivante :

$$AR(p) : Y_t = \sum_{1}^{p} \Phi_i y_{t-i} + \varepsilon_t \qquad \forall t \in Z$$

ou $Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \ldots\ldots\ldots + \phi_p Y_{t-p} + \varepsilon_t$

Où ϕ_i sont des paramètres à estimer positifs ou négatifs ; ε_t est un aléa.

L'identification de l'ordre p s'établit à l'aide du corrélogramme de la variable. En effet, il est démontré que le corrélogramme simple d'un processus AR(p) est caractérisé par une décroissance géométrique de ses termes et que le corrélogramme partiel a ses p seuls premiers termes différents de 0. L'étape qui suit « l'identification et l'estimation » des paramètres est le test de la qualité. Une bonne approximation par un processus autorégressif AR(p) se traduit par deux types de tests [5] :

- Tests sur les paramètres : tests de student, ϕ est significatif au risque de 5% si $\left|\hat{\Phi} / \hat{\sigma}(\Phi)\right| > 1{,}96$.
- Tests sur le bruit blanc : test de Ljung-box (Q_{LB}) et test de Portmanteau (Q_P)
  H0 : $\varepsilon_t \sim BB$

$$Q_{LB} = [(T+2)\, T \sum_{j=1}^{M} \hat{e}_j / T - j\,] \sim \chi^2_{(M-P)} \qquad \text{et} \qquad Q_P = T \sum_{j=1}^{M} \hat{e}_j \sim \chi^2_M$$

Où M =Min[T/2, $3\sqrt{T}$] et P nombre de paramètres à estimer.

Les deux statistiques Q_{LB} et Q_P testent le degré d'autocorrélations des erreurs.

S'agissant des processus de moyenne mobile d'ordre q, ils permettent d'estimer chaque observation y par référence à une une moyenne pondérée d'aléas jusqu'à la q ième période.

$$MA(q) : Y_t = \sum_{1}^{q} \theta_i \varepsilon_{t-i} + \varepsilon_t \qquad \forall t \in Z$$

Ou encore $Yt = \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} + \ldots\ldots\ldots + \theta_q \varepsilon_{t-q} + \varepsilon_t$

Dans ce processus, tout comme dans le modèle autorégressif AR, les aléas sont engendrés par un processus du type bruit blanc.

Le corrélogramme simple des processus MA (q) se caractérise par les q premiers termes qui sont significativement différents de 0. Ainsi, nous pouvons déterminer l'ordre q grâce à un examen des corrélations simples (ACF).La qualité d'estimation s'évalue par rapport aux mêmes tests utilisés au niveau du processus AR.

Les modèles ARMA représentent les processus qui combinent simultanément les valeurs et les erreurs passées. Ils se définissent par l'équation :

$$ARMA (p,q) : \quad (1- \phi_1 B- \phi_2 B^2-\ldots\ldots- \phi_p B^p)Y_t = (1- \theta_1 B- \theta_2 B^2-\ldots\ldots- \theta_q B^q) \varepsilon_t .$$

L'identification et l'estimation de ce type de modèles reposent sur les mêmes principes combinés pour les modèles autorégressifs AR(p) et moyenne mobile MA(q).

Le modèle ARIMA, autoregressive integred moving average, est une extension du modèle simple ARMA. Généralement un modèle ARIMA (p, d, q) se présente sous la forme :

$$\phi(B) (1-B)^d Y_t = \theta (B) \varepsilon_t + C$$

$\phi(B)$, θ (B) :polynômes d'ordre p et q respectivement. ϕ_i, θ_i représentent respectivement les paramètres de l'autoregressif et de la moyenne mobile ; d est l'ordre de différenciation et B est l'opérateur retard.

La sélection d'un modèle ARIMA (p, d, q) est le résultat des quatre principales étapes suivantes :

Etape 1 : identification des premières valeurs des ordres p, d et q est basée sur l'étude des corrélogrammes simple et partiel.

Etape 2 : l'estimation des paramètres θi et ϕi est fondée sur une maximisation des fonctions de vraisemblance recourant à des procédures itératives.

Etape 3 : les paramètres étant estimés, les résultats d'estimation doivent être examinés par référence aux tests sur la signification des paramètres et la qualité des résidus (absence d'auto-corrélation). :

Etape 4 : le choix du modèle le plus approprié parmi tous les modèles estimés s'effectue sur la base des deux critères : Akaike(AIC) et Schwartz (SC), qui mesurent la qualité d'approximation de la réalité par le modèle retenu.

2.2 MODÈLES GARCH

Les modèles autorégressifs à hétéroscédasticité conditionnelle (ARCH) sont spécialement conçus pour modéliser et prévoir les variances conditionnelles. La variance de la variable dépendante est modélisée comme une fonction des valeurs passées des variables dépendantes et variables indépendantes. Les modèles ARCH sont employés couramment dans la modélisation de séries temporelles financières, qui comportent des volatilités variables c'est-à-dire des périodes agitées suivies par des périodes de calme relatif. Ces modèles sont largement utilisés dans diverses branches de l'économétrie, en particulier dans l'analyse de séries financières.

Lors de l'élaboration d'un modèle ARCH, trois spécifications différentes sont mises en œuvre : une équation pour la moyenne conditionnelle, une seconde pour la variance conditionnelle, et une autre pour la distribution des erreurs conditionnelles.

Nous commençons par décrire quelques caractéristiques de base d'un modèle GARCH(1,1) où la variable objet d'étude y est expliqué par une fonction des variables exogènes avec un terme d'erreur. La variance conditionnelle ou la volatilité σ est exprimée en fonction d'un terme constant ω et le carré de l'erreur retardée de l'équation de base ainsi que la variance conditionnelle décalée d'une période.

$$Y_t = X_t'\theta + \epsilon_t$$
$$\sigma_t^2 = \omega + \alpha\epsilon_{t-1}^2 + \beta\sigma_{t-1}^2$$

Le modèle GARCH (1, 1) se réfère à la présence d'un terme du premier ordre autorégressif GARCH (le premier terme entre parenthèses) et d'un terme du premier ordre en mouvement ARCH en moyenne (le second terme entre parenthèses). Un modèle ARCH ordinaire est un cas particulier d'une spécification GARCH dans lequel il n'existe pas de variations retardées dans l'équation de la variance conditionnelle, soit un modèle GARCH (0, 1).

Cette spécification est souvent interprétée dans un contexte financier où un agent financier prévoit la variance de cette période en formant une moyenne pondérée de la moyenne à long terme (la constante), de l'écart prévu de la dernière période (le terme GARCH), et des informations sur la volatilité observée dans la période précédente (le terme ARCH). Si le rendement de l'actif a été plus élevé que prévu soit dans le haut ou vers le bas, l'agent va augmenter l'estimation de la variance pour la prochaine période.

La spécification GARCH(1,1) a été généralisée pour intégrer les modélisations d'ordre p et q dans la variance conditionnelle. Ainsi un modèle GARCH(p,q) se présente comme suit :

$$\sigma_t^2 = \omega + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^2 + \sum_{i=1}^{p} \alpha_i \epsilon_{t-i}^2$$

3 RESULTATS DES ESTIMATIONS

3.1 ETUDE DE LA STATIONNARITÉ

L'analyse de la série brute du Masi révèle deux grandes phases de son évolution, avec une présence assez marquée du phénomène de volatilité. La première phase, ayant coïncidé avec l'année 2010, a été caractérisée globalement par une tendance haussière de l'indice, malgré le mouvement correctif de son profil au cours des mois d'avril, mai et juin 2010. La seconde phase, plus longue, a débuté au mois de janvier 2011. Elle a été marquée par une baisse tendancielle de l'indice, reflet de la chute de la valorisation boursière. En effet, le marché boursier a subi de plein fouet les effets de la crise financière internationale et incertitudes liées à la conjoncture économique internationale difficile, ce qui a maintenu le marché dans une phase d'attentisme et de manque de confiance de la part des investisseurs.

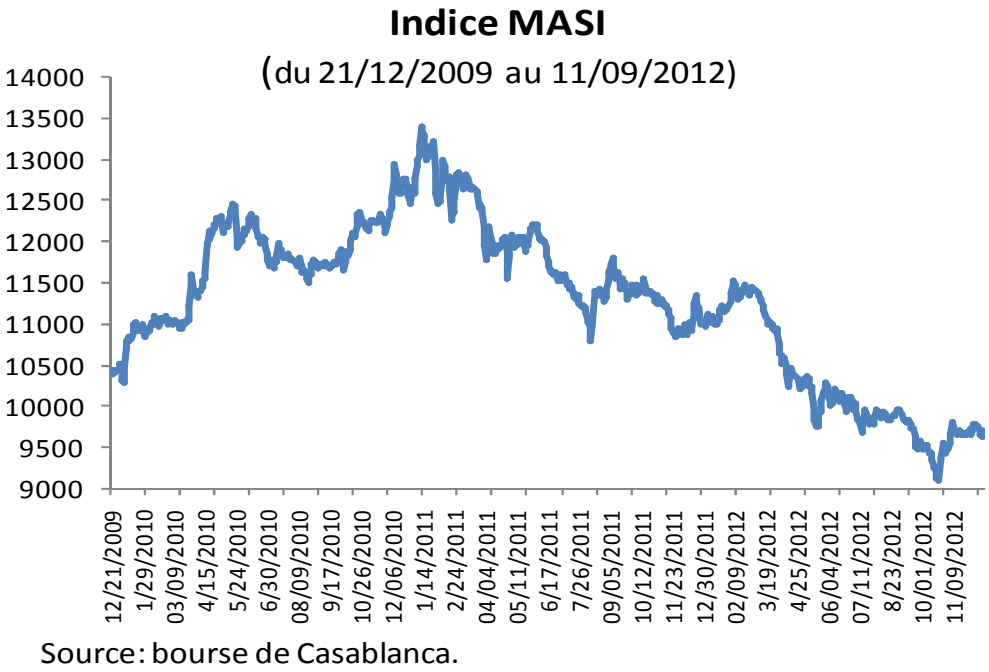

Fig. 1.Evolution de l'indice Masi de la bourse de Casablanca

Par ailleurs, et malgré la quasi- stabilité de l'indice en moyenne, force est de constater que la série n'est pas stationnaire. Ce résultat peut être confirmé, par ailleurs, par l'examen du corrélogramme des corrélations simples et partielles.

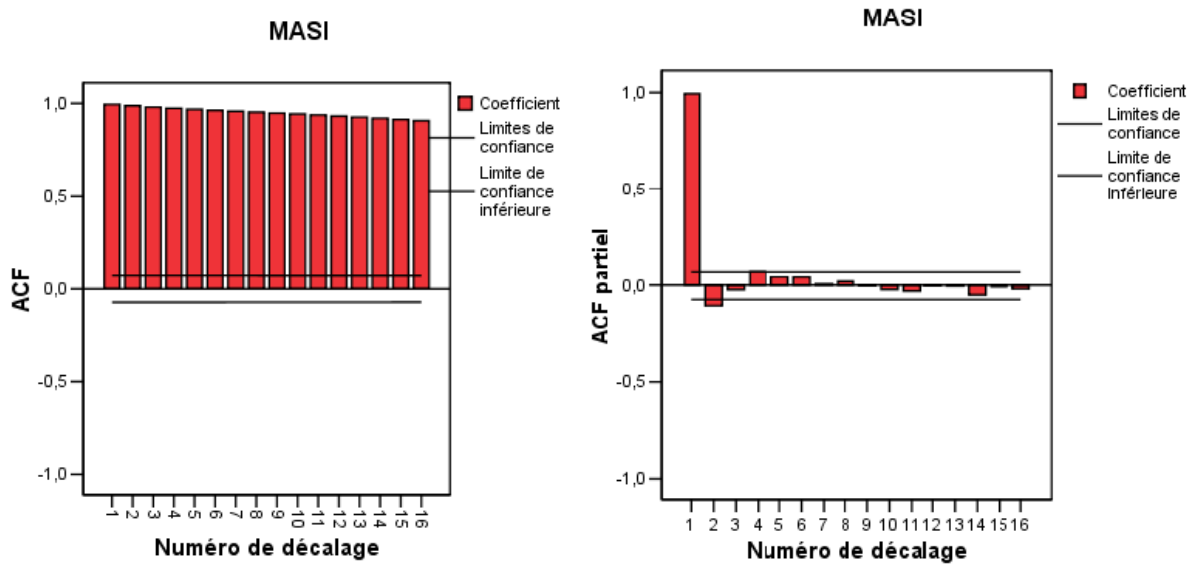

Fig. 2.Corrélogramme de la série MASI (ACF : autocorrélations simples ; PACF : autocorrélations partielles)

La figure 1 confirme la structure particulière du corrélogramme d'une série non stationnaire. En effet, les corrélations simples sont toutes significativement différentes de 0 et diminuent très lentement. Au niveau des autocorrélations partielles, seule la première est significativement différente de 0.

La non-stationnarité de la série MASI peut être également confirmée par le test de Dickey-Fuller. Ainsi, en testant le modèle 3, qui met en exergue les décalages de l'autorégressif, une constante et une tendance, on obtient :

Table 1. Stationnarité de la série MASI

Null Hypothesis: MASI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.657547	0.0262
Test critical values:	1% level	-3.976742	
	5% level	-3.418944	
	10% level	-3.132019	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MASI)
Method: Least Squares
Date: 03/14/13 Time: 14:39
Sample: 1/03/2011 12/18/2012
Included observations: 494

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MASI(-1)	-0.045520	0.012445	-3.657547	0.0003
D(MASI(-1))	0.183895	0.044460	4.136227	0.0000
C	573.4180	158.6634	3.614053	0.0003
@TREND(1/03/2011)	-0.307220	0.088965	-3.453264	0.0006

R-squared	0.051723	Mean dependent var	-6.063745
Adjusted R-squared	0.045918	S.D. dependent var	81.69870
S.E. of regression	79.80095	Akaike info criterion	11.60501
Sum squared resid	3120414.	Schwarz criterion	11.63904
Log likelihood	-2862.438	Hannan-Quinn criter.	11.61837
F-statistic	8.908963	Durbin-Watson stat	2.004384
Prob(F-statistic)	0.000009		

Lorsqu'on compare la statistique calculée des coefficients de la tendance et la constante (-3.45 et 3.61 respectivement) avec les valeurs données de la table, on conclut au rejet de l'hypothèse nulle, qui stipule qu'elles sont égales à 0 : la tendance et la constante sont, en effet, significativement différentes de 0 dans la série MASI. En outre, la statistique calculée de Dickey-Fuller (-3.65) est supérieure au risque de 1% à celle tabulée (-3.97). Ainsi, la série MASI en niveau n'est pas stationnaire.

Pour stationnariser le MASI, on lui applique une première différentiation avant de le refaire subir un test de Dickey-Fuller pour s'assurer si la série (d(masi)) nécessite une seconde différentiation.

Table 2. Stationnarité de la série MASI différencié

Null Hypothesis: D(MASI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-18.79490	0.0000
Test critical values:	1% level	-2.569652	
	5% level	-1.941466	
	10% level	-1.616269	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MASI,2)
Method: Least Squares
Date: 03/14/13 Time: 15:26
Sample: 1/03/2011 12/18/2012
Included observations: 494

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MASI(-1))	-0.834945	0.044424	-18.79490	0.0000

R-squared	0.417428	Mean dependent var	-0.095709
Adjusted R-squared	0.417428	S.D. dependent var	105.8617
S.E. of regression	80.80043	Akaike info criterion	11.62386
Sum squared resid	3218654.	Schwarz criterion	11.63237
Log likelihood	-2870.094	Hannan-Quinn criter.	11.62720
Durbin-Watson stat	1.995471		

Après avoir re-testé la signification de la tendance et la constante (modèles 3 et 2 de la procédure de Dickey-Fuller), et conclu à l'acceptation de l'hypothèse nulle, notre intérêt s'est attelé à vérifier le premier modèle illustré dans la figure ci-dessus. Les résultats attestent de la stationnarité de la série d(Masi), confirmée par ailleurs par un examen graphique de la série d(MASI).

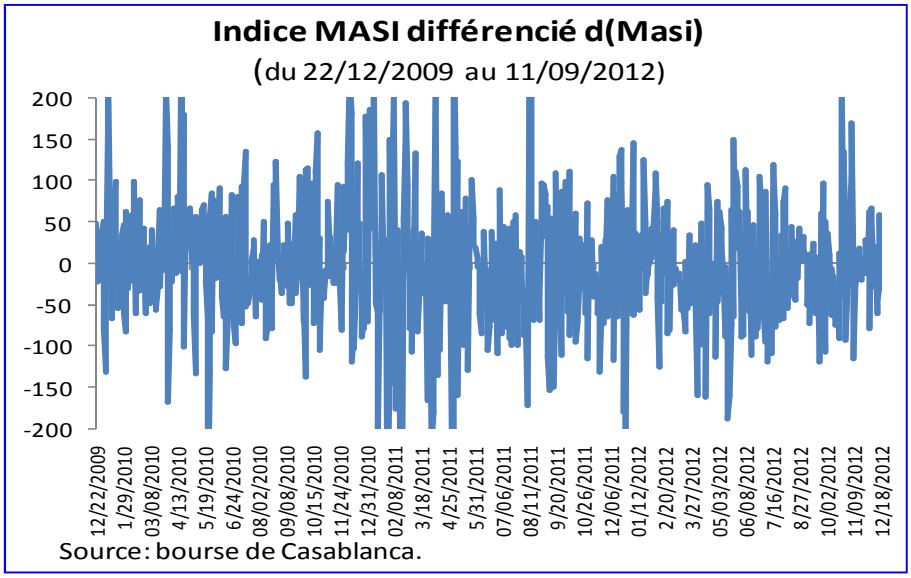

Fig. 3.Graphique de l'indice MASI différencié

Le graphe de la série d(masi) met en évidence la présence d'une moyenne constante (égale à zéro), une variance moins stable. Globalement, on peut admettre la validation de la stationnarité stochastique pour la série différentiée et procéder à l'identification du modèle qui lui correspond le plus parmi la famille ARMA (p,q) .

3.2 IDENTIFICATION DU MODÈLE ARMA (P,Q)

La méthodologie d'identification des ordres p et q du modèle ARMA(p,q) repose sur l'examen des corrélations simples et partielles. Le corrélogramme simple permet d'identifier le modèle MA(q) alors que le corrélogramme partiel permet de conclure sur l'ordre p du modèle AR(p) [6].

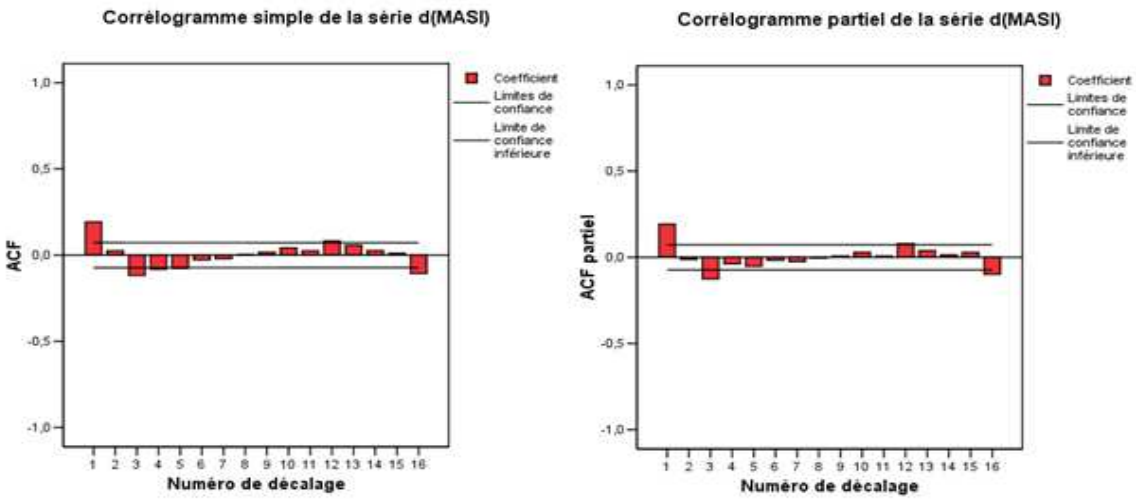

Fig. 4. Corrélogramme de la série MASI différencié

La figure 2 montre que la première autocorrélation (simple et partielle) de la série d(MASI) est significativement différente de zéro. Les trois processus à retenir sont donc: AR(1), MA(1), AR(3), MA(3), ARMA (3,3) et ARMA(1,1). Pour conclure à la qualité d'estimation des trois modèles, nous allons utiliser les critères AIC et le SW (les plus petits).

Table 3. Résultats des estimations

		Estimation	Ecart type	T-statistique
Modèle MA(1)	**Coefficient**	**-0,18**	**0,04**	**-5,00**
Modèle AR(1)	**Coefficient**	**0,19**	**0,04**	**5,37**
Modèle AR(3)	**Coefficient**	**0,19**	**0,04**	**5,33**
	Coefficient	0,01	0,04	0,34
	Coefficient	**-0,12**	**0,04**	**-3,44**
Modèle MA(3)	**Coefficient**	**-0,19**	**0,04**	**-5,10**
	Coefficient	-0,04	0,04	-1,04
	Coefficient	**0,10**	**0,04**	**2,68**
Modèle ARMA(1,1)	**Coefficient**	0,17	0,18	0,92
	Coefficient	-0,02	0,18	-0,11
Modèle ARMA(3,3)	**Coefficient**	0,27	0,24	1,15
	Coefficient	0,44	0,27	1,66
	Coefficient	-0,34	0,19	-1,79
	Coefficient	0,09	0,24	0,36
	Coefficient	0,45	0,25	1,82
	Coefficient	-0,14	0,18	-0,77

Dans le modèle MA(1), la statistique calculée de Student du coefficient de l'ordre 1 MA(1) étant de 3,5, supérieure, en valeur absolue, à 1,96 au risque de 5%, l'on conclut ainsi à la signification du coefficient. On constate également que le coefficient de l'ordre 1 (AR(1)) est significativement différent de 0, puisque la statistique calculée de Student est supérieure, en valeur absolue, à 1,96. De même, tant pour le modèle AR(3) que pour MA(3), les coefficients d'ordre 1 et 3 sont significativement différents de zéro.

Par contre, le modèle ARMA(1,1) et ARMA(3,3) présentent le problème de non signification de l'ensemble de leurs coefficients, puisque leurs statistiques calculées de Student y afférentes sont inférieures à 1,96.

Globalement, l'étape d'estimation des modèles a débouché sur la conservation des modèles AR(1), MA(1), AR(3) et MA(3) pour examen des tests des résidus.

3.3 VALIDATION DU MODÈLE ARMA

La validation du modèle passe par la vérification des tests d'absence d'auto-corrélation des résidus. Pour ce faire, nous allons examiner les corrélogrammes des résidus de chacun des quatre modèles maintenus (figure 3).

On peut tout d'abord observer que tous les termes des fonctions d'autocorrélation simple et partielle ne sont pas significativement différents de 0 pour les modèles AR(3) et MA(3). Ils sont tous situés dans l'intervalle de confiance matérialisé par les traits verticaux. L'on accepte ainsi l'hypothèse nulle qui stipule de l'absence d'autocorrélation, ce qui prouve que les résidus des modèles AR(3) et MA(3) sont des bruits blancs. A l'inverse, nous pouvons constater que pour les modèles AR(1) et Ma(1), les retards d'ordre 3 sont significatifs et débordent de l'intervalle de confiance, conséquence de la présence d'une auto-corrélation d'ordre 3.

Modèle AR(1)

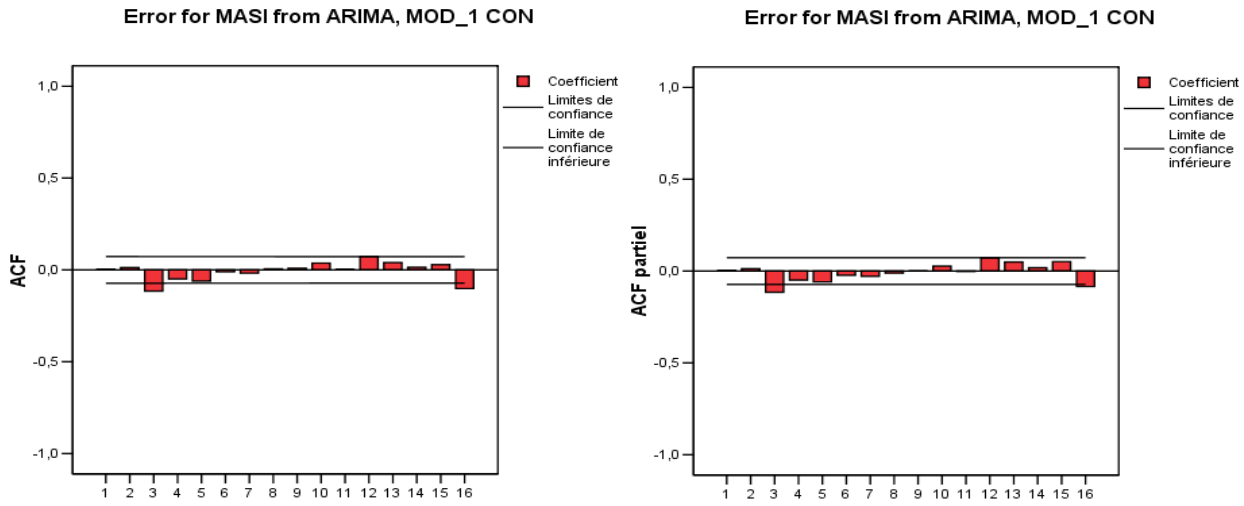

Fig. 5.Corrélogramme des résidus du modèle AR(1)

Modèle MA(1)

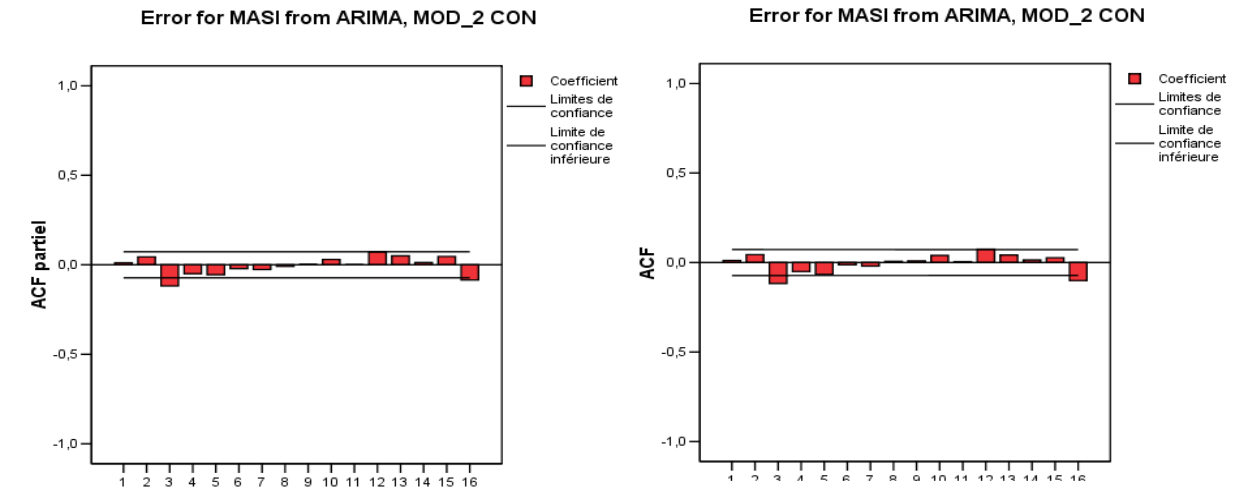

Fig. 6. Corrélogramme des résidus du modèle MA(1)

Modèle AR(3)

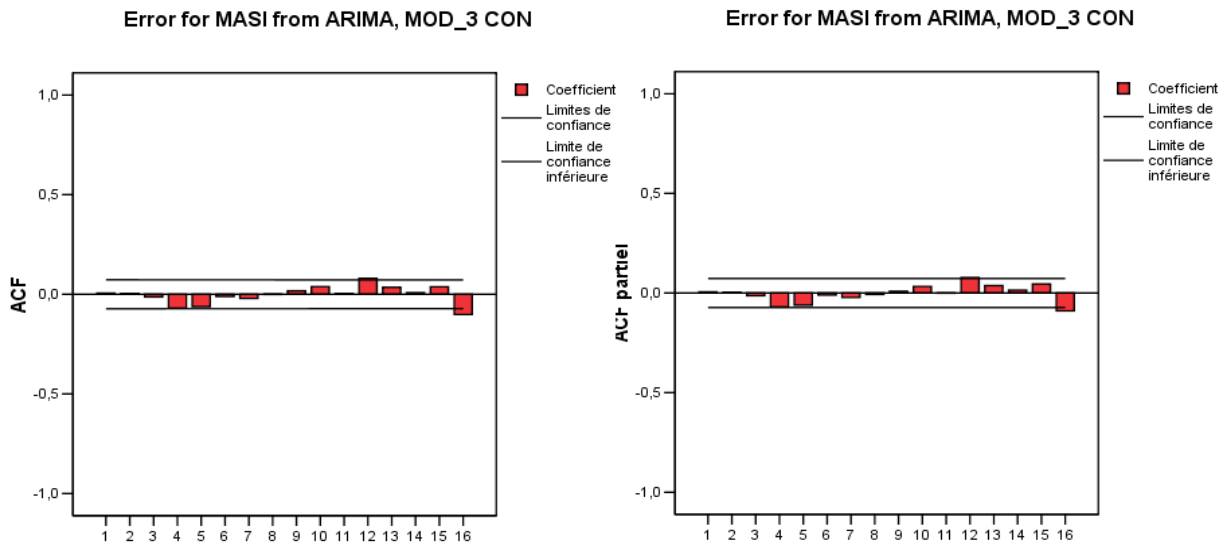

Fig. 7.Corrélogramme des résidus du modèle AR(3)

Modèle MA(3)

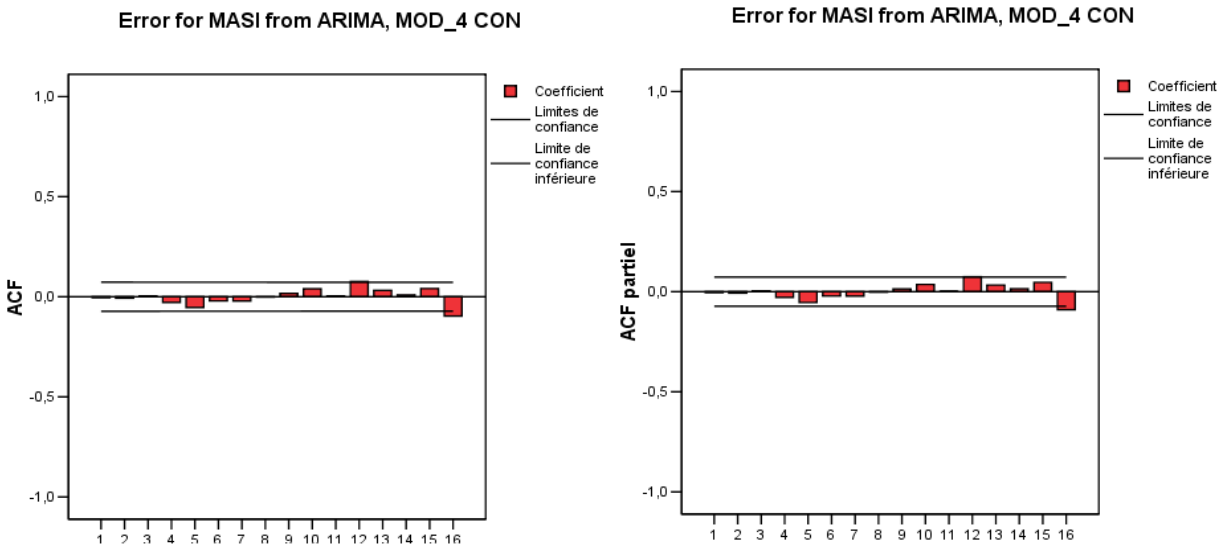

Fig. 8.Corrélogramme des résidus du modèle MA(3)

Test de la moyenne

Le test sur la moyenne permet de tester l'hypothèse de nullité de la moyenne des séries des résidus issus des modèles AR(3) et MA(3). Globalement, on peut remarquer que la moyenne des résidus des deux modèles peut être considérée comme nulle au seuil de 95%. En effet leur T de student sont inférieurs, en valeur absolue, à la valeur critique de 1,96 (voir tableau ci-dessus).

Table 4. Test de la moyenne

	T-statistique
Modèle AR(3)	-0,3198
Modèle MA(3)	-0,3081

L'on conclut ainsi à la présence d'un bruit blanc centré dans les deux modèles. On va maintenant procéder au choix du meilleur modèle parmi les deux ayant été conservés par les tests d'absence d'autocorrélation des résidus.

Choix du modèle

Le choix du modèle le plus approprié parmi les modèles estimés s'effectue sur la base des critères d'Akaike(AIC) et de Schwartz (SC), qui mesurent la qualité d'approximation de la réalité par le modèle retenu à partir de la fonction de variance des résidus et du nombre de paramètres à estimer. De façon concrète le modèle le plus approprié est celui qui minimise les critères d'Akaike (AIC) et de Schwartz (SBC) [7].

Le tableau ci-après présente la valeur calculée de ces deux critères pour chaque modèle :

Table 5. Valeurs calculée des critére d'Akaike et Scwartz

	MA(3)	AR(3)
AIC	8705,6	8702,2
SW	8724,1	8720,7

Les critères du modèle AR(3) sont inférieurs à ceux du modèle MA(3). De ce fait, on peut conclure que le meilleur modèle est le modèle AR(3).

L'équation du modèle retenu est la suivante :

$$Masi_t(1-B)(1-0{,}19B-0{,}01B^2+0{,}12B^3)=\varepsilon_t$$

3.4 TEST D'HÉTÉROSCÉDASTICITÉ

Par ailleurs, et vu la nature des données financières caractérisées par une forte volatilité, nous allons faire subir les résidus de ce modèle un test d'hétéroscédasticité (test ARCH). Ce dernier consiste à tester la signification d'une forme particulière de la variance des résidus. Le test LM retient une spécification particulière d'hétéroscédasticité, motivée par le constat que dans beaucoup de séries financières, l'ampleur des résidus semble être liée à l'importance des résidus des dernières années.

Pour tester l'hypothèse qu'il n'y a pas d'effet ARCH jusqu'à l'ordre p dans les résidus, la régression suivante est menée :

$$e_t^2 = \beta_0 + \left(\sum^{q} \beta_s e_{t-s}^2 \right) + v_t$$

Avec e_t : résidu du modèle ARIMA. Il s'agit d'une régression des carrés des résidus sur une constante et le carré des résidus retardés à l'ordre p. L'on devra analyser les deux statistiques de test de cette régression de test.

Table 6. Le test ARCH

ARCH Test:

F-statistic	37.32546	Probability	0.000000
Obs*R-squared	34.82976	Probability	0.000000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/21/13 Time: 20:33
Sample (adjusted): 1/04/2011 12/18/2012
Included observations: 493 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4714.387	652.0701	7.229877	0.0000
RESID^2(-1)	0.265832	0.043512	6.109456	0.0000

R-squared	0.070649	Mean dependent var	6424.104
Adjusted R-squared	0.068756	S.D. dependent var	13551.33
S.E. of regression	13077.16	Akaike info criterion	21.79917
Sum squared resid	8.40E+10	Schwarz criterion	21.81621
Log likelihood	-5371.496	F-statistic	37.32546
Durbin-Watson stat	2.009434	Prob(F-statistic)	0.000000

Les résultats du test confirment la présence de l'hétéroscédasticité des erreurs, puisque la probabilité associée à la statistique TR^2 est égale à 0,000 < 0,05. De plus, on constate que le t de Student calculé (6,1) est supérieur à 1,96, ce qui confirme également la présence de l'hétéroscédasticité des résidus : D'où la nécessité de recourir à une modélisation de type GARCH [8].

4 MODÉLISATION GARCH

Ainsi, en dépit des avantages que représentent le modèle ARIMA(3,1,0), il n'en demeure pas moins qu'il incorpore un problème d'hétéroscédasticité des résidus. Pour modéliser cette hétéroscédasticité, nous allons utiliser un modèle ARCH(p,q). Pour choisir ce dernier, nous allons tout d'abord examiner le corrélogramme des résidus au carré du modèle ARIMA(3,1,0). Ce faisant, la première et troisième autocorrélations (simples et partielles) sont significativement différentes de zéro. On retient les modèles suivants : ARCH(1), ARCH(3), GARCH(1,1), GARCH(1,3), GARCH(3,1) et GARCH(3,3). La comparaison des modèles estimés s'effectuera à l'aide des critères : AIC et SW. On choisira le modèle qui minimise les critères AIC et SW et dont les coefficients GARCH sont positifs.

Table 7. Le choix du modèle

	ARCH(1)	ARCH(3)	GARCH(1)	GARCH(3)	GARCH (1,1)	GARCH (3,3)
Akaike	11,528	11,488	11,502	11,495	11,475	11,464
Schwarz	11,580	11,556	11,553	11,563	11,534	11,558
Contrainte de positivité des coefficients GARCH	Respect	Respect	Respect	Non respect	Respect	Non respect

5 CONCLUSION

En guise de conclusion, l'on peut affirmer que l'analyse des résultats obtenus avec le modèle ARIMA (3,1,0) et le modèle GARCH (1 ,1), privilégie la modélisation GARCH, puisque ses valeurs estimées sont plus proches des valeurs réelles réalisées, en plus de sa prise en compte incontestable de la volatilité qui caractérisait l'indice MASI tout au long la période d'observation.

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Web services at the service of e-learning platforms

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ABSTRACT: In this article, we defined the steps to create a web service based on an example that relates to the field of e-Learning. In addition, it cited the components and the basic functionality of a web service. In determining the concepts on which is based the web services namely SOAP and WSDL (a description in XML Schema web service) and UDDI, these three elements constitute the life cycle of use of a web service architecture in a distributed client / server.

KEYWORDS: Web services, e-learning, XML, SOAP, WSDL, UDDI, JAXWS.

1 INTRODUCTION

Web services are modular web-based applications that perform specific tasks and follow a specific format. They allow your applications to use remote features, thus simplifying the exchange of data [1]. Web services allow applications to communicate across the network, regardless of their platform execution and their implementation language. They are part of the continuity of initiatives such as CORBA (Common Object Request Broker Architecture, OMG) [2] However, providing a simple answer, based on recognized and accepted standards and technologies now of everyone.

2 WEB SERVICES ARCHITECTURE

The concept of Web Services is currently organized around three concepts [11] as follows:

- SOAP (*Simple Object Access Protocol*)

It is an inter-exchange application independent of any platform protocol, based on XML. A call SOAP [3] [6] service is an ASCII stream framed in XML tags [5] and carried in the HTTP protocol.

- WSDL (*Web Services Description Language*)

WSDL [3] [4] [7] gives the description XML Web Services by specifying the methods that can be invoked, their signatures and the access point (URL, port, etc. ...).

So WSDL is an XML file generated by the server and is provided to the customer on demand.

- UDDI (*Universal Description, Discovery and Integration*)

UDDI [8] normalizes a distributed directory of Web Services solution, allowing both the publication and exploration (search) Web Services [3].

UDDI behaves itself as a Web service whose methods are called via SOAP.

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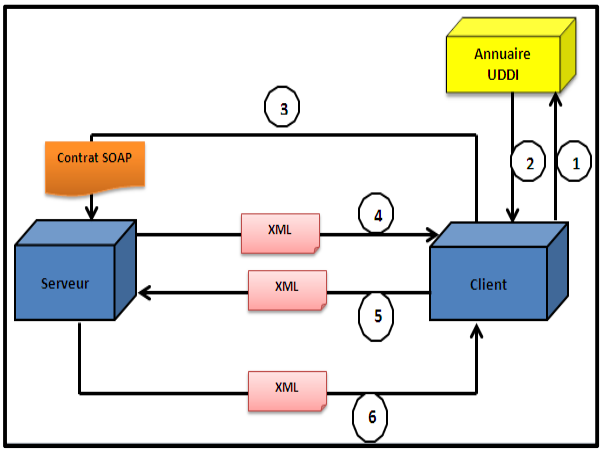


Figure 1: Life Cycle of using a web service

Description of Figure 1:

1: Looking for a Web Service
2: Found here is the server hosting the web service.
3: What is the format of calling the service you propose?
4: Behold my contract (WSDL).
5: I understand how to invoke your service and I will send you an XML document representing my request
6: I ran your query and I will return the result

3 WEB SERVICES WITH JAX-WS

JAX-WS is the new name of JAX-RPC (Java API for XML-Based RPC), which allows to easily develop web services. JAX-WS provides a set of annotations to map the Java-WSDL mapping. Simply annotate directly the Java classes that will represent the web service. Regarding the client, JAX-WS allows a proxy class to call a remote service and hide the complexity of the protocol. Thus, neither the client nor the server needs to generate or parse SOAP messages. JAX-WS is responsible for the low level processing.

In the example below, a Java class that uses JAX-WS annotations that will allow later to generate the WSDL document. The WSDL document is auto-generated by the application server at deployment time:

```
@WebService()
public class learningService{
@WebMethod
public Cours getCours(Long code) {
...
}
...
}
```

JAX-WS uses JAXB 2.0 API [14] for all that concerns the correspondence between XML and Java objects. A graph of objects comprises the following elements constituting the XML document. JAXB (Java Architecture for XML Binding) facilitates bidirectional mapping by providing a higher level than SAX or DOM [15] and abstraction based on annotations.

For example, if we want to get an XML representation of the Client class, simply annotate avec **@javax.xml.bind.annotation.XmlRootElement**. Other annotations allow you to specify that an attribute is an identifier with **@XmlID** or rename an attribute (e-mail instead of email, for example) with **@XmlAttribute**:

```
@XmlRootElement
public class Apprenant {
@XmlID
private String id;
private String nom;
private String prénom;
@XmlAttribute(name="e-mail")
private String email;
}
```

These annotations are then used to generate the following from the class, and vice versa XML document:

```
<?xml version="1.0" encoding="UTF-8"?>
<apprenant>
  <id>3456</id>
  <nom>Alaoui</nom>
  <prénom>Ali</prénom>
  <e-mail> alaoui.ali@gmail.fr</e-mail>
</ apprenant>
```

4 HOW TO DEVELOP A WEB SERVICE

In reality, the development of a web service is relatively simple although several technologies are implemented. Such is the power of Java EE [9]. For this, there are several phases of code generation that comes into play and implementing all the technical plumbing. The development and use of a web service consists of four phases:

- Development of the web service itself.
- Generating server-side artifacts (Skeletons).
- Generate client-side artifacts (stubs).
- Start the server by deploying the web service.
- Call the web service to the customer.

An artifact is composed of all the necessary documents to a web service. We can cite for example the WSDL or Java classes that form the XML SOAP message exchanges.

The following diagram shows the architecture for the development of web service with JAX-WS [13].

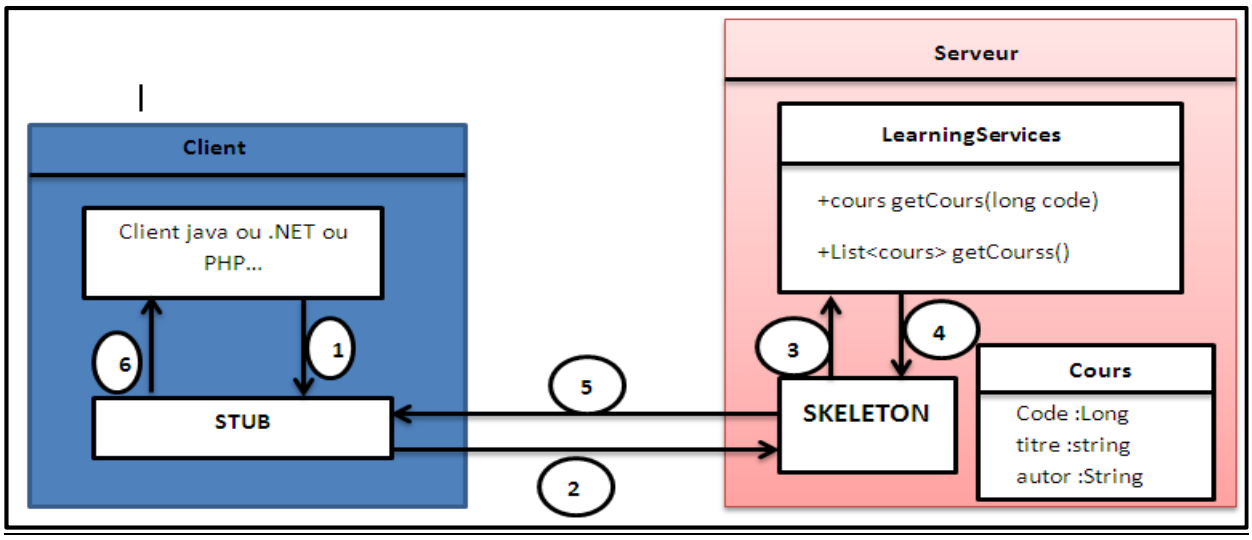


Figure 2: architecture development web service with JAX-WS

1: The client tells the stub to call the getCours () method.
2: Stub Skeleton connects and sends a SOAP request.
3: Skeleton uses the web service method.
4: The web service returns the result to the Skeleton.
5: Skeleton sends the result in a SOAP request to the Stub
6: The Stub provided the required result to the client.

4.1 DEVELOP A WEB SERVICE

-Tools to install:

- o JDK1.6
- o java Publisher: Eclipse.

-Create a java project using JDK1.6 as java compiler and runtime environment.

-Create learningWS.java class package ws:

```
package ws;
import java.util.Date;
import javax.jws.WebMethod;
import javax.jws.WebParam;
import javax.jws.WebService;
import javax.jws.soap.SOAPBinding;

@WebService(targetNamespace="http://bk/test",serviceName="learningService")
@SOAPBinding(style=SOAPBinding.Style.DOCUMENT,use=SOAPBinding.Use.LITERAL)
public class learningWS {


@WebMethod(operationName="titre_cours")
    public Compte getCours(@WebParam(name="code")Long code){
            return new Compte(code,”Mathematique”,”Newton”);
                    }
@WebMethod()
    public List<Cours> getCourss(){
            List<Cours> nb=new ArrayL ist<>();
            nb.add(new Cours(1L,”Physique”,”Enstien”));
            nb.add(new Cours(2L,”Chimie”,”Bernoli”));
            return nb;
    }
@WebMethod(operationName="dateDuServeur")
    public Date getServerDate(){
            return(new Date());
    }
}
```

- This class defines a web service named learningService which is defined by

- method named *getCours* which allows you to return a course.
- *getCourss* method to return the list of courses .
- A method to return the server date.

JAX-WS annotations are specific to web services. They allow influencing the structure of a WSDL document by changing some parameters of the service or methods that compose it. In this section, we describe more precisely the behavior of these annotations.

- The main annotation to define a web service @javax.jws.WebService web service. This annotation applies to a class and possibly using several attributes that allow, for example, to specify the location of a web service.

  Here is the list of attributes that can be implemented:

  1- **name** : Specifies the name of the web service. This name is now in the WSDL file in the name attribute of the tag <portType> . The default value is the name of the implementation class here learningWS.

  2- **serviceName** : Sets the service name. This name is found in the WSDL file in the name attribute of the tag <service> . The default value is the name of the implementation class learningWSService suffix "Service" here then.

  3- **wsdlLocation** : sets the URL , either absolute or relative , an existing WSDL file. By default, this file is auto-generated during deployment.

  4- **endpointInterface** : Sets the full name of the interface "endpoint " defining the methods of the web service. This allows the developer to separate the "contract" (interface) of the implementation. The implementation of this interface service is not required. The advantage of this solution is to assign annotations to Java mapping to the WSDL in the interface and not the implementation class.

- The **@WebMethod** annotation is used to declare the methods accessible by the web service (we are talking about operation in the SOAP protocol). Here are the details of the attributes it contains:
  - **operationName**: Sets the value of the name attribute of the tag <operation> in the WSDL file . It represents the name of the operation.
  - **exclude**: mark a method as unavailable by the web service. This parameter is used when we want to hide an inherited method, for example.
  - The method parameters and return value can also be changed. The **@javax.jws.WebParam** controls the generation of the WSDL for the parameters of the method. Thus, the annotation **@WebParam** allows you to specify information about the arguments of the operations defined in the WSDL file.

4.2 BUILD SERVER

- Our web service is ready to be deployed in a J2EE application server. In this work, we will create our own server.
- In the src folder, create a ServeurWS.java class whose code is as follows :

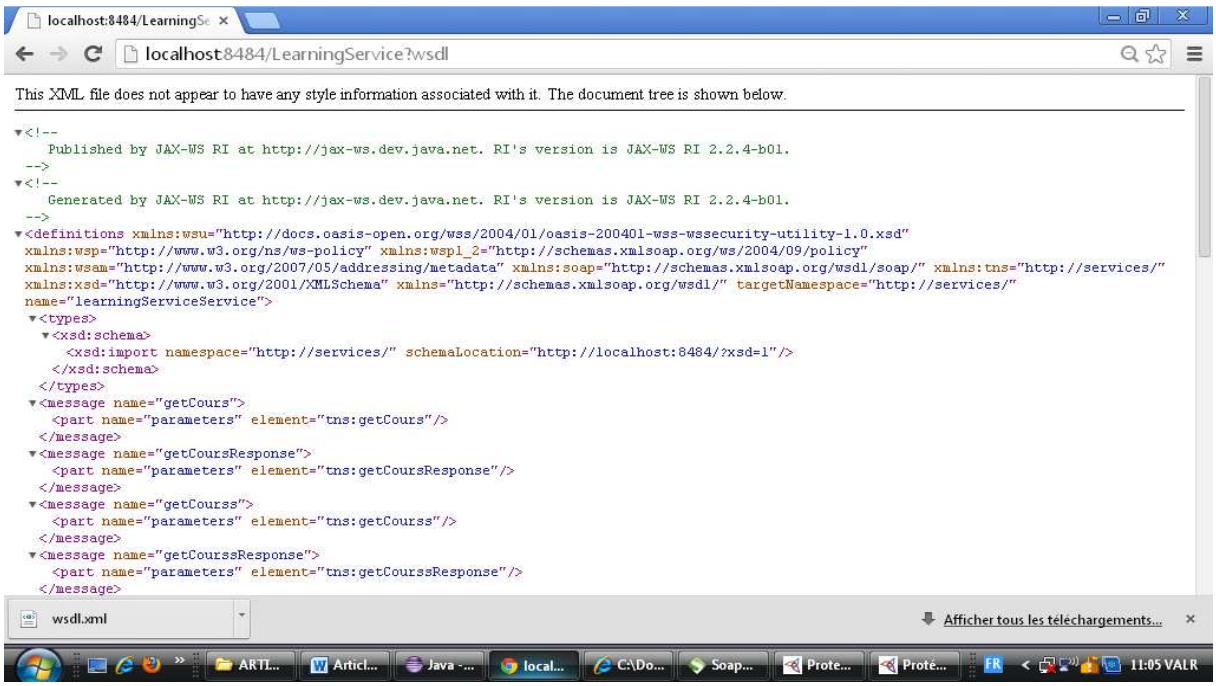
```
package serveur;
import javax.xml.ws.Endpoint;
import services.learningService;
public class ServeurWS {
        public static void main(String[] args) {
                String
url="http://localhost:8484/";
        Endpoint.publish(url,new
learningService());
        System.out.println(url);
        }
}
```

- Start the server by running the LearningService application. The server starts by displaying the following message:

Web Service published http://localhost:8484/

4.3 TESTING THE WEB SERVICE WITH A WEB BROWSER

- Launch a browser and enter the url : http://localhost:8484/LearningService?wsdl



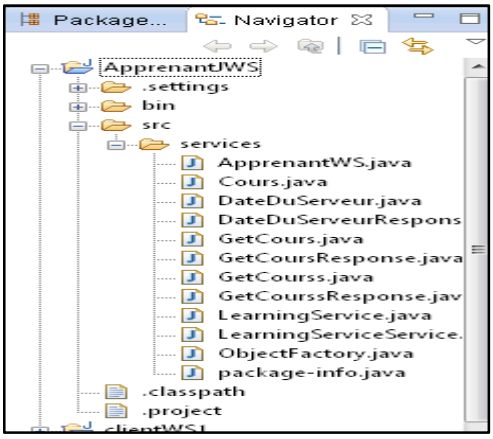
- To view the XML schema for SOAP messages, type the url :http://localhost:8484/LearningService?xsd=1

4.4 CREATING A JAVA CLIENT

On the command line, navigate to the src folder of your project. And type the command:

wsimport –s . LearningService.wsdl

The following files will be generated:



- Now is the time to easily create a java client for our web service.
- In the src folder create the following ApprenantWS class:

```
package services;
import java.util.List;


public class ApprenantWS {


	public static void main(String[] args) {
			LearningService stub=new LearningServiceService().getLearningServicePort();
			Cours res=stub.getCours(1L);
			System.out.println(res.getCode());
			System.out.println(res.getTitre());
			System.out.println(res.getAutor());
			System.out.println("----------");
			List<Cours> nb=stub.getCourss();
			for(Cours c:nb){
				System.out.println(c.getCode());
				System.out.println(c.getTitre());
				System.out.println(c.getAutor());
				System.out.println("----------");
			}

	}
}
```

- **Result of execution :**

```
1
mathematique
Newton
-----------------------------------
1
physique
enstein
----------
2
chimie
bernoli
----------
```

5 CONCLUSION

This work presents the steps required to create a web service based on an example that relates to the field of e -Learning. In addition, it cited the components and the basic functionality of a web service. We also describe how educational content can be dynamically created and disseminated in a distributed e-Learning system based on Web services.

Our studies have shown that most existing solutions that can manage a dynamic educational content way, are always in the context of centralized systems and use proprietary formats. Web services come to resolve this obstacle interoperability of e -Learning [12] systems. Web services technologies can contribute to solving these problems.

The few cases the use of web services in e -Learning distributed system [10] are currently at a conceptual level, and are deployed in large or medium called enterprise systems. Our approach is based on simple principles using as much as possible of standard concepts and open source tools.

We have shown an example of implementation of web services for the contribution to the development of an e -Learning system. It remains as a perspective to upgrade this environment we achieved to allow students to practice learning divers.

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Caractérisation chimique, activités antiradicalaire et antibactérienne des extraits de l'écorce de racine de *Cochlospermum planchoni* du Bénin

[Chemical characterization, antiradical and antibacterial activities of extracts of the root bark of *Cochlospermum planchoni* of Benin]

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ABSTRACT: Herbal medicines are the most widely used especially in rural areas to solve problems of human and animal health Saharan average. This paper reports the results of the chemical and biological studies of the root bark of *Cochlospermum planchoni* used by farmers in Benin in the treatment of gastrointestinal diseases of animals. Results obtained, it appears that the root bark of *C. planchoni* is rich in secondary metabolites such as flavonoids, polyphenols, tannins, anthocyanins, leucoanthocyanins, mucilages, saponins, sterols and terpenes. Regarding the extraction yield, the binary water-ethanol (50/50) allowed to have a better (23.2%) extraction yield this of plant. As for the quantification of the polyphenols content, it is practically insensitive to the nature of the extraction solvent on crude extracts of the root bark of *C. planchoni*. According to the tests of antiradical activity, both fractions ethyl ether and ethyl acetate (IC_{50} = 1µg/ml) showed a more interesting radical scavenging activity than that of quercetin (IC_{50} = 3µg/ml) and BHA (IC_{50} = 4, 8µg/ml) which are antiradical syntheses. The results from the test of antibacterial activity show that the fractions of ethyl acetate, diethyl ether and butanol are more active than of the crude extracts of *C. planchoni* on the four bacterial strains used in this study.

KEYWORDS: Cochlospermum planchoni, secondary metabolites, bactericidal, DPPH.

1 INTRODUCTION

Cochlospermum planchoni de la famille de Cochlospermaceae, est un arbre ou arbuste de 2 à 2,5 m de hauteur. Il a de jeunes branches et des feuilles avec des échelles peltées [1].

Cochlospermum planchoni fait partie des plantes médicinales les plus utilisées au Bénin dans la médecine traditionnelle, depuis des siècles contre une multitude de pathologies humaines et animales, et notamment comme antidiabétique, anti-hypertenseur et anti-inflammatoire. La décoction de la racine entière est utilisée comme remède pour la gonorrhée et les maladies gastro-intestinales des animaux [2].

Le contrôle des maladies gastro-intestinales des animaux d'élevage a été basé, pendant de nombreuses années, sur l'emploi des produits de synthèse, associé à des degrés divers à une gestion raisonnée du pâturage [3].

Dans les Pays en voie de développement comme le Bénin, ces produits coûtent très chers et ne sont pas toujours disponibles tant en quantité qu'en qualité. Aussi, la prévalence de la résistance de certains parasites est particulièrement élevée [4], [5] et l'appel à une réduction d'emploi de produits chimiques en élevage dans le contexte de l'agriculture durable est de plus en plus fort [6]. Ces éléments ont conduit à envisager de nouvelles méthodes de lutte antiparasitaire. Parmi les solutions alternatives de lutte contre les maladies gastro-intestinales des animaux d'élevage, une approche prometteuse

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repose sur l'exploitation des extraits des plantes dotés de plusieurs propriétés. Il existe une gamme variée de plantes utilisées dans la pharmacopée vétérinaire au Bénin [7], [8], [9], [10], [11], [12]. Ces traitements sont peu valorisés car les tests pouvant confirmer leur efficacité restent très peu nombreux et mal connus. C'est dans ce cadre que rentre le présent travail qui vise l'étude chimique et biologique de *Cochlospermum planchoni.*

Plus spécifiquement, il s'agit d'identifier les métabolites secondaires, d'évaluer les teneurs en composés polyphénoliques, les activités antibactérienne et antiradicalaire des extraits bruts et des fractions de l'écorce de racine de *Cochlospermum planchoni*.

2 MATÉRIELS ET MÉTHODES

2.1 MATÉRIEL VÉGÉTAL

Le matériel végétal utilisé dans la présente étude est constitué de l'écorce de racine de *Cochlospermum planchoni* récoltée en Janvier 2014 à Dassa au sud du Bénin.

2.2 MATÉRIEL ANIMAL

Il est constitué des souches de références de *Staphylococcus aureus* (ATCC 27844), *Escherichia coli* (O : 157H7), *Salmonella typhi* (R.0951401) et de *Klebsiella pneumoniae* (ATCC 35657). Ces souches ont été fournies par le Laboratoire National de la Santé du Bénin.

2.3 MÉTHODES

Après la collecte du matériel végétal, les échantillons ont été séchés à la température du laboratoire (25°C-30°C) pendant environ un mois puis réduits en poudre.

2.3.1 IDENTIFICATION DES MÉTABOLITES SECONDAIRES

La détermination des métabolites secondaires a été faite par des réactions de coloration et de précipitation.

Flavonoïdes: l'identification des flavonoïdes a été réalisée par le test à la cyanidine [13].

Tanins: Ils ont été mis en exergue par le test de Stiasny[14]

Saponosides: Les saponosides ont été déterminés par le test de mousse; degré de dilution d'un décocté aqueux donnant une mousse persistante après agitation [15], [16].

Polyphénols: La détermination des composés appartenant au groupe des polyphénols a été faite par la réaction au chlorure ferrique [15].

Stérols et terpènes: Les stérols et les terpènes ont été mis en évidence par le test de Liebermann-Burchard [17].

Alcaloïdes : Les alcaloïdes ont été identifiés par le test de Meyer et confirmés par le test de Bouchardât [18].

Anthraquinones : ils ont été identifiés par le test de Bornträger [16], [19]

Mucilages: L'obtention d'un précipité floconneux d'un décocté dans l'éther éthylique indique la présence des mucilages [20].

Coumarines: Les coumarines ont été mises en évidence par la fluorescence à l'UV à 365nm [14].

Composés volatils: Les composés volatils ont été identifiés par la méthode d'hydro distillation à l'aide d'un extracteur de type Clevenger[21], [22].

2.3.2 PRÉPARATION DES EXTRAITS BRUTS ET DES FRACTIONS

La technique utilisée est celle de la macération. 50g de poudre de chaque échantillon ont été introduits dans un flacon de 500 ml contenant 250 ml de solvant d'extraction (Ethanol, eau ou éthanol-eau 50/50). Le flacon est bouché et laissé sous

agitation continue pendant 72 heures. Après filtration, les extraits ont été évaporés à sec à 60°C à l'aide d'un rotavapor de type Heidolph.

Quant aux fractions, elles sont obtenues par partitions successives avec des solvants de polarité croissante (hexane, dichlorométhane, éther diéthylique, acétate d'éthyle et butanol) suivant le diagramme de la figure 1.

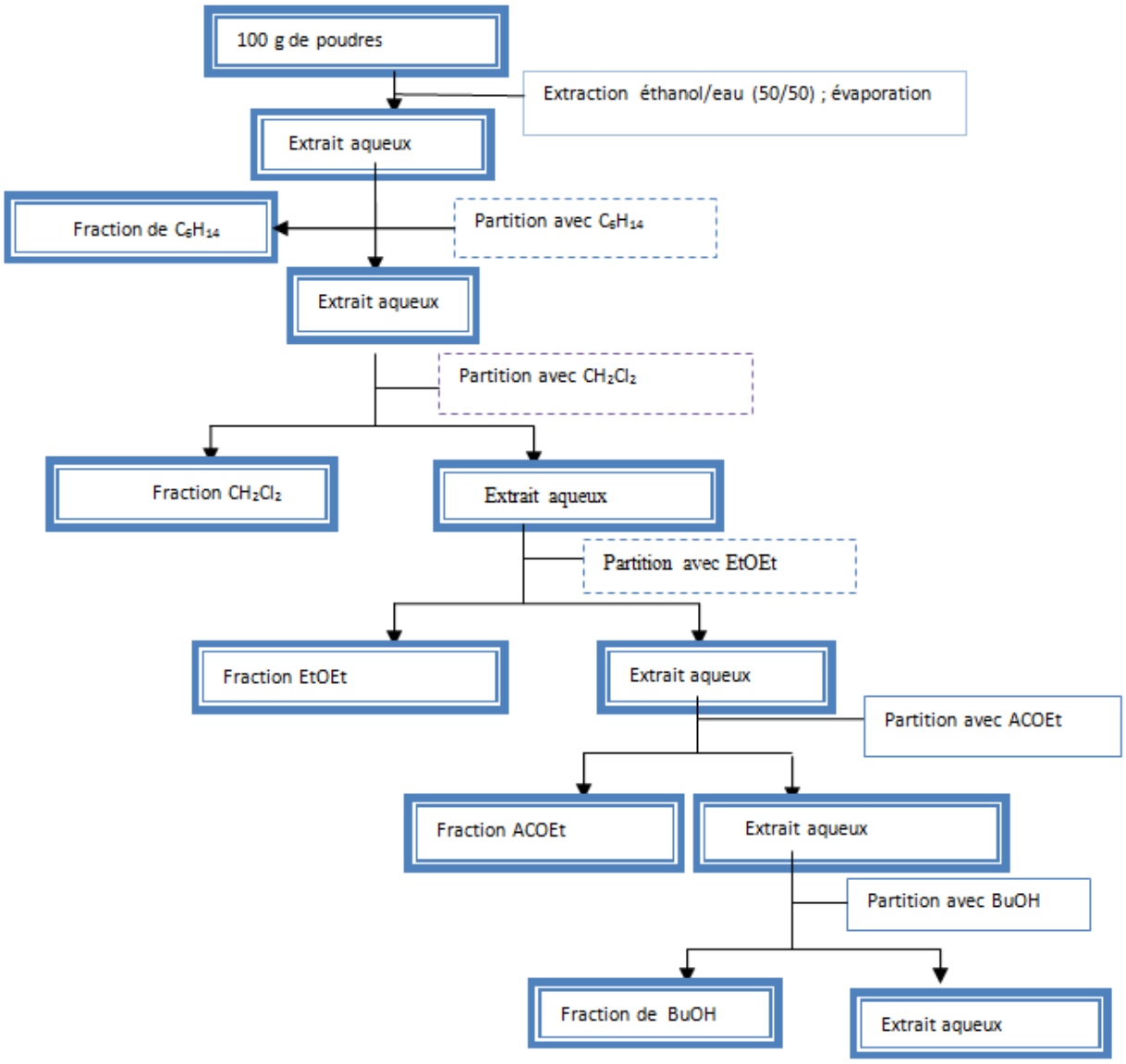

Fig. 1 Schéma de l'extraction liquide-liquide avec des solvants de polarité croissante

Le rendement (R) d'extraction est calculé par la formule ci-dessous :

$$R\ (\%) = \frac{\text{Masse de l'extrait}}{\text{Masse de produit végétal utilisé}} X100$$

2.3.3 DOSAGE DES COMPOSÉS POLYPHÉNOLIQUES

Polyphénols totaux: La méthode de dosage des polyphénols totaux est celle de Folin-Ciocalteu[23], [24] . Le réactif de Folin utilisé est constitué d'un mélange d'acide phosphotungstique et phosphomolybdique qui est réduit, lors de l'oxydation des phénols en mélange d'oxydes bleus de tungstène et de molybdène [25]. L'absorbance a été mesurée au spectrophomètre (JENWAY 50/60 Hz) à 765 nm. L'acide gallique a été utilisé comme référence et la teneur en polyphénols totaux dans l'extrait a été exprimée en mg équivalent d'acide gallique par g de matière sèche.

Flavonoïdes totaux: La méthode du trichlorure d'aluminium ($AlCl_3$) est utilisée pour quantifier les flavonoïdes totaux. Cette technique est basée sur la formation du complexe flavonoïdes-aluminium qui a une absorption maximale à 500 nm [26], [27].

Tanins condensés: Le dosage des tanins condensés est réalisé par la méthode à la vanilline sulfurique[28], [29],. Le principe de ce dosage est basé sur la fixation du groupe aldéhydique de la vanilline sur le carbone en position 6 du cycle A de la catéchine pour former un complexe chromophore de couleur rouge qui absorbe à 510 nm.

2.3.4 EVALUATION DE L'ACTIVITÉ ANTIRADICALAIRE

L'activité antiradicalaire a été évaluée par la méthode au DPPH. Le principe de cette méthode est basé sur la mesure du piégeage des radicaux libres d'une solution de DPPH. Ce piégeage est visualisé par la disparition de la couleur pourpre du DPPH. Les cuves sont laissées à l'obscurité pendant une heure et les absorbances ont été mesurées à 517 nm [30], [31]. Le pourcentage de piégeage a été déterminé par la formule: $P = \frac{(Ab-Ae)}{Ab} X100$.

Avec P : pourcentage de piégeage ; Ab: absorbance du blanc, Ae: Absorbance de l'échantillon.

2.3.5 DÉTERMINATION DE L'ACTIVITÉ ANTIBACTÉRIENNE

L'activité antibactérienne a été évaluée par la méthode de micro-dilution dans les microplaques et dans les boites de Pétri [32], [33],[34].

3 RÉSULTATS ET DISCUSSION

Les métabolites secondaires de l'écorce de racine de *Cochlospermum planchoni* sont consignés dans le tableau 1.

Tableau1. Métabolites secondaires identifiés dans l'écorce de racine de Cochlospermum planchoni

Métabolites secondaires		*Cochlospermum planchoni*
Alcaloïdes		+
Flavonoïdes		+
Anthocyanes		+
Leuco-anthocyanes		+
Anthraquinones		+
Anthraquinones libres		
Anthraquinones combinés	o-hétérosides	-
	o-hétérosides à génines réduites	-
	c-hétérosides	-
Composés réducteurs		+
Tanins	galliques	-
	catéchiques	+
Stérols et terpènes		+
Mucilages		+
Saponosides		+
Coumarines		+
Quinones		+
Protéines		+
Composés volatils		+

***+**: présence; **-** : absent*

Les écorces de racine de *C. planchoni* de Dassa (Bénin) renferment des composés volatils, des saponosides, des tanins catéchiques, des polyphénols, des mucilages, des flavonoïdes, des alcaloïdes, des anthocyanes, des leuco-anthocyanes, des protéines, des composés réducteurs, des coumarines, des anthraquinones libres, des stérols et des terpènes alors que dans les écorces de racine de *C. planchoni* récoltée à Markudi (Nigeria), Ezeja et Anaga [35] ont noté la présence des tanins, des flavonoïdes, des carbohydrates et des glycosides. Au niveau des tiges feuillées de cette même plante récoltée à Okene (Nigeria) Isah *et al* [36] ont identifié des carbohydrates, des anthraquinones, des glycosides, des saponosides, des flavonoïdes, des tanins, des stérols et des terpènes. La variation de métabolites secondaires remarquée au niveau de notre échantillon par rapport aux travaux antérieurs pourrait être liée à la période de la récolte, à la nature du sol ou aux facteurs climatiques [37], [38]. La diversité en métabolites secondaires de l'écorce de *C. planchoni* pourrait expliquer son utilisation dans le traitement des maladies inflammatoires; diarrhéiques; parasitaires, dans les infections et dans les maladies gastro-intestinales. La présence par exemple, des tanins et des flavonoïdes dans l'écorce de racine de *C. planchoni* justifierait l'usage de cette plante dans le traitement des affections diarrhéiques et des maladies gastro-intestinales des animaux [39], [40].

3.1 RENDEMENT DES EXTRAITS BRUTS ET DES FRACTIONS

RENDEMENT DES EXTRAITS BRUTS

Le tableau 2 indique les rendements des extraits éthanolique, semi-éthanolique et aqueux de l'écorce de racine de *C. planchoni.* L'extrait semi-éthanolique a un rendement de 23,2 % suivi de l'extrait éthanolique (15,6%) et enfin de l'extrait aqueux (11,2%). Le binaire éthanol-eau (50/50) a favorisé l'extraction des métabolites au niveau de l'écorce de racine de cette plante comparé aux deux solvants éthanol et l'eau pris séparément.

Tableau 2. Rendement d'extraction (%)

Extraits	*Cochlospermum planchoni*
Ethanolique	15,6
Semi-éthanolique	23,2
Aqueux	11,2

RENDEMENT DES FRACTIONS

Les rendements des fractions de l'extrait semi-éthanolique sont répertoriés dans le tableau 3

Le rendement le plus important est obtenu au niveau de la fraction butanolique (5,8%). Celui de la fraction à l'acétate d'éthyle est de 1,5 %, accompagné de celui à l'éther éthylique qui est égal à 0,8 %.

Tableau 3. Rendement d'extraction liquide-liquide (%)

Fractions	*Cochlospermum planchoni*
Ether diéthylique	0,8
Acétate d'éthyle	1,5
Butanolique	5,8

3.2 TENEUR EN COMPOSÉS POLYPHÉNOLIQUES DES EXTRAITS BRUTS DE L'ÉCORCE DE RACINE DE *COCHLOSPERMUM PLANCHONI*

La figure 2 montre les teneurs en polyphénols totaux (exprimées en mg équivalent d'acide gallique par gramme de matière sèche), en flavonoïdes totaux et en tanins condensés (exprimées en mg de catéchine équivalent par gramme de matière sèche) des extraits éthanolique, semi-éthanolique et aqueux de l'écorce de racine de *C. planchoni.*

Ces teneurs sont de (6,968±0,317) mg EAG/g MS, (6,818±1,322) mg EAG/g MS et (6,557±0,035) mg E AG/g MS respectivement pour les extraits éthanolique, semi-éthanolique et aqueux. La teneur en polyphénols de l'écorce de racine de *C. planchoni* est pratiquement insensible à la nature de solvant d'extraction.

La teneur en flavonoïdes totaux de l'extrait éthanolique est de (30, 549±0,525) mg EC/g MS alors que celles des extraits semi-éthanolique et aqueux sont respectivement de (29,079±0,685) mg EC/g MS et (32,342±0,548) mg EC/g MS.

La teneur en tanins est de (114,512±4,341) mg EC/g MS pour l'extrait éthanolique et (125,023±0,526) mg EC/g MS pour l'extrait semi-éthanolique alors que l'extrait aqueux a une teneur de (87,721±2.236) mg EC/g MS. L'extrait semi-éthanolique est plus riche en tanins que les extraits éthanolique et aqueux de *C. planchoni*.

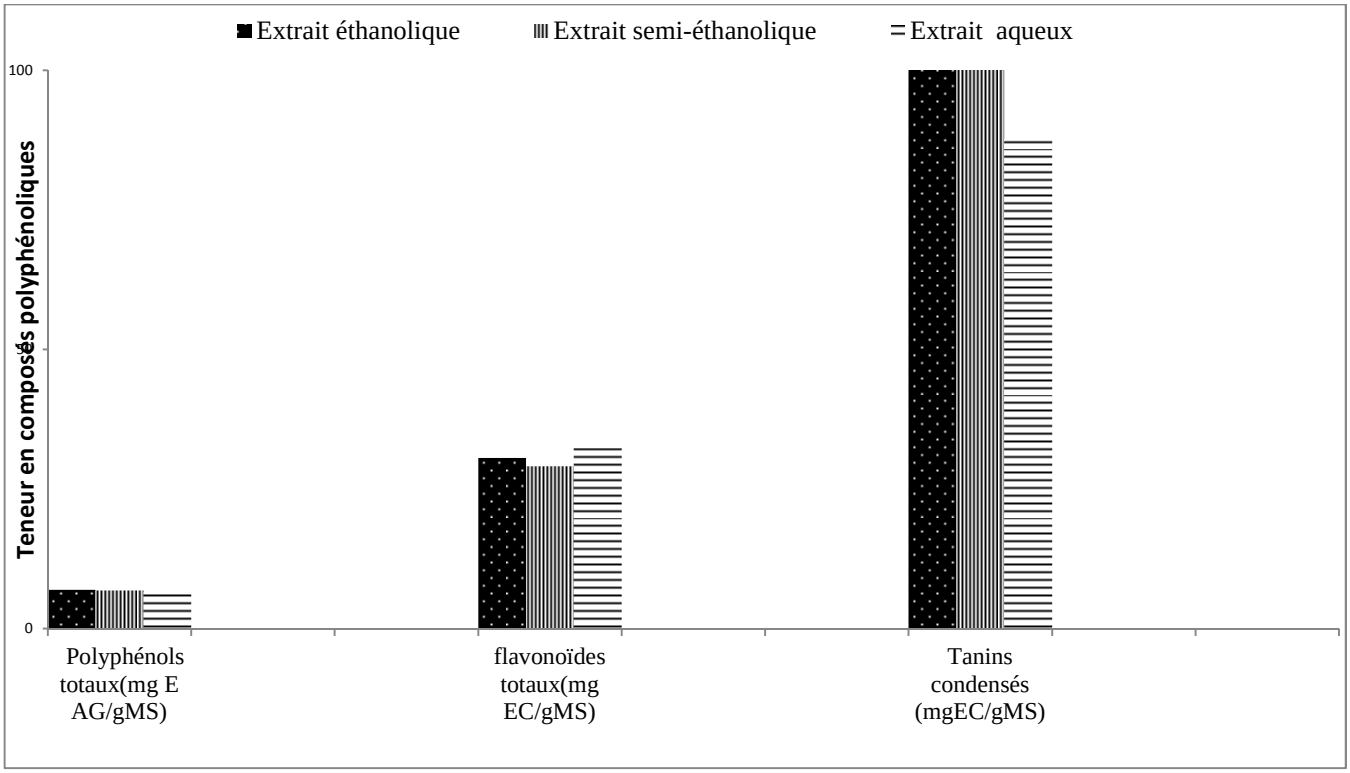

Fig. 2. Teneur en composés polyphénoliques des extraits bruts de l'écorce de racine de C. planchoni

3.3 TENEUR EN COMPOSÉS POLYPHÉNOLIQUES DES FRACTIONS DE L'ÉCORCE DE RACINE DE *C. PLANCHONI*

Les teneurs en polyphénols totaux (exprimées en mg équivalent d'acide gallique par gramme de matière sèche) en flavonoïdes totaux et en tanins condensés (exprimées en mg de catéchine équivalent par gramme de matière sèche) des fractions butanolique, acétate d'éthyle et éther diéthylique de l'écorce de racine de *C. planchoni* sont indiquées par la figure 3.

La teneur en polyphénols totaux de la fraction butanolique est de (0,201±0,057) mg E AG/MS, celles des fractions acétate d'éthyle et de l'éther éthylique sont respectivement de (1,965±0,151) mg E AG/MS et (2,053±0,187) mg EAG/MS.

Quant aux teneurs en flavonoïdes totaux, elles sont respectivement de (3,234±0,364) mg E C/g MS, (16,517±0,157) mg E C/g MS et (4,005±0,328) mg EC/g MS pour les fractions butanolique, acétate d'éthyle et éther éthylique.

Concernant les teneurs en tanins condensés, la teneur la plus élevée est obtenue au niveau de la fraction acétate éthylique (30,639±0,329) mg E C/g MS tandis que les teneurs des fractions éther éthylique et butanolique sont respectivement de (17, 500± 0,082) mg E C/g MS (15,669±2,014) mg EC/g MS.

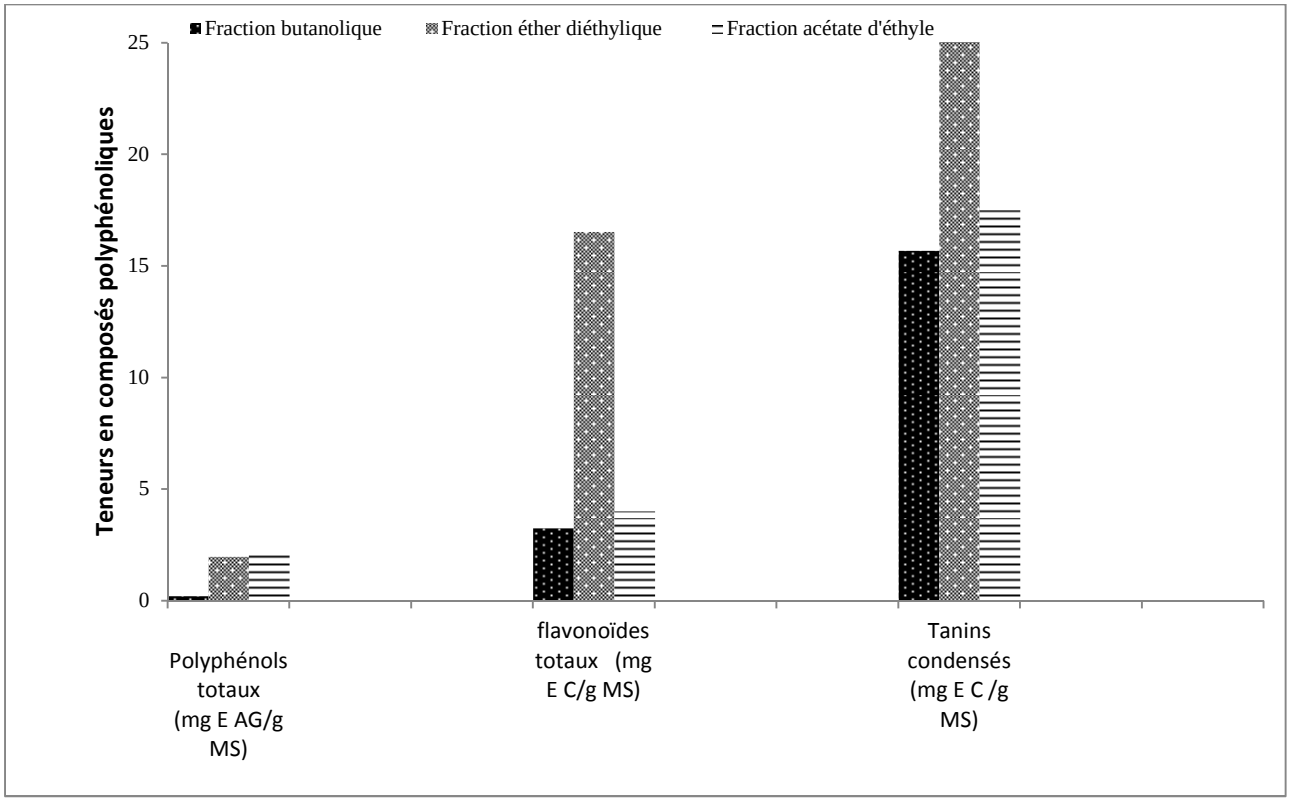

Fig. 3. Teneur en composés polyphénoliques des fractions de l'écorce de racine de C. planchoni

3.4 ACTIVITÉ ANTIRADICALAIRE DES COMPOSÉS DE RÉFÉRENCE, DES EXTRAITS BRUTS ET DES FRACTIONS DE L'ÉCORCE DE RACINE DE *C. PLANCHONI*

Le taux de piégeage de radicaux libres en fonction des concentrations des extraits bruts et des fractions de l'écorce de racine de *C. planchoni* est indiqué par les courbes de la figure 4.

A partir de ces courbes, la IC_{50} de chaque extrait a été déterminée et comparée à celles de trois composés de références (Tableau 4). Il faut noter que l'activité antiradicalaire des extraits éthanolique (IC_{50}=1,6µg/ml) et aqueux (IC_{50}=2µg/ml) est plus importante que celle de la quercétine (IC_{50}=3µg/ml) et du BHA (IC_{50}=4,8µg/ml) utilisés comme standards mais moins actifs que l'acide gallique (IC_{50}=0,9µg/ml), alors que l'extrait semi-éthanolique (IC_{50}=4µg/ml) a une activité antiradicalaire plus intéressante que la quercétine uniquement.

Quant aux fractions, le taux de piégeage des radicaux en fonction des concentrations des fractions éthéré, acétate d'éthyle et butanolique de l'écorce de racine de *C. planchoni* montre une allure similaire. On note une augmentation de taux de piégeage qui devient constant à des concentrations qui varient suivant la fraction.

Les deux fractions de l'écorce de racine de *C. planchoni* (éther éthylique et acétate d'éthyle) ont une activité antiradicalaire similaire (IC_{50}=1µg/ml) alors que l'IC_{50} de la fraction butanolique est de 5 µg/mL.

Ces deux fractions (éther éthylique et acétate d'éthyle) sont pratiquement cinq fois plus actives que la fraction butanolique. Elles sont plus actives que les extraits bruts (éthanolique, semi-éthanolique et aqueux) et les antiradicalaires de synthèses tels que la quercétine et le Butylhydroxyanisole. Il faut noter que les fractions éther éthylique et acétate d'éthyle ont une activité antiradicalaire comparable à celle de l'acide gallique qui est aussi un antiradicalaire de synthèse mais le plus actif parmi les trois composés de référence utilisés dans ce travail.

Les fractions éther éthylique et acétate d'éthyle s'étant déjà révélées plus riches en polyphénols totaux que la fraction butanolique, l'activité antiradicalaire plus prononcée de ces deux fractions pourrait être attribuée à leur teneur en composés phénoliques comme en témoignent plusieurs travaux dans la littérature sur les extraits végétaux [31], [41], [42].

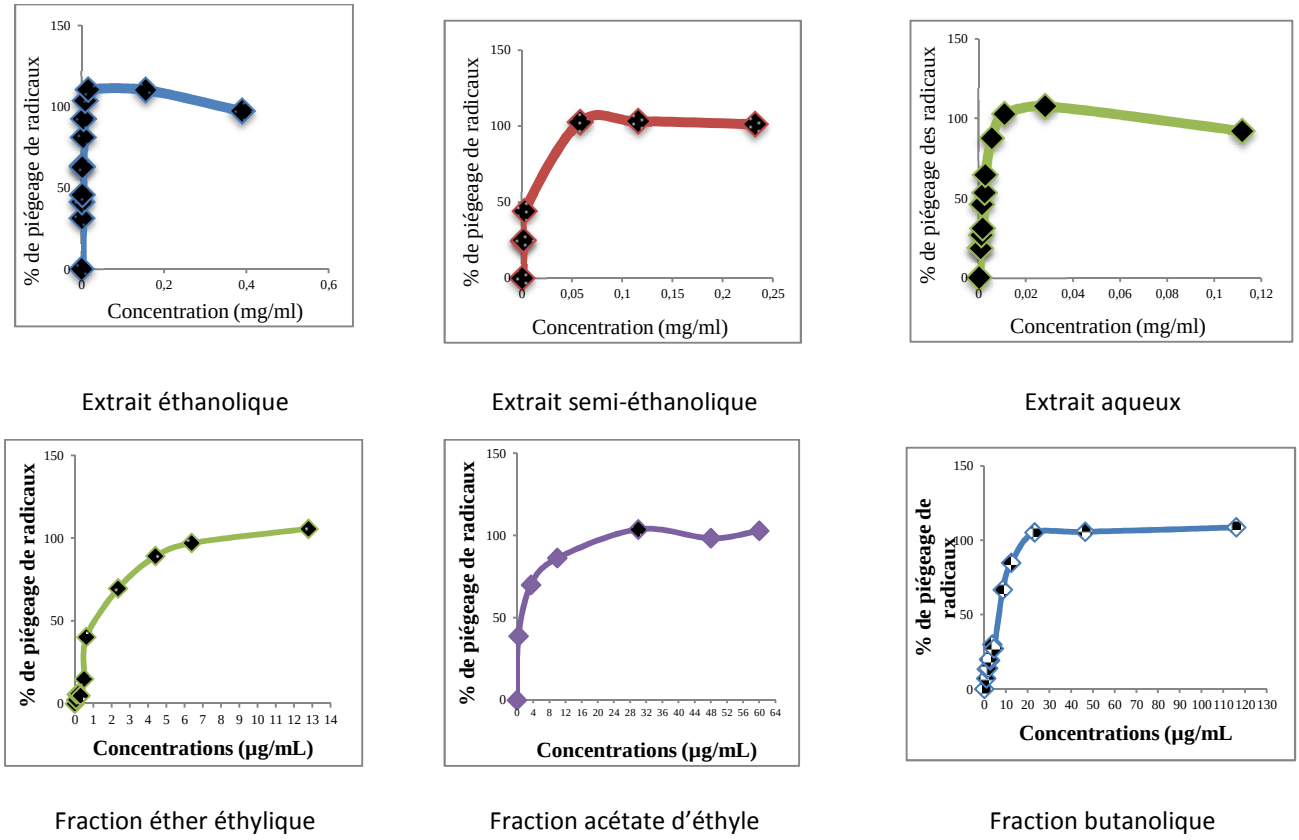

Figure 4. Activité antiradicalaire des extraits bruts et des fractions de l'écorce de racine de C. planchoni

Tableau 4. IC_{50} des extraits bruts des fractions et des composés de référence

Extraits bruts et fractions de l'écorce de racine de *C. planchoni*	IC_{50} (µg/ml)
Extrait éthanolique	1,6
Extrait Semi-éthanolique	4
Extrait aqueux	2
Fraction éther diéthylique	1
Fraction acétate d'éthyle	1
Fraction butanolique	5
Butylhydroxyanisole	4,8
Quercétine	3
Acide gallique	0,9

3.5 EVALUATION DE L'ACTIVITÉ ANTIBACTÉRIENNE DES EXTRAITS BRUTS ET DES FRACTIONS DE L'ÉCORCE DE *C. PLANCHONI*

3.5.1 EXTRAITS BRUTS DE L'ÉCORCE DE RACINE DE *C. PLANCHONI*

Les Concentrations Minimales Inhibitrices (CMI) et les Concentrations Minimales Bactéricides (CMB) des extraits bruts de l'écorce de racine de *C. planchoni* sont consignées dans le tableau 5.

Les extraits éthanolique, semi-éthanolique et aqueux de l'écorce de racine de *C. Planchoni* ont une activité bactéricide avec les souches de *K. pneumoniae* respectivement à des concentrations de 0,78 mg/ml ; 25 mg/ml et 100 mg/ml. Ces

extraits (extraits éthanolique, semi-éthanolique et aqueux) ont montré une activité bactériostatique avec *S. typhi*. Les extraits semi-éthanolique et aqueux de l'écorce de racine de *C. planchoni* ont permis d'inhiber uniquement *S. aureus,* mais cette souche est insensible à l'extrait éthanolique de l'écorce de racine de *C. planchoni*. *E. coli* est sensible aux extraits éthanolique et aqueux de *C. planchoni* alors que l'extrait semi-éthanolique n'a pas d'effet sur cette souche. Les extraits éthanolique et aqueux possèdent un pouvoir antibiotique avéré avec la bactérie *E. coli* alors que les trois extraits (éthanolique, semi-éthanolique et aqueux) ont montré un pouvoir antibiotique vis-à-vis de la souche de *K. pneumoniae.*

Tableau 5: Concentrations Minimales Inhibitrices et Bactéricides

Souches bactériennes	Extraits	Concentrations (mg/ml)		CMB/CMI
		CMI	CMB	
S. typhi	Ethanolique	1,56	12,50	8,01
	Semi-éthanolique	0,78	6,25	8,01
	Aqueux	1,56	50,00	32,05
S. aureus	Ethanolique	nd	nd	nd
	Semi-éthanolique	1,56	nd	>64,10
	Aqueux	100,00	nd	>1,00
E. coli	Ethanolique	0,39	0,78	2,00
	Semi-éthanolique	nd	nd	-
	Aqueux	0,39	1,56	4,00
K. pneumoniae	Ethanolique	0,39	0,78	2,00
	Semi-éthanolique	12,50	25,00	2,00
	Aqueux	25,00	100,00	4,00

nd: non déterminée

3.5.2 FRACTIONS DE L'EXTRAIT SEMI-ÉTHANOLIQUE DE L'ÉCORCE DE RACINE DE *C. PLANCHONI*

Les Concentrations Minimales Inhibitrices (CMI) et les Concentrations Minimales Bactéricides (CMB) des fractions de l'extrait semi-éthanolique sont indiquées par le tableau 6

Dans ce tableau la CMI varie de 3,125 mg/ml à 50 mg/ml alors que la CMB évolue de 25 mg/ml à 100mg/ml. A une concentration de la fraction butanolique égale à 25 mg/ml, cette fraction devient bactéricide vis-à-vis de *S. typhi* alors que la fraction acétate d'éthyle a montré cette activité à 100mg /ml avec un pouvoir antibiotique égal à 2. Ces deux fractions ont une activité antibactérienne avérée avec les souches de *S. typhi.* La fraction éther éthylique de l'écorce de racine de *C. planchoni a* tué la bactérie de *S. typhi* à une concentration de 50 mg/ml mais cette fraction à un pouvoir antibiotique égal 8, ce qui lui confère une activité bactériostatique. Quant à la souche de *S. aureus,* les fractions à l'acétate d'éthyle et à l'éther éthylique ont montré une activité bactéricide à la même concentration de 50 mg/ml alors que l'extrait butanolique a manifesté une activité bactériostatique avec cette souche.

Concernant la bactérie *E.coli*, la fraction à l'acétate d'éthyle de l'écorce de *C. planchoni* a inhibé uniquement cette souche alors que la fraction butanolique a une activité prononcée suivie de la fraction éther éthylique.

Au niveau de *K. pneumoniae,* la fraction à l'éther éthylique de l'écorce de racine de *C. planchoni* est insensible à *K. pneumoniae* tandis que la fraction à l'acétate d'éthyle s'est révélée très active pendant que la fraction butanolique a montré une activité antibactérienne modérée avec cette bactérie. L'activité antibactérienne notée au niveau de ces extraits et fractions pourrait probablement être liée au profil chimique de l'écorce de racine de *C. planchoni* soit à l'action d'un seul métabolite secondaire soit à une synergie entre ceux- ci (polyphénols, tanins, saponosides, flavonoïdes, alcaloïdes) [43], [44].

Tableau 6. Concentrations Minimales Inhibitrices et Bactéricides

Souches bactériennes	Extraits	Concentrations (mg/ml)		CMB/CMI
		CMI	CMB	
S. typhi	Butanolique	50	100	2
	Acétate d'éthyle	0,78	6,25	8,01
	Ether éthylique	6,25	50,00	8
S. aureus	Butanolique	6,25	50	8
	Acétate d'éthyle	25	50	2
	Ether éthylique	12,5	50	4
E. coli	Butanolique	25	100	4
	Acétate d'éthyle	3,125	nd	>32
	Ether éthylique	3,125	25	8
K. pneumoniae	Butanolique	12,5	100	8
	Acétate d'éthyle	12,5	25	2
	Ether éthylique	nd	nd	-

nd: non déterminée

4 CONCLUSIONS

Cette étude avait pour objectif de mieux connaître les métabolites secondaires et l'activité biologique des extraits bruts et des fractions de l'écorce de racine de *C. planchoni* utilisés par les éleveurs pour traiter les maladies gastro-intestinales des animaux d'élevage au Bénin.

L'écorce de racine de cette plante est riche en métabolites secondaires tels que les polyphénols les flavonoïdes, les tanins, les anthocyanes, les leuco-anthocyanes, les mucilages, les saponosides, les stérols et les terpènes.

En ce qui concerne le rendement d'extraction, le binaire éthanol-eau (50/50) a permis d'avoir un meilleur rendement d'extraction.

Quant à la quantification de la teneur en composés polyphénoliques, elle est pratiquement insensible à la nature de solvant d'extraction au niveau des extraits bruts de l'écorce de racine de *C. planchoni*. Au niveau des fractions, on note une variation significative de la teneur en polyphénols totaux qui est plus élevée dans les fractions à l'acétate d'éthyle et à l'éther éthylique que dans la fraction butanolique.

Concernant les tests de l'activité antiradicalaire, les deux fractions (éther éthylique et acétate d'éthyle) les plus riches en composés phénoliques ont montré une activité antiradicalaire plus intéressante que la quercétine et le BHA qui sont des antiradicalaires de synthèse.

Les résultats issus du test d'activité antibactérienne ont prouvé que les fractions à l'acétate d'éthyle, à l'éther éthylique et au butanol sont plus actives que les extraits bruts de *C. planchoni* vis-à- vis des quatre souches bactériennes utilisées dans ce travail.

La diversité en métabolites secondaires et les activités biologiques notées au niveau des extraits de l'écorce de racine de *C. planchoni* pourraient justifier l'usage de cette plante par les éleveurs pour traiter les pathologies de bétail.

Il s'avère donc opportun d'orienter des études futures vers l'isolement et la caractérisation des molécules bioactives présentes dans les fractions éther éthylique et acétate d'éthyle.

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Assessment of the Factors Influencing the Increase in Child Sexual Abuse: The Case of Morogoro Municipality

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ABSTRACT: Child vulnerability has been a growing agenda in everyday life. Child trafficking, child labor, physical abuse and sexually abuse are the issue in our ears in these days. This area has been neglected by the researcher due to its methodological difficulties, the only data that are eventually used are from the police station which again only few cases are reported. The research used a cross sectional design with sample size 100. This counted 70 for children, 15 for Focus Group Discussion (FGD) and 10 key informants. Open ended interviews were carried to parents and the key informants. A statically package for social science (SPSS) version 11.5 was used for data analysis especially for the quantitative analysis. It has been noticed that the society only perceive CSA as anal or vaginal penetration. The issue like non-contact sexual abuse like, abusive language (100%) and pornography (82.9%) were found normal among the respondent. The result also has shown that much effort by the stakeholders is placed on adult to child sexual abuse (ASCA) than child to child sexual abuse (CCSA) internet has also been the source of information to children about sexual images. Most of the children are vulnerably in the age of 10-15. There is a need to review the family, legal and local government responsibility in collaboration and to discuss the weakness in each institution.

KEYWORDS: Child, Child Sexual Abuse, perpetrators, abusive language.

1 INTRODUCTION

1.1 OVERVIEW

This chapter seeks to present the general background of the study trying to link it with the perception of the society on Child Sexual Abuse (SCA) basing from its historical context problem statement, justification of conducting the research and objective of research.

1.2 BACKGROUND OF THE STUDY

The issue of sexual abuse has been a burning issue, especially in the last quarter of 20th century [1]. Globally, it is estimated that 150 million girls and 73 million boys under 18 experienced forced sexual intercourse or other forms of sexual violence during 2002 [2]. Between 100 and 140 million girls and women in the world have undergone some form of female genital mutilation/cutting. In sub- Saharan East Africa, Egypt and Sudan, 3 million girls and women are subjected to mutilation/cutting every year. In 2004, 218 million children were involved in child labor, of which 126 million were in hazardous work. Estimates from 2000 suggest that 1.8 million children were forced into prostitution and pornography, and 1.2 million were victims of human trafficking [3].

In Africa, there is one day dedicated to what they call ‘an African child. The 16th of June every year since 1991 has been the day of reviewing children's issues in Africa. The issues under discussion include the prostitution, war and constraint to

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children' rights. The motto for African child the year 2008 is "Community Commitment: Avoid Child Abuse and Negligence" [4]. There is nothing to support the widely held view that child sexual abuse is very rare in SSA-prevalence levels are comparable with studies reported from other regions.

In Tanzania, the problem has been treated as a criminal offense. In the Penal Code Cap. 16 16 and the revised laws of the Sexual Act of 1998 Revised Edition of 2002, a child has been defined as the one under the age of 18. This is followed by the penalty of 30years imprisonment. However, whoever sexually abuses the child less than 10years, will be sentenced for life imprisonment. As parents can no longer afford paying school fees for their children. Thus affected students have left for urban centers seek employment consequently becoming implementation of the policy on child development that advocated the protection against child abuse, torture, and harmful social and cultural practices. The violation of children right makes them to run away from their families to urban areas where they are subjected to physical and sexual abuse, thereby subjecting them to vulnerability to HIV/AIDS pandemic [5].

The increase in divorce rates and initiation ceremonies has in most cases busted the problem, when a marriage break up; the father lives the children with their mother but no means of upkeep making her burden heavier. As a result the children, particularly girls resort to prostitution to get their needs [6]. Some cultural practices which involve young girls from the age of five were also mentioned as the major causes of their problem. We have noticed that after attending this cultural practice some girls end up in getting pregnant before completing school because of what they were taught in their initiation lessons [6].

Also, it has been noted that, the reason for the increase of sexual abuse of children are not exactly known. Reference [7], found that, some adults seeking to have sexual relations with young people thought to be free of HIV or in their way a failure to approach their fellow adult. Other adults were mentioned to have sexual relation to children in order to clean themselves spiritually according to their taboo. Some minors and business had the beliefs that doing the sexual acts with children they can have a lot of money on their activities as put forward by [8].

The study of CSA has been so much based on how to care for the ready affected children ignoring on reason behind. Reference, [9] contends that, "this book attempt to address this and similar questions as well as giving guidance on how best to respond when, as a health worker you find yourself faced with an instance of child sexual abuse". Why do you wait until you face the instance and not to confront it from its roots? That's why the point of interest is to assess the factors influencing the increase in child sexual abuse cases. The fact is that, the worldly awareness about this catastrophe was revealed at the quarters of the 20th century. With this explanation, we should concur with [1] who explained that, "I have chosen to speak on the subject of sexual abuse of children and adolescents as another hidden pediatric problem and a neglected area. Our pediatricians are insufficiently aware of the frequency of sexual abuse; it is, believe just as common as physical and abuse and the failure-to-thrive syndrome".

1.3 PROBLEM STATEMENT

Reference [10] states that, the high prevalence levels of HIV/AIDS in region expose sexually abused children to high risks of infection. It is estimated that, approximately 0.6-1.8% of children in high HIV-incidence countries in Southern Africa will experience penetrative sexual abuse by an AIDS/HIV infected perpetrator before 18 years of age. Reference [11] elaborates that, about 18,000 school girls in for granted because they swim in the risk of getting an STD and HIV/AIDS. The police department and court are the only data source for CSA. There is a need to expand the horizon for investing in this neglected area which has methodological difficulties which give a loophole for being diverted. Due to the nature of these crimes they are seldom reported to child protection services. Although Child pornography has received a great deal of attention to the punishment of the perpetrators very little has been written about the fate of children who are in this manner. Nevertheless, those crimes are worthy of closer attention not only as a result of potential psychological and social hurt to children, but also non-contract abuse may serve as a forerunner to other forms of abuse, where the perpetrator is grooming the child for other sexual acts. Despite the study covers about CSA there is also the opportunity of learning Non-contract Sexual abuse, something which is very little known to the society.

1.4 PROBLEM JUSTIFICATION

The research aims at giving awareness to the whole society at large, individual stakeholders and associations on the extent of the problem. Specifically, the research will be beneficial for police investigators, the child care institutions and the ministry responsible for gender and children. Morogoro Municipality has been just the model, other municipalities all over Tanzania can learn through the results obtained. Furthermore, the issue at stake in the Millennium Development Goal number 3 and the National Strategy for Growth and Reduction of Poverty (NSGRP) famously known in Swahili as Mkakati WA

Kukuza Uchumi na Kupunguza Umaskini (MKUKUTA) cluster 2 Goal No.2 which states the need for; Improved survival, health and well-being of all children and women and women and especially vulnerable groups [11]. It is beyond doubt that research on CSA is in germinating stage in the developing world, therefore it is my hope that, this study will make a good contribution for this take off. In most cases, it is put forward to be both of practical concern and academic interest.

1.5 OBJECTIVES

1.5.1 GENERAL OBJECTIVE

The main objective of the study is to assess the factors which have led to shooting up Child Sexual Abuse (CSA)

1.5.2 SPECIFIC OBJECTIVES

To identify the socioeconomic, cultural and demographic factors leading to CSA in Morogoro Municipality.

To investigate the forms or types of CSA prevalent in Morogoro Municipality.

1.5.3 RESEARCH QUESTIONS

What are the factors for CSA in MM?

What are the forms for CSA, which are prevailing in MM?

Where and in what circumstances CSA acts are happening?

2 METHODOLOGY

2.1 DESCRIPTION OF THE STUDY AREA

This research was conducted in Morogoro Municipality, the area geographically lies between the longitude 37.30E and in latitude 6.7S. Morogoro is the hub of the country of which the road network connects the entire country particularly, the Lake Zone and Southern highland zone. This nature of the geographical positioning gives the advantage of welcoming multiculturalism from the entire country. The Municipality also lies along the Eastern Arc Mountain ranges which are named here as Uluguru Mountains.

Also Morogoro is famous due to the fact of becoming the center of academic Institutions. The Sokoine University of agriculture (SUA), Mzumbe University, Jordan University College and Muslim University. Others are Ardhi institution and the Morogoro Teachers College.

2.2 POPULATION

MOROGORO Municipality as one of the oldest towns in the history of Tanzania, 195 kilometers to the west of Dar Es Salaam and the headquarters of Morogoro region. It has 19 administrative wards and 274 mitaa that in total make 260 square kilometers occupied by 228 863 people [13]. According to the 2002 Tanzanian censuses, the total population under 18 years of age was 87 081 of which male ware 42 451 and female 44 630. This makes the group to up (38%) of the whole population of the municipality as seen in the Table: 2 below.

Table 2: The distribution of population below 18 years in Morogoro urban

Age	Both Sexes	Male	Female
0	5,385	2,692	2,693
1	4,434	2,265	2,169
2	5,179	2,638	2,541
3	5,087	2,560	2,527
4	4,773	2,423	2,350
0 – 4	**24,858**	**12,578**	**12,280**
5	4,593	2,360	2,233
6	4,816	2,440	2,376
7	5,192	2,575	2,617
8	4,605	2,212	2,393
9	4,433	2,127	2,306
5 – 9	**23,639**	**11,714**	**11,925**
10	5,018	2,445	2,573
11	4,316	2,102	2,214
12	5,521	2,707	2,814
13	4,523	2,119	2,404
14	4,738	2,148	2,590
10 – 14	**24,116**	**11,521**	**12,595**
15	4,691	2,187	2,504
16	4,881	2,187	2,694
17	4,896	2,264	2,632
15 – 17	**14,468**	**6,638**	**7,830**
TOTAL	**87,081**	**42,451**	**44,630**

Source: [13]

2.3 ECONOMIC ACTIVITIES

Majority of the of Morogoro municipality (MM) are petty traders. This includes small business enterprise like, selling of second hand clothes, selling agricultural products in Morogoro market, small shops, small scale industries and fishery .others are employed in private companies and very few in public sectors many youths are employed as town bus daladala drives and conductors. However, the motorcycles riding for passengers have been another growing business in town. Some people also do engage in agriculture and livestock keeping though in this area rainfall has become unreliable in last few years.

2.4 SAMPLING PROCEDURES

The number of sample size taken was 100 respondents. The choice of this sample size was justified by limitation of time and financial resources, accuracy, and a need to ensure sufficient number for meaningful analysis [14]. Three techniques were used in sampling procedure depending on which group to be picked. There were three groups selected, that are 70 children, 15 respondents for Focus Group Discussion (FDG) and 15 key informants.

2.4.1 SNOWBALL SAMPLING

Snowball or Chain Sampling is a non-probability way of sampling from which the respondents to be interviewed or any knowledgeably person on the issue in discussion is responsible or helpfully for the next interview. Reference [15] explained that, by asking a number of people, you can identify a specific kind of cases, for example critical and extreme and so on. Snowball sampling begins with a few or cases and then gradually increases the sample size as new contacts are mentioned by the people you started out with. This reflects the nature of the snow, which tends to increase as it rolls down for its peak. It was this technique which was used to get children who are victimized. The total numbers of 70 victimized children were sampled after the selection of the wards. The sampling started at Central Police Station Morogoro (CPSM) were different crimes are reported. The children respondents from each wards results showed: Mwembesongo (34%), Kingolwira (29.0%), Mji mkuu (21.7%) and Kihonda (14.5%) as shown by Table 3.

Table 3: Distribution of respondents by wards

Ward	Frequency	Percentage
Kihonda	10	14.5
Kingolwira	20	29.1
Mjimkuu	16	21.7
Mwembesongo	24	34.7
Total	**70**	**100.0**

Apart from snowball sampling, the key informants were chosen purposefully to target the people with skills and knowledge about the issue at stake that is under this perspective CSA. The purposive technique has been generally recommended in social scientific researches as it focuses directly to the area intended for study [16]. Most of them were the heads of different departments for the key informants included Police, Municipal Departments for Community Development, and several CBOs concerned with children.

2.4.2 SYSTEMATIC RANDOM SAMPLING

A systematic random sampling was used to get the respondents for FGD. The members for FGD were a mixed group determined by their age, sex, income status and education. With the aid of Ward, Executive Officer (WEO), the researcher was able to select 45 members of the said characteristics out of the universal population. To get 15 members, therefore, the researcher had to pick every 3rd member from the list. In systematic sampling, every nth element in the total list was chosen for inclusion in the sample [17].

Four awards were picked randomly out of 19 wards of MM. The randomization was done by writing all the 19 wards on the separate fold papers. These papers were mixed thoroughly to get four wards. The randomization and number as they appeared in the list resulted the following: Kihonda (6), Kingolwira (9), Mjimkuu (13), and Mwembesongo (16).

2.5 RESEARCH DESIGN

The design used was a cross sectional descriptive study. The design is most appropriate for descriptive purpose as well as determination of relationship between variables. This method is considered to be useful because of time limit and resources available hence fulfill the objective of the study.

2.6 DATA COLLECTION

2.6.1 PRIMARY DATA COLLECTION

The primary data were collected from children, parents and key informants. A questionnaire with tabular, open and closed ended questions was used to collect information from male and female children who were the victims of sexual abuse aged 7 and 17 years. The interview had common questions for both male and female respondents, and specific questions for either male or female respondents. Key informants and the FGD had their separate checklist which was mainly a qualitative study. Key informants included experts who in their professional work got interacted with victims and perpetrators of Child Sexual Abuse. The key informant checklist was used to generate active discussion and it involved face to face interviews.

FGD contained parents with different levels of income and education. This was done at Mjimkuu ward which is the commercial centre of the Municipality. The ward was chosen because of its culturally diversity nature and the most densely populated ward in relation to the others. In ranks the first in MM of all the wards with 19% of the total population. The field assistant was facilitating the discussion while the researcher was taking down the notes with this discussion which took place at the WEOs office.

2.6.2 SECONDARY DATA COLLECTION

The secondary data were obtained from the offices dealing with vulnerably children issues. Specifically, The National Bureau of Statistics for Population size, research reports from various local or international institutions. Others were from Central Police Station Morogoro, Community Development Offices, UMATI Morogoro, and Morogoro Municipal and from Ward Executive Officers (WEO) of the visited wards. Also, other sources were from internet, Non-Government NGOs, and in the Morogoro regional magistrate court where I had the access to legal statutes.

2.7 DATA PROCESSING AND ANALYSIS

Both qualitative methods of data analysis were used in this research. That is, the survey data which were collected through questionnaires were summarized and coded before being entered. Statistical Packages for Social Sciences (SPSS) computer software version 11.5 was employed for data analysis whereby, the descriptive statistics computation such as frequencies and percentages were calculated. On the other hand, the secondary data, FGD and Key informant interviews underwent content analysis and the results were summarized and presented in the research report.

3 RESULTS AND DISCUSSION

3.1 GENERAL FACTORS FOR CHILD SEXUAL ABUSE

The study was aiming to seek on the prevailing socio- economic, socio-cultural, and demographical factors for CSA in Morogoro municipality (MM).The questions were asked as open ended questions to both, children, key informant and parents. The leading factors were related to poverty within the society, the lust within the children themselves, the reasons given in the FGD were sexual pleasures, peer influence, temptations, lack of parental responsibility and sexual desires. Many children fail in the trap of CSA at the age of 7-10 as table 8 shows. 7-10 gives (37.1%), 11-14 (11-4%),15 ages and above (31.4%), and that who doesn't know their abused age gave 20%. These results also concur with the study done in Kichangani Tanga [18]. It was reported that in their study that adolescent start to engage in sex as low as 10 years of age. In this specific area of specialization the finding as socio economic, socio culture and demographical factors are explained as hereunder.

Table 8: The distribution by the first age they engage on sexual activities

First age for CSA	Frequency	percentage
7 to 10	26	37.1
11 to 14	8	11.4
15 and above	22	31.4
Don't know	14	20.1
Total	**70**	**100.0**

3.1.1 ECONOMIC FACTORS

The majority of Morogoro people are living in less than a dollar per day as the national statistics articulates. Reference [19] stated that, poverty is pervasive in Tanzania, with over a third of households living below a basic needs poverty line, set in 2000/01 at Tshs 259 per adult equivalent per day, even in purchasing power party terms well below 1 per day. However, according to one of the representative of the municipal planning unit, said that in the municipality there has been a geometrical change from 2000 to 2009 to least 1000 Tshs. However, there still have the social problems like the increase in inflation rate; unemployment, poor housing, and inadequate number of meals per day as table 9 the result show is as followed (52.9%) one meal per day, (30%) twice per day and (17.1%) three meals per day.

Sexual exploitation of children is embedded in social inequalities, corruption, gender discrimination, cheap labor practices, and poor education opportunities. Worsening poverty among especially vulnerably families and communities affected by HIV/AIDS and increasing rate of adult mortality associated with AIDS illness, is creating a very dangerous situation for affected children who became very easy targets for sexual exploitation and trafficking. Consequently, most of the children fail in the trap of CSA.

Table 9: The distribution of respondents according to number of meals per day

Meals per day	Frequency	percentage
Once	37	52.9
Twice	21	30.0
Thrice	12	17.1
Total	**70**	**100.0**

In the FGD the finding showed that, many of respondents reacted that the problem here is in children themselves. That is children have lust and prestige to have things of higher status. This grows in a competitive basis among children themselves, that is, to be taken by expensive cars in schools, to have chicken chips, *chipsi kuku* and *chips mayai* as famously known foods of high status according to these students. So, every youth needs these kinds of entertainments regardless his/ her family background ability. Forest Hill secondary school is the one named among the schools whereby we find this kind of competition. One of the children respondents said:

> "*I need to start the sexual relation early in order to have the good network with my fellow age mate who are used to the same situation. This is the only and an alternative way to earn money for any girl of my type. You know, my parent even if can afford to cover my needs, there are such a silly and funny things that he cannot fund for".*

The network which she referred to was the way to interact with her fellow age mate whose it was like a fashion to have these relations. The silly and funny things were referred to as, disco dance, weekend outings and of course daily chicken chips. She said these are not the good things parents would want to hear about but only strictness in school. This has been the loopholes for the people who have money referred to as *predeshee* or *fataki* as town slang to get in and fish this younger generation are also referred to as "*Sugar mummy's* and *sugar daddy's*. "It is really shamefully in these days, that adults are in search for young and young in search for the adults, and do you know what they insist: *nahitaji damu changa,* (the need for a warm blooded guys – young) while the other, *nahitaji mzee wa kunilea."* (the need for a petting adult), Uttered one of the FGD respondents. Others mention factors in the FGD are single shared room by the whole family, food insecurity as result of frequent drought since few years back and unemployment are also the prevailing factors cementing the problem

3.1.2 SOCIAL CULTURAL FACTORS

MM is growing geometrical with regarded to population, infrastructure and habitation. The places like Kihonda, Bingwa and Nanenane are the good example to witness her growth. This municipality also is the hub of the country, that is, her privilege of being the road access to every division of the country like southern highlands, central zone, Lake Zone and the northern zone**.**

This makes MM to be influenced most by socio cultural problems related to CSA and other social problems as well. The respondents were asked openly to mention some socio cultural factors influencing CSA in MM specifically. They were asked openly to mention from the most influential to the least factors. The results showed that foreign cultural influence hold (54%) inadequate deterrent measure against offenders (20.3.), Ngoma and initiation ceremonies (15.5%),peer groups (3.3%) and others (7%).

- **Foreign culture influence**

Foreign cultural is some external ways of living which try to penetrate and enculturation to the existing modes of living. This enculturation is brought about by the globalization that is the development of science and technology. The evolutions have made easier for the globe as one village but on the other hand the decline of old good cultural values and children are the most vulnerable. However we should not sit back and only blame the evolution but to take a precaution measures on how to move with it because we are also a changing society. The areas which affect most the children include TV plays, internet, fashions in clothing and music.

- **Television**

The FGDs result concerning the TV portrayed that, some TV shows are not in accordance to the local good cultural values existed. That is, they show soaps associated to sexual images for instances mouth kissing, sexual action and wearing only underpants like bikini. The FGD revealed that, the situation has slightly changed in relation has slightly changed in relation to those existed According to [20] who stipulated that, There are programs in various TV stations like 'love bus', 'Quado a sesmia,' and 'secreto de Amor', to mention few, which either show sexually explicit actions or a kind of romantic movies that also stimulate sexual desires to adolescent. At least, the soaps like 'growing up, in star TV; la Tormenta in capital TV, "The promise" in TBC and cartoons programs are fair to the children. They said, great problem has remained in the plays famously known as bongo movies which some of them shows the sexual explicitly images and halfnacked wearing. This movie which are Swahili movies, most of them were said to be so direct to the point that even a child of three years is able to know what is going on. Channel "e" a free to air (FTA) channel but available in satellite dishes has been showing pure sexual images and acts in the mid nights of Fridays and Saturdays.

- **Internet café**

The question was asked to children was to children as to whether they visited internet café in the past 7 days of which result showed that (60%) visited internet café while (40%) said no. For the visited the internet they were asked to state the websites they normally visits. It was portrayed that education (15.7%), facebook and chat (27.1%), love (5.7%), games (21.4%), music (17.1%) and don't have specific thing (12.9%), see table 10. Several internet café in Morogoro were visited postal internet café said that they have decided to put the sticker which prohibits the sexual image watch. It was noticed that a big number of primary and secondary school children were visiting to watch the sexual images.

Table 10: The distribution of respondents by web visited in the internet cafe

Web visited	**Frequency**	**percentage**
Education	11	15.7
Love	4	5.7
Music	12	17.1
Facebook and Chat	19	27.2
Games	9	21.4
Don't have specific thing	9	12.9
Total	**70**	**100.0**

Source: Survey 2010

- **Fashion in clothing and music's**

Fashion in clothing and musics was said to grow rapidly in the municipality. The teenagers prefer the western clothes *mitumba* that is secondhand clothes, which tighten their body, mini skirt and those which show bellybutton. Also some boys are wearing trousers under the waist, famously known as *mlegezo* or they call hugging. This was as per the interview along Kitope road where the interview with with the Hair cutting salon attendant was conducted. The kitope road is the pedestrian's busiest street in town which passes in between the Jamhuri Stadium and CPSM and the passage for the students of two secondary schools and two primary schools that is, forest hill and Morogoro secondary and Bungo/mchikichini primary school respectively. The street was started to be the pass by area for the for the youth who either look for the entertainment at Jamhuri Stadium or going to school. More or less equal results are found in the research done in Kinondoni district Dare es Salaam by [20] who found that, current media have been depleting the old good values of our culture. The society, especially the teenagers has been copying the system regardless on the impact of it. The WEO of Mji Mkuu ward in the discussion had this to say: "the clothing's which shows belly bottom, miniskirts which exposes the upper knees areas, mouth kissing, pinda mugongo taarabu and ranga muffin music style (shaking the whole body) music as presented by the media has became the source of temptation to our youths. Also it is beyond doubt that the famous *udaku* magazine given the image and love stories which sensitize this age group".

- **Religiosity**

The children were asked whether they believe in God, or they pray, the results showed that 100% they believed. When they were asked on how often they prayed or doing some religious services, the observation showed that,(28%) never attached, (21.4%) once per day (11.4%) very rare in a month and nobody and prayed more of often per day see table 11. These observations mean that, most of the children are religious but they hardly follow the ethics in their religious denominations and of course the results stipulated that, most of the respondents belonged to Christian and Muslim religion.

Table 11: The distribution of respondents by the number of time they pray

Routine in prayer	Frequency	Percent
More often per day	0	0.0
Once per day	8	11.4
Once per	15	21.4
Very rare in a month	8	11.4
Only on religious Holidays	19	27.3
Never at all	20	28.5
Total	**70**	**100.0**

- **Inadequate deterrent measures for offenders**

Under this perspective the study needed to investigate the kind of sexual offenses and their respective penalties, furthermore the discussion about them and the weakness. The concerned offences are rape, abduction under 16, grave sexual abuse and sexual exploitations as reported in CPSM in the year 2006-2008 and as seen in Table 12.

Table 12: Nature of the Offences Related to CSA from the year 2006-2008

Nature of the Offence	Year					
	2006		2007		2008	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Rape	**24**	**24.0**	**14**	**12.2**	**14**	**11.4**
Abduction	**55**	**55.0**	**73**	**63.5**	**86**	**69.9**
Grave Sexual						
Abuse	**16**	**16.0**	**21**	**18.3**	**18**	**14.6**
Sexual						
Exploitation	**5**	**5.0**	**7**	**6.0**	**5**	**4.1**
Total	**100**	**100.0**	**115**	**100.0**	**123**	**100.0**

Source: [24]

According to the Table 12 the findings shows that in the year 2006 rape cases in MM were (24%), abduction (55%), Grave Sexual Abuse (16%) and sexual exploitation (5%). In 2007, rape (12.2%), abduction (63.5%), Grave Sexual Abuse (18.3%) and sexual exploitation (18.3%). However in 2008/2009; rape (11.4%) abduction (69.9%), Grave Sexual Abuse (14.6%) and sexual exploitation (4.1%). The general outlook of the finding shows that, the cases have been increasing from year to year. However, the offence of abduction has been shooting tremendously. This is due to the fact that many of parents or guardians were reporting this kind of cases which involves the students who were either impregnated or married. At this specific time, the government screwed up on this law and gave an eye to watch on the violating weaknesses. The study may come in to conclusion that there are lots of unreported issues and so this makes the data to be not exhaustive.

- **The Reaction to the penalties of the offenders**

The discussion from key informant generally portrayed the results on three issues that are, the penalties are too heavy for the offenders, the problem in investigation procedures and, some people are born criminal by nature.

In FGD many respondents complained about the life imprisonment penalty as something inhuman which does not shape rather than destroying. “When someone is life imprisoned no feedback from him to the society, society tend to forget after a short time. Think about Papii Nguza (*Babu Seya*) and others who were life imprisonment. People no longer talk about this case which had interest to the society; if someone has changed how do we know it?” Some also said that this creates the enemity in the society between the two families. However it is also too expensive for the government to sustain those who are life imprisoned.

The respondents were not also concurring with the justice in respect to sexual offenses and penalties among children themselves, famously termed as “Children to Children Abuse (CCA)”. It was noticed that the law is not just for both boys and girls. When a Boy under 18 impregnates a girl of the same age set, only the boy is held liable for the offense under sect. 130.

This means there is weakness to check the abuse between children themselves by holding the boys as the only abusers. The law needs to be revised so as to have the double cut. "When you go to the police station with your victim son in the case of impregnation and his mate, you will leave your boy at the police station for answering the charges as the only accused while the girl only be justified to be as the witness and thus she just go back home". This has the impact to girls not to be strict while being approached for sexual purposes. On top of that, the weakness of the law to the notion of child to child abuse creates the immunity of the problem among children. The laws overlook children to insist only CSA on adult to Children Abuse (ACA).

It was also discussed that there penalties give loopholes for corruption in the judiciary section and as a reconciliation deal in the society. How? Foe the judiciary, the act of leaving the decision of penalty hanging which is not a direct penalty; for instance, the "grave sexual abuse" gives the penalties of imprisonment not below 20 years or not exceeding 30 years or paying compensation to the victim. These choices or alternatives give opportunity for unethical magistrate to give what is not due to the offender, which is lessening or increment of the penalty. This makes the penalties to be subjective rather than objective. Some members from the society also upon heavy penalties use the loopholes to settle issues outside the court.

Another issue raised about deterrent measures to offenders is the weakness in the investigative unit. This weakness which was said is either the investigative unit fails to accomplish its duties or they are working out of their ethics. This means, they are violating what they have received in their trainings or the human resources is not well planned within the system. The queries like corruption, preferential favoring when giving posts, poor working facilities are the factors mentioned as a speed governor to the efforts of alleviation of the problem. It was noted that, the police department in the Municipality has only on operational car to deal with the crime on the entire area which again is the weaknesses creates the immunity to the perpetrators and the problem persists.

However, one of the public prosecutors of Morogoro Resident Magistrate in the interview negated the blame to the investigative unit. The arguments were based on the failure of the witness to appear before the court. It was said that some people are using the cases as the business so that they can earn money. He said that he had witnessed a number of cases dismissed in each year.

The problem of habitual crime was also stated as the factor hindering the efforts to regulate penalties to the offenders. Despite all the legal preventive measures the crime will still increase due to the presence of some criminals who are born criminal by nature [21]. According to the Morogoro Habitual Crime Registrar it is normal to find the names in criminal records such as *Zinga, Shoborobo, Bernard Rocky and Solapawa.*

- **Ngoma and initiation ceremonies**

This is a kind of formal education which is handled down by the means of oral tradition. The majority of the respondents were of the Luguru ethnic group. This kind of group support initiation ceremonies which its general objective is to justify growth that is, movement from childhood to adulthood.

According to the discussion, the initiation ceremony is aiming positive but only some people are failing to observe the positive values in it. They said if not for initiation where will young ones learn their culture. These ceremonies give them the self actualization about their culture.

The question was whether who attended initiation ceremony or not. The result showed that (60%) attended while (40%) did not attend. Also they were asked to state the age for initiation ceremonies. The result showed that, (64.3%) said in the age of (10-12), (24.3%) said 15 or above and (11.4%) they don't know as seen in Table 13.

Table 13: The distribution of respondents according to the age for Initiation Ceremonies

Age for the Initiation Ceremony	Frequency	Percent
10 to 12 years	45	64.3
15 or above	17	24.3
Don't Know	8	11.4
Total	**70**	**100.0**

The initiation ceremonies is characterized by traditional teaching to *Mwali* that means a young matured boy or a girl of the age between 10 to 15 as shown in the table above. For a girl the ceremony is concluded by the final show whereby a girl will sit on the shoulder of a man on the open place for everybody to watch. The girl with her breast open will start giving the

advertisement show which is famously known as *kunema.* Also the ceremony is accompanied by the night ngoma dance which welcomes drunkards, drug and prostitution. The aim of kunema is to declare that the girl is fully adult and everybody is welcome!

However, Mr. Makengo, the chairman of TETA which is an NGO working with vulnerable youths, commented on the initiation ceremony by giving an explanation on the need to edit the ceremonies, "An Initiation ceremony is something necessary which can help us to take off. It is like a runway on an air port ground. If we neglect we are not able to proceed. Tradition and taboos are something deeply rooted in mind, so let's work with it carefully"

FGD also portrayed other factors for CSA as drugs and alcoholism, the increasing number of street children, the types of food eaten which stimulates body super normal growth, inner body changes for teenagers, the haphazardly increasing in number of bars and guests houses, walk or working in darkness's or hidden places. Also the night disco and public transportation system which encourage on beyond level seating creates a kind of congestion which may foster stimulation. According to [22], many children aged 12 and above practice sex works especially at the Tupendane pombe shops Chamwino area. Through my personal observation I saw many children hang around the area some selling food, fish or other goods while waiting for their customers, mainly drunk persons. After getting their customers, they go to nearby guest houses to entertain them for short time bases that is, two to five hours time for using rooms.

3.1.3 DEMOGRAPHIC FACTORS

Demographic factors include the different groups of the population. Such groups in the issue at stake include the single parent children, the street children, the disabled children, male children and female children, age group and body morphology. The question was targeted to know which group is mostly in the risk of CSA in MM.

The finding shows that, the most affected are the street children (45%) single parent children (30%), disabled (15.5%) and body morphology (9.5%) see Table 14. The empirical measurement on body morphology was in accordance to the individual who were interviewed. Some especially those for commercial sex were even proud of their well built body *umbo namba nane*, as they termed it. This kind of figure was valuable for customers.

Table 14: The distribution of respondents according to the vulnerable cases

Vulnerable Cases	Frequency	Percentage
Body morphology	7	10.0
Street children	31	44.3
Single parent children	21	30.0
Disabled	11	15.7
Total	**70**	**100.0**

The observation shows that among those street children most of them have also single parent. Some children respondents' were roaming in the street selling banana and oranges even during the school time or class sessions. Moreover, it has become like the tradition in the evening at 19:00 tonight along Madaraka and Uhuru Street to find this age group selling fruits. This has placed them in the dangerous situation of being abused. The reason behind was that most of them were not leaving with their parents.

The HIV/AIDS has set fire to the increasing number of single parent victims and street children according to the national statistics [23], shows that Morogoro is in top five among other regions in Tanzania. This has the consequences to the increasing in number of street children. On the question of the disabled children it seems due to their weakness they fail in to the traps of CSA. One of the respondents of 15 years was even pregnant! So the offenders are taking the loophole of them being disabled.

3.2 FORMS AND CIRCUMSTANCES FOR CSA

One cannot avoid talking about form and circumstances when talking about the problem of CSA. Actually these are the two things that they are inseparable, that is why the study included these variables. In this sub topic we are going to review generally the forms in the definition of CSA and according to findings we will be able to know specifically the types in MM. Also it is good to know the places and means whereby these forms are taking place.

3.2.1 FORMS

The forms of CSA found in MM can be classified in to two, that is, contact sexual abuse and non-contact sexual abuse. The study portrayed that the most under reported forms of CSA are those that occur without actual sexual contact between the perpetrator and the child. These includes showing children sexual images and movies, having children watch adult engaging in sexual activities, encourage children to masturbate as an act of sexual satisfaction and sexual photograph of children for their personal or commercial use.

Many forms of CSA were given in fronts of the respondents and in each he/she was obliged to state whether addicted to it or not. The question stressed on addition after observation than that about (90%) have at least undergone each form. The findings in Table 15 showed that, (100%) of the children respondents were using abusive language, pornographic watch (82.9%), sexual relation (65%), masturbation (20%) forced penetration (18%), homosexual (10%), married at an early age (8.6%), and commercial sex (7.4%) as in Table 14.

However, the survey revealed that people in the area have different perceptions about CSA and most respondents did not regard certain acts of CSA as abuse (e.g. abusive language to children or touching of children's sexually sensitive parts and regarding those with the age of 14-17 as children). The survey revealed issues of serious concern in the area on CSA.

The WEO of Kiwanja cha Ndege ward revealed other types of CSA as Kula video, oral sex, group sex, and the occasions which allow the coming in to close contact famously known as Mfadhaiko e.g. some Raga muffin music and Bongo flavor, and the daladala transport. "Kula Video" is the Swahili word which means to peep through the window or key holes.

Table 15: The distribution of respondents according to forms of CSA

Characters	Frequency	Percentage
Pornography		
Yes	58	82.9
No	12	17.1
Sexual Relation		
Yes	41	58.6
No	29	41.4
Sexual Organs touched		
Yes	47	67.1
No	23	32.9
Masturbation		
Yes	46	65.7
No	14	20.0
Don't Know	10	14.3
Abusive Language		
Yes	15	21.4
No	55	71.6
Early Married		
Yes	10	14.3
No	60	85.7
Forced Penetration		
Yes	13	18.6
No	57	81.4
Commercial Sex		
Yes	10	14.3
No	60	85.7

It was discovered that some kids do pass around guest houses in town with their long screw drivers unfold the curtain of the rooms to watch what is happening within the room. This was reported to happen in Mawenzi area, Chamwino, Mji mpya, and the guest houses around Msamvu bus terminal.

The researcher observed certain famous clubs said to be chronic for CSA. Most of them were in Luna Street known as Kahumba and Chipukizi and visited in the mid night. It was observed that, this is the center of commercial and tourism sex,

meaning that both local and foreigners customers were served. The place is really busy especially from 18hrs to 00hrs and majority are there to search the customers for sexual purpose. One of the police investigators of CPSM in the interview had this to say, "In my investigative experience when you talk of commercial sex in Mororgoro you should talk about Kahumba Night Park, Chipukizi Club and Makuti Club near Msamvu bus terminal, these are the two things inseparable. The meaning of this inseparability is due to the fact that having reached MM if you ask for a commercial sex you will be directed to the area. The victims of this kind of sex who majority of them are in between the age of 15-18 have even lost the conscious that they are doing criminal to the point that they bring their customers who failed to pay them to the police station". The observation portrayed that even those who are above 18 years of age making commercial sex; they also facilitate CSA by marrying young boys for their sexual satisfaction after a hard work of satisfying a customer. These boys are famously known as King'asti.

Moreover, MM is one of the touristy regions in Tanzania due to its advantage of having the good access to Uluguru Mountain ranges, Mikumi and Udzungwa National Parks. The Municipality has also the advantage of being the breakpoint of transit goods to central and southern African imported goods through the Dar es Salaam harbor. In front of Lupila Complex and Msamvu bus terminal has the good and favorable parking access to the up country trucks. All these have become the threat to some children adults who were observed meandering here and there searching for customers. Also, Data from Central Police Station Morogoro (CPSM) shows that rape and indecent assault has been persisting geometrically as shown on Table 15.

Table 16: crime statistic due to the offences related to child sexual abuse reported in MM for the year Jan 2005 – May 2009

Year	Cases	Convicted	Percentage of Convicted
2005	95	5	5.3
2006	99	11	11.1
2007	115	17	14.7
2008	123	24	19.5
May 2009	52	3	5.8
Total	**485**	**60**	**12.4**

Source: [25]

The data in Table 16 shows the increase in the crime rate from the year 2005 to 2009 but the number of convicted is not equivalent to number of cases. The year 2005 had (5.3%) of perpetrators convicted out of cases reported, 2006 (11%), 2007 (14.7), 2008 (19.5%) and 2009 (5.8%). The overall percentage of offenders convicted from the year 2005 to May 2009 was only (12.4%). In this case the researcher was eager to know on what makes the difference. Many of the police investigators, community development officers and WEOs during interviewing were asked to state the weaknesses and difficulties they face in working out with the problem of CSA. Most of them especially police officers observed the child abuse cases been taken as a business. That is, most of the cases are either not reported or if reported they fail to proceed in court due to failing for the witness to appear before the court. It was noticed that most of the parents are settling these disputes by earning money from the offenders and disregarding the court proceedings.

One of the POSEA-Morogoro representatives gave one case study relating this fact that: in the area of Mwembesongo there was a person who had her rooms using the for selling little girls for commercial sex. This other was using her daughter to go and pick some samples from one of the nearby primary school. The daughter was also schooling at the same primary. She used mangoes, sweets and potato chips to capture them. The issue was reported to CPSM after a grade four and a grade five girls being victimized at this famous house, *danguro*. After the preliminary investigation, the case was taken to the court for hearing. POSEA also was hand in hand to make sure that the case is followed. The offenders and enabler were arrested but the key witnesses failed to appear before the court of law and the case was dismissed. This obviously shows the fact that the two parties finished the issues out of the court. However, the courts also were blamed for engaging in corruption which either deflects the right or un necessary elongation of the cases which finally break.

3.2.2 CIRCUMSTANCES

The circumstances for CSA include the perpetrators and frequent places whereby the acts are taking places. The circumstances for CSA are very much affected by the types and the age of a child and the nature of the perpetrators. It was noticed that most of the abuse actions are done along Morogoro River, in bushes and in the hidden areas of the unfinished houses night clubs or bar seen in Table 17. The table portrays that, 8.6% of CSA are taking place in bushes, 2.9% in unfinished houses and along the river valley, 8.6% in night clubs or bars, 42.9% in video theatres and 37.1% for others. It was observed

that, the others stand for those acts which either took place at home or at the perpetrators premises sometimes referred to as Ghetto.

Table 17: The distribution of respondents by circumstances of abuse

Circumstances	Frequency	Percentage
Bushes	6	8.6
Unfinished houses and along the river	2	2.9
Night club or bar	6	8.6
Video Theatres	26	37.1
Others	30	42.8
Totals	**70**	**100.0**

The internet cafes in town center are the most mentioned places for pornographic images. The researchers took time to visit some famous internet café in town. Having the pre knowledge that many of the students are accessing the internet during the weekend; the places were visited on the respective days. Actually, it is strictly forbidden to watch pornography at the café as prescribed by the posters appeared in each computer at the café. That being the case, it was difficult to witness it directly to know that they watch pornography, but with the help of the café attendant we were able to recall the entire website previously opened mostly to be the pornographic sites. It was discovered that these guys are opening two websites at the same time with one which they will feel confident to work with and the other with pornographic images. In this case one is minimized and the other one is highlighted depending on the situation. According to the internet attendants most visited websites are www.worldsex.com, www.arabsex,com, www.perfectgirls.com and many other more.

The video theatres are the simple building characterized by iron sheet walls or pieces of clothes and bag wall. Usually you may find the advertisement outside concerning the movie to be shown of which they are mostly soccer. They can be found at least in every street in town. For pornographic advertisement, they use the hidden language as *Pilau, Sarakasi* or Blue in order to deliver the message. Very few of these businesses are licensed. They are the places mentioned where most of youths take up their time.

According to the FGD, along the Morogoro River and Mafisa brick making valleys are the places where the boys are engaging in sexual and drug abuse. According to the sources from CPSM about 8 boys were raped along the river in between September, 2008 to May 2009. This kind of group is the most affected in these circumstances due to the fact that they go there for economic purposes. Some boys were said to be as either the household head of the family or they had to contribute something for the welfare of their family. This was proved by my visit to the said river where the boys less than 13 years were found on the river as shown by plate 2-4. One of the boys having about 11 years said that, "*My household considers me as an entrepreneur, as a male member, I have the responsibility to contribute to the household income*".

Apart from that the brick making area in Mafisa Valley and along the Morogoro River was said to be the place for criminals' camp not only for vulnerability in children but other big criminal issues as house breaking, theft, and drug abuse. It has been as a jobless corner, an open access whereby no one owns.

The FGD results gave the blames on bars and night clubs, the observation shows that many girls are employed in different bars in town, the fact being that the owner can make a lot of money since many customers are in favor of this kind of age group. These are the places where the waiters are violated by being touched their private parts, half necked clothes and sometimes finger penetration. Some bars which were mentioned were Kahumba Night Club, Morogoro by Night and Chipukizi club. There was also unlicensed guest houses *gesti bubu* mentioned by key informants which are used as a hidden commercial sex point. The chronic reported areas are Manzese, Kiwanja cha Ndege, Mwembesongo and Chamwino. The reviewed literature from CPSM from January to May 2009 shows that the offenders of CSA mostly use *Ghetto* and unfinished houses.

4 CONCLUSION

Tanzania's national population statistics reveal a startling truth that more than half of the country is comprised of children and youth. In 2002, it was reported that 55% of the population is 19 years of age or younger. In 2005, it was revealed that a full 45.8% of Tanzania's population is actually under the tender age of 15. In direct response to the urgency of the situation for Tanzania's children and its national future, the Caucus for Children's Right has launched a campaign to spark national awareness that Tanzania's future depends on the treatment of Tanzania's children today.

The issues about CSA embraces in the entire society that is, as a part and parcel of the society. As it is known the children carries 50% of the population in Tanzania. So vulnerability in children is actually the entirely countries vulnerability. The findings in this study bring a number of issues that are important for social livelihood. CSA has always be taken to mean as the abuse from adult to young, employer to employee that means, the one with power or taking care of versus to the one who is under the power or inferior. But this study has gone further looking on the types or forms of abuse not only adult to child abuse but also those initiated by children themselves or children versus children abuse.

4.1 RECOMENDATIONS

- There is a need for the family education parents which will synthesize between the indigenous knowledge on child rearing and the scientific ways.
- The rules and laws guiding the children's rights should be strictly followed so as to discourage the perpetrators of CSA.
- Sports and gaming after school session should be rejuvenated in the municipaity.
- There should be the 'the National child protection network task force' which cuts across each Ministry in order to monitor the youth.
- The laws also have weaknesses and contradicting each other. The criminal law in SOSPA 1998 RE. 2002, sect. 130 (1) hold the criminal to the one who willfully make a sexual contact with the girl under 18 years of age whether voluntary or involuntary. Whereas, the marriage act of 1977 revised in 2002 sect. 13 (a) concludes that a girl can be married at 14 years of age with the court satisfaction of the circumstances.

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A STUDY OF SLUMS AS PROBLEM FOR URBAN GROWTH OF NANDED CITY, MAHARASHRTA (INDIA)

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ABSTRACT: In present paper we tried to study the slum settlement, slum population & land ownership of slums in the Nanded city. Slum dwellers live in the difficult social and economic conditions that manifest in different forms of deprivation – material, physical, social, and political in Nanded city. The slum area does not have even the essential facilities; for example, health care, water supply, roads, disposition of wastages, etc. In comparison with the south part of the city, the slums and the slum-dwellers are increasing in the north. Not only the slum dwellers but also the number of slums is increasing in the city. In 1971 total population of Nanded city were 126518 out of which Slum population were 20000 and in 2011 total population of city increases up to 719188 out of which Slum population is 279024. The slum population accounts 15.80 percent of the city population in 1971 whereas it increases up to 38.79 in 2011. This shows that rapid increase in slum population in Nanded city and it creates many social and economical problems in Nanded city.

KEYWORDS: Slum, Population, Basic Services in Slums, Sanitation, Land ownership.

INTRODUCTION

In the present, the estimated 828 million slum-dwellers represent the one third population of the world. The vast majority of these slums – more than 90% – are located in cities of under-development countries. Often, the fastest growing cities have the highest concentrations of these temporary settlements. Slums are no longer just marginalized neighborhood housings, but a relatively small proportion of the urban population. In fact, in many cities, carving their way into the fabric of modern cities slums are the dominant type of human settlement, and making their mark as a distinct category of human settlement that characterizes many cities in the under-development world. Slum dwellers live in the difficult social and economic conditions that manifest in different forms of deprivation – material, physical, social, and political. They live in overcrowded, poorly constructed housing, often with insecure land possession. Housing in these settings ranges from high-rise tenements to shacks to plastic sheet tents on sidewalks, often located in undesirable parts of the city such as steep hillsides, riverbanks subject to flooding, or industrial areas. Slum dwellers' health is further affected by reduced access to safe food and water, poor sanitation, a breakdown of traditional family structures, high crime, and high unemployment rates. Due to the high population density, overcrowding, and lack of safe water and sanitation systems, slums are productive breeding grounds for tuberculosis, hepatitis, dengue, pneumonia, cholera, and diarrheal disease. Despite the tremendous need, healthcare services are generally difficult to access in these areas.

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STUDY AREA

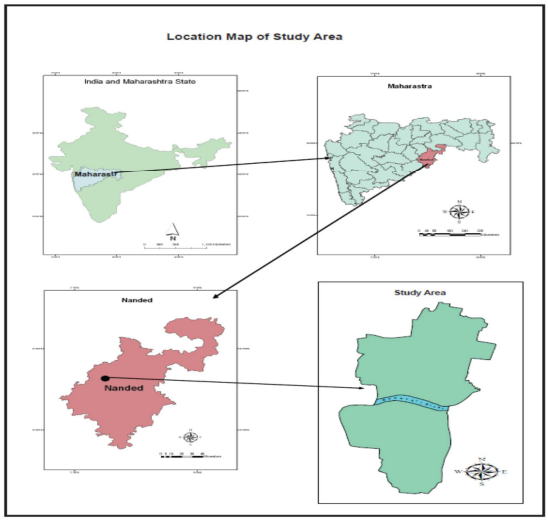

Figure no: 1

Nanded is one of the historical places in Marathwada region of Maharashtra State. It lies in Godavari basin. It is situated between 18^0 15′ to 19^0 55′ N latitude and 77^0 7′ to 78^0 15′ E longitude. The total area under waghala municipal corporation jurisdiction is 61.74 sq.k.m. Nanded is the second largest city in Marathwada after Aurangabad. The state of Andhra Pradesh lies to the east and Karnataka state to the south. The river Godavari flows through the city. Deep Black Soils have limited distribution along the bank of Godawari. The entire study region receives rainfall from June to November. As per provisional reports of Census of India, population of Nanded-Waghala in 2011 is 719188; of which male and female are 286152 and 264412 respectively.

OBJECTIVE

- To study the Population growth pattern of slum in Nanded city.
- To study of the occupational structure of slum in Nanded city.
- To analyses land status of the slum area.

DATABASE AND METHODOLOGY

The required data present study has collected from primary and Secondary Data Collection by various government departments, i.g. District Census Hand Book of Nanded District 1981,1991 ,2001 and 2011, Socio-Economic Review and District Statistical Abstract of Nanded District 1981,1991 ,2001 and 2011, District Gazetteer of Nanded District, Various branch offices of Nanded Zilla Parishad. Various Municipal Corporation Offices of the Nanded District, Industrial Development Corporation (MIDC), Town planning Department Nanded, Nanded Municipal Reports. Data collected data has tabulated, classified, presented, compared and interpreted with help of various appropriate statistical methods. Tables, Diagrams and maps have used at appropriate place and their interpretation has realized the present study.

DISCUSSION AND RESULT

NANDED CITY PROFILE

As per provisional reports of Census of India, population of Nanded-Waghala in 2011 is 719188; of which male and female are 286152 and 264412 respectively. Average literacy rate of Nanded-Waghala city is 87.40 percent (421606) of which male and female literacy is 92.68 (231449) and 81.74 percent (190157). The sex ratio of Nanded- Waghala city is 924 per 1000 males. Child sex ratio of girls is 872 per 1000 boys.

DEMOGRAPHIC PROFILE

Table No. 2 Demographic profile of Nanded City

Particular	2001	2011
Area (sq.km)	52	61.74
Population	430733	719188
Density (Persons/Sq.km)	8283	11648
Decadal Growth Rate	288455	25.77
No. of HHs	72733	1,04,415
HH Size	16.88	14.51
Total Election Wards	87	87

Source: Census 2001 and 2011, NWCMC

Table No. 3- Demographic profile of slum

Particular	2001	2011
Total Slum Settlements	220	246
Slum Population	156241	279024
Slum HHs	--	38452
Slum HH Size	--	7.25
% Slum Population to total Population	36%	38%

SLUMS PROFILE

There are about 246 slum settlements in Nanded, of these 25 have been notified or declared and Slums Profile 221 that are non-notified. The total slum population is 279024 with total number of households are 38452. The slum HH size is 7.25. The slum population accounts for about 50.6 percent of the city population. More than 75% of slum lands are privately owned. The total area under slums is about 342.73 Ha (in whole of Nanded city) as against 92.96 Ha in 1996 (in North Nanded alone). The numbers of slums and slum population have increased in the last decade. The migrant workers without adequate supply of affordable housing are mostly settled in the slum and squatter settlements that have grown over the years

Table No. 4 Showing the Growth of Slum

Year	Slum Population
1971	20000
1981	64000
1991	100000
2001	156241
2011	279024

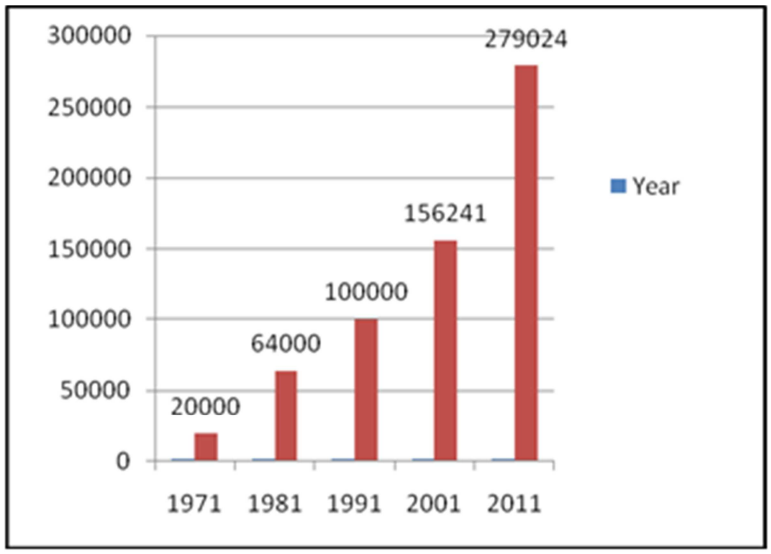

Figure No. 2 Showing the Growth of Slum

CAUSES OF SLUM GROWTH

a) Increase in urbanization of city lead in to migration of people from rural areas to city. These people could not afford housing and squatted illegally on government, Corporation land which ultimately developed into slums. b) Workers in unorganized sector and urban poor, unemployed could not afford housing due to paucity of land in city. c) Industrial closure in nineties like national textile mill, Tex com created huge unemployment. d) Unplanned development in pri-urban area. No proper layouts. e) Merger of peripheral rural area in Municipal Corporation which had slum

Table No. 5 Decadal Growth and Percentage of Slum Population to Total Population

Census Year	Total Population	Slum Population	Decadal Growth of Slum Population	% of Slum Population to Total Population
1971	126518	20000	--	15.80
1981	191269	64000	44000	33.46
1991	309316	100000	36000	32.32
2001	430733	156241	120241	36.27
2011	719188	279024	158783	38.79

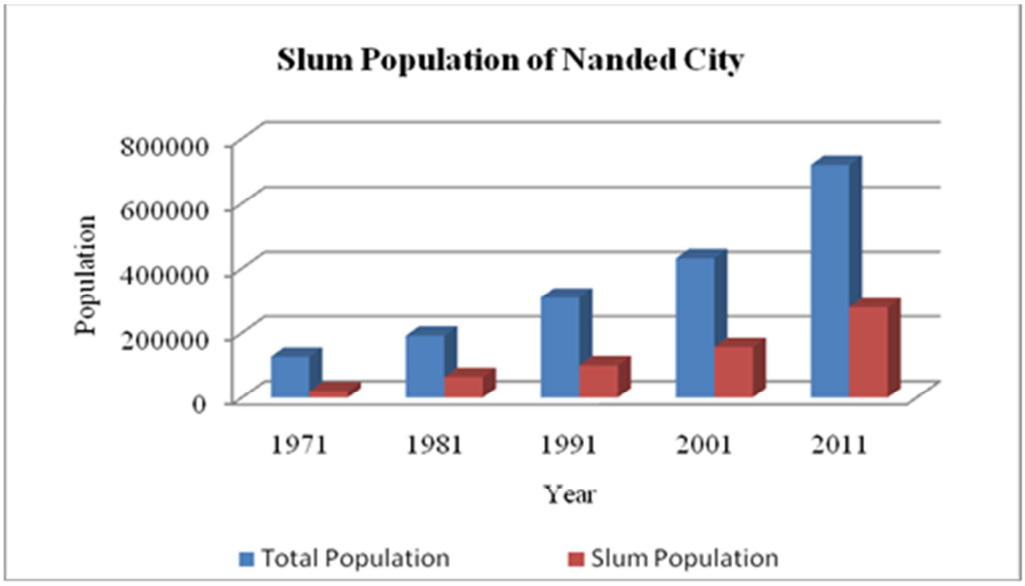

Figure No. 3 Showing the Growth of Slum to total population

ACCESS TO BASIC SERVICES IN SLUMS

In terms of level of services in slums, about 90 percent of the population in the declared slums and BPL areas is covered by water supply – through public stand posts, and sanitation services – through public conveniences. In case of the yet to be declared slums and BPL settlements, the water supply coverage ranges between 25 percent to 60 percent in different slums, while the sanitation coverage ranges from 25 to 60 percent in different slums.

Table No. 6 - Year Wise Population in Slums and Number of Slums:

Year	No of Slums	Population		
		Male	Female	Total
2005 – 06	148	96892	82537	179429
2006 – 07	152	102849	87611	190460
2007- 08	152	102849	87611	190460
2008 – 09	152	102849	87611	190460
2009– 10	218	125327	106190	231517
2010 – 11	218	125327	106190	231517
2011 – 12	246	150672	128352	279024

Source: NWCMC

Table No. 7 - The table below presents the access to basic services in slums in Nanded city.

Access to Basic Services in Slums		
Water Supply	% of slum settlements having internal water supply network	58.7%
	Household coverage of individual water supply connections in slums	26.3%
Sanitation	Household coverage of individual toilets in slums	52.9%
	% of households defecating in open in slums	58.7%
Sewerage	Coverage of wastewater network services in slums	7.1%
Solid Waste Management	Household level coverage of solid waste management services in Slums	41.6%

Source-Field work

STATUS OF LAND OWNERSHIP

More than 70% of slums are on private land and semi government or local authority land. As city develops such lands are to be utilized for the development purpose for which it was reserve.

CONCLUSION

Slum area is spread all over the Nanded city. Since the 1970s, the percentage of slum-dwellers in Nanded is increasing; for instance, in 1974 the population of slum dwellers was 20000 whereas in 2011 it was 279024. The slum area does not have even the essential facilities; for example, health care, water supply, roads, disposition of wastages, etc. In comparison with the south part of the city, the slums and the slum-dwellers are increasing in the north. Not only the slum dwellers but also the number of slums is increasing in the city. The fact indicates that the living style of the people is decreasing and the poverty level being maintained.

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Contribution à la caractérisation des événements dommageables du sol, ses problèmes et ses perspectives à Irhambi/Katana

[Contribution to characterization of prejudicial events of soil, their problems and perspectives at Irhambi/Katana]

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ABSTRACT: Irhambi/Katana situated in the territory of Kabare, province of the South-Kivu (R.D. Congo) is among the main region supplier the city of Bukavu in agricultural product. Our objective is to identify while valuing the sources of deterioration of the observable or measurable earths by the scientists and the farming environment and to put them in relation with the indicators recognized and used by the agriculturist, concerning the quality of the soil of Katana. The survey that lasted 12 months is achieved according to a methodological gait that is inspired by the inventory approach. This inventory consisted to visit the intervention sites (villages) by a transverse walk (transect walk) while following Horizontal axes to identify the sources of deterioration of the soil.

The level of appreciation of these sources of deterioration made itself by free observation with simple and open questions by people of the village met for enlightenments on the state of deterioration of the soil. Our results show that the erosion (60%) to eat the herbs abusively (50%) constitute a problem of management of the soil in Kajuchu; the domestic garbage threa ten the terrestrial environment in Mwanda (45%). The source of soil deterioration identified in the present work will be an indicator privileged to allow farmers to decide the opportunity to exploit or no their soil.

KEYWORDS: Evaluation, indicator, soil, deterioration, agriculturist, Irhambi/Katana.

RESUME: Le groupement d'Irhambi/Katana situé dans le territoire de Kabare, province du Sud-Kivu (R.D. Congo) est parmi les principaux groupements pourvoyeur en produits vivriers de la ville de Bukavu. Ce travail a pour objectif identifier tout en évaluant les sources de dégradation des terres observables ou mesurables par les scientifiques et les aménagistes du milieu rural et les mettre en relation avec les indicateurs reconnus et utilisés par les agriculteurs, concernant la qualité des terres de Katana. L'étude qui a duré 12 mois est réalisée suivant une démarche méthodologique qui s'inspire de l'approche d'inventaire. Cet inventaire a consisté en une visite des sites d'intervention (villages) par une marche transversale (transect walk) en suivant des axes Horizontaux pour identifier les sources de dégradation des terres.

Le niveau d'appréciation de ces sources de dégradation s'est fait par observation libre avec des questions simples et ouvertes auprès des personnes du village rencontrées pour des éclaircissements sur l'état de dégradation des terres. Nos résultats montrent que l'érosion (60%) et le surpâturage (50%) constituent un problème de gestion des terres à Kajuchu ; les déchets

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ménagers menace l'environnement terrestre à Mwanda (45%). La source de dégradation du sol identifié dans le présent travail sera un indicateur privilégié pour permettre aux agriculteurs de décider de l'opportunité d'exploiter ou non leur sol.

MOTS-CLEFS: Evaluation, indicateurs, sol, détérioration, agriculteurs, Irhambi/Katana.

INTRODUCTION

La terre est une ressource vitale pour l'humanité, car son exploitation permet de nourrir chaque jour les 6,5 milliards d'habitants de la planète. « *La terre est la ressource la plus précieuse du monde et pourtant elle n'est pas appréciée à sa juste valeur* » disait Edouard. Saouma, ancien directeur général de la FAO. Les composantes de l'environnement planétaire (le climat, l'eau, l'air, les forêts, les océans…) font l'objet de très nombreux débats dans les médias et entre les politiciens ; mais pas la terre et sa composante principale le sol « *qui est le grand oublié de l'environnement* »[1].

La terre est à la base de tous les processus de perpétuation de la vie sur la planète, abritant une grande partie de la biodiversité du globe. De par ses propriétés physiques, chimiques et biologiques, elle sous-tend toute une gamme de biens et services écosystémiques dont l'humanité dépend pour sa survie. Il s'agit notamment des services d'approvisionnement, tels que les aliments et l'eau, des services de régulation, tels que la régulation des crues et de la sécheresse, des services d'appui, tels que la genèse du sol et le cycle des éléments nutritifs, et des *services culturels* tels que les loisirs et autres bienfaits spirituels et immatériels[2].

L'utilisation de la terre à des fins agricoles et sylvicoles contribue considérablement à la prospérité mondiale, profitant à des milliards de personnes, dont un grand nombre vivant essentiellement de l'agriculture et des produits forestiers [3].

La dégradation des sols désigne la diminution ou disparition, dans les zones arides, semi-arides et subhumides sèches, de la productivité biologique ou économique et de la complexité des terres agricoles pluviales ou irriguées, des terrains de parcours, des pâturages, des forêts ou des forêts claires, résultant de l'utilisation des terres, d'un processus ou d'une combinaison de processus, y compris ceux découlant d'activités humaines et de schémas d'habitation. Il ressort de l'Évaluation des écosystèmes pour le millénaire que la dégradation des services écosystémiques compromettra l'amélioration du bien-être humain à l'avenir et inhibera éventuellement les progrès accomplis dans certaines régions si des mesures ne sont pas prises pour s'attaquer à ses effets [4].

La dégradation des sols touche 33 % de la surface terrestre de la planète, affectant plus de 2,6 milliards de personnes dans plus de 100 pays [5].

La dégradation des sols due aux activités de l'homme affecte tout un ensemble d'écosystèmes et, selon les estimations, 20 à 196 millions de km^2 de la surface terrestre sont concernés[6].

L'un des principaux symptômes de la dégradation des sols est la forte dégradation de leurs fonctions due à l'érosion, à la salinisation, à la compaction et à l'appauvrissement en nutriments. La dégradation des fonctions du sol est la perte de productivité réelle ou potentielle observée lorsque des techniques agricoles et des modes de gestion forestière non viables sont appliqués. Ces techniques et modes de gestions diminuent la capacité des sols à produire des biens et services, et notamment à assurer des fonctions importantes, telles que la fourniture des éléments nécessaires à la production de la biomasse et de la biodiversité et la régulation du cycle de l'eau et des substances nutritives [7].

En République Démocratique du Congo, environ 60% de la population vit en milieu rural. Globalement, les sols congolais sont moyennement fertiles. On y rencontre aussi des sols fertiles (sols volcaniques, tourbe, sols alluvionnaires …), et des sols peu fertiles, qui sont déjà dégradés à divers degrés, à cause notamment de l'agriculture itinérante sur brûlis, du surpâturage, des feux de brousse, de la déforestation liée à diverses activités humaines, de l'urbanisation non maîtrisée etc. Il a été observé une intensification de la pression anthropique sur les ressources naturelles ainsi qu'une surexploitation des sols due au déboisement systématique le long de grands axes routiers et à des mauvaises pratiques culturales [8]. Le pourcentage élevé des sources de dégradation dans certaines localités serait un frein pour la bonne marche des activités champêtres si aucune mesure de protection n'est prise pour stopper leur avancée alarmant.

Il est à noter que les connaissances sur les sources de dégradation du sol demeurent insuffisantes, en particulier dans la culture locale. D'où l'importance de réaliser un inventaire des sources de dégradation du sol présentant un grand danger environnemental à Irhambi/Katana.

Notre étude a pour objectif d'identifier tout en évaluant les sources de dégradation des terres observables ou mesurables par les scientifiques et les aménagistes du milieu rural et les mettre en relation avec les indicateurs reconnus et utilisés par les agriculteurs, concernant la qualité des terres de Katana.

MILIEU D'ÉTUDE

Le groupement d'Irhambi-Katana se situe sur les rives occidentales du Lac Kivu entre 2° et 2° 30' de latitude Sud et 28° 30' et de 29° de longitude Est[9]. Il est inclus dans le territoire de Kabare, Sud-Kivu en République Démocratique du Congo et se trouve à 50Km au Nord de la ville de Bukavu. Il comprend sis localités à savoir : les localités de Mwanda, Kahungu, Kabushwa, Mabingu, Kabamba et Kajuchu. Avec sa superficie de 189,5 Km^2 , il est limité au nord par la rivière Nyabarongo qui le sépare du territoire de Kalehe, au sud par le groupement de Bugorhe, à l'Est par le Lac Kivu, à l'Ouest par le parc National de Kahuzi Biega.

Le groupement d'Irhambi/Katana fait parti des hautes terres de l'Est du Congo. Son relief est dans son ensemble marqué par des mouvements tectoniques qui ont affecté l'Afrique orientale.

De l'Est à l'Ouest, on note la présence de trois paliers plus ou moins étagés. Ils correspondent aux anciens fonds du graben respectivement à 1470 m à Cibale vers Mwanda (bord du Lac) à 1580 m au centre commercial de Katana, pour passer à 2074 m à Chombo (Kahungu) et à plus de 2200 m de Tshibati[10]. Au nord, ces paliers se confondent en un seul. Celui-ci s'individualise par la falaise de la faille du mur au Nord du Lac Kivu et domine la baie de Kalehe. Le relief se présente avec une côte très découpée caractérisée par d'étroites baies, des presqu'iles (comme Kajuchu). Ces ressources végétales sont utilisées dans plusieurs domaines. Dans l' ensemble, la végétation est essentiellement composée de bananerais *Musa spp* de quelques ilots d'*Eucalyptus spp*, *ficus spp*, *Erythrina abyssinica* etc. La savane pâturée est dominée par le genre Hyparhenia. Dans les marais et aux bords du lac la savane est composée par les *Cyperus latifolia* et *phragmite mauritanius.*

MATÉRIELS ET MÉTHODES

L'étude qui a durée 12 mois est réalisée suivant une démarche méthodologique qui s'inspire de l'approche d'inventaire *(survey approach)* exposée par [11]. Cette inventaire a consisté en une visite des sites d'intervention (villages) par une marche transversale (transect walk) tel que défini par[12] en suivant des axes Horizontaux pour identifier les sources de dégradation des terres et les stratégies de protection à utiliser pour lutter contre l'érosion hydrique, mauvaise pratique culturale, cultures maraichères, coupe de bois, surpâturage, déchets des ménages, inondation, éboulement, construction anarchique des maisons, traçage des routes, briqueteries, carrière moellon et sable, feux de brousse, déchets hospitaliers, déchets plastics, scierie, pesticides et fongicides.

L'évaluation de l'intensité et le niveau de prise de conscience des sources de dégradation des terres étaient fait par une enquête auprès des personnes autochtones par localités. Dans chaque village, l'échantillon interviewé est composé de chef de village, les conseillers du Chef, les gardiens de la coutume, les notables, les propriétaires terriens, les personnes ressources (religieux, responsables des institutions étatiques et privés) et d'opérateurs de projets reparti en deux groupes focal de discussions de 30 personnes chacun. Les questions sont spécifiquement choisies en fonction du statut de l'interviewé.

L'enquête par questionnaire nous a permis de poser quatre questions fermées auxquelles les enquêtés par groupe focal ont répondu par oui ou non.

Le dépouillement a été fait par une saisie manuelle et analyse à l'aide du tableur Macrosoft Excel 2003. Une séance de cartographie participative a été conduite en vue de dégager les sites à haute vulnérabilité et la mise en place des mécanismes pour contourner les problèmes de dégradation des terres en vue d'une perspective d'avenir meilleure.

RÉSULTATS

Tableau 1 Evénements dommageables des sols dans six localités d'Irhambi/Katana

Evénements	Kajuchu	Mabingu	Kabamba	Mwanda	Kabushwa	Kahungu
Erosion hydrique	+ + + +	+ + +	+ +	+ +	+ +	+ +
Mauvaise pratique culturale	+ + +	+ +	+ +	+ +	+ +	+ +
Cultures maraichères	+ +	+	+	+ + +	+	+ +
Coupe de bois	+	+ + + +	+ +	+	+ + +	+ +
Surpâturage	+ + + +	+ + +	+ +	+ +	+ + +	+ + +
Déchets des ménages	+ +	+	+ + +	+ + + +	+	+ +
Inondation	+ +	+	+ + +	+ +	+	+ +
Eboulement	+ +	+ +	+ +	+ +	+ +	+
Constructions anarchiques	+	+	+ ++	+ + + +	+	+
Traçage Routes	+ +	+	+ + +	+ + + +	+	+ +
Briqueteries	+	+	+ + +	+ +	+	-
Carrière moellon et sable	+	+ +	+	+	-	-
Feux de brousse	+	+	-	-	+	-
Déchets hospitaliers	+ +	+ +	+	+ + + +	+ + +	+ +
Déchets plastics	+ +	+	+ +	+ + +	+	++
Pesticides et fongicides	+ +	+	+	+ + +	+ +	+ +

Légende : - : pas vu, + : faible ++ : moyen, +++ : abondant, ++++ : très abondant

Il ressort de ce tableau que les événements dommageable tel que l'érosion hydrique, surpaturage, les mauvaises pratiques culturales sont abondant à Kajuchu. A Mwanda se fait remarquer l'abondance des cultures maraichères et inondation pendant la saison des pluies. La coupe de bois est très abondant à Mabingu et Kabushwa. Dans toutes les localités les éboulements se font sentir avec une intensité moyenne sauf à Kahungu où il est faible. Les constructions anarchiques sont mieux représenté à Mwanda et Kabamba étant donné que ces deux localités hebergent toute la population venu des milieux insécurisé. Dans ces deux localités le traçage des routes locales se fait remarquer très considérablement. La localité de Kabamba précisément le villlage de Ruvoma produit 90% des briqueteries de Katana. Quelques carrières de moellon et sable ont été identifié à Mabingu, Kabamba et Mwanda. Aucune carrière n'a été identifié à Kahungu et Kabushwa. Le feu de brousse et faible à Kajuchu, Mabingu et Kabushwa. Aucune présence de feu de brousse à Kabamba, Mwanda et Kahungu. Les déchets des ménages sont abondants à Mwanda et Kabamba.

Tableau 2 Evaluation des dégâts causés par les événements environnementaux à Irhambi/Katana

Evénements environnementaux	*Effet positif*	Bénéfique	Dommageable	Effet à Long terme	Réversible	Irréversible
Erosion hydrique	*X*		*X*	*X*	*X*	
Mauvaise pratique culturale			*X*	*X*	*X*	
Cultures maraichères	*X*	*X*	*X*	*X*	*X*	
Coupe de bois		*X*	*X*	*X*	*X*	
Surpâturage			*X*	*X*	*X*	
Déchets des ménages		*X*	*X*	*X*	*X*	
Inondation			*X*	*X*		*X*
Eboulement			*X*	*X*		*X*
Construction anarchique			*X*	*X*	*X*	
Traçage des Routes	*X*	*X*	*X*	*X*	*X*	
Briqueteries	*X*	*X*	*X*	*X*	*X*	
Carrière moellon et sable	*X*	*X*	*X*	*X*		*X*
Feux de brousse	*X*	*X*	*X*	*X*	*X*	
Déchets hospitaliers			*X*	*X*	*X*	
Déchets plastics			*X*	*X*	*X*	
Pesticides et fongicides		*X*	*X*	*X*	*X*	

De ce tableau nous remarquons que tous les événements identifié dans ce travail ont des effets dommageable, réversible et leur effet à long terme. L'érosion, les cultures maraichères, traçage de route, briqueterie, carrière et feu de brousse ont des effets positifs sur le vécu de la population qui les exerce par le bénéfice que ces activités génèrent pour eux. Les dégâts causés par les inondations, éboulements et carrières sont irréversibles dans la plupart de cas.

Tableau 3 Indicateur liés à la prise de conscience de l'homme face aux événements dommageable du sol à Katana

INDICATEURS	Mwanda	Kahungu	Kabushwa	Mabingu	Kabamba	Kajuchu
Implantation des brigades de lutte antiérosive dans chaque village (nbre)	15	10	8	7	11	9
Existence des comités de reboisement qui contrôle l'accès aux boisements privés (nbre)	10	8	12	15	9	11
la population recours à l'élevage en stabulation par manque d'espace pour faire paître les bêtes (%)	60	40	20	15	35	50
Brigades opérationnelles de formation sur la production de compost et bio-fertilisants (nbre)	12	11	5	14	7	13
Existence des brigades opérationnelles de sensibilisation sur la consommation de l'eau potable (nbre)	6	5	3	5	6	4
la population s'investi dans l'aménagement des routes afin d'épargner les sols du danger (%)	80	60	50	40	30	40
Quelques associations conscientisent les paysans des répercussions des briqueteries sur les sols dans le milieu (nbre)	7	5	6	4	5	4

Ce tableau montre que la présence des brigades antiérosives sont inégalement repartis à Irhambi, sur 60 brigades, la localité de Mwanda à 15 soit 25%, suivi de Kabamba avec 11brigades soit 18,3% , Kahungu vient en troisième position avec

10 brigades soit 16,7. Les autres localités comme Kajuchu 15%, Mabingu 11,7% et Kabushwa 13,3%. Pour ce qui est des comité de reboisement Mabingu represente 23%, Kabushwa 18,5%, Kajuchu 16,9%, Mwanda 15,4%, Kabamba 13,8% et Kahungu 12,3%. L'élevage en stabulation occupe un pourcentage considérable à Mwanda soit 27,3% et faible à Mabingu soit 6,9%. Les brigades sur la production de bio-fertilisants sont 14 à Mabingu soit 22,6%, 13 à Kajuchu soit 20,9%, 12 à Mwanda soit 19,4% 11 à Kahungu soit 17,8%. Les brigade de sensibilisation sur la consommation de l'eau potable sont repartis de la manière suivante, 6 brigade à Mwanda et Kabamba soit 20,7% ; 5 brigades à Kahungu et Mabingu soit 17,3% ; 4brigades à Kajuchu soit 13,8% et 3 brigades à Kabushwa soit 10,3%. L'aménagement des routes se font à Mwanda à 26,7% suivi respectivement de Kahungu 20%, Kabushwa 16,7%, Mabingu et Kajuchu 13,3% enfin Kabamba 10%.

DISCUSSION ET CONCLUSION

Le pourcentage élevé des certaines sources de dégradation du sol comme le surpâturage, l'érosion, les déchets ménagers, les cultures maraichères dans certaines localités serait un frein pour la bonne marche des activités champêtres. Les résultats obtenus au cours de cette étude nous ont amené à distinguer les sources de dégradation des terres d'Irhambi/Katana.

La localité de Kajuchu vient en tête avec un taux élevé d'érosion hydrique, suivi de Mabingu , à Mwanda, Kabamba, Kabushwa, et Kahungu, l'érosion est moyen. Cette situation est due au fait que le relief de ces localités n'est pas tellement accidenté, en plus de cela le sol est couvert par quelques arbres, bananiers et herbes. Dans une étude réalisée au Tchad[13] affirme que l'érosion accélérée ou érosion des sols due aux diverses sortes d'activités humaines : pratiques agricoles, exploitations forestières, pâturages, constructions de routes et de bâtiments, exploitations minières accélérent souvent de façon considérable le rythme de l'érosion. Dans la plupart des régions habitées du monde, les phénomènes d'érosion et de sédimentation sont fortement influencés par l'homme.

Le déboisement occupe une bonne place à Mabingu, suivi de la localité de Kabushwa. Ce phénomène est moyen à Kahungu et Kabamba et faible à Mwanda et Kajuchu. La construction des maisons sans normes urbanistiques occupe une place à Mwanda, un peu à Kajuchu, moyen à Mabingu et Kabamba et faible à Kabushwa et Kahungu.

Le surpâturage est très abondant à Kajuchu, abondant à Mabingu, Kabushwa et Kahungu, il est moyen à Kabamba et Mwanda. [14]affirment que le surpâturage entraîne une baisse de la couverture végétale, une modification vers la baisse de la qualité du fourrage et / ou vers le compactage du sol. Cela peut provoquer à son tour la réduction de la productivité du sol et une érosion éolienne ou hydrique. [15]Robert dans son travail dit que les pressions directes sur les ressources naturelles et les écosystèmes dues aux activités humaines telles que le surpâturage, la surexploitation des terres et le déboisement vont conduire à une réduction du couvert végétal, exposant les sols vulnérables à l'érosion. Le faible teneur en matières organiques et la faible stabilité structurelle des sols va entraîner un déficit en éléments nutritifs et une capacité insuffisante de rétention d'eau, d'où une réduction de la croissance des plantes.

Les cultures maraichères se font intensément dans la localité de Mwanda, suite à une démographie qui est entrain de croitre chaque jour avec l'arrivé des déplacés victimes de l'insécurité en provenance des localités voisines qui souhaite vivre dans cette localité où la sécurité est encore un peu assurée . A part cela le nombre de marais qu'on trouve à Mwanda est supérieur à celui d'autres localités d'Irhambi/Katana. A Kahungu et Kajuchu la culture maraîchère est moyennement réalisée, tandisqu'à Kajuchu, Kabamba et Mabingu elle est faible. La pratique de feux de brousse est faible à Kajuchu, Mabingu et Kabushwa, cependant, rien n'a été vu à Kabamba, Mwanda et Kahungu. Cette pratique de feux de brousse se faisait lorsque la population avait encore de terrain suffisant pour l'élevage. [16]Morcadeu, 1995 affirme que les feux de brousse détruisent aussi les arbres et mettent à nu les sols qui sont ainsi exposés à l'érosion et au ravinement. Le tarissement des cours d'eau est l'une des conséquences essentielles de la destruction du couvert végétal dûe aux feux de brousse. Le ruissellement et l'érosion deviennent ainsi plus importants. Les pertes de terre par érosion peuvent être de l'ordre de dizaines ou même de centaines de tonnes métriques chaque année, selon le milieu et les systèmes de culture mis en place[17]. Dans un travail réalisé en Republique Centre Africaine, il a été constaté que suite aux différentes activités humaines, telles que l'agriculture, la coupe anarchique de bois d'oeuvre, les feux de brousse, la chasse incontrôlée et la pêche à l'aide des produits toxiques ; aujourd'hui, un marécage a disparu avec toutes ses richesses (déséquilibre biologique de l'écosystème)[18].

L'érosion et le ruissellement sont des phénomènes complexes. L'ampleur du ruissellement et du transport de particules de terre dépendent d'une multitude de facteurs et d'interactions: type de culture, techniques de travail du sol, nature du sol et de la roche-mère... L'intensité des pluies (généralement mesurée en nombre de millimètres par heure) ainsi que le degré de la pente et sa longueur comptent parmi les plus importants.

Les déchets ménagers sont abondant à Mwanda et à Kabamba, moyen à Kajuchu et Kahungu, Les déchets ménagers sont faibles à Kabushwa et Mabingu. Dans les localités de Mwanda et Kabamba le nombrre d'individu est en croissance excessif suite au déplacement massif de la population venue des localités voisines à cause de l'insécurité. Dans ces deux localités se trouvent les deux grand marchés du groupement d'Irhambi, d'où la présence d'une quantité considérable des déchets au marché de Kabamba et Katana.

Les inondations commencent à inquiéter la population de Mwanda et Kabamba où la concentration de la population en provenance des localités victimes de l'insécurité comme Kahungu, Kabushwa et Mabingu est à la base des inondations car les maisons sont confinées sans aucune norme urbanistique. Pendant la période de crue les eaux des rivières en provenance des localités voisines emportent tout sur son passage vers le Lac Kivu. Ces éboulement détruisent le sol car ce dernier subit un déplacement, au cours de ce déplacement la nature du sol change complètement, de fois les cultures sont détruites, les maisons etc.

Dans notre étude nous avons démontré que l'expansion démographique à Irhambi/Katana exerce un impact négatif sur les terres. Ceci a été affirmé par[19] qui a dit que pour assurer sa subsistance et faire face aux besoins en alimentation et en bois de chauffe des villes en expansion démographique, cette population exerce de fortes pressions sur les ressources forestières. La dégradation des sols se manifeste par la baisse qualitative et quantitative généralisée des services écosystémiques (débits fluviaux, gestion du climat et des crues, formation et protection du sol, etc.) qui sous-tendent la productivité des écosystèmes agricoles. D'autre part, la dégradation des sols dans les écosystèmes agricoles est préjudiciable aux services écosystémiques liés à la qualité de l'air et de l'eau, à la lutte contre les maladies et les parasites et à la réduction des risques associés aux catastrophes naturelles. Elle constitue également une grave menace pour la sécurité alimentaire, les revenus et les moyens de subsistance des populations rurales, en particulier dans les pays en développement. La perte des biens et services assurés par les écosystèmes est un obstacle majeur à la réalisation des objectifs de développement pour le Millénaire concernant la lutte contre la pauvreté, la faim et les maladies. Il est difficile de déterminer le coût économique de la dégradation des sols, mais selon les estimations, il représente 1 à 7 % de la part de l'agriculture dans le produit intérieur brut de certains pays en développement[20].

Les forêts sont converties progressivement en terres agricoles, en plantations, en routes ou alors modifiées par l'exploitation du bois d'œuvre, du bois de chauffe, du charbon de bois, par l'agriculture itinérante sur brûlis et/ou d'autres activités d'extraction pour satisfaire les besoin ultimes de la population[21]. Cette situation n'est pas différente avec ce que nous avons constaté à Katana.

L'étude sur la dégradation des terres dans la groupement d'Irhambi/Katana réalisée pendant 6 mois a permis de mieux connaître l'état actuel des terres dans cette région d'étude. L'utilisation de l'inventaire, associée à l'observation suivi des questions, constitue un excellent moyen pour déterminer la situation actuelle de dégradation des terres, ses problèmes et ses perspectives dans le groupement d'Irhambi/Katana. Vu son originalité, on peut même croire que réaliser ce travail serait impossible ou même pas faisable dans cette région. Il importe seulement de se faire une ligne de conduite de respecter l'objectif que ce travail voudrait atteindre, le contrôle du terrain, l'exploitation judicieuse de la documentation et du matériel mis à notre disposition ainsi que le personnel.

Les terres d'Irhambi/Katana sont relativement peu dégradées et que le potentiel agricole d'Irhambi/Katana est encore préservé. Cependant, le déboisement est intensifié considérablement depuis les turbulences politiques que nous avons connues après la chute de la deuxième Republique. Ce déboisement récent et incontrôlé pourrait entrainer une accélération de la dégradation des terres au cours de la prochaine décennie. Il est donc recommandé d'assurer la surveillance des terres et de l'environnement. Celle-ci pourra être réalisée, non plus au niveau national, mais au niveau provincial et local.

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Enquête sur les conséquences de l'action anthropogénique sur l'environnement en milieu rural: cas d'Irhambi/Katana, Territoire de Kabare, Sud-Kivu

[Investigation on the consequences of human action on the environment in rural area: case of Irhambi/Katana, Territory of Kabare, South-Kivu]

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ABSTRACT: The increasing of human activities surroundings and the fashions of culture the man's will to minimize the effects of the natural variability by an increasing control of resources and of the production conditions and to maximize the productivity valued of way simplified in outputs to the hectare. The goal of this survey is not to hold forth on the definitions, but to present a critical reflection on the variability of the perceptions of the role of human in the working and the dynamics of the ecosystems in view of an environmental draft on the farming environment. Work consisted by visiting of the intervention sites through a transverse walk. The environmental problems are enormous left on all vital aspects of the population of Irhambi/Katana.

KEYWORDS: investigation, role, human activities, consequences, ecosystems, Irhambi/Katana.

RESUME: L'artificialisation croissante des milieux et des modes de culture reflèterait la volonté de l'homme de minimiser les effets des variabilités naturelles par un contrôle croissant des ressources (sélection) et des conditions de production (amendements, artificialisation des sols) et de maximiser la productivité évaluée de façon simplifiée en rendements à l'hectare. Elle se traduit ainsi par une rupture avec l'environnement.

Le but de cette étude n'est pas d'épiloguer sur les définitions, mais de présenter une réflexion critique sur la variabilité des perceptions du rôle de l'homme dans le fonctionnement et la dynamique des écosystèmes en vue d'une ébauche environnementale sur le milieu rural. Le travail a consisté en une visite des sites d'intervention (villages) à travers une marche transversale (transect walk).

Le niveau d'appréciation des facteurs s'est fait par observation libre avec des questions simples et ouvertes auprès des personnes du village rencontrées en groupe focal pour des éclaircissements sur leur état environnemental. Les problèmes environnementaux sont énormes repartis sur tous les aspects vitaux de la population d'Irhambi/Katana. L'intervention des communautés se limite à une participation passive à des comités et des réunions menés par les spécialistes de la conservation et ne prend pas la forme d'un pouvoir de prise de décisions active sur la manière de gérer leurs milieux. La participation de la femme à la gestion des ressources naturelles est faible. L'enfant innocent est victime pour rien de la

dégradation de son milieu. L'impact humain se traduit par une déstabilisation ou un dysfonctionnement des écosystèmes entraînant soit une accélération des mécanismes d'évolution soit un blocage à Katana.

MOTS-CLEFS: investigation, rôle, activités humaines, conséquences, écosystèmes, Irhambi/Katana.

INTRODUCTION

L'artificialisation croissante des milieux et des modes de culture reflèterait la volonté de l'homme de minimiser les effets des variabilités naturelles par un contrôle croissant des ressources (sélection) et des conditions de production (amendements, artificialisation des sols) et de maximiser la productivité évaluée de façon simplifiée en rendements à l'hectare. Elle se traduit ainsi par une rupture avec l'environnement [1].

Dans ce cas, la diversité s'appauvrit également et le système devient instable; néanmoins, dans certains cas, le système reste stable puisqu'ils existent différents comportements des écosystèmes face aux intensités et fréquences des perturbations humaines. Dans sa démarche, le phytoécologue jugera des groupements végétaux et de leur état en fonction d'un degré d'anthropisation comparable. Ceci lui permettra d'établir un classement selon des critères précis (composition floristique, groupements d'espèces...). Il hiérarchisera les groupements à l'aide d'indices de perturbation [2].

La persistance de ces espèces ou ressources chute assez vite, mais même si la perturbation reste intense ou fréquente, on peut donc penser qu'on parvient à un changement substantiel du milieu, dans lequel seulement les espèces les plus adaptées sont capables de survivre [3].

Cette dynamique des pratiques spatiales s'exprime par des changements dans les réseaux de sociabilité et de fréquentation familiale et sociale qui n'ont pas entamé encore le dynamisme démographique [4].

Dans le cadre de cette étude, la diversité biologique est d'un intérêt majeur mis en relation avec la gestion du milieu, notamment pour les raisons suivantes: a) intensification des activités agricoles et des autres utilisations du sol, qui normalement conduisent à un appauvrissement croissant de la diversité; b) la qualité du patrimoine naturel est évalué, entre autres, par des critères de diversité; c) l'esthétique, ou qualité émotionnel du paysage, dans un sens large, trouve dans la diversité un des ingrédients universels les plus importants [5].

La plupart des études portant sur les conséquences de l'action anthropogénique sur l'environnement en milieu rural se caractérisent soit par des approches descriptives du milieu, soit par des études agronomiques et pédologiques superficielles, soit encore par des approches de type « inventaires et densités de la ressource disponible ». Les approches des indicateurs liés à l'évaluation de l'action anthropogénique sur l'environnement en milieu rural sont rares dans cette région.

Pourtant, l'évaluation de l'action anthropogénique sur l'environnement en milieu rural constitue un élément utile à prendre en compte pour l'amélioration de l'environnement. Ce travail tente de pallier à cette carence et présente l'étude de l'évaluation de l'action anthropogénique sur l'environnement en milieu rural dans le Groupement d'Irhambi, Sud-Kivu, RDCongo.

Le but de cette étude est de présenter une réflexion critique du rôle de l'homme dans le fonctionnement et la dynamique des écosystèmes en vue d'une ébauche environnementale sur le milieu rural et d'amener la population rurale à gérer écologiquement et économiquement son cadre de vie, pour elle et pour les générations futures.

MILIEU D'ÉTUDE

Le groupement d'Irhambi-Katana se situe sur les rives occidentales du Lac Kivu entre 2° et 2° 30' de latitude Sud et 28° 30' et de 29° de longitude Est [6]. Il est inclus dans le territoire de Kabare, Sud-Kivu en République Démocratique du Congo et se trouve à 50Km au Nord de la ville de Bukavu. Il comprend six localités à savoir : les localités de Mwanda, Kahungu, Kabushwa, Mabingu, Kabamba et Kajuchu.

Avec sa superficie de 189,5 Km^2 , il est limité au nord par la rivière Nyabarongo qui le sépare du territoire de Kalehe, au sud par le groupement de Bugorhe, à l'Est par le Lac Kivu, à l'Ouest par le parc National de Kahuzi Biega.

Le groupement d'Irhambi/Katana fait parti des hautes terres de l'Est du Congo. Son relief est dans son ensemble marqué par des mouvements tectoniques qui ont affecté l'Afrique orientale. Il se présente avec une côte très découpée caractérisée par d'étroites baies, des presqu'iles (comme Kajuchu). De l'Est à l'Ouest, on note la présence de trois paliers plus ou moins

étagés. Ils correspondent aux anciens fonds du graben respectivement à 1470 m à Cibale vers Mwanda (bord du Lac) à 1580 m au centre commercial de Katana, pour passer à 2074 m à Chombo (Kahungu) et à plus de 2200 m de Tshibati. La végétation est essentiellement composée de bananerais *Musa spp* de quelques ilots d'*Eucalyptus spp*, *Ficus spp*, *Erythrina abyssinica* LAM. etc. La savane pâturée est dominée par le genre Hyparhenia. Dans les marais et aux bords du lac la savane est composée par les *Cyperus latifolius POIRET* et *Phragmites mauritianus KUNTH , Bridelia micranta BAIL L. , Albizia ssp, Alangium chinense, (L.f) REDHER.* Les contraintes majeures de la communauté sont liées à la surpopulation, avec une densité humaine d'environ 350 habitants/km^2.

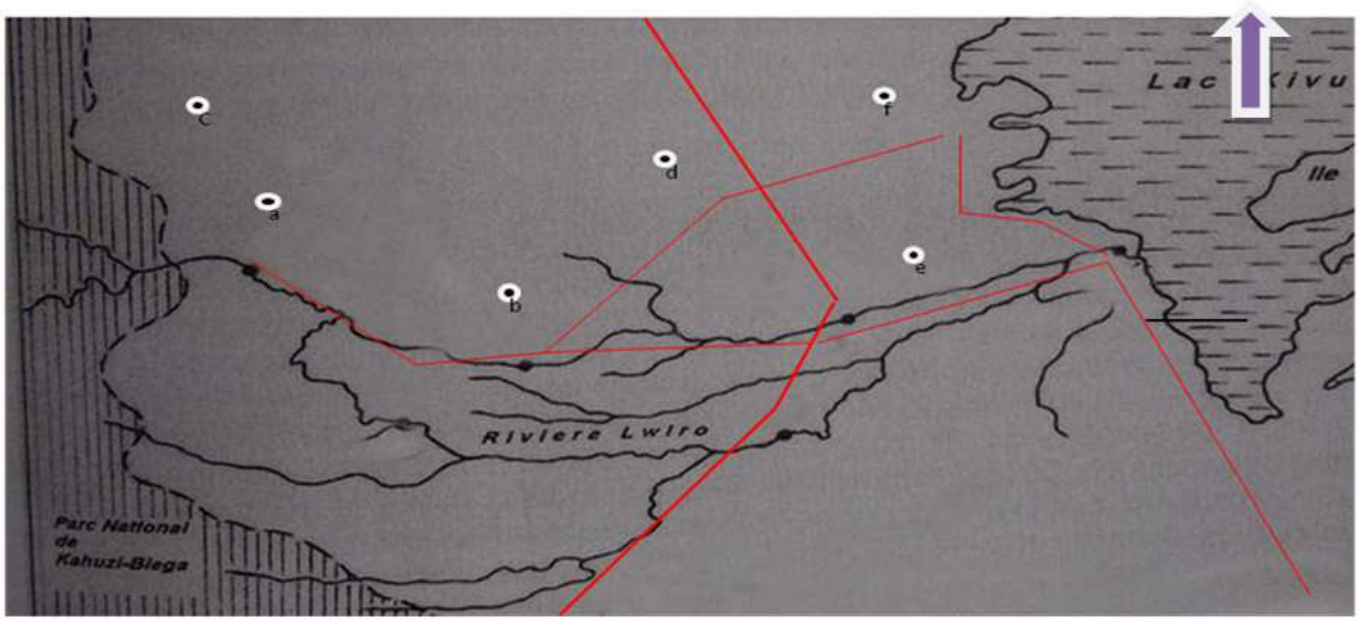

Figure 1 : Carte de la région de Katana

Légende:

- Sites de collecte des données

Tronçons routiers qui traversent la région

Nationale N°5 reliant Bukavu et Goma

a: Kabushwa b: Kahungu c: Mabingu d: Kabamba e: Mwanda f: Kajuchu

MATÉRIELS ET MÉTHODES

L'étude qui a duré 12 mois a été conduite dans 6 localités du groupement d'Irhambi/Katana avec objectif de développer des méthodologies simples et adaptées pour collecter le maximum d'information environnementale sur la gestion des ressources naturelles. Lors de l'enquête, le travail a consisté en une visite des sites d'intervention (villages) à travers une marche transversale (transect walk) telle que défini par [7] en suivant des axes horizontaux en vue de cerner les problèmes environnementaux clés ayant un lien avec l'exploitation minière, pêche, déforestation, les déchets, l'érosion, l'inondation, le feu de brousse, zoonoses, pénurie alimentaire, maladies hydriques, qualité du sol. L'auto-analyse des problèmes de dégradation du milieu exprimés par les paysans d'Irhambi/Katana fut réalisée.

Le niveau d'appréciation des facteurs s'est fait par observation libre[8] avec des questions simples et ouvertes auprès des personnes du village regroupées en groupe focal (30 personnes par localité) pour des éclaircissements sur leur état environnemental.

7 membres des associations locaux de développement dont 3 femmes
7 paysans agriculteurs de profession dont 3 femmes
3 représentants de Pygmées
3 membres de Comité de Conservation Communautaire.

Les chefs locaux et autres personnes cibles étaient questionnées isolément dans un climat social favorisant le dialogue démocratique (1 chef de localité, 3 agents des services de l'Etat (environnement, agriculture et vétérinaire, 3 membres de Fédération des Entreprise du Congo, 3 religieux).

L'enquête au sein de la population et le dépouillement du rapport de la zone de santé de Katana a permis de nous imprégner de l'existence des maladies hydriques liées à la consommation de l'eau des rivières Choga, Kamunyerere, Nyabinkonongo, Nyabizenga, Chihembe, Chashonzi, lulonge.

La connaissance sur la présence des zoonoses était cernée par l'analyse des échantillons des matières fécales prélevés sur un total de 150 bovins, 166 caprins et 19 ovins choisi au hasard dans les différentes zones de pâture disponibles. Les matières fécales ont été recueillies directement dans le rectum de chaque animal et mis dans des tubes à essai ou dans des boites de pétri pour être examines au laboratoire d'Entomologie vétérinaire, suivant la méthode d'ovoscopie qualitative directe pour la recherche des Trématodes [9].

TRAITEMENT DE DONNÉES DE L'ENQUÊTE

Le dépouillement de contenu des réponses reçues lors des interviews focalisées a été fait par une séance de cartographie participative conduite en vue d'identifier les sites vulnérable et de mettre en place des mécanismes pour contourner les mauvaises pratiques anthropogéniques qui sont à la base de la destruction de l'environnement.

RESULTATS

Tableau1 Structure des enquêtés par âge et genre dans le groupement d'Irhambi/Katana

	Kahungu	Mwanda	Kabamba	Kadjuchu	Kabushwa	Mabingu	Total	Pourcentage
15-25 ans	5	3	2	4	5	6	25	6,95
26-40 ans	10	9	18	11	14	15	77	21,38
>41 ans	15	18	10	15	11	9	78	21,67
Sexe masculin	19	17	9	18	21	17	101	28,05
Sexe feminin	11	13	21	12	9	13	79	21,95

Il ressort de ce tableau que la tranche d'âge comprise entre 26 et plus de 41 ans constitue la majorité des individus qui nous ont fournis l'information sur la pression humaine sur les ressources environnementales à Katana. Ceci montre que la population adulte de ce groupement est impliquée dans le problème qui se pose dans son milieu. Le sexe masculin qui représente 28,05% vient en première position pour justifier l'intérêt qu'ils accordent à la bonne gestion du milieu.

Tableau 2 Conséquences de la pression humaine sur l'environnement à Katana

PRESSIONS	ECOSYSTEMES	CONCERNES	CAUSES	CONSEQUENCES
Feux de brousse	Collines, boisements (Kajuchu, Mabingu, Kabushwa)	Les agriculteurs les chasseurs	ouverture de nouvelles parcelles d'exploitation	-déforestation - tarissement des cours d'eau -érosion active des sols
agriculture sur brûlis	(Kajuchu, Mabingu, Kabushwa)	Les agriculteurs	ouverture de nouveaux champs	-déforestation - tarissement des cours d'eau -érosion active des sols
Exploitation Minière	toutes les zones minières (Kabushwa, Mabingu)	les exploitants miniers	Recherche de gains	-destruction de la forêt - pollution et mise à nu des sols - érosion des sols
Pêche illicite	toutes les zones humides des différentes zones (rivières, ruisseaux, Lac Kivu)	- les pêcheurs, les femmes et enfants - les chasseurs, les exploitants Miniers	autoconsommation - recherche de gains - pauvreté - sous équipement	- destruction de la flore et faune aquatiques - dégradation de l'état de santé des populations - perte de la diversité biologique aquatique
Déforestation	lisières du PNKB (Mabingu, Kahungu, Kabushwa, Mwanda, Kabamba)	- les industries du bois - les habitants consommateurs	- besoins quotidiens - recherche de gains	- déforestation - tarissement des cours d'eau - perte de la diversité biologique - Destruction de la forêt
Erosions des sols	Sols à Kajuchu, Mabingu, Kabushwa, Mwanda, Kabamba	Agriculteurs, les industries du bois, les exploitants miniers	Sol arables emportés dans le bas-fond par les eaux de ruissellement.	-10% de la superficie est menacée des érosions pluviales.
Inondation	Mwanda, Kabamba, Kajuchu	- Agriculteurs - les industries du bois - les habitants exploitants du sol - les exploitants miniers	Intensité de pluie, sol saturé en eau, nature et position du sol	-Les inondations sont observées au courant des mois de pics des pluviosités (novembre-décembre ; mars-avril). -Plusieurs ménages des maraichers sont exposés à des pertes des cultures. -En moyenne 5% des terres agricoles restent inondées et inexploitables pendant plus de 6 mois.
Présence zoonose	Toutes les localités d'Irhambi/Katana	-Animaux -Individus	- Les chèvres, les vaches et les porcs sont généralement infestés de douve de foie, de ténia. - Mauvaise cuisson de la viande	20% des populations sont infestées par la téniase, la schistosomiase, la fasciolose hépatique.
Mauvaise qualité du sol agricole	Tous les champs du groupement d'Irhambi	- Les agriculteurs - Eleveurs	- Mauvaise pratiques agricoles ou sylvicoles, - le niveau économique	Des initiatives locales pour restaurer la fertilité des sols et prévenir les érosions

Les activités humaines constituent la cause principale de la destruction des écosystèmes de Katana. D'une façon générale toutes les pression exercées sur l'environnement à Katana causent des dommages et ont des effets négatifs sur le milieu. Toutes les pressions exercées sur le milieu d'Irhambi sont réversibles sauf l'inondation. Le feu de brousse, l'exploitation minière et la pêche illicite sont bénéfiques à ceux-là qui souhaitent satisfaire leur besoin égoïste.

Tableau 3 Auto-analyse des problèmes de dégradation du milieu exprimés par les paysans d'Irhambi/Katana

Problèmes exprimés par les paysans	Solutions déjà envisagées	Demande paysannes à entreprendre dans le milieu
agriculture sur brûlis	- enfouissement de la végétation dans le sol	- formation sur méthode de composte
Exploitation Minière	- bon choix des sites non accidenté - bonne gestion des déchets et produits chimiques	- Mette à la disposition des exploitants miniers des matériels appropriés - offrir un bon marché des produits chimiques
Pêche illicite	- utilisation des bons matériels de pêche - Interdire de pêcher dans les maternités - Défendre l'utilisation des produits toxiques	- Implantation des coopératives de pêcheurs - Assurer une bonne sécurité des pêcheurs lors de la pêche - Limitation des taxes
Déforestation	- Disponibiliser des jeunes plants à distribuer aux paysans - sensibiliser les paysans pour remplacer un arbre abattu par 10 jeunes arbres	- Reboiser les espaces vide et à risque - Procurer le matériel d'entretien des boisements communautaire et privés - Fournir des produits phytosanitaires
Erosions des sols	- cultiver sur les pentes en respectant les courbes de niveau - bonne gestion des eaux en provenance de toitures des maisons	-reforestation des espaces vides et à risque - sensibilisation des paysans sur la gestion des sols érodés
Inondation	- Entretien des terrains présentant de danger - Eviter de construire sur les bordures des cours d'eau	- Implantation des services météorologiques dans le milieu - Informer à tems les paysans des catastrophes imminentes
Présence zoonose	- Vaccination mensuel de tous les animaux - Eviter que les humains ne passent pas la nuit dans un même bâtiment avec les animaux - les animaux morts doivent être incinérés - faire vacciner et soigner le personnel qui est toujours en contact avec les animaux	- contrôle à la frontière des mouvements des animaux - recyclage des vétérinaires locaux

DISCUSSION

Au vue de l'état de déforestation qui se réalise avec des avancées alarmantes, à Katana 476 ha ont été déboisés (Kabamba, Buhengere, Mantu Kajuchu...). Cette situation a fait naître des répercussions néfastes sur ces écosystèmes. Il est évident que Katana constitue un marché d'achat et d'écoulement des charbons. Ce sont les arbres des parcelles (*Ficus vallis choudae Ficus exasperate*) qui sont carbonisées pour la production des braises dont 80% sont mis sur le marché pour approvisionner la ville de Bukavu. C'est une ville actuellement peuplée par environ 100.000 ménages dont le besoin moyen de consommation des braises est de 2 sacs par mois (soit 0,5 arbre). Le feu de brousse est très rare voire inexistant, sauf à Mabingu, Kajuchu et Kabamba.

Les déchets tants biodégradables que non biodégradables sont abondants et très visibles sur le lieu de grandes activités, cas des agglomérations Katana, Kabamba. A ces endroits se développent des gîtes d'insectes vecteurs des maladies tropicales. [10] Jusque-là, aucun système d'évacuation de ces déchets n'existe, sauf pour certains agriculteurs qui en désirent, ces derniers passent en prendre sporadiquement pour la fertilisation de leurs parcelles. Ceci est fréquent dans ce milieu rural naturellement à vocation agricole où l'érosion hydrique a emporté le sol arable et où plusieurs événements malheureux fréquents comme la destruction du couvert végétale par les animaux. Lam affirme cela dans son étude réalisé en République Centre Africaine en 1996 que l'érosion des structures communautaires traditionnelles peut constituer un facteur dans les pertes de cultures croissantes découlant des dégâts causés par des animaux.

Les conditions écologiques comme la présence du lac, la forêt et une population humaine dense qui se développent sont favorables à la prolifération des ravageurs des cultures comme les rats, oiseaux, vaches, chèvres, volailles, babouins réduisant à plus de 40% le rendement agricole d'Irhambi/Katana. Dans une étude menée en Namibie par Weaver et Skyer en

2003 on a constaté que la surveillance des cultures contre les ravageurs est un mécanisme adopté dans de nombreux endroits, en particulier lorsque le moment de la récolte approche, mais elle demande beaucoup de temps et a souvent des effets négatifs sur le nombre d'enfants scolarisés, car ce sont souvent eux qui sont assignés à cette tâche. Les pertes de cultures et de bétail à cause d'animaux sauvages peuvent avoir des impacts considérables sur les populations pauvres.

Le déséquilibre entre la disponibilité de l'eau de boisson et la demande rend la population de Kajuchu et Mabingu très vulnérables pendant la saison sèche surtout. Cette précarité entraîne également une dégradation des conditions de vie de la population (maladies, viols, vols, conflits…). Certaines sources d'eau aménagées n'arrivent pas à satisfaire les besoins de la population qui doit parcourir une grande distance pour puiser de l'eau.

Les variations des infestations selon la provenance montrent que les animaux abattus aux marchés de Katana et Kabamba sont infesté par suite de manque de contrôle et de mise en quarantaine par le service vétérinaire pour ceux qui viennent de l'étranger. Pour les infestations dans les ménages, une moyenne de deux personnes par ménage est porteuse de tænia, dont aussi les extrémités peuvent aller au-de1à de 7 personnes. Les personnes âgées de 5 ans et plus sont plus parasitées (40,8%) que celles âgées de 0 à 5 ans (8,2%) moyenne[11].

La dégradation du sol suite à sa surexploitation, conduit a des rendements très réduits bien qu'on utilise l'engrais organique, le fumier. Plusieurs cultures sont atteintes des malades cas de bananier avec le wilth bactérien, le manioc avec la mosaïque et la striure brune. Cependant la croissance démographique va maintenant à l'opposé de la production agricole. Cela conduit à l'importation des denrées alimentaire.

Depuis la création des Comités de Conservation Communautaire (CCC), les ressources naturelles étaient détruites par les riverains du Parc cela par le fait que ces derniers ne connaissaient pas le bien fondé de l'existence de ce Parc à Irhambi/Katana. Cependant, la conservation communautaire et la gestion collaborative telles que pratiquées dans les aires protégés ougandaises aujourd'hui ne donnent pas lieu à une gouvernance démocratique des ressources naturelles, et ce parce que la participation communautaire dans le cadre de la conservation communautaire et de la gestion collaborative ne se traduit pas de manière adéquate et efficace pour un renforcement de l'autonomie des communautés et le contrôle communautaire sur les ressources, en particulier pour ce qui est de la prise de décisions [12].

Les problèmes environnementaux sont repartis sur tous les aspects vitaux de la population d'Irhambi/Katana. L'intervention des communautés se limite à une participation passive à des comités et des réunions menés par les spécialistes de la conservation et ne prend pas la forme d'un pouvoir de prise de décisions active sur la manière de gérer leurs milieux. Les comités villageois et les autres formes d'organisations communautaires sont établis par des programmes formels de conservation, avec parfois un faible degré de participation et d'appropriation locales [13].

A l'instar de l'Afrique centrale, l'Afrique de l'Est présente en général plus de modèles de participation communautaire relativement passive à la Gestion des Ressources Naturelles que de cas de prise de décision sur la faune, les forêts et les pêcheries [14].

En Afrique centrale, la terre appartient à l'État et la gestion des ressources est en général extrêmement centralisée. Au niveau pratique toutefois, les systèmes fonciers communautaires traditionnels ont persisté du fait de la médiocrité des infrastructures, de la faiblesse des autorités gouvernementales centrales et des établissements humains ruraux petits et dispersés, autant de facteurs qui rendent difficiles la prise de conscience et la mise en application des lois [15].

CONCLUSION

Cette étude rare dans la région a permis de présenter une réflexion critique du rôle de l'homme de Katana dans le fonctionnement et la dynamique des écosystèmes en vue de gérer rationnellement son cadre de vie.

L'impact humain se traduit par une déstabilisation ou un dysfonctionnement des écosystèmes entraînant soit une accélération des mécanismes d'évolution soit un blocage. La perception de la naturalité est donc plus une question de culture qu'un simple diagnostic scientifique. La mesure de l'impact de l'homme dans un contexte comme les écosystèmes terrestres ne peut se faire par référence à un témoin qui n'existe plus, mais par des bilans à intervalles réguliers dans un système en évolution permanente. La base des recherches doit s'élargir de manière à englober des questions plus générales ayant trait à la réforme agraire, à l'économie, à la démocratisation, à la transformation en produits commercialisés, à l'utilisation durable et aux changements climatiques, ainsi que les Accords Environnementaux Multilatéraux associés dans le contexte de la Gestion Communautaire des Ressources Naturelles. Pour ce milieu de Katana confrontée par une surpopulation et confinée entre le lac Kivu et le parc national de Kahuzi-Beiga, il faut construire une synergie, renforcer le capital social pour une conservation environnementale rationnelle.

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Phytotoxicological assessment of Moringa oleifera Lam. against larvae of important human malaria vector Anopheles *stephensi* Liston (Insecta:Diptera:Culicidae)

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ABSTRACT: Application of plant extracts have become an available alternative in sustainable vector control strategy due to their less toxic, easily available and non persistant nature. In the present study, leaves, flowers and seeds of *Moringa oleifera* Lam. are evaluated for their larvicidal activities against *Anopheles stephensi* (L). The larval mortality was observed at 24hrs and 48 hrs of time exposure. Highest larval percent mortality was observed to be found in the seed extract of *Moringa oleifera* Lam. plant with 100% mortality at 100 ppm of concentration. LC_{50} value was calculated against different concentrations. The lowest LC_{50} value was observed in the *M. oleifera* Lam. seeds followed by flowers and leaves i.e. 15.17 ppm, 23.99 ppm and 38.99 ppm respectively after 24 hrs of exposure time and 12.62 ppm, 20.46 ppm and 25.11 ppm. respectively at 48 hrs of exposure time. The plant extracts also exhibited some developmental deformities in larvae and pupae. The obtained data indicates that phytochemical derived from *M. oleifera* Lam. seed extracts are effective mosquito vector control agent.

KEYWORDS: *Moringa oleifera* Lam*., Anopheles stephensi*, Insecticidal, Phytochemicals.

1 INTRODUCTION

Vector and vector-borne diseases have become a challenging problem to public health in these days as it has social and economical impact. Insect-transmitted diseases remain a major cause of illness and death worldwide (Pavela 2009)). Mosquitoes are vectors of several diseases affecting humans and domestic animals around the world and are the major vectors for the transmission of malaria, dengue, yellow fever, filariasis, Japanese encephalitis, *etc*., causing millions of deaths every year (James 1992). In the last 50 years, insect pests have mainly been controlled with synthetic Insecticides. However, one major drawback with the use of these chemical insecticides is that these are non-selective and could be harmful and adversely affect the other organisms in the environment (Omena et al. 2007). Plant products have been used traditionally by human communities in many parts of the world against the vectors and the different species of insects**.** Phytochemicals explored from plant sources can act as larvicides and can be responsible for the interruption of the transmission of mosquito-borne diseases at the individual as well as at the community level (Govindrajan et al. 2008)**.**

Moringa oleifera Lam. (drumstick tree, horseradish tree) is indigenous to northwestern India. The tree is valued mainly for the tender pods, which are esteemed as a vegetable (Ramachandran et al. 1980). A paste of the leaves is used as an application for wounds. Moreover, the leaves are a good source of essential amino acids such as methionine, cystine, tryptophan, and lysine with a high content of proteins (Makkar and Becker 1997). Decoctions and extracts made from these leaves are also variously employed in traditional medicine (Morton 1991). Pal et al., 1995 have reported that the methanol fraction of *Moringa* leaf extract possesses antiulcer activity against induced gastric lesions in rats. On the other hand, pressed juice of the fresh leaves shows strong antibacterial activity. Nonetheless, the flowers of *M. oleifera* are considered to possess

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medicinal value as a stimulant, diuretic, and cholagogue, and they have been also reported to contain flavonoid pigments such as quercetin, kaempferol, rhamnetin, isoquercitrin, and kaempferitrin (Nair et al. 1962). One of the best uses in the west of moringa is to flocculate contaminants and purify drinking water with its powered seeds. The seeds possess antimicrobial properties (Ali et al. 2004), ovicidal and larvicidal effects on *Ae. aegypti* L. (Paulo et al. 2009). Njom et al., 2011 reported the toxicity and growth regulatory effects of Moringa oleifera seed extracts were assessed on third larval instars of Anopheles gambiae. Biological effects of the water extract of *Moringa oleifera* seeds (WEMOS) were assessed on eggs and 3rd instar larvae of *Aedes aegypti* by Paulo et al. 2009.

Information on effects of *Moringa oleifera* Lam. on the malaria vector *Anopheles stephensi* (L) have been limited in this part of the world despite the havoc the vector is causing. This research amongst others intends to assess the toxicity and growth regulatory effects of *Moringa oleifera* Lam. on the larvae of *Anopheles stephensi* (L.) (Diptera: Culicidae). The present study was conducted to evaluate the mosquito larvicidal activity of leaves, flowers and seeds of *Moringa oleifera* Lam. against human malaria vector *Anopheles stephensi* (L).

2 MATERIALS AND METHODS

2.1 COLLECTION OF PLANTS

Fully developed leaves, flowers and seeds of the *Moringa oleifera* Lam. were collected from in and around the Mohan lal Sukahadia University campus, Udaipur, Rajasthan, India. The dried plant materials were powdered by an electrical blender.

2.2 EXTRACTION

The plant parts were washed with tap water, shade-dried, and finely ground. The finely ground plant material powder (10g/ solvent) was loaded in Soxhlet apparatus (Vogel 1978). The solvents from the extracts were removed using a rotary vacuum evaporator to collect the crude extract. Standard stock solutions were prepared at 1% by dissolving the residues in methanol. From this stock solution, different concentrations were prepared and these solutions were used for larvicidal bioassays.

2.3 TEST ORGANISMS

The mosquitoes *Anopheles stephensi* (L), were reared in the Insect Microbial and Herbal Control laboratory, Department of Zoology, Mohan Lal Sukhadia University. The larvae were fed on dog biscuits and yeast powder in the 3:1 ratio. Adults were provided with 10% sucrose solution and rabbit for blood meal. Mosquitoes were held at 28±2°C, 70–85% relative humidity, with a photo period of 14-h light and 10-h dark.

2.4 LARVICIDAL BIOASSAY

The larvicidal activity of the plants crude extracts were evaluated as per the method recommended by World Health Organization (2005). Batches of 25 third instar larvae were transferred to small disposable test beakers, each containing 100 ml of water. The appropriate volume of dilution was added to 100 ml water in the beakers to obtain the desired target dosage, starting with the lowest concentration. Five replicates were set up for each concentration, and an equal number of controls were set up simultaneously using tap water. The control mortalities were corrected by using Abbott's formula (Abbott 1925). The LC_{50} and LC_{90} were calculated after 24 and 48 h by Probit analysis (Finney 1979).

$$\text{Percentage mortality} = \frac{\text{Number of dead larvaes}}{\text{Number of larvaes introduced}} \times 100$$

$$\text{Corrected mortality} = \frac{\text{Observed mortality in treatment} - \text{Observed mortality in control}}{100 - \text{Control mortality}} \times 100$$

2.5 STATISTICAL ANALYSIS

The mortality observed (ppm) was corrected using Abbott's formula during the observation of the larvicidal potentiality of the plant extracts. Statistical analysis of the experimental data was performed with MS EXCEL 2003 to find the LC_{50}, regression equations (Y = mortality; X = concentrations) and regression coefficient values.

3 RESULTS

The extracts of different plant materials of *Moringa oleifera* Lam. has been studied for use as ecofriendly insecticide instead of eco enemy synthetic insecticide. The five different concentrations 20, 40, 60, 80, 100 ppm of leaves, flowers and seeds were tested against malarial vector *Anopheles stephensi* (L). The effect of larvicidal activity was demonstrated in the present study; confirm their potential for control of larval population. Effect of *Moringa oleifera* Lam. on the third instar larvae increased with the increase in the concentration. Larval mortality and LC_{50} value were observed. Regression analysis showed a concentration dependant significant correlation of the plant extract with larval mortality. Figure 1 shows the toxicity evaluation assay of *Moringa oleifera* Lam. leaves, flowers and seeds and their effect on *Anopheles stephensi* (L) larvaes. With regard to morphological abnormalities larval aberrations reached the highest values when treated with flower extracts. In the meanwhile, the morphological abnormalities were more pronounced with the seed extracts as compared to normal larvae. Several forms of morphological malformations resulted from the treatment of larvae. The apodous larvae (Fig1E & F) show several types of morphological malformations: deformed mouth brushes, melanized and scleoritized cuticle, light yellowish albino coloured abdominal structures with lack of peritrophic membrane outline compared to control (Fig 1D) shows prominent mouth brushes and healthy cuticle and digestive tract structure shows clear peritrophic membrane outline. Most of the treated larvae died as highly pigmented forms and some other died with peritrophic membrane disrupted forms.

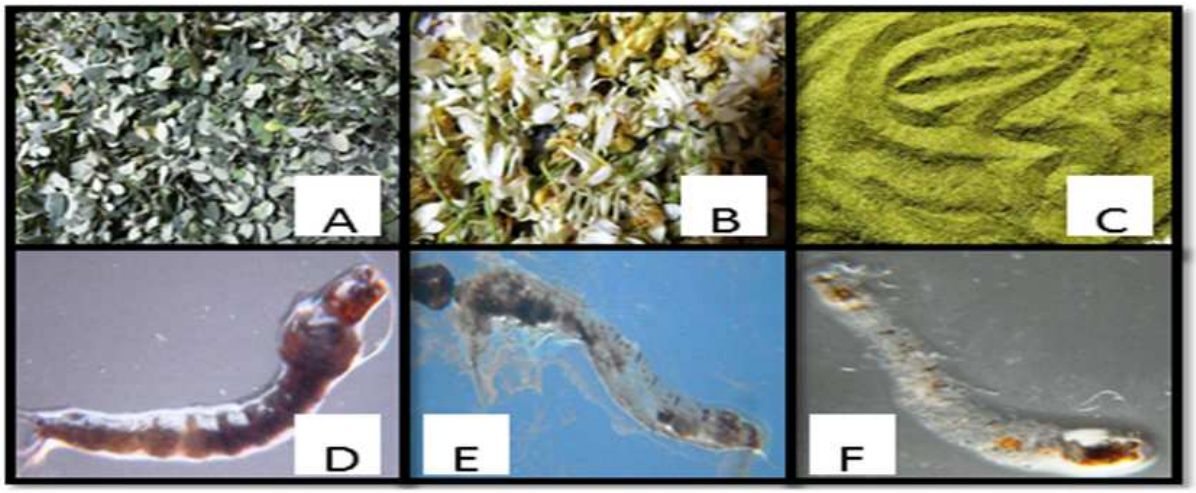


Figure 1: Toxicity Evaluation (A), Moringa oleifera Lam. leaves, (B) Moringa oleifera Lam. flowers , (C) Moringa oleifera Lam. leaves powder, (D) Normal Anopheles stephensi (L) larvae, (E) Anpheles stephensi (L) larvae treated with Moringa oleifera Lam. flower extract, (F) Anpheles stephensi (L) larvae treated with Moringa oleifera Lam. seeds extract.

Table 1: Efficacy of leaf extract of Moringa oleifera Lam. against Anopheles stephensi (L) at 24 and 48 hrs

Concentration (ppm)	Time (hrs)	% of mortality ± SD
20	24h	36.67±1.26
	48h	53.33±0.96
40	24h	50.00±0.96
	48h	63.33±0.58
60	24h	70.00±0.96
	48h	76.67±0.50
80	24h	83.33±0.58
	48h	86.67±0.50
100	24h	86.67±0.58
	48h	93.33±0.58

Table 2: Efficacy of flower extract of Moringa oleifera Lam. against Anopheles stephensi (L) at 24 and 48 hrs

Concentration(ppm)	Time (hrs)	% of mortality ± SD
20	24h	53.33±0.58
	48h	63.33±0.58
40	24h	66.67±1.26
	48h	73.33±0.58
60	24h	86.07±0.50
	48h	87.67±0.80
80	24h	93.33±0.58
	48h	95.33±0.58
100	24h	96.07±0.58
	48h	96.67±0.58

Table 3: Efficacy of seed extract of Moringa oleifera Lam. against Anopheles stephensi (L) at 24 and 48 hrs

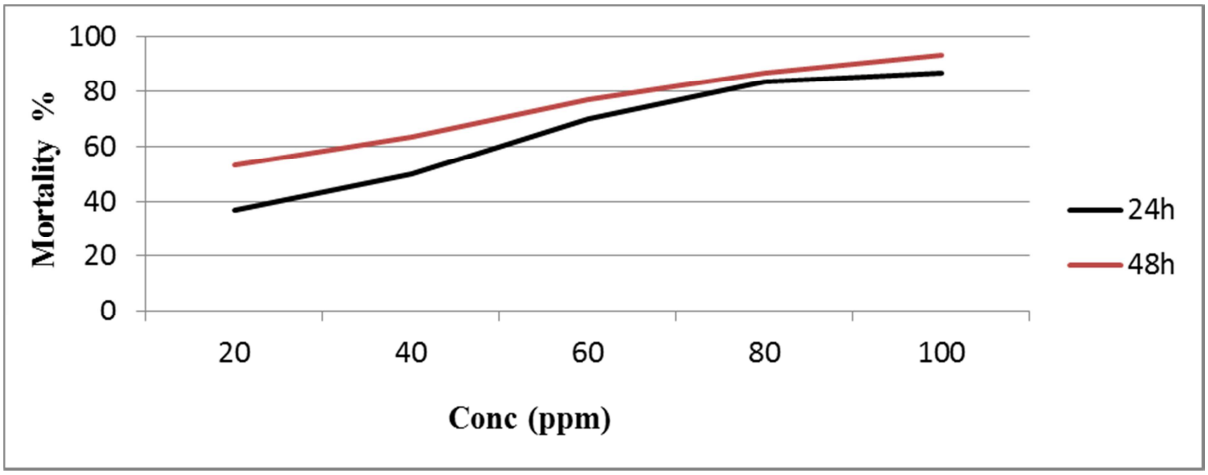
Concentration (ppm)	Time (hrs)	% of mortality ± SD
20	24h	66.67±1.26
	48h	70.00±0.50
40	24h	83.33±1.00
	48h	85.33±0.50
60	24h	93.33±0.50
	48h	95.33±0.58
80	24h	96.67±0.50
	48h	100.00±0.00
100	24h	100.00±0.00
	48h	100.00±0.00

Table 4: Toxicity of leaves, flowers and seeds extract of Moringa oleifera Lam. against Anopheles stephensi (L) under 24h and 48 h exposure time

Plant material	Exposure time (h)	LC_{50} (ppm)	Regression equation
Moringa oleifera leaves	*Moringa oleifera* after 24 h	38.99	Y=1.45+2.24X
	Moringa oleifera after 48 h	25.11	Y=2.17+2.02X
Moringa oleifera flowers	*Moringa oleifera* after 24 h	23.99	Y=1.36+2.64X
	Moringa oleifera after 48 h	20.46	Y=2.36+2.02X
Moringa oleifera seeds	*Moringa oleifera* after 24 h	15.17	Y=2.20+2.36X
	Moringa oleifera after 48 h	12.62	Y=2.83+1.97X

If the efficacy is compared between the plant parts, seed extract exerted maximum effects followed by flowers and leaves. The result (Table 1, 2 and 3) clearly depicts that at lower concentration of 20ppm, 70±0.50percent mortality was observed with seeds whereas same dose exerted 63.30± 0.58 and 53.33±0.96 percent mortality after 48 hrs of treatment time. Trends of mortality were time as well as dose dependant with all the three plant parts and a linera co-relation could be established between time and concentration (Fig 2).

Table 1 revealed the efficacy of leaf extracts of *Moringa oleifera* Lam. against *Anopheles stephensi* (L) at 24 and 48 hrs and generally found that highest larval mortality took place at highest (100 ppm) concentration i.e. 93.33±0.58% at 48 hrs of exposure time. Larval mortality was maximum in 48 h (86.67±0.50%) exposure time as compared to the 24 h (83.33±0.58%) in 80 ppm concentration and this trend was generally observed with all the concentrations. Toxicity of flower extract at the different concentrations revealed highest mortality at the 100 ppm concentration (96.67±0.58%). As compared to the leaf extract high larval mortality was observed at less time exposure (Table 2). *Moringa oleifera* Lam. seed extract is 100% mortality at 80ppm concentration and at the lowest concentration i.e. at 20 ppm it reaches the value at 66.67±1.26%. (Table 3 and Figure 2)



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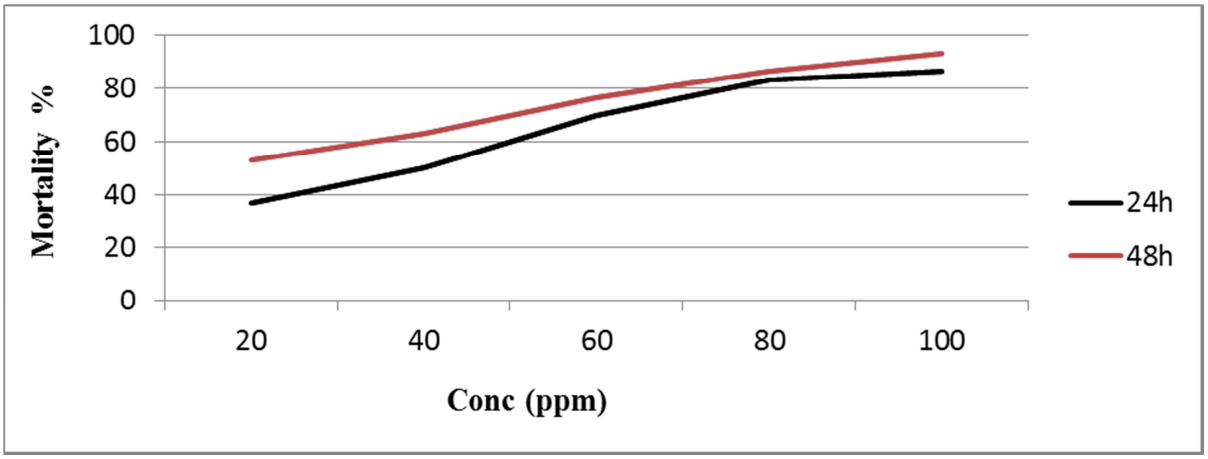

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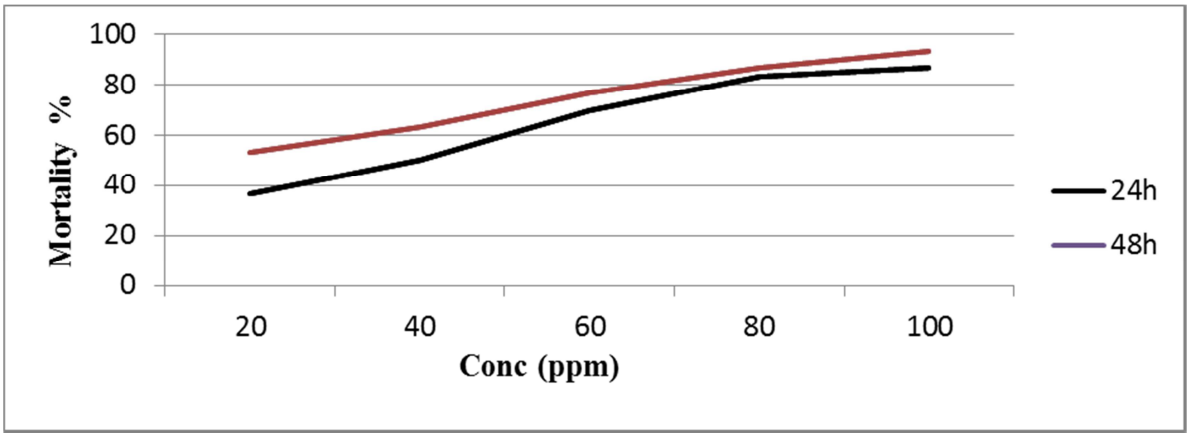

C

Figure 2: Dose response relationship for extracts of Moringa oleifera Lam.for 24h and 48h against Anopheles stephensi (L) . A) Leaf extract B) Flower extract C) Seed extract

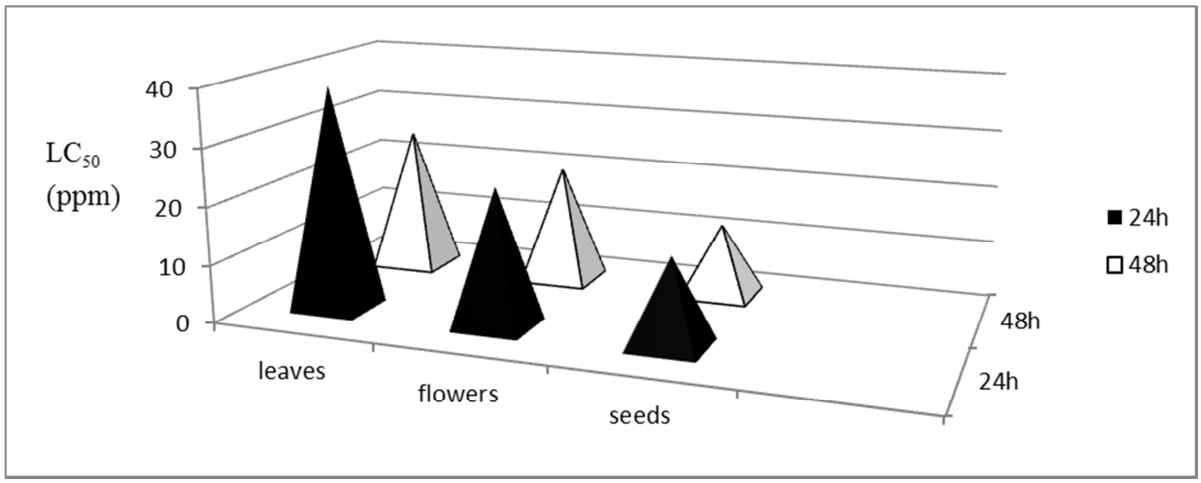

Figure 3: LC_{50} value of leaves, flowers and seeds extract of Moringa oleifera Lam. against Anopheles stephensi (L).

Table 4 shows the LC_{50} value and the regression equation which was calculated using the Probit analysis. LC_{50} value was calculated against different concentrations. Lowest LC_{50} value was observed with *M. oleifera* Lam. seeds followed by flowers and leaves i.e. 15.17 ppm, 23.99 ppm and 38.99 ppm respectively after 24 h of exposure and 12.62 ppm, 20.46 ppm and 25.11 ppm. respectively at 48 h of exposure (Figure 3)

4 DISCUSSION

Many researchers have been done on plants and natural derived chemicals which are non toxic to man and domestic animals and serve as useful basis for development of safer and more effective mosquito control agents. In the present research, encouraging results have been obtained after the treatment of *M. oleifera* Lam. against *An. Stephensi* (L). The obtained larval mortality may be due to active chemical compounds present in *M. oleifera*. *M. oleifera* seeds extract also act as larvicidal agent and studies have been reported on water extracted *M. oleifera* seeds (WEMOS) against *Aedes aegypti* larvae and methanol- extracted *M. oleifera* roots against *Culex quinfasciatus* and *Aedes albopictus*. The present findings have important implication in the control of mosquito larvae in the polluted aquatic ecosystems. The plants studied are explored in large quantities and these extracts are easy to handle, inexpensive and safe natural product for mosquito control. The extract of Murungai (Local tamil name) seed can also be used for water purification (Patterson et al. 1975). In view of residue problems in the environment and development of insect resistance to synthetic insecticides like DDT, the recent trend is to explore our natural resources to obtain extracts that are safe for non target and do not pose any residue problems but are still able to suppress pest populations. These advantages encourage the dispersion of *M. oleifera* tree around the world as well as the exploitation of its seed as a way to reduce the exorbitant costs of water treatment, mainly in developing countries and rural areas (Jahn et al. 1988). An additional benefit is that *M. oleifera* seed is available throughout the year, preferrably when the mosquito population is higher. The plants grow in nature without any extra care or cost and simple technology would be necessary to separate the most suitable fractions to be exploited as a possible chemical to be employed in mosquito control programs.

Quercetin and Kaempferol are flavnoiods, compounds of phenolic hydroxyl groups of *M. oleifera* with antioxidant action of potential therapeutic and pharmaceutical uses. (Asciak et al. 1995). Since many of the plant extracts have been subjected to risk factor in mosquito control and *An. Stephensi* breeds in drinking water tank. The plant extracts which are highly toxic against this malarial mosquito are also toxic to human beings. In the present study *M. oleifera* seed extract shows good effect on *An. stephensi* and it is also non toxic to human beings. Much previous study proved that extract of this plant is a water purifying agent. *M. oleifera* seed can also be used as a natural coagulant in household water treatment as well as in the community water treatment. Hence it is considered that the seeds extract of *M. oleifera* is not only a mosquitocidal agent but also a water treatment agent for the community. The present observation also revealed that seed extract of *M. oleifera* has a promising larvicidal efficacy. Plants are rich sources of bioactive organic chemicals and offer a promising advantage over synthetic pesticide as naturals are non toxic, less prone to development of resistance and easily biodegradable. The seed extract of *M. oleifera* therefore plays an important role in the mosquito control. Many compounds of plant origin are reported as larvicidal (Jeyabalan and Murugan 1996; Curtis et al. 1989; Curtis et al. 1990; Foidl et al. 1990; Murugan et al. 1996; Pushpanathan and Muthukrishnan 1995; Rajkumar et al. 2004; Saxena et al. 1993; Sharma and Saxena 1994; Vatandoost et al. 2010), there is wide scope for the discovery of more effective plant products (Saxena and Yadav 1986).

These results indicated a metamorphosis inhibiting effect of the plant extracts, which possibly based on the disturbance of hormonal control (Sharook et al. 1991), as the noticed morphogenetic aberrations suggesting a type of insect growth regulating activity. The most important deformities, larval-pupal intermediates and ecdysal failure, seemed to be the major cause of the mortalities. Likewise, such abnormalities were noted following treatment of immature mosquitoes with juvenile hormone (JH) analogues and chitin synthesis inhibitors (El-Barky et al. 1993; Khater 2003; Sivagnaname and Kalyanasundaram 2004)

5 CONCLUSION

An attempt has been made to evaluate the role of *Moringa oleifera* L. leaves, flowers and seeds extracts for their larvicidal bioassay against *Aopheles. Stephensi* L. The results reported in this study open the possibility for further investigations of the efficacy of larvicidal properties of natural product extracts as a potential agent for combating mosquitoes. Further research work undoubtedly will lead to improved formulations with enhanced activities which may eventually become environmentally acceptable and replace objectionable conventional insecticide for control of mosquitoes. It may be concluded that nature posses numerous natural herbs which may be useful for vector borne diseases.

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Optimization of pectin extraction from steam distillated orange peels through an experimental factorial design

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ABSTRACT: This study examined variables that influence the acid-extraction of pectin from Steam Distillated Orange Peels using two different acids; an organic acid (citric acid) and a mineral one (sulfuric acid). The effects of these acids on extraction of pectin were investigated by response surface methodology. Extraction parameters which are employed in this study are temperature of extraction (X1: 50°C-80°C), acid concentration (X2: 0.05M-0.1M), acid hydrolysis time (X3: 30min-60min) and. In the case of citric acid, results showed that extraction temperature, time and acid concentration had the most significant combined effect on the extraction rate of pectin from Steam Distillated Orange Peels, followed by the combined effects of extraction temperature and acid concentration. While results showed, in the case of the sulfuric acid, that all the combinations have a significant effect on pectin yield, but the combined effect of the three factor is the most significant followed by the combined effect of time and temperature extraction, then the combined effect of the acid concentration and time extraction and finely the acid concentration and temperature extraction as the less significant combined effect. Pectin yields varied from 11.32% to 28.23% using citric acid and from 11.6% to 30.30% using sulfuric acid.

KEYWORDS: Pectin, Response Surface Methodology, Citrus Solid Waste, Optimization, Combined Effect.

1 INTRODUCTION

Pectins are polysaccharides from plant cell walls, widely used in the food industry as gelling and stabilizing agents. In addition, May and Mohnen reports that pectin has several positive effects on human health, including reduced serum cholesterol, reduced serum glucose and reduced cancer incidence amongst other effects [1], [2].

The extraction of pectin from citrus wastes is mainly accomplished, pectin content of citrus peel is usually high, 25 - 30% of the dried peel mass and this yield may change according to the acid used in the extraction and different factors such as acid concentration, time and temperature of extraction. Many works are available on the extraction of pectins with mineral acids, such as sulfuric acid [3], [4], hydrochloric acid [5], [6], [7], [8], nitric acid [9], [10], tartaric acid [11] and with organic acids such as citric acid [12], [11], [13], [14]. In this study we choose to use the sulfuric acid for the good pectin yield that it provide and the citric acid that could be better than the other extractors from an economic as from an environmental point of view.

Few works has been done on the combined effects of variables factors on pectin extraction from steam distillated orange peels. In fact, both the optimization of the process and investigation of their combined effects are time consuming.

Experimental factorial design is the most effective way for the above-mentioned purpose, which was a collection of statistical and mathematical techniques [15], [16], [17], [18], [19], [20].

In this paper, experimental factorial design was employed for the extraction of steam distillated orange peel pectin. The aim of this research is to develop an approach that allow a better understanding of the combined effects of three different processing variables (acid concentration, time and extraction temperature) on the desired response (pectin yield) , as well as to look for optimum conditions of the pectin extraction from steam distillated orange peels (SDOP).

2 MATERIALS AND METHODS

2.1 RAW MATERIALS

Orange peels were collected from local restaurant as solid waste after jus extraction. The peels were washed dried and steam distillated for essential oil extraction. Once the steam distillation completed, the steam distillated orange peels were collected, dried and crushed for pectin extraction.

2.2 PECTIN EXTRACTION

Pectin was extracted from SDOP with aqueous sulfuric acid and citric acid (1:30, w/v) under reflux, using a mechanical blender in the extraction conditions established by preliminary tests. After centrifugation (3000g for 10 min), each extract obtained was filtered, treated with ethanol 96% (v/2v; extract/ethanol) and stirred slowly and stored in a refrigerator overnight in order to fully achieve pectin precipitation [21], [22). Afterward, the polysaccharides were removed by centrifugation, washed three times with ethanol and dried under vacuum. The weight was monitored until stabilization.

2.3 EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS

Response surface methodology was used to determine the optimum condition for pectin extraction from steam distillated orange peels in each case (sulfuric and citric acid). The variables were monitored using a 3^2 factorial design and each experiment was realized in triplicate.

Experimental factorial design was used to determine the optimum condition for pectin extraction from SDOP in each case (sulfuric and citric acid). The variables were monitored using a 3^2 factorial design and each experiment was realized in triplicate.

The variables used were: extraction temperature (X1), acid concentration (X2) and extraction time (X3). The minimum, maximum levels for citric acid concentration were set at 0.05M and 0.1M, respectively, and for the effect of extraction time they were set to 30 and 60 min, respectively. While the minimum, maximum levels for the extraction temperature were 50°C and 80°C. The levels were selected based on previous studies (unpublished results). The complete design consisted of 8 experiments and each one of theme was realized in triplicates. All the experiments were carried out at random in order to minimize the effect of unexplained variability in the observed responses due to systematic errors. The response function (y) measured was the pectin yield.

2.4 PECTIN EXTRACTION RATE

Pectin yield was calculated as follows:

$$\text{Pectin yield (\%)} = (m_0/m)*100$$

m0 (g) is the dried pectin weight;
m (g) is the dried raw material weight

3 RESULTS AND DISCUSSION

3.1 REGRESSION ANALYSIS OF RELATIONSHIP BETWEEN DESIRED RESPONSE AND VARIABLES

Twenty four experiments were carried out according to the conditions indicated in Table 1. Response values (pectin extraction yield under each acid condition) were reported in the last column of this table. For both acids, regression analysis (Table 2 for citric acid and table 3 for the sulfuric acid) was made to the experimental data aiming at an optimal region for the responses studied (pectin yield). F-test and p-value (Table 2 & 3) were used to the determination of the significance of each coefficient; it would be more significant if the absolute F-value becomes greater while p-value becomes smaller [15].

Table 1. Design with the experimental responses values for pectin yield using citric acid and sulfuric acid

Experiments	Temperature (X1)	Concentration (X2)	Time (X3)	Yield (%) citric acid	Yield (%) sulfuric acid
1	1	-1	-1	12.81	15.45
2	-1	-1	1	13.43	17.41
3	1	-1	-1	11.32	14.62
4	1	1	-1	28.12	19.24
5	-1	-1	-1	21.58	11.6
6	1	1	-1	28.23	20.44
7	1	-1	1	19.10	21.39
8	-1	-1	1	13.05	18.24
9	1	1	-1	26.36	20.86
10	1	-1	1	20.16	22.92
11	1	1	1	21.61	24.66
12	1	-1	-1	12.35	15.06
13	-1	-1	1	13.59	18.68
14	-1	1	-1	17.73	13.85
15	1	-1	1	19.69	21.76
16	-1	1	1	23.87	29.35
17	-1	-1	-1	19.86	11.96
18	-1	1	-1	16.89	14.57
19	-1	-1	-1	18.25	12.09
20	-1	1	1	24.00	30.3
21	1	1	1	23.58	24.48
22	1	1	1	22.11	24.29
23	-1	1	-1	16.30	13.69
24	-1	1	1	24.38	29.24

3.1.1 CITRIC ACID CASE

Table (2) and Figure (1) showed that the variables with the most significant effect were the interaction effects of acid concentration, extraction temperature and time (X1*X2*X3), followed by the combined effect of the acid concentration and temperature extraction (X1*X2) and the combined effect of extraction temperature and time (X1*X3) was less significant than the previous combined effects, while acid concentration and time (X2*X3) was the least significant combined effect. The linear terms of the effect of concentration (X2) was highly significant, followed by the term of temperature extraction (X1), while the term of time extraction (X3) was the least significant. The graphical representation is below (3.1.2 SULFURIC ACID CASE).

Table 2. Estimated regression model of relationship between response variables (pectin extraction) and independent variables (X1, X2 and X3) and variance analysis of items of regression under citric acid conditions

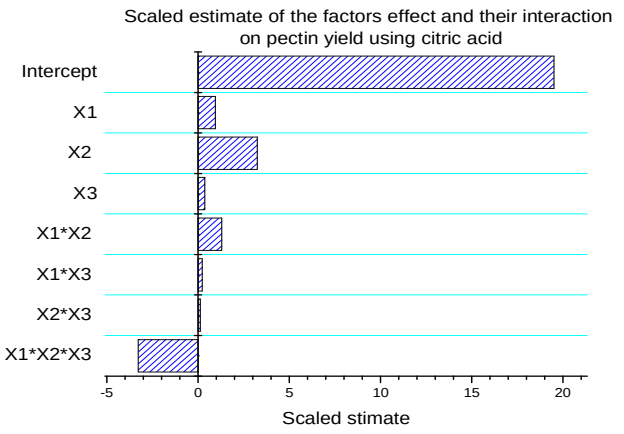
Effects	Sum of Squares	Degree of Freedom	Mean square error	F Ratio	Prob> F
X1	21.113	1	21.113	26.183	0.0001
X2	253.435	1	253.435	314.301	<0.0001
X3	3.205	1	3.205	3.974	0.06353
X1*X2	40.482	1	40.482	50.204	<0.0001
X1*X3	1.193	1	1.193	1.479	0.2416
X2*X3	0.393	1	0.393	0.487	0.4953
X1*X2*X3	258.924	1	258.924	321.108	<0.0001
Model	578.743	7	82.678	102.534	<0.0001
Error	12.902	16	0.806	<0.0001	
C. Total	591.645	23	25,724		

3.1.2 SULFURIC ACID CASE

Regression analysis (in Table 3) was made to the experimental data aiming at an optimal region using sulfuric acid for the pectin extraction. Table 3 showed that the variables with the most significant effect were the interaction effects of acid concentration, extraction temperature and time (X1*X2*X3), followed by the combined effect of time and temperature extraction (X1*X3) and the combined effect of the acid concentration and time (X2*X3), finely the combined effect of acid concentration and temperature extraction (X1*X2) was less significant between all combined effects. The linear terms of time extraction (X3) was highly significant, followed by the term of acid concentration (X2), while the temperature extraction (X1) has the least significant effect. These effects were illustrated graphically in Figure 2.

Table 3. Estimated regression model of relationship between response variables (pectin extraction) and independent variables (X1, X2 and X3) and variance analysis of items of regression under sulfuric acid conditions

Source	Sum of Squares	Degree of Freedom	Mean square error	F Ratio	Prob> F
X1	24.382	1	24.382	75.2961	< 0.0001
X2	169.549	1	169.549	523.608	< 0.0001
X3	410.771	1	410.771	1268.562	< 0.0001
X1*X2	13.878	1	13.878	42.858	< 0.0001
X1*X3	41.686	1	41.686	128.736	< 0.0001
X2*X3	16.750	1	16.750	51.729	< 0.0001
X1*X2*X3	54.451	1	54.451	168.158	< 0.0001
Model	731.465	7	104.495	322.707	<0.0001
Error	5.181	16	0.3234	<0.0001	
C. Total	736.646	23	32.028		



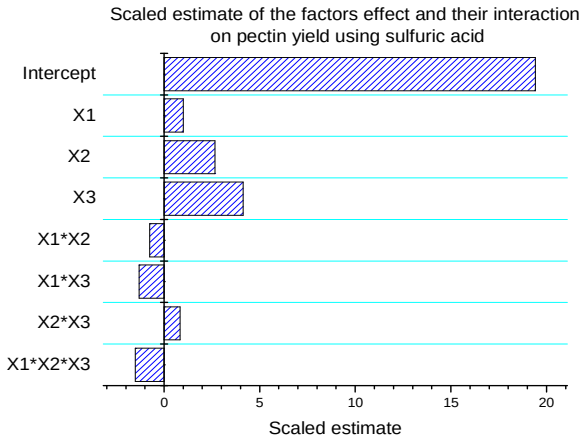


Fig. 1. Scaled estimate of the factors effect and their interaction on pectin yield using citric acid

Fig. 2. Scaled estimate of the factors effect and their interaction on pectin yield using sulfuric acid

Analysis of variance (ANOVA) for the model was carried out to validate the model (in Tables 2and 3). Results showed that the regression was significant (p-value<0.05).

3.2 ANALYSIS OF RESPONSE SURFACE OF THE PECTIN EXTRACTED WITH CITRIC ACID AND SULFURIC ACID

The relationship between the responses and the experimental variables can be illustrated graphically by plotting three-dimensional response surface plots (Figs. 3–5).

3.2.1 INTERACTION EFFECTS OF TEMPERATURE (X1) AND ACID CONCENTRATION (X2) ON EXTRACTION YIELD.

Fig. 3 represents a response surface of the extraction temperature and citric acid concentration value on the extraction yield of pectin from SDOP. It showing that the extraction rate of pectin increased by increasing both extraction temperature and acid concentration value. These effects were markedly shown for extraction temperatures at 80°C and at high concentration level. The possible explanation for the increase of the extraction rate is what Coulson and Richardson has shown that the improvement of solubility of the extracted pectin by increasing temperature in a certain domain of influence. Besides, the diffusion coefficient also normally increased and so that improved the pectin yield [23]. Also, the acidic conditions allow the hydrolysis of the insoluble pectin constituents into soluble pectin, which increases the pectin yield [24].

Fig. 4 represent a response surface of the extraction temperature and sulfuric acid concentration value on the extraction yield of pectin from SDOP, showing that the extraction rate of pectin increased by increasing extraction temperature and/or decreasing acid concentration value. These effects were markedly shown for extraction temperatures at 80°C and at a low concentration level. As reported above, the solubility of the extract pectin is improved by increasing the temperature which improves the pectin yield.

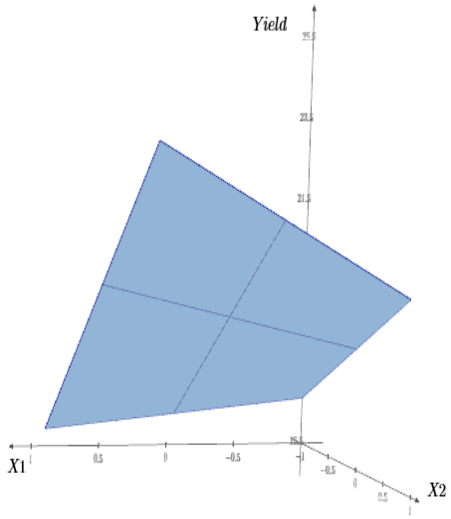


Fig. 3. (citric acid case)

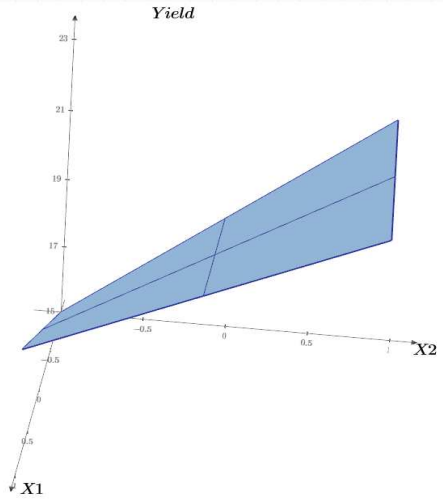


Fig. 4. (sulfuric acid case)

Interaction effects of extraction temperature and acid concentration.

3.2.2 INTERACTION EFFECTS OF EXTRACTION TIME AND ACID CONCENTRATION VALUE ON PECTIN EXTRACTION YIELD.

The response surface in Fig. 5 showed the combined effects of extraction time and citric acid concentration show that longer extraction time and a high acid concentration provides a high pectin yield. Further prolonging the extraction time at low acid concentration increased the extraction rate. The maximum extraction rate was reached at the optimum conditions (concentration of 0.1 M and extraction time of 60min).

The response surface in Fig. 6 showed the combined effects of extraction time and acid concentration, indicating that longer extraction time firstly led to higher extraction rate of pectin. Prolonging the extraction time, even at low acid concentration, increase the extraction rate. The highest pectin yield was reached at the optimum conditions (concentration of 0.1 M and extraction time of 60min.

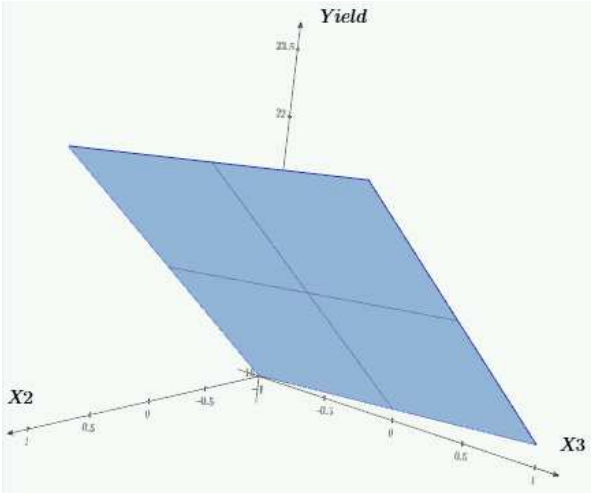


Fig. 5. (citric acid case)

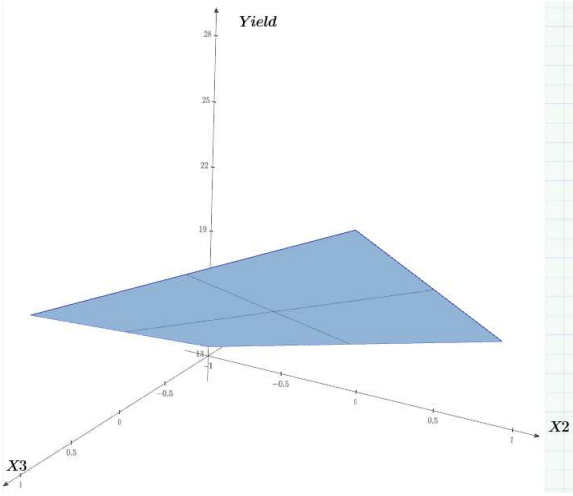


Fig. 6. (sulfuric acid case)

Interaction effects of extraction time and acid concentration.

3.2.3 INTERACTION EFFECTS OF TIME AND TEMPERATURE ON PECTIN EXTRACTION YIELD

In Fig. 7, the examination of three-dimensional plots showed that the extraction rate of pectin increased when increasing both time and temperature. These effects were markedly shown for temperatures 80°C and long duration 60 min. The reason was that the pectin was not so easy to be dissolved out from the plant cell wall if the extraction temperature was too low and extraction time was too short. Furthermore, a too long extraction time and a very high temperature can lead to some degradations of pectin chain, thus lowering the pectin yield.

Both extraction time and temperature (Fig. 8) displayed significantly effects on the yield of pectin. The extraction rate of pectin first increased rapidly with the decrease of both extraction time and temperature. It was inferred that the greater extraction rate of pectin could be obtained at the following conditions: about 50°C of extraction temperature and 30min of extraction time. In the citric acid case, long time extraction and a high temperature were necessary to get a high yield, but in the sulfuric acid case short time extraction and a low temperature were good enough to get a high pectin yield. These results can be very interesting knowing that pectin chain may be deteriorated by a hot temperature and longtime extraction.

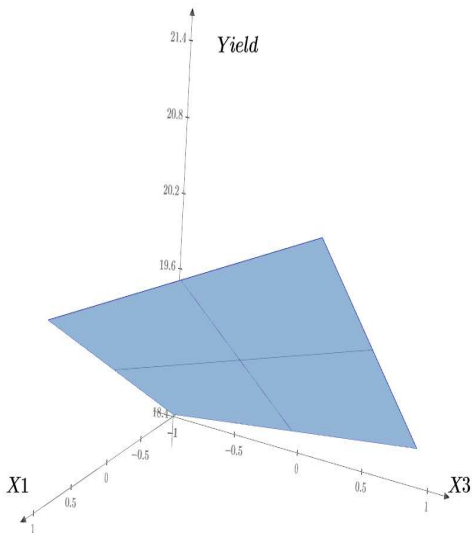


Fig. 7. (citric acid case)

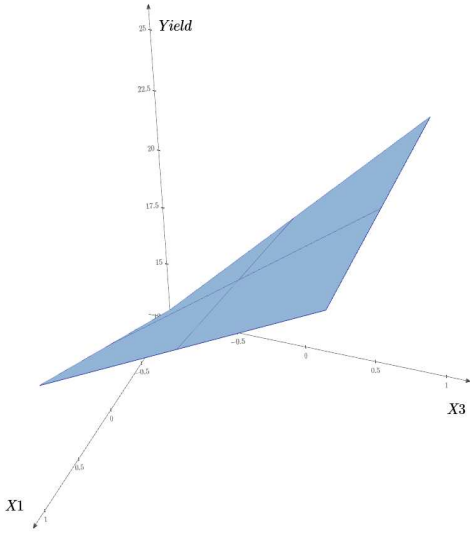


Fig. 8. (sulfuric acid case)

Interaction effects of extraction time and temperature.

4 CONCLUSION

Experimental factorial design was used as tool to estimate the interaction effect of independent variables in the extraction of pectin from steam distillated orange peels. The combined effect of the three factors was significant in both case of pectin extraction (citric and sulfuric acids).

Extraction temperature and acid concentration showed more significant combined effect on the response value obtained using citric acid to the pectin extraction, than the quadratic term of the other combined effects. Besides, the linear terms of acid concentration and temperature and their interaction also obviously influenced the extraction rate of pectin from steam distillated orange peels. The optimum condition of these operating variables was also graphically obtained to reach a high extraction rate of pectin. While in the sulfuric acid case, the linear terms of extraction time and concentration were more significant than all the combined effects. The interaction of temperature extraction and time has a significant effect on the pectin yield, followed by the interaction of temperature extraction and acid concentration.

These results demonstrated the successful extraction of pectin from steam distillated orange peels, providing potential benefits to industrial extraction of pectin, from both an economic and environmental points of view.

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Reserve Estimation of Rashidpur Gas Field Using Typecurve Analysis

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ABSTRACT: Reserve estimation is the fundamental study in the field of petroleum engineering for economic analysis of a reservoir. If a considerable reserve of gas or oil is in place and the pressure is also high enough, then a reservoir can be considered economically viable to go on production. In the early life of the reservoir mainly during or just after exploration; volumetric calculation is the key to estimate reserve. However, it is sometimes invaluable to estimate reserve during production life of the reservoir. Considering this aspect, we have tried to exercise a graphical and reliable approach to estimate reserve. Production data, well data, fluid properties, formation properties were used for this task. It has been found that, total Gas Initially In Place (GIIP) is about 1.63 Tcf among which about 1.3 Tcf is recoverable with a recovery percentage of 80. In addition, total remaining reserve is calculated to be about 773 Bcf. All seven wells of Rashidpur Gas Field are estimated individually and summed up. The full study is a software approach and several typecurves have been exercised using a software "FEKETE F.A.S.T. RTA^{TM}. Since all the typecurves have showed approximately same result, we can be certain about the accuracy our estimation.

KEYWORDS: Reservoir, Exploration, Production, Volumetric calculation, Remaining reserve.

1 INTRODUCTION

There have been many conventional methods available for calculating oil or gas reserve. Reservoir engineers generally use material balance equations, volumetric calculations, reservoir simulation and typecurve analysis as the main tools to estimate reserve. Among these techniques, typecurve analysis, a rigorous method to interpret production and pressure data, has been found quite accurate in absence of some known reservoir parameters. So type curve is used to fulfill the objectives of this research.

The objectives related to the estimation of individual well's reserve are:

- Calculating Gas Initially In Place (GIIP/OGIP) within the areal extent of each well
- Finding Ultimate Expected Recovery (EUR) of each well
- Calculating remaining reserve (RR) that can be recovered from each well.

Following assumptions have been made for this work:

- Homogeneous isotropic reservoir
- Uniform formation thickness for each sand
- Constant porosity and compressibility
- No change of fluid properties with pressure and time.

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2 STUDY AREA

Rashidpur Gas Field, a matured, on production gas field located at Bahubal Upazila, Sylhet, Bangladesh, was found suitable with more available data and has been selected for this research. It is one of the four largest gas fields of Bangladesh discovered in 1960 by Pak Shell Oil Company Limited [4].

2.1 BACKGROUND

In one estimation, "National Committee for Gas Demand and Reserve" mentioned that, the Gas Initially In Place in Rashidpur Gas Field was 2000 Bcf among which 1460 Bcf was recoverable with a recovery percentage of 73 [3].

Before this estimation, Intercomp-Kanata Management Ltd (IKM) and Hydrocarbon Unit Bangladesh (HCU)/Norwegian Petroleum Directorate (NPD) made an estimation, which is shown in **Table-1**.

Table 1. Reserve estimation made by IKM & HCU/NPD [3]

Rashidpur Gas Field	GIIP (Bcf)	Recovery (%)	Recoverable Reserve, 2P (Bcf)
IKM(1992)	2242	58	1309
HCU/NPD (2001)	2002	70	1401

3 MATERIALS AND METHODS

3.1 DATA COLLECTION AND TREATMENT

All the data for this study were collected from "Sylhet Gas Field Limited" (SGFL) through Petrobangla. Collected data includes production data, well data, reservoir data, PVT data and some annual reports of SGFL.

FEKETE "RTA" software has been used for this analysis. Production data entered into FEKETE "RTA" seemed to be very scattered. It was required to be filtered. The objectives of data filtering were to minimize error and to obtain a good match to typecurves. So, to remove data noise and to reduce scattered data, data were filtered using type curve data filter.

After filtering it has been seen that some of the points have disappeared and the trend of the early time data is less scattered. Finally all the necessary data were entered into FEKETE "RTA" to perform the analysis.

3.2 ANALYSIS METHODS

Blasingame, Agarwal-Gardner and Normalized Pressure Integral (NPI) typecurve Analysis have been used for this work. Fetkovich analysis could not be used as we can't match the data since Fetkovich analysis assumes that production occurs under constant bottom hole flowing pressure condition.

3.3 METHODOLOGY

In Blasingame analysis, normalized rate, rate integral, and rate integral derivative are plotted vs. material balance time. In Agarwal-Gardner analysis, normalized rate and inverse semi-log derivative data are plotted against material-balance time and Normalized pressure, pressure integral, and pressure integral derivative are plotted vs. material-balance time in case of Normalized Pressure Integral analysis. All the data are plotted on a log-log scale of the same size as the type curves. This plot is called the "data plot". The data plot was moved over the type curve plot, while the axes of the two plots were kept parallel, until a good match was obtained [1][2][6]. Several different type curves have been tried to obtain the best fit of all the data. The type curve, that best fits the data, is selected. Gas Initially In Place (GIIP/OGIP) is directly calculated from the type-curve match.

4 RESULTS & DISCUSSIONS

4.1 RESULTS

In this section the results of this individual type curve analysis is presented and discussed. Results, found by each analysis are close enough, however to get a better result, we have averaged the results of these methods. Total cumulative production G_p is 532.538 Bcf [4]. Remaining recoverable reserve is calculated to be 861.57 Bcf using the following equation -

$$RR_{total} = EUR_{total} - G_p$$

The results of each analysis methods are given in **Table-2**. Figures are shown in **Appendix-A**

Table 2. Results of different type curve analysis methods

Analysis methods→		Blasingame	Agarwal-Gardner	Normalized Pressure Integral(NPI)	Average value
Name of well ↓	Results (Bcf)				
Rashidpur 01	GIIP	665.451	667.017	669.779	667.42
	EUR	532.360	533.613	535.823	533.93
Rashidpur 02	GIIP	184.280	182.051	180.553	182.29
	EUR	147.424	145.641	144.442	145.84
Rashidpur 03	GIIP	231.144	227.152	230.789	229.7
	EUR	184.915	181.721	184.631	183.76
Rashidpur 04	GIIP	291.875	289.305	292.803	291.33
	EUR	233.500	231.444	234.242	233.062
Rashidpur 05	GIIP	73.036	72.840	73.474	73.12
	EUR	58.429	58.272	58.779	58.49
Rashidpur 06	GIIP	21.904	21.488	21.949	21.78
	EUR	17.523	17.190	17.559	17.424
Rashidpur 07	GIIP	165.400	166.847	166.147	166.13
	EUR	132.320	133.478	132.918	132.91

- Total Gas Initially In Place (GIIP, Average value) : 1631.77 (Bcf)
- Total Ultimate Expected Recovery (EUR, Average value) : 1305.41(Bcf)
- Total Remaining Reserve (RR, Average value) : 772.87 (Bcf)

4.2 DISCUSSIONS

The estimated GIIP of this work is compared with the previous estimation made by HCU/NPD as shown in **Table -3**

Table-3: comparison between the estimation made by HCU/NPD and this analysis.

Reserve estimation made by-	GIIP (Bcf)	Recovery %	EUR (Bcf)
HCU/NPD (2001)	2002	70	1401
This work	1631.77	80	1305.41

Table-3 shows a difference of about 370.23 Bcf in GIIP between these two analyses. Since reserve can be categorized as developed reserve, which is expected to be recovered from the existing wells and undeveloped reserve, which is expected to be recovered from new wells on undrilled acreage; this difference can be considered undeveloped reserve [5]. However, the comparatively higher recoverable reserve of our research is the result of higher recovery percentage.

Total developed reserve from the seven wells is found to be 1.631 Tcf. Comparing to the initially estimated 2.002 Tcf by HCU/NPD; more wells should be drilled to extract the undeveloped reserve.

5 FIGURES

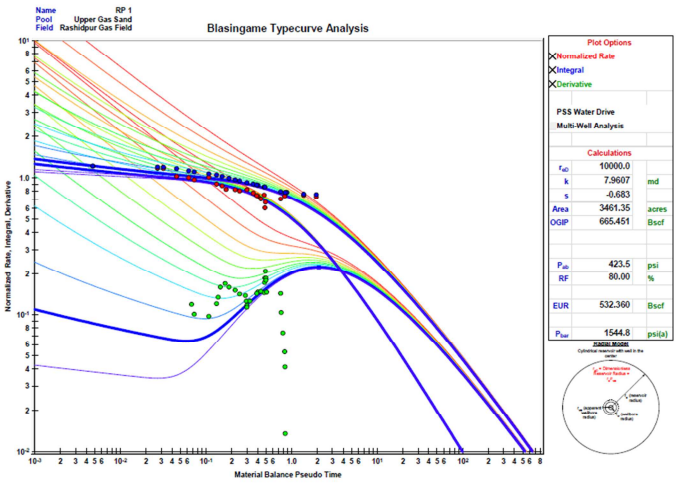

Figure-1: Reserve estimation of Rashidpur-1 well using Blasingame type curve

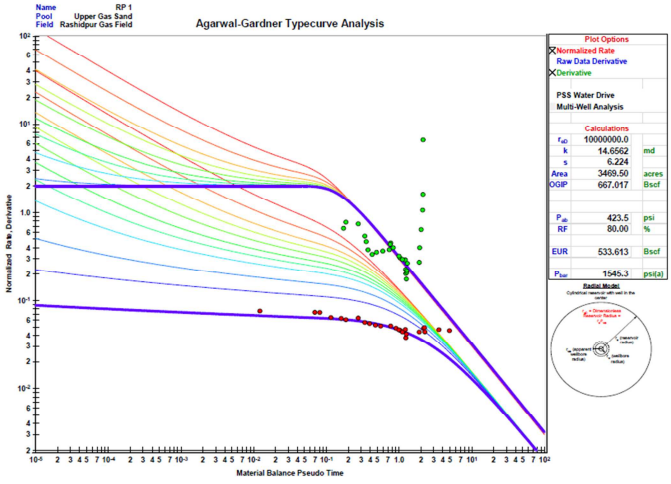

Figure-2: Reserve estimation of Rashidpur-1 well using Agarwal-Gardner type curve

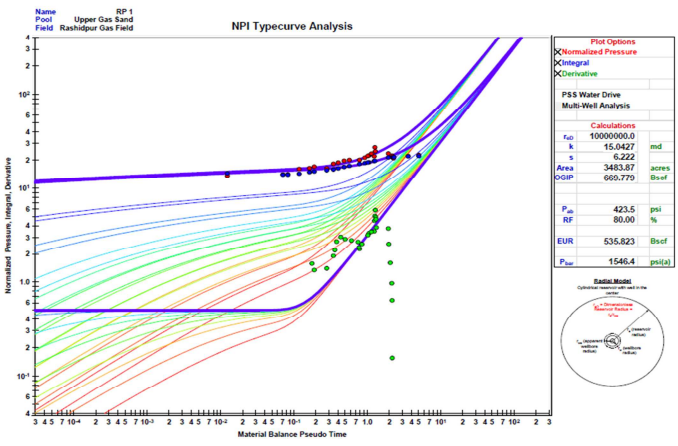

Figure-3: Reserve estimation of Rashidpur-1 well using NPI type curve

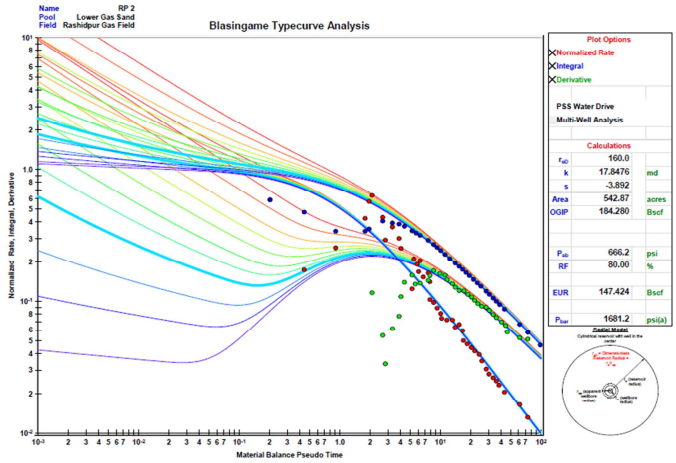

Figure-4: Reserve estimation of Rashidpur-2 well using Blasingame type curve

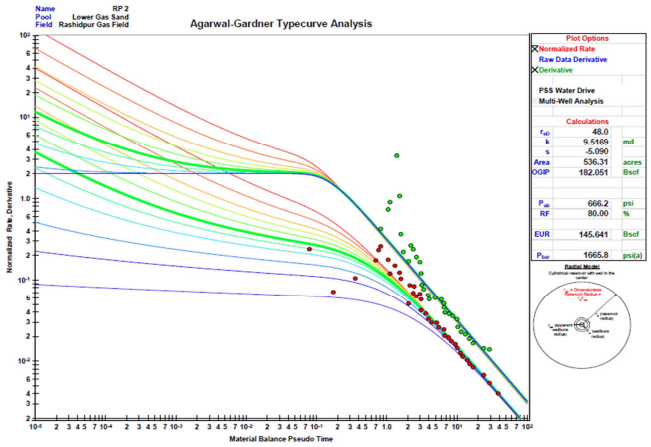

Figure-5: Reserve estimation of Rashidpur-2 well using Agarwal-Gardner type curve

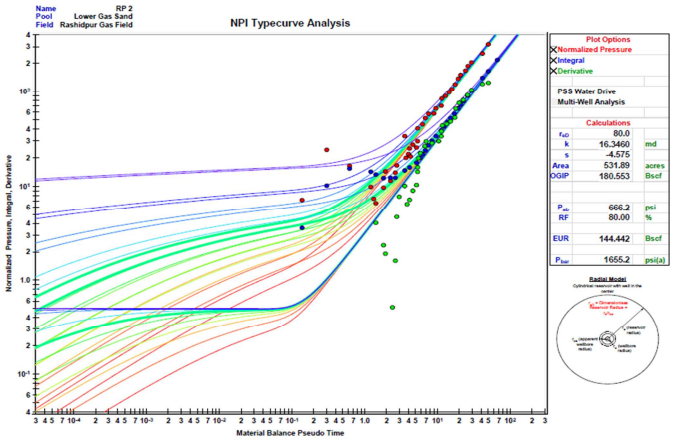

Figure-6: Reserve estimation of Rashidpur-2 well using NPI type curve

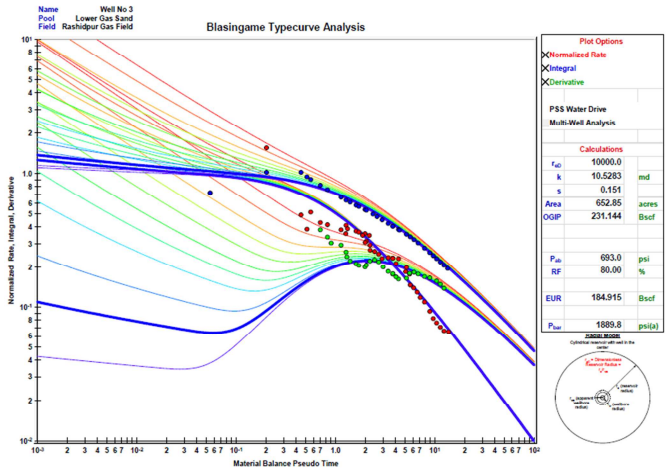

Figure-7: Reserve estimation of Rashidpur-3 well using Blasingame type curve

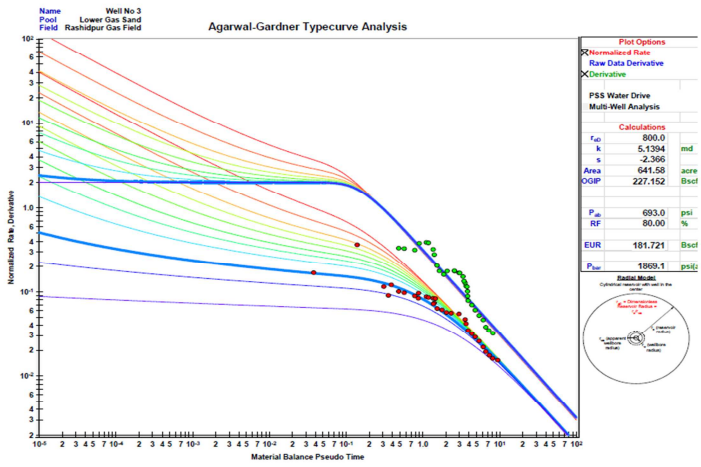

Figure-8: Reserve estimation of Rashidpur-3 well using Agarwal-Gardner type curve

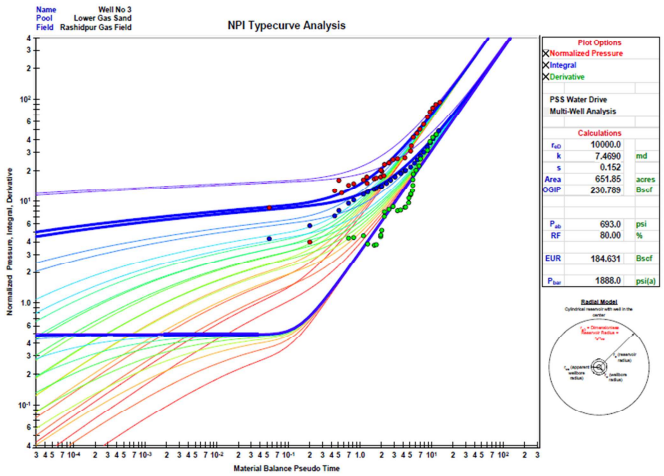

Figure-9: Reserve estimation of Rashidpur-3 well using NPI type curve

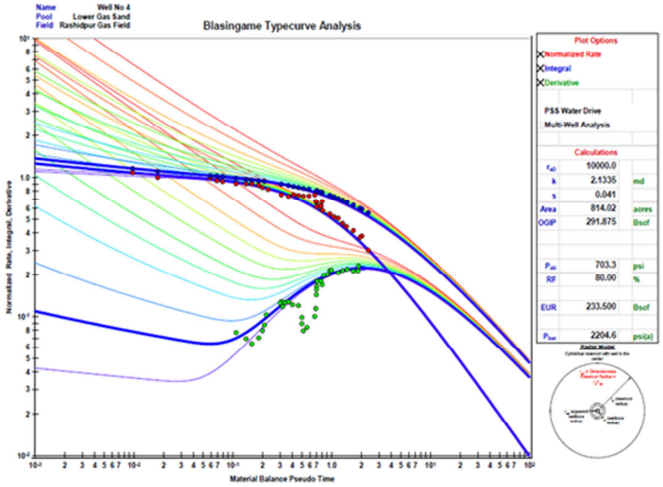

Figure-10: Reserve estimation of Rashidpur-4 well using Blasingame type curve

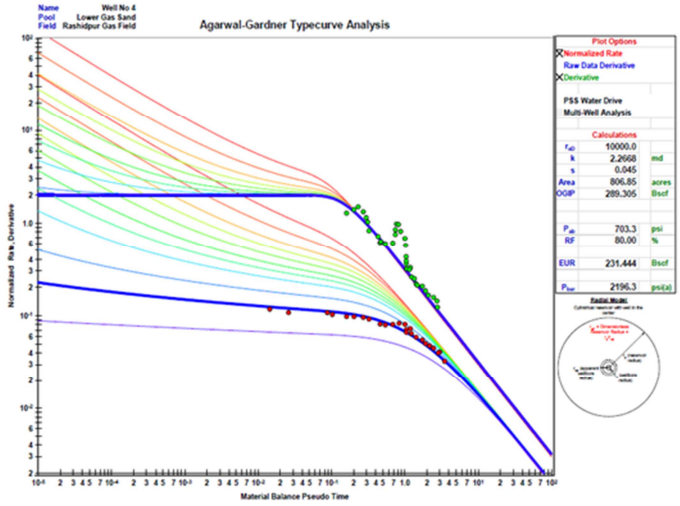

Figure-11: Reserve estimation of Rashidpur-4 well using Agarwal-Gardner type curve

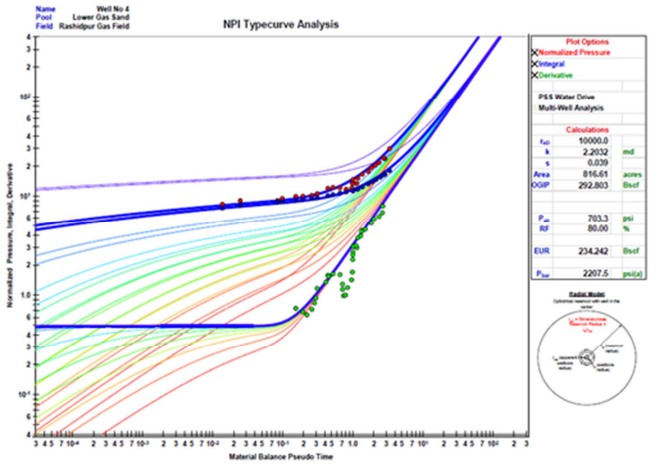

Figure-12: Reserve estimation of Rashidpur-4 well using NPI type curve

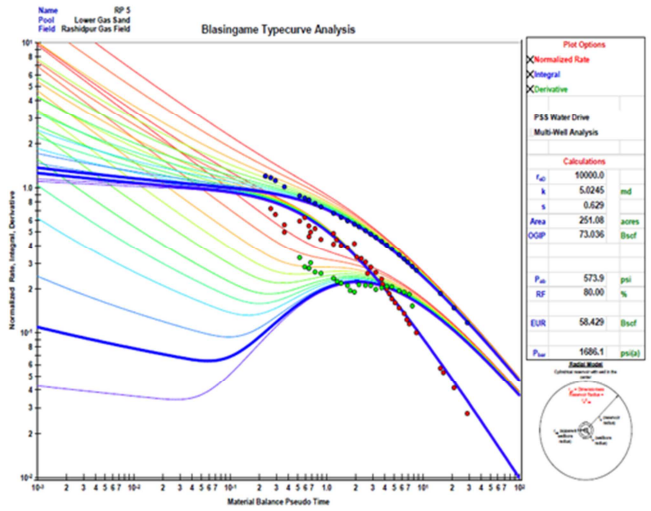

Figure-13: Reserve estimation of Rashidpur-5 well using Blasingame type curve

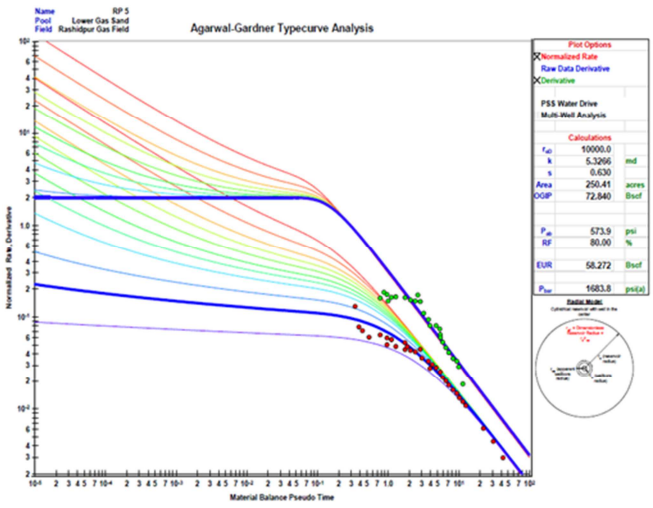

Figure-14: Reserve estimation of Rashidpur-5 well using Agarwal-Gardner type curve

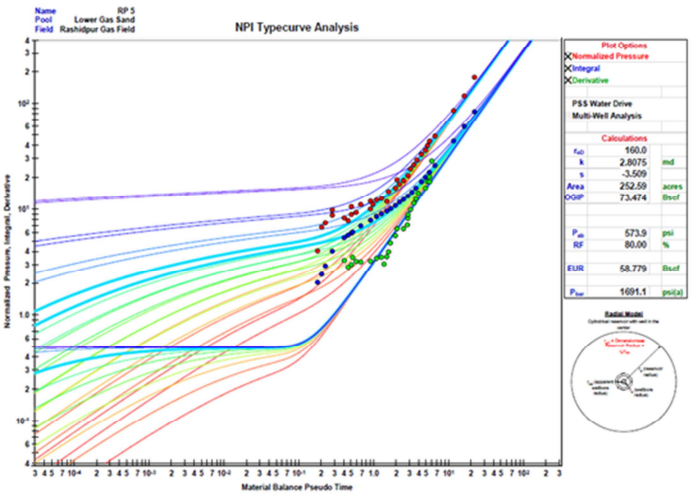

Figure-15: Reserve estimation of Rashidpur-5 well using NPI type curve

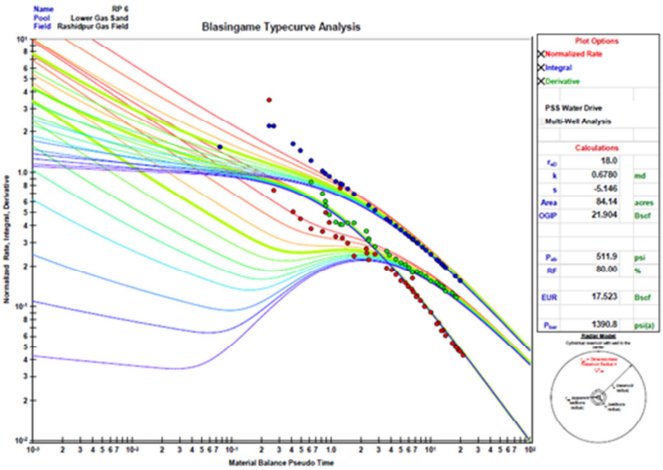

Figure-16: Reserve estimation of Rashidpur-6 well using Blasingame type curve

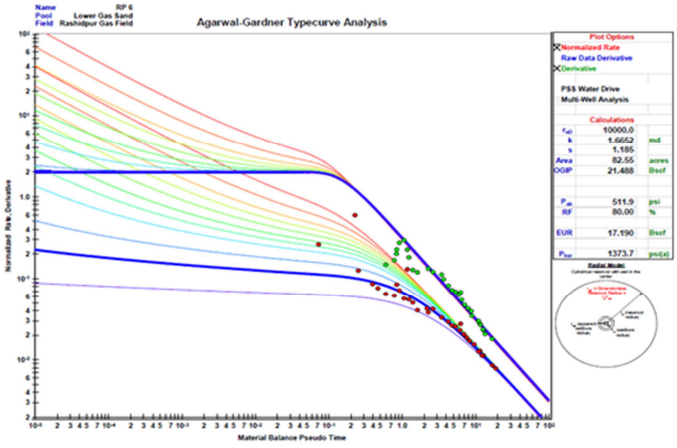

Figure-17: Reserve estimation of Rashidpur-6 well using Agarwal-Gardner type curve

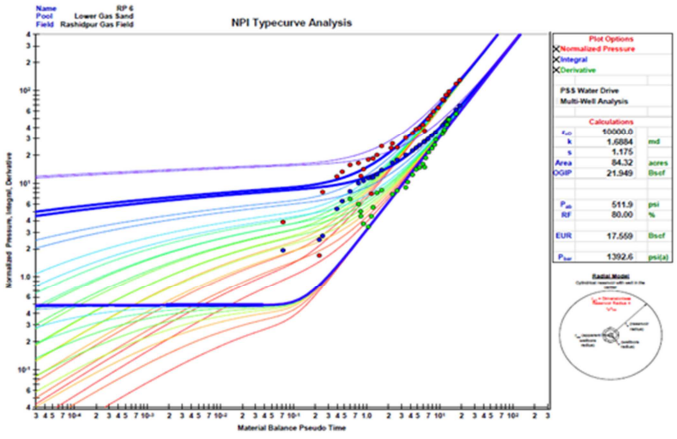

Figure-18: Reserve estimation of Rashidpur-6 well using NPI type curve

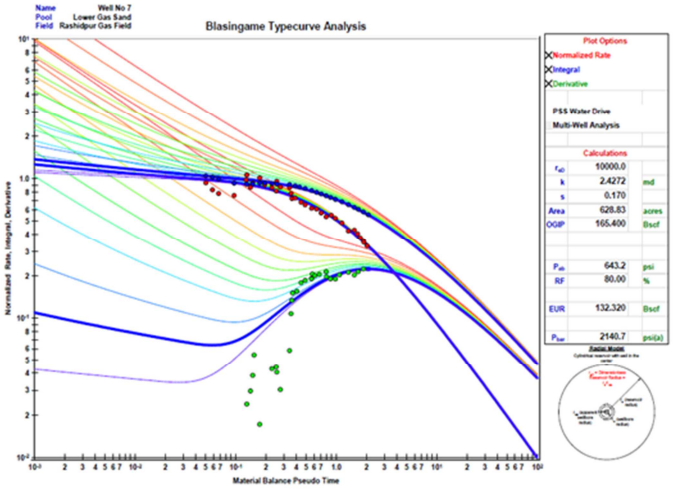

Figure-19: Reserve estimation of Rashidpur-7 well using Blasingame type curve

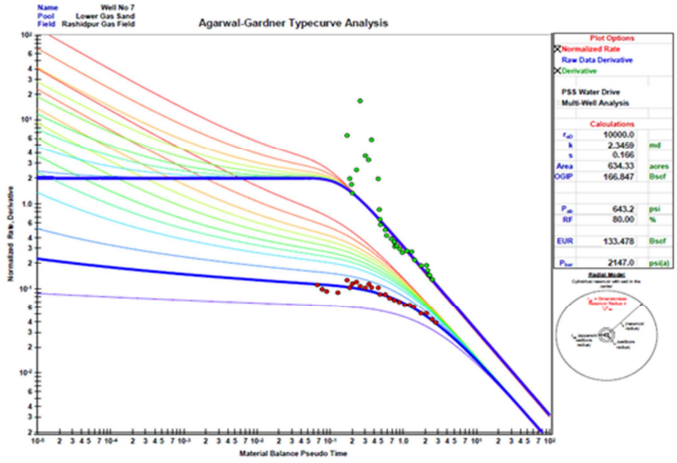

Figure-20: Reserve estimation of Rashidpur-7 well using Agarwal-Gardner type curve

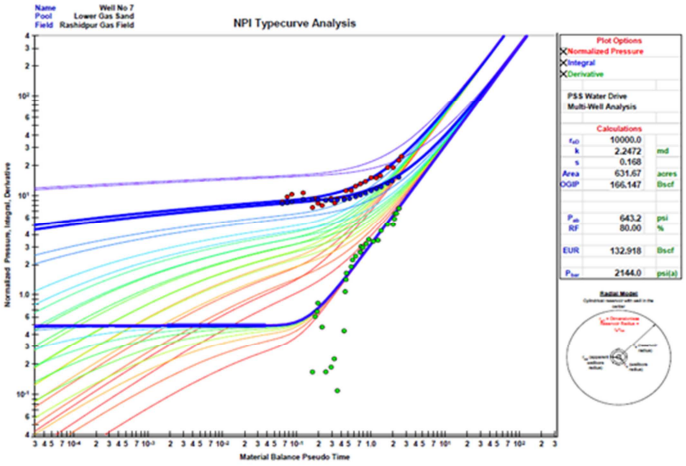

Figure-21: Reserve estimation of Rashidpur-7 well using NPI type curve

6 CONCLUSION

Reserve may change with time due to the migration and accumulation of gas. So reserve estimation is a dynamic activity conducted when more accurate data are available with the development of the field. The approximately same result of all the typecurves is an indication of reliable estimation.

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Cancer et différence sexuelle: Étude rétrospective au Maroc

[Cancer and gender difference: retrospective study in Morocco]

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ABSTRACT: This work aims to investigate the influence of patients' gender on the repartition of cancer types and on death according to cancer types. It consists in a retrospective study based on 3915 cases of males and females common cancers, diagnosed and treated in Al Azhar oncology centre of Rabat between 1994 and 2004. Results showed that males display a significantly higher risk for cancer of larynx, lung and bladder, with relative risks of 5.5, 4.5 and 2.3 respectively, whereas females have a significantly higher risk for thyroid cancer, with a relative risk of 6.3, and cancers of gall bladder, liver, bone, colon-rectum, Hodgkin lymphoma, soft tissue and non Hodgkin lymphoma. As far as death is concerned, gall bladder cancer displays a death risk 4 times higher in men. Also, non Hodgkin lymphoma and larynx cancer in men are significantly associated with death, then they constitute risk factors of death in men. On the other hand, cutaneous cancers and bone cancers show higher death risk in women, with relative risks of 2.5 and 2.4 respectively. Nevertheless, we found no significant association between cancer type and death in females. In conclusion, anti-cancer strategies in Morocco and elsewhere should take into consideration the gender difference in cancer risk and death risk for common cancers, and fit their priorities to the gender of target population.

KEYWORDS: cancer, gender, risk, types, death.

RESUME: Le présent travail vise à investiguer l'influence du sexe des patients sur la répartition des types de cancers d'une part, et sur l'évolution vers le décès d'autre part. Il s'agit d'une étude rétrospective basée sur un échantillon 3915 cas de cancers communs aux deux sexes, diagnostiqués et traités dans le centre d'oncologie Al Azhar de Rabat pendant la période allant de janvier 1994 jusqu'à décembre 2004. Les résultats montrent que les hommes présentent significativement plus de risque pour les cancers du larynx, du poumon et de la vessie avec des risques relatifs respectifs de 5.5, 4.5 et 2.3, tandis que les femmes présentent significativement plus de risque pour les cancers de la thyroïde, avec un risque relatif de 6.3, le cancer de la vésicule biliaire, du foie, du squelette, du colon-rectum, du lymphome de Hodgkin, des tissus mous et des lymphomes non hodgkiniens. En ce qui concerne l'évolution vers décès, le cancer de la vésicule biliaire présente un risque de décès 4 fois plus important chez les hommes. De même, les lymphomes non hodgkiniens et le cancer du larynx évoluent vers le décès de manière significative. Par conséquent, ces types de cancer constitueraient des facteurs de risque pour le décès chez le sexe masculin. D'autre part, les cancers cutanés et ceux du squelette présentent significativement plus de risque de décès chez le sexe féminin par rapport au sexe masculin, avec des risques relatifs de 2.5 et 2.4 respectivement. Toutefois, aucun type de cancer n'a montré une association significative avec le décès pour le sexe féminin. En conclusion, les stratégies anti-cancer dans notre pays et ailleurs devraient prendre en considération la différence sexuelle en terme de risque et d'évolution de la maladie dans le cas des cancers communs, par l'adaptation de leur priorités selon le sexe de la population cible.

MOTS-CLEFS: cancer, sexe, risque, types, décès.

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1 INTRODUCTION

En 2008, l'OMS a estimé à 12,7 millions le nombre de nouveaux cas de cancer dans le monde entraînant ainsi 7,6 millions de décès, ce qui fait du cancer un véritable problème de santé publique [1].

En terme d'incidence, les cancers les plus fréquents dans le monde sont respectivement les cancers du poumon (12.5%), du sein (10.6%) et du colon rectum (9.4%). En ce qui concerne la mortalité, le cancer pulmonaire est de loin le plus fréquent avec 17.53% des décès par cancer dans le monde suivi de celui de l'estomac avec 10.4% et celui du foie avec 8.9% [2].

Le point le plus marquant de la répartition des cancers selon le sexe est la prédominance masculine du cancer pulmonaire. Aussi, les cancers de l'estomac, de l'œsophage et de la vessie sont beaucoup plus fréquents chez les hommes. Cette répartition différente chez les deux sexes est essentiellement attribuable à une différence d'exposition aux agents causaux plutôt qu'à une différence de prédisposition. Pour d'autres types de cancer, tels que ceux du colon-rectum et du pancréas, cette différence de répartition est très petite [3].

Dans ce sens, le présent travail vise à investiguer l'influence du sexe des patients sur la répartition des types de cancers d'une part, et sur l'évolution vers le décès d'autre part.

2 MATÉRIEL ET MÉTHODES

Il s'agit d'une étude rétrospective basée sur un échantillon 7023 cas de cancers diagnostiqués et traités dans le centre d'oncologie Al Azhar de Rabat pendant la période allant de janvier 1994 jusqu'à décembre 2004. Ce centre a été jugé représentatif du secteur libéral de la région nord du Maroc pendant la période de l'étude vu qu'il était parmi les cinq seuls centres d'oncologie qui existaient au Maroc.

Dans le présent travail, nous nous sommes limités à l'étude des cas de cancers communs aux deux sexes dont le nombre est 3915, soit 55.7%, les cancers des organes sexuels ayant été écartés dans le but de pouvoir étudier les risques liés au sexe.

La méthodologie statistique a été basée sur deux axes :

- Statistique descriptive : dégagement des fréquences et des caractéristiques de chaque paramètre étudié. Les résultats sont exprimés en valeurs brutes pour les variables qualitatives et en moyennes ± l'écart type pour les variables quantitatives. Le nombre de données valides (n actif) est mentionné dans les figures.
- Statistique analytique : nous avons utilisé le test Chi-deux pour comparer la distribution observée du sexe à la distribution théorique. Les résultats sont considérés significatifs lorsque p est inférieur à 0.05, très significatifs lorsque $p<0.01$ et hautement significatifs lorsque $p<0.001$. D'autre part, le calcul du risque relatif du sexe (RR) pour chaque localisation vis-à-vis des autres nous a permis de déceler le degré d'association entre le sexe et la localisation du cancer. Si la valeur 1 est incluse dans l'intervalle de confiance à 95% (IC95%) du RR on en déduit qu'il n'existe pas d'association entre ces deux paramètres. Par contre, si la valeur 1 est exclue de l'IC du RR on en conclut l'existence d'une association entre le sexe et la localisation de la tumeur.

3 RÉSULTATS

3.1 INFLUENCE DU SEXE DES PATIENTS SUR LA RÉPARTITION DES TYPES DE CANCER

Nous avons procédé à un test Chi-deux de contingence afin d'étudier l'influence du sexe sur la répartition des types de cancers. Le calcul a donné une valeur de χ^2 de 368.56, hautement significative ($p<0.001$) ce qui montre que les types de cancer dépendent étroitement du sexe.

Par ailleurs, nous avons calculé le risque relatif (RR) pour le sexe pour chaque type de cancer afin de déceler l'association entre chaque type de cancer et le sexe des patients. En effet, nous avons calculé les RR à deux reprises. Dans la première, nous avons considéré le sexe masculin comme étant exposé (Tableau 1) et dans la deuxième, c'est le sexe féminin qui était exposé (Tableau 2). Dans les deux cas, ne sont représentés que les types de cancer pour lesquels le sexe exposé présente plus de risque de cancer (RR>1).

Ainsi, le tableau 1 montre les types de cancers communs pour lesquels les hommes présentent plus de risque que les femmes. Les risques relatifs les plus élevés sont observés pour les cancers du larynx, du poumon et de la vessie dont le risque est respectivement de 5.5, 4.5 et 2.3 fois plus important chez le sexe masculin. Ces types de cancer sont liés à ce dernier de manière significative ($IC_{95\%}$: 2.67-11.45 ; 3.48-5.89 et 1.64-3.23 respectivement).

Tableau 1 : Répartition des risques relatifs (RR) pour le sexe (sexe masculin exposé) selon les types de cancers communs, représentés par ordre décroissant.

Types de cancer	N	RR/Masculin	Intervalle de confiance (95%)	
			Inférieur	Supérieur
Cancer du larynx	95	5,53*	2,67	11,45
Cancer du poumon	593	4,53*	3,48	5,89
Cancer de la vessie	235	2,31*	1,64	3,23
Cancer d'origine inconnue	81	1,63	0,97	2,74
Autres cancers O.R.L	67	1,25	0,73	2,14
Cancer du cavum	344	1,23	0,96	1,57
Cancer du rein	59	1,23	0,70	2,16
Cancer cutané	98	1,18	0,76	1,83
Cancer du pancréas	76	1,07	0,66	1,75
Cancer de l'estomac	161	1,04	0,74	1,46

** Risque relatif significatif (p < 0.05)*

D'autre part, les données du tableau 2 révèlent les types de cancers pour lesquels les femmes présentent plus de risque. On constate que le cancer de la thyroïde, avec un risque 6.3 fois plus important chez le sexe féminin, est significativement lié à celui-ci ($IC_{95\%}$: 4.02-9.88). De même, le cancer de la vésicule biliaire, du foie, du squelette, du colon-rectum, du lymphome de Hodgkin, des tissus mous et des lymphomes non hodgkiniens sont significativement plus liés aux femmes.

Tableau 2 : Répartition des risques relatifs (RR) pour le sexe (sexe féminin exposé) selon les types de cancers communs, représentés par ordre décroissant.

Types de cancer	N	RR/Féminin	Intervalle de confiance (95%)	
			Inférieur	Supérieur
Cancer de la thyroïde	103	6,30*	4,02	9,88
Cancer de la vésicule biliaire	53	3,13*	1,80	5,45
Cancer du foie	46	2,04*	1,14	3,65
Cancer du squelette	94	1,81*	1,20	2,72
Cancer colorectal	434	1,80*	1,47	2,20
Lymphome hodgkinien	129	1,74*	1,22	2,47
Cancer des tissus mous	61	1,73*	1,04	2,88
Lymphome Malin Non-Hodgkinien	432	1,48*	1,21	1,82
Leucémie	93	1,47	0,97	2,24
Cancer de la cavité buccale	97	1,31	0,87	1,98
Cancer œsophagien	55	1,25	0,72	2,17
Myélomes	56	1,22	0,70	2,10
Cancer du système nerveux	294	1,08	0,84	1,39

** Risque relatif significatif (p < 0.05)*

3.2 INFLUENCE DU SEXE DES PATIENTS SUR LA RÉPARTITION DES DÉCÈS

Dans le but d'évaluer l'association entre le sexe et l'évolution vers le décès nous avons opté pour le calcul des risques relatifs de décès pour le sexe. Comme nous l'avons signalé dans une partie précédente, nous avons calculé les RR à deux reprises : dans la première, nous avons considéré le sexe masculin comme étant exposé au décès (Tableau 3) et dans la deuxième, c'est le sexe féminin qui était exposé (Tableau 4) et dans les deux cas, nous n'avons représenté que les types de cancer ayant plus de risque de décès chez le sexe exposé (RR>1).

Ainsi, le tableau 3 rapporte les types de cancers pour lesquels le sexe masculin présente plus de risque de décès. On constate que le cancer de la vésicule biliaire, ayant un risque de décès 4 fois plus important chez les hommes, évolue significativement vers le décès ($IC_{95\%}$: 1.36-17.69). De même, les lymphomes non hodgkiniens et le cancer du larynx évoluent vers le décès de manière significative ($IC_{95\%}$: 1.29-3.88 et 1.03-1.19 respectivement). Par conséquent, ces types de cancer constitueraient des facteurs de risque pour le décès chez le sexe masculin.

Tableau 3 : Répartition des risques relatifs (RR) de décès pour le sexe selon les types de cancer, représentés par ordre décroissant.

Types de cancer	RR/masculin	Intervalle de confiance (95%)		N
		Inférieur	Supérieur	
Cancer de la vésicule biliaire	4,91*	1,36	17,69	53
Myélomes	3,80	0,74	19,42	56
Cancer des tissus mous	3,72	0,39	35,44	61
Cancer de la cavité buccale	2,25	0,74	6,82	97
Lymphome Malin Non-Hodgkinien	2,23*	1,29	3,88	432
Lymphome hodgkinien	2,19	0,41	11,74	129
Cancer du système nerveux	1,84	0,86	3,91	294
Cancer colorectal	1,49	0,90	2,49	434
Cancer du foie	1,47	0,43	4,98	46
Cancer du poumon	1,32	0,77	2,26	593
Cancer du cavum	1,31	0,65	2,63	344
Cancer du larynx	1,11*	1,03	1,19	95
Leucémie	1,06	0,40	2,79	93

** Risque relatif significatif ($p < 0.05$)*

D'autre part, le tableau 4 représente les types de cancer dont le risque de décès est supérieur chez le sexe féminin. Les cancers cutanés présentent le risque de décès le plus élevé avec 2.5, suivi du cancer du squelette avec un RR 2.4 fois plus important par rapport au sexe masculin. Toutefois, aucun type de cancer n'a montré une association significative avec le décès.

Tableau 4 : Répartition des risques relatifs (RR) de décès pour le sexe selon les types de cancer, représentés par ordre décroissant.

Types de cancer	RR/Féminin	Intervalle de confiance (95%)		N
		Inférieur	Supérieur	
Cancer cutané	2,54	0,48	13,40	98
Cancer du squelette	2,44	0,82	7,29	94
Cancer de la vessie	1,86	0,84	4,08	235
Autres cancers O.R.L	1,75	0,53	5,78	67
Cancer d'origine inconnue	1,74	0,55	5,46	81
Cancer du rein	1,54	0,46	5,15	59
Cancer oesophagien	1,48	0,47	4,66	55
Cancer de la thyroïde	1,39	0,28	7,01	103
Cancer de l'estomac	1,12	0,52	2,42	161
Cancer du pancréas	1,05	0,39	2,82	93

4 DISCUSSION

Bien que les cas féminins de cancer, tous types de cancer confondus, soient les plus fréquents, c'est le sexe masculin qui est le plus fréquent en terme de cancers communs. Ces résultats impliquent que les cancers sexuels, en particulier celui du sein et celui du col utérin, sont responsables de la fréquence élevée chez les femmes, des cancers tous types confondus [2], [4].

En ce qui concerne le sexe, nous avons trouvé que les hommes présentent un risque significativement supérieur à celui des femmes pour les cancers du larynx, du poumon et de la vessie. Ce risque masculin élevé serait essentiellement du au tabagisme qui constitue la cause majeure pour ces trois types de cancer et, à un degré moindre, à l'exposition professionnelle et environnementale aux substances cancérigènes, plus importante chez les hommes [5], [6], [7], [8], [9], [10]. En revanche, le sexe féminin présente le risque le plus élevé par rapport au sexe masculin pour les cancers de la thyroïde, de la vésicule biliaire et du foie. Le même résultat a été retrouvé au niveau de la littérature pour les cancers vésiculaire et thyroïdien et s'explique par les hormones sexuelles féminines dont l'implication dans le développement de telles tumeurs a été largement étudiée [11], [12], [13]. Par contre, la majorité des études épidémiologiques rapportent que le risque du cancer hépatique est largement supérieur chez les hommes [14], à la différence de ce que nous avons trouvé. Ceci pourrait simplement être du à l'effectif réduit pour ce type de cancer au niveau de l'échantillon étudié.

Un autre résultat important est que le sexe masculin présente significativement plus de risque de décès que le sexe féminin pour le cancer de la vésicule biliaire, les lymphomes non hodgkiniens et le cancer du larynx. Aucune explication n'a été attribuée à cette différence sexuelle d'évolution vers le décès au niveau de la littérature, mais deux hypothèses pourraient être émises. La première consiste en l'implication du tabagisme dans l'aggravation du pronostic vital des sujets atteints de ces trois types de cancers, les hommes étant plus exposés à ce phénomène par rapport femmes. La deuxième suggère plutôt que les hormones sexuelles féminines auraient un rôle protecteur contre cette aggravation, probablement par le ralentissement de la dissémination métastatique.

5 CONCLUSION

Au terme de ce travail, il faut noter que les stratégies anti-cancer dans notre pays et ailleurs devraient prendre en considération la différence sexuelle en terme de risque et d'évolution de la maladie dans le cas des cancers communs aux deux sexes, et ce par l'adaptation de leur priorités au sexe de la population cible.

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Prévalence du *Staphylococcus aureus* isolé à partir de la viande de poulet commercialisée au niveau de Rabat, Maroc

[Prevalence of *Staphylococcus aureus* isolated from chicken meat marketed in Rabat, Morocco]

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ABSTRACT: The aim of this work was to evaluate the contamination of chicken meat marketed in Rabat, Morocco by *Staphylococcus aureus* (*S. aureus*). This pathogen was isolated from 300 samples of chicken meat collected during the period from June 2011 to December 2012. The overall prevalence of *S. aureus* recovered from the 300 samples analyzed was 16.66% and the average load of contamination was 2.67 $\log_{10}$ CFU/g. While this prevalence was higher in traditionals slaughterhouses (27%) compared with that found in supermarkets (8%). The results of this study revealed that the degree of compliance with good hygiene practices in traditionals slaughterhouses has a significant impact on the hygienic quality of chicken meat. To improve the safety and hygienic quality of this meat, the implementation of good hygiene and continuous microbial surveillance is an absolute necessity to protect consumer health.

KEYWORDS: Prevalence, *Staphylococcus aureus*, meat chicken, Morocco.

RESUME: L'objectif de ce travail était de contribuer à l'évaluation de la contamination de la viande de poulet commercialisée dans les grandes surfaces (GS), les tueries traditionnelles situées au niveau des différents quartiers (TTQ) de la ville de Rabat et les tueries traditionnelles situées au niveau du bidonville à Salé (TTB) par *Staphylococcus aureus* (*S.aureus*). Ce germe pathogène a été isolé à partir de 300 échantillons de viande de poulet prélevés durant la période allant de juin 2011 à décembre 2012. La prévalence totale de *S. aureus* retrouvée dans les 300 échantillons analysés était 16,66 % et la charge moyenne de contamination était 2,67 $\log_{10}$ UFC/g. Tandis que, La prévalence et la charge moyenne de contamination retrouvées dans les 100 échantillons prélevés au niveau des sites de catégorie 1 étaient 8% et 1,87 $\log_{10}$ UFC/g respectivement, celles trouvées au niveau des sites de catégorie 2 étaient 15% et 2,4 $\log_{10}$ UFC/g et celles trouvées au niveau des sites de catégorie 3 étaient 27% et 3,04 $\log_{10}$ UFC/g. Les résultats de la présente étude ont révélé que le niveau de respect des bonnes pratiques d'hygiène au niveau des TTQ et TTB a un impact significatif sur la qualité hygiénique de la viande de poulet commercialisée dans ces tueries. Afin d'améliorer la sécurité sanitaire et la qualité hygiénique de ces viandes, la mise en application de bonnes pratiques d'hygiène ainsi que la surveillance microbienne continue est une nécessité absolue pour protéger la santé des consommateurs.

MOTS-CLEFS: Prévalence, *Staphylococcus aureus,* viande de poulet, Maroc.

S. Senouci and MM. Ennaji share senior authorship in this study (equal contribution)

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1 INTRODUCTION

Les risques microbiologiques et les maladies d'origine alimentaire auxquelles ils donnent lieu constituent un problème croissant pour la santé publique [1]. En effet, les germes pathogènes *Salmonella enterica, E.coli O157:H7, Campylobacter jejuni, Staphylococcus aureus* et *Listeria monocytogenes* sont à l'origine d'un nombre important de toxi-infections alimentaires chaque année dans le monde. Leur transmission féco-orale se fait principalement par la consommation d'aliments contaminés, consommés frais ou n'ayant pas subi de traitement industriel ou domestique suffisant. Ils sont souvent à l'origine d'épidémies d'importance variable, selon le délai de déclaration et les mesures de contrôles adoptés [2]. Bien que des progrès importants aient été accomplis dans de nombreux pays grâce à une amélioration de la sécurité sanitaire des aliments, des millions de personnes développent chaque année des pathologies suite à la consommation d'aliments contaminés [3].

Il est important de noter que les bactéries pathogènes alimentaires peuvent être séparées en trois groupes distincts. Le premier groupe comprend les batteries invasives ou a multiplication intracellulaire, qui déclenchent la maladie par envahissement des cellules intestinales telles que *Listeria monocytogenes* et *Salmonella sp*. Le deuxième groupe rassemble les batteries non invasives, qui se multiplient dans l'intestin et provoquent la maladie, c'est un groupe auquel appartiennent *Vibrio cholerae* et *Clostridium perfringens*. Enfin, le dernier est constitué de batteries toxinogènes pour lesquelles l'ingestion de la toxine, seule présente dans les aliments, provoque une intoxication chez l'homme, c'est le cas du *Staphylococcus aureus* [4]. Les intoxications alimentaires sont en majorité causées par *S. aureus* coagulase positive. Il n'est pas habituel de trouver des souches coagulase négatives et thermonucléase négatives qui produisent des entérotoxines. Les souches positives pour la production de coagulase et de thermonucléase devraient être considérées comme productrices potentielles d'entérotoxine [5].

Le genre Staphylococci est un parasite saprophyte de l'homme et de l'animal. Son principal habitat est la muqueuse nasale, la bouche, la gorge et la peau d'individus sains. Cette bactérie peut être disséminée facilement dans l'environnement et peut ainsi contaminer les aliments [6]. Ainsi, tous les aliments peuvent être incriminés dans le développement d'une TIAC, toutefois certains d'entre eux doivent faire l'objet d'une grande attention, ce sont le lait cru ou fermenté, les œufs et les ovo produits, la viande de boucherie en l'état ou hachée, les abats et les volailles.

Au Maroc, nous sommes plusieurs milliers de personnes à souffrir chaque année d'intoxications alimentaires. En effet, selon le rapport de l'étude rétrospective élaboré en 2011 par la Direction de l'Epidémiologie et de Lutte contre les Maladies sur l'épidémiologie des toxi-infections alimentaires durant la période 2001-2010 au Maroc, 13339 cas de TIAC ont été signalés au cours de la période de janvier 2001 à décembre 2010 dont *S. aureus* qui viens au premier rang des bactéries responsables d'intoxication alimentaire au Maroc avec un taux de 31% des cas suivi par Salmonella avec un taux de 27% [7], [figure1].

L'objectif de ce travail est de contribuer à l'évaluation de la contamination de la viande de poulet commercialisée dans les GS, les TTQ et TTB par *S. aureus*, mais aussi le statut hygiénique de ces tueries dans la ville de Rabat-Salé du Maroc. Cette étude a consisté d'une part, en une enquête permettant d'apprécier le niveau de respect des bonnes pratiques d'hygiène dans les tueries et d'autre part, évaluer la qualité microbiologique de la viande de poulet pour montrer l'impact de la qualité hygiénique des locaux et du processus d'abattage sur la qualité hygiénique des viandes de poulets.

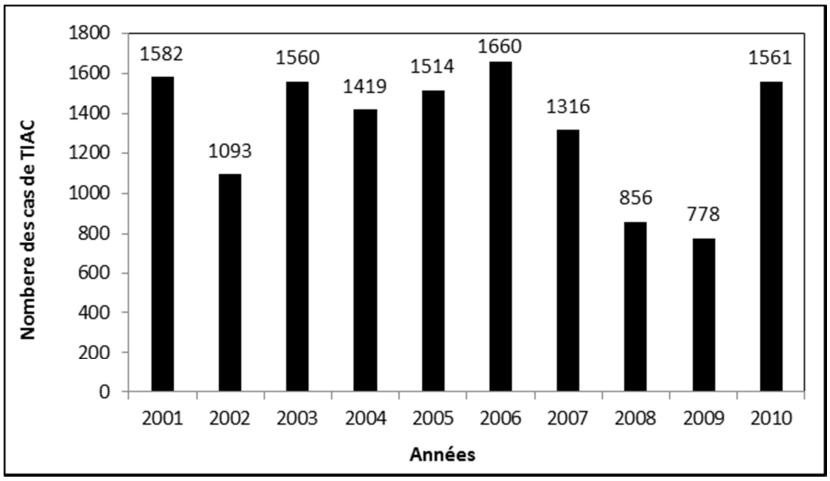

Fig. 1. Evolution des nombres de cas des TIAC survenus au Maroc durant la période 2001-2010 [7].

2 MATERIAL ET METHODES

2.1 ECHANTIONNAGE ET PRELEVEMENT

Notre étude a porté sur 30 sites de prélèvement différents choisis au hasard groupés en 3 catégories:

- La catégorie 1 était composée de 10 grandes surfaces (GS) situées à Rabat ;
- La catégorie 2 était composée de 10 tueries traditionnelles situées au niveau des différents quartiers de la ville de Rabat (TTQ) ;
- La catégorie 3 était composée de 10 tueries traditionnelles situées au niveau du bidonville à Salé (TTB).

Au total 300 échantillons ont été prélevés à raison de 10 échantillons par site au cours de 10 compagnes de prélèvements organisées durant la période allant de juin 2011 à décembre 2012. Les prélèvements ont était effectués de façon aseptique dans des sachets stériles préalablement numérotés et identifiés. Les échantillons étaient constitués d'approximativement 50 g de découpes de viande de poulet de chair crue (muscle et peau). Lesdits échantillons ont était transportés à 4°C dans les plus brefs délais, dans une caisse isotherme bien étanche contenant 3 à 4 accumulateurs de froid, accompagnés d'une fiche de prélèvement comportant les rubriques suivantes : le code du site de prélèvement, le numéro de l'échantillon, la date et l'heure de prélèvement, la date et l'heure de l'abatage du poulet sujet du prélèvement.

2.2 QUESTIONNAIRES

Un questionnaire a été rempli lors des prélèvements au niveau des sites de catégorie 2 et 3 (TTQ et TTB) pour répondre à un certain nombre de questions se rapportant aux conditions d'abattages, procédés de nettoyage et de désinfection, sur l'état d'hygiène des locaux, du personnel, du matériel et poste de travail et sur l'approvisionnement en eau potable pour les tueries des bidonvilles.

2.3 ANALYSE MICROBIOLOGIQUE

La détection et l'identification du *S. aureus* ont été effectuées, selon la norme marocaine en vigueur [8], immédiatement à l'arrivée des prélèvements au laboratoire de microbiologie alimentaire de l'Institut National d'Hygiène de Rabat, avec la limite respective fixée, à 1000 UFC/g (3 $\log_{10}$ UFC/g), par la réglementation Marocaine [9].

La solution mère étant réalisée en ajoutant 25 g de chair avec peau à 225 ml du milieu non sélectif liquide ; l'Eau Peptonée Tamponnée (Bio-Rad Marne-la-Coquette- France). On réalise ainsi une dilution au 1/10 du produit. Après homogénéisation de la suspension mère au Stomacher (Seward Laboratory Systems Inc. (USA)), des dilutions de 10 en 10 ont été effectuées à partir de la solution mère à 10^{-1} en prélevant à chaque fois 1 ml ajouté à 9 ml d'eau salée à 10/°° contenue dans un tube à essai. Les dilutions 10^{-2}, 10^{-3} et 10^{-4} ont été ainsi réalisées.

S. aureus est dénombré sur le milieu sélectif de Baird Parker additionné de jaune d'œufs et de tellurite de potassium (Oxoid Ltd., Hampshire RG24 8 PW England), solidifié dans une boîte de Pétri. Cette boîte de Pétri ainsi préparée est ensemencée avec 0,1 ml des différents dilutions ; cette dernière est étalée en surface à l'aide d'un râteau en verre stérile à la flamme. L'incubation est effectuée à 35 +/- 1°c pendant 24h à 48h. La lecture à l'issue de la durée d'incubation conduit au dénombrement des colonies suspectes : noires et luisantes entourées d'une auréole d'éclaircissement du milieu, suivie d'une confirmation des *S. aureus* à l'aide de deux tests : le test de la DNAse et le test au coagulase [10].

2.4 MÉTHODE STATISTIQUE

Le test utilisé est le test de Khi-deux $\chi 2$ d'indépendance, puisque tous les effectifs théoriques sont > 5. Cette méthode statistique consiste à mesurer l'écart qui existe entre la distribution des effectifs théoriques (ti) et la distribution des effectifs observés (ni) et à tester si cet écart est suffisamment faible pour être imputable aux fluctuations d'échantillonnage [11].

3 RÉSULTATS

Les résultats de dénombrement du *S. aureus* ont été exprimés en UFC/g (unités formants colonies par gramme) puis convertis en $\log_{10}$ UFC/g (unité logarithmique de micro-organismes par gramme).

3.1 CONTAMINATION DES VIANDES DE POULETS

Les résultats d'analyse des échantillons prélevés au niveau des 3 catégories de sites, sont représentés dans le tableau 1.

Tableau 1. Prévalences, charges moyennes de contamination et taux d'échantillons insatisfaisants

	Nb d'échantillons analysés	Prévalences	Charges moyennes de contamination en log_{10} UFC/g	Taux d'échantillons insatisfaisants
GS	100	8% (n=8)	1,87	3% (n=3)
TTQ	100	15% (n=15)	2,4	9% (n=9)
TTB	100	27% (n=27)	3,04	21% (n=21)
Total	300	16,66 % (n=50)	2,67	11% (n=33)

La prévalence totale de *S. aureus* retrouvée dans les 300 échantillons analysés était 16,66 % et la charge moyenne de contamination était 2,67 log_{10} UFC/g. Tandis que, La prévalence et la charge moyenne de contamination retrouvées dans les 100 échantillons prélevés au niveau des sites de catégorie 1 étaient 8% et 1,87 log_{10} UFC/g respectivement, celles trouvées au niveau des sites de catégorie 2 étaient 15% et 2,4 log_{10} UFC/g et celles trouvées au niveau des sites de catégorie 3 étaient 27% et 3,04 log_{10} UFC/g [figure 2 et 3].

La comparaison des niveaux de contamination de la viande de poulet par *S. aureus* par rapport aux seuils fixés par la norme marocaine [9] montre que la qualité hygiénique de 3% des échantillons prélevés dans les sites de catégorie 1 est insatisfaisante, tandis que 9% et 21% des échantillons prélevés dans les sites de catégorie 2 et 3 respectivement est insatisfaisante [figure 2].

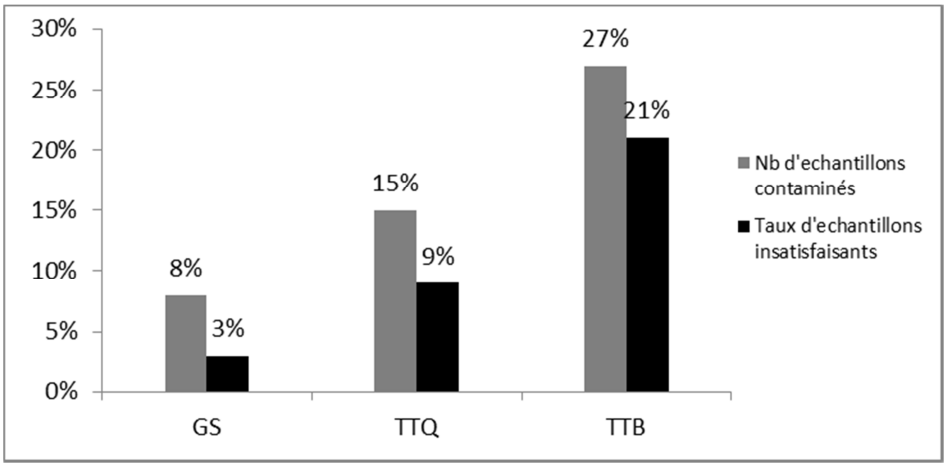

Fig. 2. Evolution des d'échantillons contaminés et des taux d'échantillons insatisfaisants

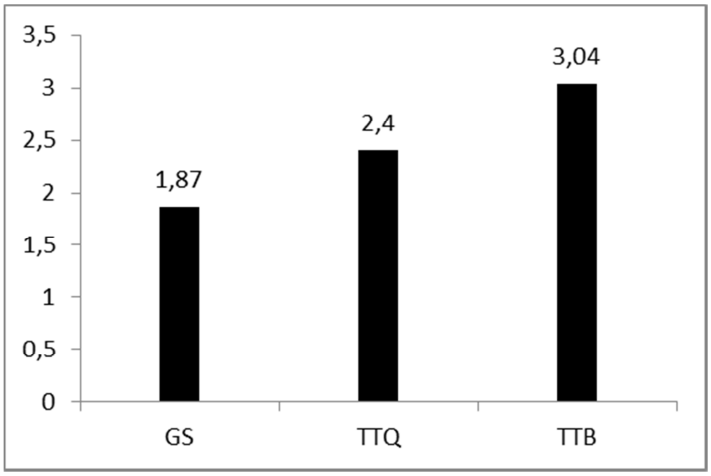

Fig. 3. Evolution des charges moyennes de contamination au niveau des 3 catégories de sites de prélèvement

3.2 ANALYSE STATISTIQUE

Tableau 2. Association entre la charge moyenne de contamination par S. aureus et les catégories de sites de prélèvement

	GS	TTQ	TTB	Valeur Test	P value	Interpretation
Présence	8	15	27	13,30	0,0012	**Significatif**
Absence	92	85	73			
Présence	8	15		2,41	0,1205	**Non Significatif**
Absence	92	85				
Présence	8		27	12,50	0,0004	**Significatif**
Absence	92		73			
Présence		15	27	4,34	0,0372	**Significatif**
Absence		85	73			

L'analyse du tableau montre que le test de Chi_2 global est significatif (p=0,0012), cela signifie qu'il existe une différence significative entre au moins 2 des 3 catégories de sites de prélèvement. L'analyse stratifiée montre que cette différence est significative entre les TTQ et les TTB (p=0,0372<0,05) et entre les GS et les TTB (p=0,0004<0,05). Par contre il n'y a pas de différence significative entre les TTQ et les GS (p=0,1205>0,05).

4 DISCUSSION

Les résultats de cette étude ont montrés que la prévalence totale de *S. aureus* trouvée dans les 300 échantillons analysés est 16,66 % et la charge moyenne de contamination est de 2,67 $\log_{10}$ UFC/g. Cette prévalence est comparable à celle trouvée par Akbar et al. [12] qui est 18,18%, mais moins élevée que celles trouvées par Wang et al. [13] et Lidij et al. [14] qui sont 24,2% et 30,30% respectivement. Alloui et al. [15] et Tougan et al. [16] ont trouvé des moyennes de contamination de l'ordre de 1,08 $\log_{10}$ UFC/g et 1,53 $\log_{10}$ UFC/g respectivement qui sont moins élevées que notre résultat alors que Singh et al. [17] ont trouvé une moyenne de contamination de 3,35 $\log_{10}$ UFC/g plus élevée que celle trouvée par notre étude.

La contamination par *S. aureus* est plus importante dans les viandes de poulet produites au niveau des sites de prélèvement de catégories 2 et 3 [figure 2] qui présentent selon le questionnaire des conditions d'hygiène déplorables. On note également que le niveau le plus élevé de la contamination de la viande de poulet se trouve au niveau des sites de prélèvement de la catégorie 3 et la catégorie 1 regroupe des viandes de poulet qui ont un niveau de contamination plus bas [figure 3]. L'analyse statistique a montré une relation significative entre niveau de contamination par *S. aureus* et les différentes catégories. Ainsi, les différences de contamination des viandes de poulets notées suivant les catégories sont dues aux différences du niveau de respect des bonnes pratiques d'hygiène. Les taux de contamination élevés sont notés dans les tueries traditionnelles (catégories 1 et 2) qui se caractérisent par des pratiques hygiéniques non satisfaisantes. Parmi les facteurs de risque qui ont un effet sur le nombre de *S. aureus* présent au niveau des échantillons étudiés, le degré de l'hygiène au niveau de la tuerie, la propreté de l'eau utilisée au cours de l'échaudage, la propreté des doigts des plumeurs, l'hygiène du personnel et les précautions prises au moment de l'éviscération. En effet, lors des opérations d'abattage, des phénomènes d'intercontamination se produisent, ce qui induit une prolifération des pathogènes sur des carcasses initialement saines [15].

La viande est le produit de transformation du muscle après la mort de l'animal. Elle est traditionnellement considérée comme le véhicule de nombreuses maladies d'origine alimentaire chez l'homme à cause des défauts d'hygiène [18], [19]. C'est une denrée alimentaire hautement périssable et dont la qualité hygiénique dépend, d'une part de la contamination pendant les opérations d'abattage et de découpe et d'autre part, du développement et de la croissance des flores contaminantes pendant le refroidissement, le stockage et la distribution [18], [20]. L'ensemble de ces lacunes peut éventuellement entraîner des risques pour la santé humaine si des actions correctives ne sont pas appliquées. Par conséquent, la production de la viande de poulet devrait être évitée dans des lieux où la présence, dans l'environnement, de substances nocives pourrait conduire à un niveau inacceptable de telles substances dans la viande. Aussi, les autorités compétentes devraient concevoir et administrer des programmes de contrôle et de surveillance adaptés aux circonstances et abordant les contaminants environnementaux susceptibles d'être présents dans la viande à des niveaux la rendant dangereuse pour la consommation humaine et la garantie que l'eau et les autres vecteurs potentiels, tels les manipulateurs, matériel, conditions d'abatage…, ne constituent pas d'importants agents de transmission de dangers.

5 CONCLUSION

Les résultats de la présente étude ont révélé que le niveau de respect des bonnes pratiques d'hygiène au niveau des TTQ et TTB a un impact significatif sur la qualité hygiénique de la viande de poulet commercialisée dans ces tueries. Afin d'améliorer la sécurité sanitaire et la qualité hygiénique de ces viandes, la mise en application de bonnes pratiques d'hygiène ainsi que la surveillance microbienne continue est une nécessité absolue pour protéger la santé des consommateurs.

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Lactating Adenoma: A case report

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ABSTRACT: Lactating adenoma is a benign tumor of pregnancy and lactation, found most often in the third trimester of pregnancy and less frequently during lactation. Clinically, it presents itself as a unique and discrete mobile mass. It is a rare benign tumor which the diagnosis requires pathological confirmation. Usually it disappears spontaneously. Chirurgical treatment is offered for aesthetic problems related to the size of the adenoma. The authors report a case of lactating adenoma discovered at eight months of the post-partum. Through this case, they discuss the clinical, radiological, histopathological aspects and various therapeutic modalities of this tumor.

KEYWORDS: breast, benign tumor, ultrasound, mammography, biopsy.

INTRODUCTION

Lactating adenoma is a rare benign tumor most often found in prepartum or postpartum. The authors report a case of lactating adenoma in a 27 year-old primigravida woman, discovered at eight months in the post-partum.

OBSERVATION

Mrs. FH , 27 year-old, primigravida woman, without medical history, consulted in our service for swelling of the right breast which appeared eight months after giving birth and two months after stopping breastfeeding . The swelling gradually increased in size. Breast examination found a tumefaction at the right axillary tail without inflammatory signs. Palpation found a nodule of 4/3 cm, well delineated, painless, with soft consistency and mobile. There was no palpable axillary lymphadenopathy. Mammography showed an axillary tail mass of the right breast measuring 4/3 cm , dense with regular limits and without clustered microcalcifications. Ultrasound showed a well delineated hypoechoic lesion containing several microvesicles (Figure 1). Microbiopsy (trucut) with histopathological examination revealed microcystic changes of breast parenchyma with many cystic dilated channels lined by flattened epithelial cells . The lobules were large, consisting of enlarged hyperplastic acini and lined by a double layer of myoepithelial and epithelial cells and containing many vacuoles containing mucoïd secretions (Figure 2). These features are consistent with the diagnosis of lactating adenoma. Thus, we decided to perform a tumorectomi. Postoperative recovery was uneventful.

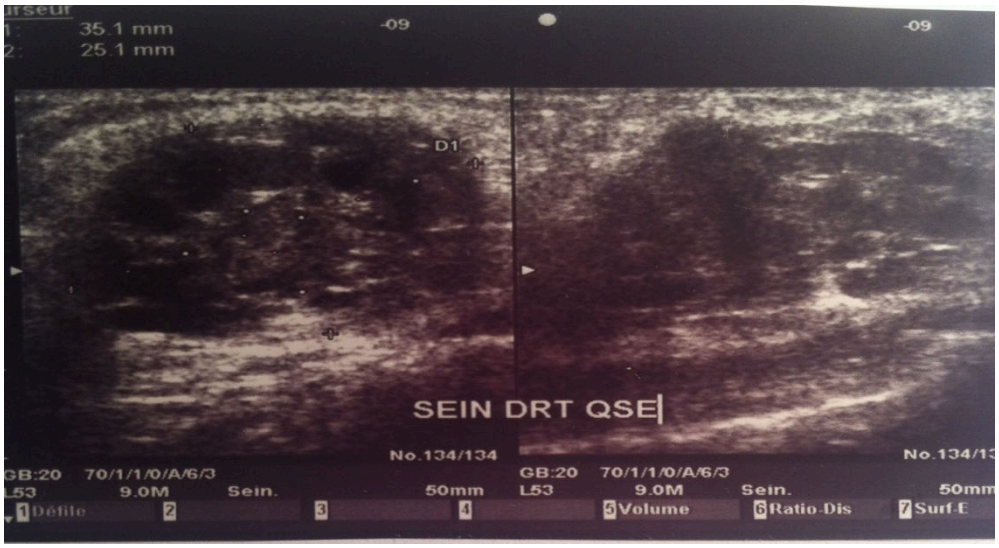

Fig. 1. Ultrasound showing a well delineated hypoechoic lesion containing several microvesicles

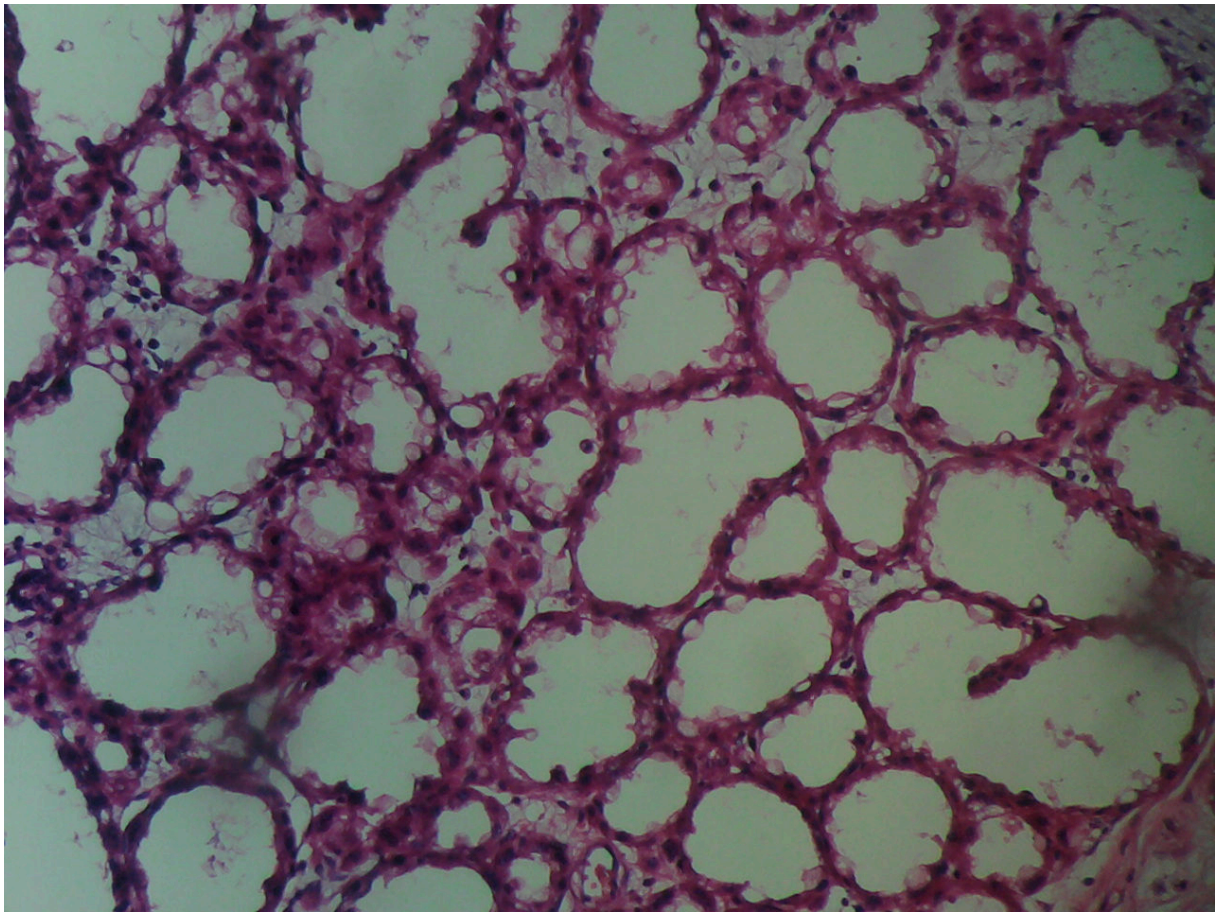

Fig. 2. Histopathological examination: Lactating adenoma: Microcystic changes of breast parenchyma with many cystic dilated channels lined by flattened epithelial cells

DISCUSSION

Lactating adenoma occurs most often young women (20-38 years) in the third trimester of pregnancy and during lactation [1] . The majority of patients are primiparous without medical history [1]. Clinically, it presents itself as a palpable mass, quite large from 1cm to 4 cm diameter with an average of 2cm, painless, well-defined, unique and mobile with a firm consistency, most often in the periphery and in the upper outer quadrant [2] . There is usually no axillary lymphadenopathy, or nipple discharge, or appearance of inflammatory skin look. Our observation are consistent with the literature data. Concerning histology, lactating adenoma is not surrounded by a capsule; It is formed by a lobules proliferation separated by thin connective vascular septations. The alveolar lumen is filled with an abundant protein material with fat and colostrum and it's lined by cuboidal epithelial cells with large vacuolated cytoplasm [2,3] . The epithelial layer is lined with a layer of myoepithelial cells sensitive to ocytocin. In immunohistochemistry, these cells express the S100 protein and lactoferrin and alpha- lactalbumin which is unique to gestational breast tissue [4]. The basal membrane is intact and there is no cellular atypia [5,6]. Mammography should be avoid during pregnancy. In the postpartum period, its analysis is limited by the high density of breasts during this period. Ultrasound is the first examination to do. Usually lactating adenoma appears as a homogeneously hypoechoic mass, with a large axis parallel to the skin, and smooth and slightly lobulated edges [2]. During pregnancy, the echogenicity may become heterogeneously anechoic or hypoechoic with echoic areas corresponding to the enlarged and milk-filled cells [4]. The biopsy allows the histopathological diagnosis of breast masses discovered during and immediately after pregnancy. Even if the mass is palpable, biopsy under ultrasound guidance is preferable to target solid portions of the mass while avoiding liquid areas. When the benign nature is confirmed by biopsy, a simple clinical and ultrasonographic monitoring is recommanded waiting for spontaneous regression. Because of the aesthetic discomfort occasioned by the tumor our patient opted for surgical resection.

CONCLUSION

Lactating adenoma is a benign tumor who regress spontaneously. It usually requires a simple clinical and radiological follow-up. Surgical indications are reserved for aesthetic issues related to the size of the adenoma.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest related to this article.

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Primary amenorrhea revealing Genital Tuberculosis: A case report

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ABSTRACT: Genital tuberculosis of women is part of extra pulmonary forms of tuberculosis. It is an uncommon disease in developed countries, but remains endemic in developing countries. The causative agent is, in most cases, Mycobacterium tuberculosis. Genital tuberculosis is a cause of infertility. The definitive diagnosis is made by biology or histology. Because this affection is paucibacillary, these tests may be falsely negative; In fact, diagnosis can then be focused on radiological, endoscopic and nosological arguments.

KEYWORDS: primary amenorrhea, extrapulmonary tuberculosis, synechia.

INTRODUCTION

Tuberculosis is a fairly common infection in Morocco where it occurs by an endemic mode. If the lung and lymph node locations are classic, genital location remains uncommon: 2.5% [1,2]. The authors report a case of genital tuberculosis revealed by primary amenorrhea in a 17 years old teenage girl. Through this observation, they discuss the epidemiological, clinical, paraclinical, therapeutic and prognostic aspects of this rare location of tuberculosis.

CASE REPORT

Our case is about a 17 years old teenage girl, Moroccan, only daughter in a family of three kids. Her mother was followed for pulmonary tuberculosis since four months and received a treatment according to the national program of antituberculosis chemotherapy. The patient consulted for isolated primary amenorrhea. The age of puberty of her parents was normal and there was no similar cases or genetic disease in the family. She was vaccinated according to the national immunization program. She comes from a normal pregnancy and the delivery was natural with normal weight. Physical examination found a patient with a female morphotype, weighing 45 kg for a height of 1 meter 55 cm. The stage of pubertal maturation corresponded to Tanner stage 4. There were no signs of hyperandrogenism. The patient was a virgin and the rectal examination allowed to detect the uterus through the rectovaginal septum. The hymen appeared intact. The examination with speculum virgin allowed to verify the existence of the vagina and cervix, eliminating vaginal aplasia or vaginal septum. The rest of the clinical examination was normal. Transabdominal pelvic ultrasound showed a normal size uterus with atrophic endometrium, both ovaries were without abnormalities. Hormonal balance including a dosage of Follicle Stimulating Hormone (FSH), luteinizing hormone (LH), Thyroid Stimulating Hormone (TSH), oestradiol, prolactin and β-Hcg was normal. The diagnosis of genital tuberculosis was strongly suspected. The tuberculin skin test was positive, greater than 20 mm. Chest-X-Rays and urinary tests looking for pulmonary and urinary location of tuberculosis were normal. Biological check-up found an accelerated sedimentation rate, renal function and blood count were normal (leukocytes 5300/mm3). After informing the patient and her parents, an exploration of the uterus by hysteroscopy objectified an insurmountable synechia. A biopsy was performed showing a white coating evoking firstly a caseum. Histological study confirmed the diagnosis of genital tuberculosis by finding an epithelioid granuloma with giant cells without caseous necrosis. Culture for mycobacteria showed a Mycobacterium Tuberculosis. The patient received anti bacillary treatment : 2RHZE/7RH; The first two months: Rifampicin, Isoniazid, Pyrazinamide and Ethambutol relayed by Isoniazid and Rifampicin for 7 months with good clinical and

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biological tolerance. The evolution was marked by weight gain and menarche after three months of starting treatment. She was informed about the poor prognosis of fertility and the usually irreversible uterine synechia.

DISCUSSION

The frequency of genital tuberculosis is probably underestimated because it's endemic in developing countries [3]. In Morocco, despite a mandatory prevention by BCG and a remarkably effective tuberculosis chemotherapy, genital tuberculosis remains a common and serious disease. Thus, it's the fourth extra-pulmonary location of tuberculosis after lymph node, digestive and osteo-articular location [4]. In industrialized countries, it is expected a recrudescence of cases of genital tuberculosis, secondary to the increased incidence of HIV status [5]. In the United States, on 66 336 cases of femal tuberculosis registered between 1993 and 2003, 1,332 (2%) were genital [6]. In developing countries, this disease typically affects young women in 72% of cases; In developed countries, genital tuberculosis is the prerogative of postmenopausal women with 62% [7]. Our patient is a Morrocan teenage girl of 17 years old whose mother was followed for pulmonary tuberculosis. Clinical examination is usually normal. Biological check-up can show an elevated sedimentation rates, lymphocytosis, modification of gamma globulin. Imaging studies are non-specific. [8] Most authors give an important place to hysterosalpingography. It can show calcified pelvic lymphadenopathy, uterine synechia, producing a typical pocket aspect, or if the uterus is totally symphysed, an opacification of the endocervix or only isthmus. We can also see tubal stenosis giving a rigid appearance, abscess images or hydrosalpinx non-characteristic. The diagnosis is made by finding Mycobacterium tuberculosis on the direct microscopic examination, or after culturing pathological samples. Hysteroscopy usually showed an impassable uterine synechia. Endometrial biospsy make the diagnosis by showing an epithelioid granuloma with giant cells without caseous necrosis. Several treatments are available. In Morocco, with the new national program against tuberculosis, we adopt the standardized protocol 2RHZE/7RH (rifampin [R], isoniaside [H], pyrazinamide [Z], ethambutol [E]) [9]. The first two months: Rifampicin, Isoniazid, Pyrazinamide and Ethambutol relayed by Isoniazid and Rifampicin for 7 month. Surgical indications are reserved initially for the treatment of complications or secondarily in case of resistance or relapse under medical treatment [3]. The place of corticosteroids is discussed during a pelvic disease [3, 4]. The prognosis of genital tuberculosis is bad, the synechia is usually irreversible. Infertility is observed in 44% of cases [10]. It is responsible of 5 to 10% of infertility (definitely sometimes) and it's complicated in 15-30% of cases by ectopic pregnancy [1]. Our patient and her parents were informed of the prognosis.

CONCLUSION

Genital tuberculosis remains a fairly common condition in our Moroccan context of endemic tuberculosis. The endometrial biopsy make the diagnosis. It is a diagnosis that we have to evoke in front of primary amenorrhea in a girl with normal sexual characteristics, without signs of hyperandrogenism and after eliminating utero-vaginal abnormalities. The prognosis is unfortunate, the synechia is usually irreversible.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest related to this article.

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