

Regional Agricultural Development and Economic Growth: Case of the Monastir area

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ABSTRACT: In this research paper, the objective is to highlight the degree of contribution of the agricultural sector in the region of Monastir to Economic growth of our country: "Tunisia". We limit ourselves to the study of regional development of agriculture in this region. This is to see the impact of this sector stage of development on economic growth. The question that concerns us is this: Is agriculture as an economic activity is involved in a huge way in the growth of the country? Or there are other more important areas in the region that are the core of economic development. Several hypotheses resulting which we quote which states that agriculture in the region and because of the recorded fluctuations had a negative impact on the country's economic growth and participates in a less efficient way, its role is less important comparison with other operative sectors in the region (manufacturing and non-manufacturing industries, Tourism, Services,...etc.). Several theoretical and empirical studies have shown that agriculture contributes an effective way to growth. Empirically, based on the time series, we will determine the contribution of the agricultural sector development and fisheries beyond fifteen years on growth and the country's economic development. Econometric results we found, it was found that agriculture contributed less efficiently to economic growth compared with other countries more competitive sectors and have considerable share in GDP and contribute more effectively to the economic development of Tunisia.

KEYWORDS: Development, Regional Development, Region, Economic Growth, Agriculture, Monastir.

INTRODUCTION

We are interested in a study of agriculture and fisheries in the governorate of Monastir located in the country's eastern center and covers 0.7% of the total area of the country. The economy of the region is based on the greenhouse cultivation where the governorate ranks first nationally. A modern and advanced agriculture based on irrigated crops over an area of 5690 hectares, is based on the cultivation of early vegetables in greenhouses and including nearly 3 million olive trees and five fishing harbors have achieved to excellent results in the production. In the governorate of Monastir and adjacent public agencies, there are specialized administrations in the agriculture and fisheries, which we quote close administration of farmers and new agricultural investors formed by the promotion agency of Agricultural Investment (APIA), the Regional Commission for Agricultural Development (CRDA), and the Regional District Fisheries (ARP).

This work is just limited to the study of regional development of agriculture in the region of Monastir, the object is to see the impact of this sector development stage on the country's economic growth. In other words, it is to question the role of agriculture in economic growth and the degree of contribution to economic development. Our goal is to study the impact of agriculture in the region on the country's economic growth. In other words, in determining the contribution of the development of agriculture and fisheries in the region beyond fifteen years of growth and economic development.

Several hypotheses resulting which we quote which states that agriculture in the region and because of the recorded fluctuations had a negative impact on the country's economic growth and participates in a less efficient way, its role is less important in comparison with other operative sectors in the region (manufacturing and non-manufacturing industries, Textile, Tourism, Services, ... etc.).

Our work will be divided into two stages. In the first, and as part of the theoretical part, we will limit ourselves to the study of regional agriculture and fisheries in order to see its contribution, its degree of contribution to growth and economic

development the country, the study area is the governorate of Monastir. We will do a descriptive study of agriculture and fisheries in the region of Monastir, in the second and final stage, and as part of the empirical part, we will study the impact of the development of the agricultural sector in the region of Monastir on the country's economic growth. In other words, the degree of contribution to growth and this through an empirical study by collecting data on the evolution of variables including: the value added, capital (investment), the number of irrigated areas with economic means irrigation water, rainfall average (in millimeters) of the governorate and the number of fishing units to fire. Changes exceed fifteen years starting from a Cobb-Douglas function to empirically validate the results that our research work will lead.

RELATIONSHIP BETWEEN AGRICULTURE AND ECONOMIC GROWTH: REVIEW OF THE LITERATURE

Several economists have frequently attached great importance to the role of agriculture in economic growth. Lewis (1954), agriculture contributes to the formation of capital, frees labor characterized by low productivity to feed other sectors including industry by creating a market for industrial products, supplier of services to and to finance imports. Gillis (1990) considers that agriculture attracts foreign direct investment (FDI) creates jobs and allows opening new opportunities for investment for local entrepreneurs to increase local production. According to the World Bank (2008), agriculture contributes to development as an economic activity, livelihood and environmental services provider, which makes it a unique instrument for development. This is confirmed by a study conducted by Guillaumont in 2003, based on the work of Barro and Sala-i-Martin (1996), which concluded that only environmental conditions and through the agricultural sector, have a significant impact on growth production in the Sahel of Africa.

However, like any economic sector, the agricultural sector requires funding for better contribution to growth. Indeed, financial condition and resources for a large part accessibility to inputs and equipment required for the adoption of an intensive production system. However, the literature shows a weakness financing in agriculture in the majority of developing countries (LDCs). FAO (1996) 'Food and Agriculture Organization, "for example indicates an under-investment in agriculture over the past decade in many developing countries. She sees a greater share of public spending on agriculture is for grants, so that there is little public resources for the creation of new infrastructure or other growth-enhancing expenditures. A study by the Centre Sector Policy Analysis (CAPES) in 2008 on vegetable crops shows that falling yields explain an incomplete and defective mastery of production techniques, a decrease in the quality of seeds or even both at a time. Thus, the study recommends a review of the production techniques, strengthening the training and the underbody of producers and agricultural technicians on technical routes of production. In addition, it should be noted that at the literature, education is the factor mentioned by several authors as an explanatory factor in the level of efficiency of producers (Zonon, 2003). However, there is no overall approval for the impact of investment in education on the productivity of farmers. Gurgand (1994.1997) finds that education has zero returns even negative in agriculture in Côte d'Ivoire.

As against Tilak (1993) and Coltear (1990) conducted a review of several studies in Asia and Europe showing that education significantly increases the productivity of farmers. Zonon in 2003 shows that literacy has a major impact on the efficiency level of the farmers. However, education alone does not increase in a systematic way the level of performance of the producers; education policies must be followed by those producers of equipment or new techniques transmission policies.

There is some agreement among economists about the importance of the agricultural sector in a developing economy. Thinking of the Physiocrats to the writings of contemporary authors, the agricultural sector remains an important pillar on which everything has to be based off of the economy. Historians have noted that in many so-called developed countries today, the agrarian revolution before the industrial revolution. This vision justifies the centrality of agriculture in development theory. Many authors of this current of thought such as Lewis (1955), Hirschman (1958), EIF and Ranis (1964), or Mellor (1966) devoted significant writings on it. And even in this period of the 21st century by FAO efficient agricultural policies implemented in the setting is a necessary condition for uprooting and eradication of hunger and the reduction of inequalities between many countries.

The study of the impact of agriculture on the growth and economic development is done according to several points of view in the economic literature. The first authors of the theory of development affected her a role "passive" in the economy. Lewis (1955), Hirschman (1958), EIF and Ranis (1964) put the upstream activities of other sectors of the economy that actually stimulate development. "Agriculture must provide the rest of the economy the resources it needs to function. The agricultural sector is thus doomed to decline gradually as the economy grows. But the notion of Agriculture for development of the rest of the economy, labor and capital tank to operate, fell more and more in front of the one to engage in the path of development farm for himself and that agriculture can sometimes be a sector of the economy in mind, especially in times of economic adjustment. "A development of the agricultural sector as a sector of economic activity is also a guarantee of achieving a level of economic development. The coexistence of urban and rural areas no longer appears as an aberration, an

absurdity in that a development of the agricultural sector would observe evolutionary improvements in living standards in rural areas.

The central element of development models explaining the role of agriculture in growth is the notion of surplus generated in the agricultural sector. To this end, the physiocrats recognize the importance of a surplus (value added) Agricultural necessary for the health of public finances and the level of economic activity. It should be noted that three major concerns arise from the literature on the role of agriculture in growth and economic development:

- Determinants of generating a surplus in the agricultural sector through productivity gains from investment and innovation;
- The various mechanisms for transfer of the surplus;
- The use of this surplus to achieve industrial development through public investment where this surplus is transferred by taxes.

In 1767, at the dawn of the industrial revolution, Mill stated that the farmer productivity defines the size of the industrial sector. Before 1950, many authors confirmed that growth in the agricultural sector may be preceded or spawned the industrial revolution. Historians of this revolution spotted recurrence and the reappearance of a certain logic by which the agricultural revolution before the industrial revolution by a shift from fifty to sixty years. But from 1950, economists viewed increasingly the agricultural sector as a delayed sector in the economy, generating a surplus of labor such as formalized Kevin (1955). Interest was focused on growth resulting in the non-agricultural sector. The agricultural sector should provide the latter with the elements necessary for its expansion. By participating in this logic, the economist Kuznets (1964) identifies four ways in which agriculture contributes to economic development:

- ❖ **Products:** Agriculture provides food to feed workers in other sectors. It also provides industry with raw materials useful to it. A productive agricultural sector provides cheap products, thereby improving the level of real wages and thus a possibility of accumulation for the other sectors. In addition, the increase in agricultural production has an effect on the growth of the Gross Domestic Product (GDP).
- ❖ **Market:** Agriculture can be a demand for industrial goods and services. Improved productivity in this sector is expected to improve incomes of the rural world and therefore increase their consumption. The agricultural sector can facilitate the emergence of new uncorked for industries.
- ❖ **Currency:** Export of agricultural products is a source of foreign exchange for the economy. In a context where agriculture is important, these currencies can be used to import machinery and raw materials needed by industry to develop. On the other hand, agriculture can afford to produce the foreign exchange savings commodities that were imported before.
- ❖ **Factors of production:** Agriculture provides to other sectors the labor surplus at its disposal.

These analyzes Kuznets appear in different works of development economists. The focus was on industrial development, since he alone was able to provide the conditions for a genuine economic development. This fascination with modernization allowed them to have an "industrializing primacy of doctrine on agricultural development, which has undermined the same time the potential contribution of agriculture to overall development." Kruegersummarized these early development theories as composed of several managers son:

- The desire and will to modernize;
- The interpretation of industrialization as a way of modernization;
- The certainty that a policy of "import substitution" was essential to protect "infant" industries;
- The distrust of the private sector and the market and the belief that the government, as paternalistic and benevolent guardian, should take the lead in development;
- The uncertainty towardsthe international economy and the lack of confidence in the possibilities of export development in developing countries.

STUDY OF THE AGRICULTURAL AND FISHERIES IN THE REGION OF MONASTIR

Agricultural: Agriculture in its broader concept means "lack of work transforming the natural environment for the production of plants and animals useful to man." A so near growing plants, are also integrated livestock, fishing and hunting. From the economic point of view, agriculture is a sector of activity, income generating activity from the exploitation of land, culture, animal husbandry, etc .; it responds to the most serious and essential needs of the human being: food. Agricultural activity is endowed with many specificities that must hold in order to understand its operation:

- **Earth:** it has a special role in farming. Farming techniques need to be increased and spread on large tracts of land. The area of farms frequently measured in hectares. Proportion to industrial activity, the Earth is a critical input for the implementation and development of agricultural activity.
- **Natural conditions and seasons:** dependence agriculture towards natural circumstances and variability of the seasons is notable. It is prevalent in developing countries where the mastery of sophisticated and advanced techniques is not yet a given. This interdependence creates many consequences which we quote: seasonal employment factors and risk. In fact, the seasonal factors, although it is not specific to agriculture, requires agricultural production function special features.
- **Rigidity of demand:** Regarding the demand for food, it is not very sensitive to price (Law King) and income (Engel's law). But it must still make the distinction between food and agricultural product. All food is not agriculture and all agricultural products are not food.

In what follows, we summarize the agricultural situation in the region of Monastir, investment incentives factors, the most important problems facing the agricultural sector faces in the region and the prospects for its development.

AGRICULTURAL SITUATION: GENERAL

The Governorate area is 102,385 ha (0.6% of the area of Tunisia), agricultural cultivated area is 81,400 ha. Forests and pastures occupy 4,700 ha (0.08% of the national total). The climate of the region is semi-arid and characterized by high temperatures in summer and stability of the climate over the rest of the year with low and erratic rainfall. The average rainfall is 360 mm, the annual rate of evaporation is 5.2 mm, the humidity average is 72.4%, the average wind speed: 15.1 km / h and the average duration of the sun is 8.3 hours. While the soil is characterized by a geographical nature that comes in the plains interspersed with some hills and a series of valleys that end in the sea. These plains are composed by soils which do not differ much in terms of their physical properties and chemical (soil depth, size, structure, mineral composition and fertility) due to natural conditions formed therein, as well as the quality of the original rock from which the soil is formed.

In 2011, the cultivated area is summarized as follows: cereals: 3700 ha gardening: 4290 ha legumes: 1280 ha fodder: 500 ha fruit trees: 71,640 ha (3.3% of the national area) of which approximately 63,600 ha of olive oil (88.7% of the area of fruit trees), 4050 hectares of almond 1875 ha and 330 ha caught pear tree.

RAINFALL:The average rainfall between 1995 and 2011, shows peaks sometimes up, sometimes down, the most remarkable is the one that corresponds to the year 1996 and beyond this year, the highest peak coincides with year 2004. Peaks less are found reduced in 2007 and 2008 and average rainfall eventually decrease and a slight rise between 2010 and 2011 15mm. We identify a rainfall of 658.5 mm peak in 1996, beyond that this year the average was down sometimes always spotted the slightest increase in 1996. Between 2000 and 2002, at the beginning a decline in average rainfall is indicated followed by a slight increase (2001-2002) due to a strong drought recorded during three consecutive years. In 2004, the average rainfall was 514 mm. From 2009, the average rainfall continues to decline reaching 417 mm in 2010 and noticed a slight increase in 2011.

WATER RESOURCES:The total water resources are estimated at 29 million m³, have renewable resources and vary from season to season depending on the amount of water available and the demands of farmers and precipitation. These resources consist mainly of water run-off: 13 million m³, a part was controlled through mountainous dam, seven small lakes and 54 storage units; Groundwater: 16,830,000 m³; Deep wells: 45 wells, 32 wells for irrigation, 7 wells intended for consumption, 6-well untapped and shallow wells 2950 wells. In addition to these own resources, 4.5 million m³ represent the portion of the water area of the dam Nebhana and 0.5 million m³ of wastewater. Thus, the total resources available will be 35 million m³ of which 22.6 million m³ are for exploitation. Water resources, public (Nebhana and deep groundwater) are managed by 42 groupings of developing and using economic means to irrigation water. The exploitation rate is 82% and the rate of increase is 90%.

IRRIGATION AREA: irrigated area has reached 5,755 hectares (6.9% of the plowed surface and 1.4% of the irrigated areas nationally) in 27 public irrigation schemes with private irrigated areas. Valid irrigable area for irrigation is distributed as follows: (Irrigated from large dams (public irrigation: 2646 hectares) Irrigated from shallow wells: 1709 ha Irrigated from deep wells: 1,283 ha; irrigated with treated water: 117 ha farm rate: 86%; intensification rate: 90%). Efforts in the field of irrigation water savings allowed the approximately 4900 ha equipment (88% of the total irrigated area and 98% of the exploited areas), and thanks to the encouragement given by the State to farmers in the form of a grant of between 40% and 60% of the cost of irrigation water saving equipment.

STRUCTURE OF FARMS:The total number of farms in Monastir is 14 200 farms (2.8% of farms in Tunisia), the average farm size is 5.8 ha and 85% of these farms are less than 10 hectares. The distribution of these operations is as follows: (98.4% of farms in the form of direct use (95% for domestic); 59.3% of farms are supplied with drinking water (45% for National) 67.7% of farms are equipped with electric lighting (76% for national); 0% of farmers living in rural areas (69% for national) and 79.2% of farmers have experience in agriculture more than 10 years (82% for national).

ANALYSIS OF PRODUCTIONS:The agricultural sector in Monastir includes various productions including: crop production (field crops, vegetable crops, olive trees, fruit trees and organic crops), animal production (Cattle, sheep, goats, poultry, etc.) and marine production (fishing).

Note that the governorate of Monastir specializes in crops of olive and vegetable crops and livestock.

- **PLANT PRODUCTION: CEREALS:** Cereal production in the region of Monastir is composed of soft wheat, durum and barley mainly. We note that the durum wheat is most noticeable over time because soft wheat production is absent beyond 2006 both before and during the period starting from the year 2000 to 2003 the quantities are in tons low compared to the quantities of durum wheat. While barley production is very important in 1998 of around 12111 tons, the minimum quantity of this production is of the order of 151 tons spotted 1995. However, in 2001 for the three categories of cereals, Production is zero (rainfall recorded in the year 2011 decreased by reaching 175 mm this can be the cause of this finding). For the amount of durum wheat, it has grown from a minimum of 34 tons in 1995 to a maximum of 3725 tons in 2006. While the amount of wheat has spent a minimum of 3 tons in 1996 to a maximum of 555 in 1990.

THE VEGETABLE CROPS:The area of irrigated vegetables is estimated at about 4,000 ha of which 2,400 ha (60%) devoted to off-season production of which 640 ha are for greenhouse crops with an intensifying rate reached 127%. The annual vegetable production is estimated at 170,000 tons, 110,000 tons of vegetables out of season. The governorate has about 10,000 greenhouses (25% of the national total), which generated an average production estimated at 57,000 tons (40% of national production).

The region specializing in market gardening produce (tomatoes, potatoes, peppers, watermelon and melon, etc.). We note that in 2011, the amount of tomatoes reached 162,000 tons in comparison with other productions. The production of other vegetables comes in 2nd position and potato production, and then the production of peppers finally production watermelon and melon that have relatively lower amounts compared to other market garden productions.

OLIVE TREES:The area occupied by olive trees is 63,636 ha or 74% of total agricultural area and 4% of the total area of the olive trees in Tunisia. The olive grove in the governorate has 3452045 olive feet. The average production of olives in the last decade is 62,000 tons, the equivalent of 12,400 tons of oil. The governorate has 168 olive presses which 88 are continuous chain type whose 03 devoted to organic oil extraction. Organic olive trees occupy an area of about 4000 ha or 200,000 feet. The average olive production is 4,000 tons or 800 tons of oil. Producing olives for oil is more remarkable in comparison with almonds productions, apricots and other fruits. The production of olive oil during evolves over time but every year it is sometimes up, sometimes down. She recorded a minimum of 2,500 tons in 2002 to a high of 103,790 in 2009 (average rainfall on that date is of the order of 417mm) .The minimum amount of almonds is 486 tons in 2001, while the amount maximum is 1717 1990.

FRUIT TREES:The area under fruit trees is about 8500 ha generating an average production of about 12,500 tons. The most important tree species in the area are dry almond, peach irrigated and dry apricot. For the production of apricots is minimum 302 tons in 2010, it is maximum in 1994 of around 850 tons. For other fruit production increased from a low of 2,284 tons in 1989 to 9869 tons in 2008.

ORGANIC CROP: The area approved by the control structures and certification in the year 2011 reached a total 4042 hectares, divided as follows: Olives: 4000 ha Fruit trees: 17 ha Vegetables: 4 ha, pastures: 6 ha, Prickly pear: 15 ha.

AREA OF ANIMAL PRODUCTION:Livestock production consists mainly of cattle, sheep and poultry. The distribution of the herd is made according to the number of heads of three categories: (Cattle, Sheep and Goats). Livestock production results through about 6360 head of cattle, 49,000 sheep and 4 strips (4 fillings buildings per year) of broilers.

The development of animal production during the period from 1989 to 2011, milk production in the region recorded a rise to 2001, and this production sometimes drops and sometimes increases, but keeps a widely abundant enough in comparison to the production of poultry which has the 2nd position, then the production of turkeys and other meat comes in 3rd position. Cattle production is relatively higher than goats. Egg production in the region has 300 million units in 2001 preceded by a smaller scale production of 80 million units in 1999. The production before and after these two years is relatively small amounts.

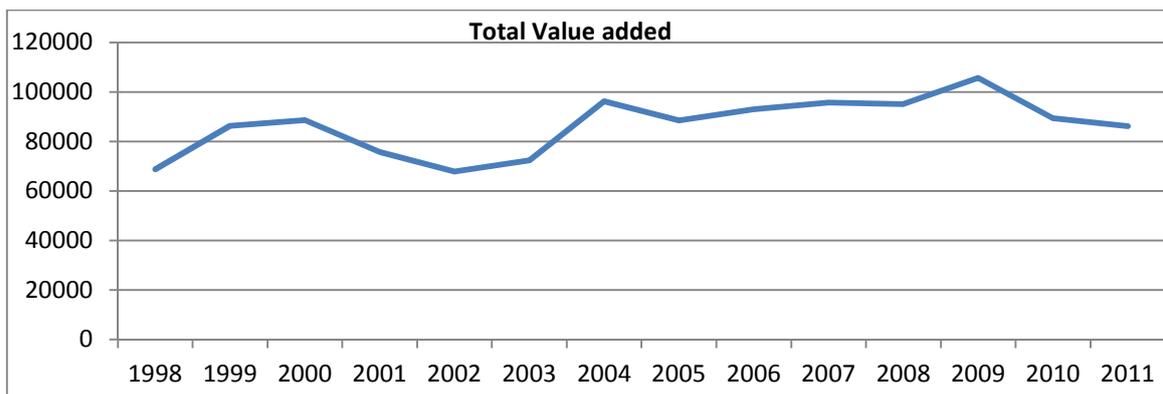
FISHERIES: The governorate has 64 km of coastline and 5 fishing ports (1 for deep fishing and 4 for coastal fishing). The region also specializes in sea fishing as this sector has assured in 2011, about 24,000 tons of fish, of which 19,193 tons of blue fish and 1962 tons from fish farming. It also provides about 4,000 jobs. Fish production in the region is about 15% of national production. The Port of "Teboulba" is one of the largest ports and most equipped and performs extensive fishing productions and clutter from 83% of production in the region. The fleet operating in this sector in 2011 is made up of 933 fishing units including 863 coastal fishing boats, 62 blue fish fishing units. Also, it is in the governorate 38 ice manufacturing plants and 17 manufacturing facilities and ship repair and 4 workshops for making nets.

Marine production is remarkable that after the fishing fires comparison to other means. It starts with a minimum of 6 tons in 1990 to 19,193 tons in 2011, while the production from trawling it is not important from a minimum of 13 in 1992 to a high of 563 in 1996. For coastal fisheries production has increased from a minimum of 1 943 tons in 2008 to a maximum of 3903 tons in 1996. For other ways of fishing, the minimum production increased from 27 tons in 2001 to 2167 tons in 2011.

Evolution of agricultural production between (2004-2008):The region of Monastir specializes in vegetable crops, the share of production for this period is on average 48.43%, followed by the production of olive oil which has an average of 24% and milk production with an average of a rate of 14.25%. Other agricultural products have very low production units that average between 1.33% and 4.18%. The advantage of this development is to show that the structure of production in the Monastir region is dominated by the market gardening sector against nationally (see table below) and a staggered period of one year (even duration: 4 years), this structure is predominated by the farming sector while the gardening ranks third.

Evolution of value added: (See Figure 1 below)

Figure-1 Evolution of the total value added (in thousand dinars) between 1998 and 2011



Source: CRDA

During the observation period, years 1998 - 2011, the value added by agriculture and fisheries has evolved from a low of 68.778 million dinars recorded in 1998 and a maximum of 105,641,000 dinars obtained 2009. This is indicated by the figure above. It appears that the data available agricultural value added, as the value of production, knows important variations. These lead to annual growth rates sometimes positive and sometimes negative. Despite its deployment, fishing is a relatively secondary place.

CLASSIFICATION OF THE REGION IN NATIONAL:There is Note that the Monastir region has achieved leadership rankings in the production at the national level in 2009 and this according to specialty (early vegetables in greenhouses, producing blue fish).

EXPORT OF AGRICULTURAL PRODUCTS:On the other hand, estimates of agricultural products exported from Monastir airport are: vegetables: 198.6 tons, cereals 12.4 tons of seafood: 84 tons.

EVOLUTION OF TRADITIONAL INDUSTRY GREENHOUSE: The governorate of Monastir is located in the coastal center of the country and covers a total area of approximately 1,024 square kilometers (0.7% of the country of Tunisia) and characterized a semi-arid climate where temperatures are relatively mild, particularly in winter which allowed him to cultivate greens off season especially early vegetables in greenhouses which represent the basic foundation of agricultural activity in the region. The culture of premieres began under traditional greenhouses since the 1975-1976 campaign (26 greenhouses). This sector has experienced a remarkable development in the area covered during the period (1975-1985) during which the total

number reached 6290 greenhouses. The highlight of the introduction of greenhouses occurred in both 1980-1981 and 1981-1982 campaigns by installing 3473 greenhouses. During the period since there has been a decline in the annual rate of acquisition of greenhouses (170 greenhouses) to reach after 30 years (in 2009) 10,500 greenhouses (525 ha). Current statistics 8470 greenhouses beyond the age of 20 or 86.5% of greenhouses and glasshouses 7670 exceed the age of 25 is 78.3% of the greenhouses.

Although this technique has, in a first stage, the development of the sector and meets the requirements of the protected cultivation, this structure have not had the desired evolution in design and has not kept pace technical development on the world stage. Inspections and field visits have shown a number of gaps in the features, which we quote:

- ❖ The aging of these structures with a single tunnel that cannot support the weight of exceptional plantations and fluids, especially during peak production. It was recorded in this context the collapse of many greenhouses, especially in case of natural disasters (strong winds, heavy rainfall);
- ❖ The lack of an effective ventilation system: a controlled ventilation system is necessary for the greenhouse to achieve the degree of consistency with plantations and reduce the high moisture content of the air especially in some coastal areas and thus reduce the occurrence of a large number of fungal diseases.

Traditional greenhouses have highlighted limitations in productivity compared to crops under the multi-chapels greenhouses that will not compete with the foreign market and provide a major production for export.

TECHNICAL AND ECONOMIC CHARACTERISTICS OF MULTI SERRES - CHAPELLES

Multi-chapels greenhouses have many technical and economic advantages that contribute to the achievement of high productivity and profitability as well as the rehabilitation of the futures industry in general. These benefits are listed as follows: Profit in the area covered by hectare; Earnings in the plastic cover; Economy in irrigation water; allow early and better production in terms of quantity and quality and thus enable improved profitability.

PROFIT IN THE AREA COVERED: In all cases, one hectare of land cannot support more than 13.5 ordinary greenhouses (6885 square meters), which implies 1563 square meters per hectare will not be exploited in the case of adoption of the common greenhouses. Multi-chapels greenhouses have an earth coverage rate estimated at 84%, while this ratio does not exceed 69% for ordinary greenhouse and is able to win 15% of the cultivated area.

BENEFIT UNDER COVER PLASTIC: For multi-chapels greenhouses, it is recommended to use the "Polyethylene" triple layers since it is a thermal insulator which prevents the low temperatures at night and has a thickness (60 μ - 80 μ - 60 μ) and earnings in the amount of plastic to cover an acre multi-chapels greenhouse is estimated 20% to 30% compared with that used for ordinary greenhouses (one tunnel) and profit in the amount of plastic has a corresponding decrease in the cost Annual 3600 dinars considering the amortization of plastic is over 3 years.

ECONOMY IN IRRIGATION WATER: Multi-chapels allow the collection of rainwater greenhouses in channels provided for this purpose and to link them with a tank dedicated to irrigate crops in condensed homes and necessary in reducing soil salinity. They also help to reduce the pressure demands for irrigation of public irrigation schemes. And when you consider that the average annual precipitation is about 350 mm or 3500 m³ per hectare that only 50% of this water can be assembled, it will be able to build 1750 m³ per hectare, equivalent nearly 50% of the needs of one hectare of crops in a season that lasts about 9 months in greenhouses.

MATURITY AND QUALITY IMPROVEMENT: Compared with ordinary greenhouses, multi-chapels greenhouses provide good thermal equilibrium overnight which is estimated at two degrees and lead to significant improvement in the indoor climate of greenhouses and a positive effect on crop growth and generates a gain on early production especially melon and chilli. In addition to the features mentioned above, the multi-chapels spaced greenhouses allow an easy job and help reduce the temperature difference between day and night, allowing to control humidity and reduce the spread of fungal diseases and to provide a good quality production ready for export.

Thus, despite all these advantages mentioned above multi-chapels greenhouses which inevitably have a positive effect on the profitability of the sector is the high investment cost and rate of grants awarded relatively small today, which has hindered the expansion of this type of greenhouses and rehabilitation sector despite a demand from farmers of the region to the greenhouses category.

To address these obstacles, it is suggested in this context: An exemption of all equipment, components of multi-chapels greenhouses added value including ventilation and PVC layer and water connections. An increase in the roof of subsidies for the categories "B" and "C" to a limit of 40% as is well known in the rehabilitation of fishing and the economy in irrigation

sector. Given the age of the common equipment, it is essential to renew a third of the fleet over the next five years as follows: Funding Program: (Self-financing: 10% Grant: 40% Loan 50% proposed area for Renewal: 150 ha, current investment cost: 150 ha × 300 dinars = 45 million dinars investment cost by integrating the exemption from value added: 150 × 270 000 dinars = 40.5 million dinars.

SCALE AND EVALUATION OF COVERAGE AND INCREASED PRODUCTION: Multi-chapels greenhouses are characterized by the possibility of adoption of a high density of plants use throughout the area covered and the reduction of the distance between the lines, as it allows the horizontal trellis plants. The crops that are traded in the greenhouses are as follows: peppers, tomatoes, melons and by comparing the density of plants between ordinary greenhouses and those multi-chapels, it is clear that there is a difference that can up to 3900 seedlings for melon, 5770 plants for growing chillies and 7200 plants for growing tomatoes in favor of multi-chapels greenhouses.

Earnings in plants density can lead to increased production estimated at: (15 tons / ha for peppers, 30 tons / ha for tomatoes, 10.5 tons per hectare for melon).

Factors encouraging investment in the region: Monastir region occupies a strategic geographical location in the middle of the East coast of Tunisia. Despite its limited size and low natural resources, it is regarded as an evolutionary development center as it is considered an important urban center and an employment reservoir comprising qualified human resources, infrastructure and sophisticated utilities and motivating economic activities and a life of luxury quality.

STRATEGIC GEOGRAPHICAL SITECITY Monastir: It is at the center of the Tunisian coast, overlooking the Mediterranean Sea. It is located just 15 km from Sousse commercial port, at a distance of 60 km from the Enfidha International Airport and future deepwater port in off the coast Hergla for the flow of goods and commodities.

CITY CENTRE IMPORTANT: Population of 456,000 inhabitants, the high population density of 445 inhabitants / km² compared to 64 inhabitants / km² nationwide. Among the important areas that attract the migratory flow from other governorates. And this is how the governorate of Monastir is a huge consumer center.

QUALIFIED HUMAN RESOURCES: Eight vocational training centers total capacity of 3445 people including 2 centers specializing in agriculture and fishing. Close to two research centers for the development namely the Institute of the olive and fruit trees KalâaKbira and the center of the organic farming Chott Meriam.

INFRASTRUCTURE AND SOPHISTICATED EQUIPMENT GROUP

- Equipment environmental protection across the network ONAS (National Sanitation Office) to be used (proportion of network connection is 97.2%) treatment plants and sewage and supervised estuaries;
- Irrigated perimeters including an area equipped with the means of the estimated 5370 ha intensive irrigation ready to be expanded especially in inland regions of the Governorate of which 3670 ha of public irrigation schemes;
- Infrastructure developed that port consists of five fishing harbors contributed effectively to the success of the national strategy for the development of fisheries for blue fish;
- Network of wholesale markets for fruits and vegetables, livestock and fishery products;
- Network storage units and packaging of the product, it consists of 44 cold storage of vegetables and total capacity of 3310 tons fruits; 14 Institutions for storage of fresh and frozen seafood products; 5 establishments processing and packaging of seafood.

ADMINISTRATION NEAR THE FARMER AND OPEN TO PROJECT CREATION OF ENVIRONMENT

Administration to listen to the concerns of farmers and new promoters, it provides them with the necessary technical support through extension and helps secure funding and take advantage of state privileges and this through:

- 11 Agricultural Extension cells covering all regions of the Governorate,
- 2 cells for fishing in Sayada and Tébourba.
- 42 agricultural centers of radiation.
- Agricultural map: helps guide developers and their management structures (offices and agricultural consultants) to the most appropriate agrarian activities to natural and economic data for the project, where there are different possibilities of activities that can be performed, listed in order of priority,
- A developed and varied banking network including five branches of the national agricultural bank.
- Promotion Agency Agricultural Investment (APIA)
- Agency Tunisian Solidarity Bank (BTS)

CHARACTERISTICS OF DIFFERENTIAL GOVERNORATE

- Close distances, which means lower costs for transport and distribution operations and supply and also a rapid export transactions of goods and import of inputs,
- Specializing in the production of early vegetables at national level,
- Possession of highly qualified technical skills and good command of such cultures,
- A futures of area represents 57% of vegetable area (10000 greenhouses)
- Production of early vegetables represents 76% of the total vegetable production
- With the highest productivity at the national level,
- High potential for export, directly or in partnership,
- A constant desire and a huge capacity of producers in the region to demand new production technologies in the fields of agriculture and fisheries.

OTHER AREAS OF INVESTMENT

- Organic crops such as vegetables, olives and some types of fruit.
- Export of vegetables out of season.
- Medicinal Plants and flowers.
- Nurseries the production of olive plants and fruit trees
- Breeding heifers, provided a solution for the supply of them from outside the governorate
- Aquaculture due to the availability of suitable sites for this type of activity and similar to sites Té Boulba - Bekalta and Monastir - Khniss
- Packaging and olive oil packaging.
- Packaging of agricultural and fishery products
- Cold storage and freezing of poultry products.

PUBLIC AND PRIVATE INVESTMENT IN THE XIth Plan: Public and private investments in the XIth Plan in the region during the period (2007-2011) are shown in the Table below:

Table 1: Public and private investment in the XIth Plan (2007/2011)

| INVESTMENTS (thousand dinars) | | 2007 | 2008 | 2009 | 2010 | 2011 | GRAND TOTAL |
|-------------------------------|-------------|-------|-------|-------|-------|-------|-------------|
| PUBLIC | | 3410 | 3686 | 2776 | 2746 | 3013 | 15631 |
| PRIVATE | "TO" | 517 | 504 | 863 | 759 | 1251 | 3894 |
| | "B" and "C" | 11215 | 6800 | 14118 | 22021 | 30000 | 84154 |
| GRAND TOTAL | | 15142 | 10990 | 17757 | 25526 | 34264 | 103679 |

Source: CRDA (2012)

Private investments for the three project types (A, B and C) as of 2011 are shown in the table below:

Table 2: Private investment in 2011

| Type Investment | Investment value (million dinars) | Value of privileges (million dinars) | Many investors |
|-----------------------|-----------------------------------|--------------------------------------|----------------|
| Project Type A | 1,251 | 0.390 | 188 |
| Project types B and C | 30,000 | 1,800 | 94 |
| GRAND TOTAL | 31.251 | 2,190 | 282 |

Source: CRDA (2012)

The investment program in the next Plan (2012-2016) is shown in the table below.

Table 3: Investment program over the next plan (2012-2016)

| YEARS | 2012 | 2013 | 2014 | 2015 | 2016 | GRAND TOTAL |
|----------------------|------|------|------|------|------|-------------|
| Programmed Area (ha) | 20 | 30 | 30 | 35 | 35 | 150 |
| Investment (dinars) | 5400 | 8100 | 8100 | 9450 | 9450 | 40500 |
| Ready (50%) | 2700 | 4050 | 4050 | 4725 | 4725 | 20250 |
| Subsidy (40%) | 2160 | 3240 | 3240 | 3780 | 3780 | 16200 |
| Cash flow (10%) | 540 | 810 | 810 | 945 | 945 | 4050 |

Source: CRDA (2012)

In addition, the amounts of money included in the state budget for the year 2010 are shown in the table below:

Table No. 4: Appropriations included in the state budget in 2010

| Securities | 2009 residues (dinars) | Year loans (dinars) | Total credits (dinars) | Credits completed (dinars) | Completion Rate (%) |
|-------------|------------------------|---------------------|------------------------|----------------------------|---------------------|
| TITLE I | - | 1112 | 1112 | 1051 | 94.5 |
| TITLE II | 1368 | 2999 | 4367 | 2785 | 64 |
| GRAND TOTAL | 1368 | 4111 | 5479 | 3836 | 70 |

Source: CRDA (2011)

AGRICULTURAL PROJECTS IN THE REGION OF MONASTIR: It is noteworthy that several projects at different stages of development located in the governorate or in certain delegations (Téboulba, Bekalta, Kouria) and are in progress.

AQUACULTURE PROJECTS IN THE REGION OF MONASTIR: Other projects that are completed, some who received the original agreement and some have received final approval.

New projects relating to the agricultural sector in the region are subsequently planned according to specific pre-planning. However, do not forget to mention the projects by the business incubator at the National Institute of Science and Monastir marine technologies up to 30 September 2011. The labor employed in the nursery companies totaled a number that exceeds 17 workers.

EMPIRICAL STUDY

In what follows, we will examine the impact of agriculture in the region of Monastir on the country's economic growth. In other words, the degree of contribution to growth and this through an empirical study (Methodology applied through the study of the variables over time "time series" over a period exceeding fifteen years) that will be developed in this frame starting from a Cobb-Douglas function.

Our model based on economic model taking into account the study of a single sector and combining agricultural added value of the region of Monastir to economic growth and this during 1995-2011. The general claim is to see whether an increase in agricultural production in Monastir has increased the level of economic growth over a given period of time.

The objective is to try to deliver an econometric model that can be used to assess the sensitivity of GDP per person to changes in total agricultural production (improving the total value added of the sector) following changes in the productivity of labor in this sector. This ambitious claim is the niche or the basic element of this study. In this part, a positive association was assumed between agriculture and the level of gross domestic product per person in 1995-2011.

Economic and econometric framework model: The theories of modern economic growth are driven by technology rather than physical capital. This was a significant change in the understanding and conceptualization of the process of agricultural contributions to economic growth is essential for development. The fundamental theoretical framework of this study is based on the unilateral economic or business model to one sector, in our case, it is the agricultural sector. The traditional sector has a fixed amount of land, little capital and a large preexisting labor. Thus, to analyze the impact of agriculture on the

economic development of our country during the period 1995-2011, the mathematical expression or identity largely authorized representative of the overall added value of the agriculture and fisheries sector is adopted.

The Cobb - Douglas in our case takes into account the added value of agriculture rather than production, it is of the following form:

$$Y = AK^\alpha S_{ir}^\beta M_{pv}^\gamma U_{pf}^\theta$$

This form can be linearized as follows:

$$\log Y = \log A + \alpha \log K + \beta \log S_{ir} + \gamma \log M_{pv} + \theta \log U_{pf} + \varepsilon_t$$

Where α , β , γ and θ are parameters determined by technology. They are also assigned to the elasticity coefficients of the explanatory variables.

Objective and estimation method: Our goal is to estimate a function of the added value of the Cobb-Douglas type of agriculture based on some explanatory variables, some of which are exogenous to the model namely Sir reminiscent irrigated areas with economic water resources irrigation, Mpv representing the average rainfall in the governorate, UPF that indicates the number of fishing units at the lights used in fishing for blue fish.

Data and variables: The data collected from the CRDA correspond to time series. The evolution of variables related to agriculture and fisheries over time in the region are defined below. The subject study period spans seventeen years from 1995 to 2011.

Y: VA: Variable value, **A:** Technical progress, **K:** Variable investment, **Sir:** Variable irrigated areas with the economic means of irrigation water (taste to taste) **Mpv:** Variable average rainfall in the governorate of Monastir, **UPF:** variable number of fishing units with lights, ε_t : Error Term

Graphical representation of the series and various tests: stationary series in level: The graphical representation for each series can raise the nonstationarity which is justified by the presence in the trend curve (trend) or the seasonal component distinguished by regular peaks. According to the figures, we see that all the series in question are not stationary in levels. According to established correlograms, there is the non-stationary series.

- **Unit root test:** Before estimating the model, it should be stationarity tests of the variables for stationarity is a necessary condition to avoid spurious relations, and check the cointegration relationship between variables, that is to say, s' ensure the convergence of different growth path over the long term. Unit root tests can highlight the stationary or not chronic by determining a deterministic or stochastic trend. Indeed, we are referring to the Dickey-Fuller test increased (1981) and Phillips Perron test (1989) to determine the order of differentiation of macroeconomic series following its evolution over time.
- **Test Augmented Dickey-Fuller (1981):** Regarding the increased Dickey-Fuller test, it is used on macro series whose evolution over time shows no change, and whose fluctuations are stationary around a deterministic function. Indeed, determining the order of integration require the use of the unit root test in the three models comprising successively a trend and a constant, then only a constant and finally either constant or trend.

$$a) \Delta X_t = \Phi X_{t-1} + \lambda + \delta t + \sum_{j=1}^p \gamma_j \Delta X_{t-j} + \eta_t$$

$$b) \Delta X_t = \Phi X_{t-1} + \mu + \sum_{j=1}^p \gamma_j \Delta X_{t-j} + \eta_t$$

$$c) \Delta X_t = \Phi X_{t-1} + \sum_{j=1}^p \gamma_j \Delta X_{t-j} + \eta_t$$

And we deduce:

The null hypothesis of non-stationarity results in the invalidity of the coefficient Φ and for any model. The number of late P is chosen according to the Akaike information criterion (AIC) and Schwartz (SC). This number corresponds to the one that minimizes both information criteria. According to the curves of output per job in logarithms ($\log y$) and the average number of years of study (S), we see that their changes over time have an upward trend and unique and pose breaking problem. This

leads us to test their stationarity by the Dickey-Fuller test increased in each equation (a, b or c) to choose the appropriate equation. The results below show that the model with constant and without trend (equation b) is most suitable.

The table below summarizes the results of the stationarity test for each variable to distinguish those that are stationary in level of those stationary in first difference.

STATIONARITY TEST:

| MODELS | p. (Prob) Critical ADF test | | | | |
|------------|-----------------------------|---------------------------------|---------------------|---------------------|---------------------------------|
| | Log VA | Log k | The Pvm | The Sir | The UPF |
| LEVEL | 0.0251 | 0.83 | 0.0001 | 0.0003 | .9855 |
| DIFFERENCE | ----- | 0.03 | ----- | ----- | 0.0655 |
| CONCLUSION | Stationary in level | Stationary in first differences | Stationary in level | Stationary in level | Stationary in first differences |

❖ **Estimated using ordinary least squares (OLS)**

- OLS, using observations from 1995-2011 (T = 17)

| LVA | Coefficient | Standard deviation | Stat Z | P> Z |
|----------|-------------|--------------------|--------|-------------|
| Constant | 10,214 | 1,084 | 9,415 | <0.0001 *** |
| LK | 0.162 | 0,137 | 2,183 | 0.05956 ** |
| LSIR | 0,127 | 0,050 | 2,499 | 0.02794 ** |
| I_Pvm | 0.058 | 0.091 | 0.642 | 0.53255 |
| I_Upf | 0,350 | 0.292 | 1,196 | 0.25448 |

*Meaning the risk by 10%

** Signification risk of 5%

*** Meaning the risk of 1%

- Heteroscedasticity corrected using the observations of 1995-2011 (T = 17)

| LVA | Coefficient | Standard deviation | Stat Z | P> Z |
|----------|-------------|--------------------|--------|--------------|
| Constant | 9.906 | 0.751 | 13.189 | <0.00001 *** |
| LK | 0.112 | 0,120 | 1,931 | 0.06983 ** |
| LSIR | 0.154 | 0,037 | 4,136 | 0.00138 *** |
| I_Pvm | 0,114 | 0,061 | 1,873 | 0.08559 * |
| I_Upf | 0.169 | 0.261 | 0,650 | 0.52762 |

* Meaning the risk by 10%

** Signification risk of 5%

*** Meaning the risk of 1%

RESULTS AND INTERPRETATION OF THE ESTIMATES OF THE VALUE ADDED FUNCTION

According to the results, we find that the regression explaining the VA per capita by various factors cited above, shows significant effects of most of the explanatory variables. Since the variables are expressed in logarithms, coefficients obviously correspond to elasticity.

Our estimate gives a coefficient of elasticity of the growth of the VA relative to Sir positive and is equal to 0.15. In other words, an increase in the variable irrigated areas with the economic means of irrigation water (taste to taste) Sir 10% leads, other things being equal, an increase of 1.5% of VA per capita which is logical and confirms the empirical studies . The investment variable is highly significant. An increase of 10% of the investment suggests an increase in VA per capita of 1.12%. In fact, any increase in investment is associated with an increase in VA per capita.

Regarding the average variable rainfall in the governorate of Monastir, we find a significant and positive effect of this indicator on the growth of the VA that a 10% increase in rainfall is associated with an increase in 1.4% at the VA per capita. This confirms the strong effect of this variable on the improvement of the agriculture sector.

The variable, number of fishing units with lights has a positive effect but not significant on improving VA per capita in the Monastir region. The increase in UPF and 10% work generates a VA improvement of 1.6% per capita.

CONCLUSION

In this research paper, we regressed some indicators of agriculture value added, we choose the Monastir region or the agricultural sector has taken in recent years, an important part of any strategy for economic development. We used a Cobb-Douglas production function over a period of seventeen years. We applied the new time series econometric techniques. Through this empirical study, we find that the predictors of agriculture in the region of Monastir have crucial effects on the improvement of agricultural value added. This result confirms the beneficial effect of agriculture on the agricultural regional development. Agriculture as any other economic sector is an important dimension that requires much attention for sustainable regional development.

The econometric results, different tests to the initial model, shows a significance of most of the explanatory variables namely the capital represented by the investment allocated to agriculture, irrigated areas with the economic means of irrigation water and the average of rainfall in the region of Monastir. While the variable number of fishing units to fire is not significant. That said, the study of the evolution of some explanatory variables and exogenous to the agricultural sector and the results of the econometric tests previously found evidence that it contributes to a less efficient way to growth and economic development of our country given that the share of agriculture and fisheries in the region of Monastir is 4.3% (17.7% nationally) in comparison with other sectors namely industry and services occupying respectively (45.3%, 35.7%) of the largest shares in the region and thus contribute more effectively to economic growth.

Definitely, through our empirical study to justify econometrically, using data on explanatory variables and exogenous to our model with a Cobb-Douglas function varied over a staggered period of seventeen years, we have seen the leading role and significant in agriculture and fisheries in the region and its contribution to economic growth in spite of the inferiority of the area of the governorate in comparison to other neighboring areas where agricultural areas are much larger. Thus, agriculture in the region of Monastir has a positive impact on economic growth alongside the success that achieved in other sectors namely industry, tourism and services in contributing to a more efficient way growth and economic development.

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