

Environmental and Social challenges of oil and gas exploration in Kenya

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ABSTRACT: The discovery of oil reserves in the Turkana Rift basin, could possibly multiply government revenue. These findings signify a major possible change in the country's position considering the fact that it is one of the low incomes, aid dependent countries in the Sub Saharan region. However, the commercial exploitation of this resource also presents the country with formidable environmental and social challenges due to weak institutions, lack of public participation, poor communication, unskilled labor in the oil industry, absence of crucial policies, poor organizational structures and governance system, indicators that continue to affect all activities leading to unsustainable actions at both the national and community levels. This could give birth to more disastrous results like civil strife, sabotage of oil dealing and the resource curse phenomenon. The paper focuses on aspects of long term sustainable actions which require engagement of all actors, dissemination of information among others driven by all the four sustainability domains (political, economic, ecological and cultural pillars) to prevent potential negative impacts on the country's socio-economic development. This involves comprehensive environmental and social baseline and impact assessment studies, best practice in environment management for effective impact reduction and mitigation, effective environment monitoring, intensive coordination with County government and socialization to local communities to obtain legal and public approval, acceptance, and support for the operation from the very beginning phase of the operations of planning until after the completion of the operations.

KEYWORDS: Oil exploration, Social and environmental challenges, Kenya.

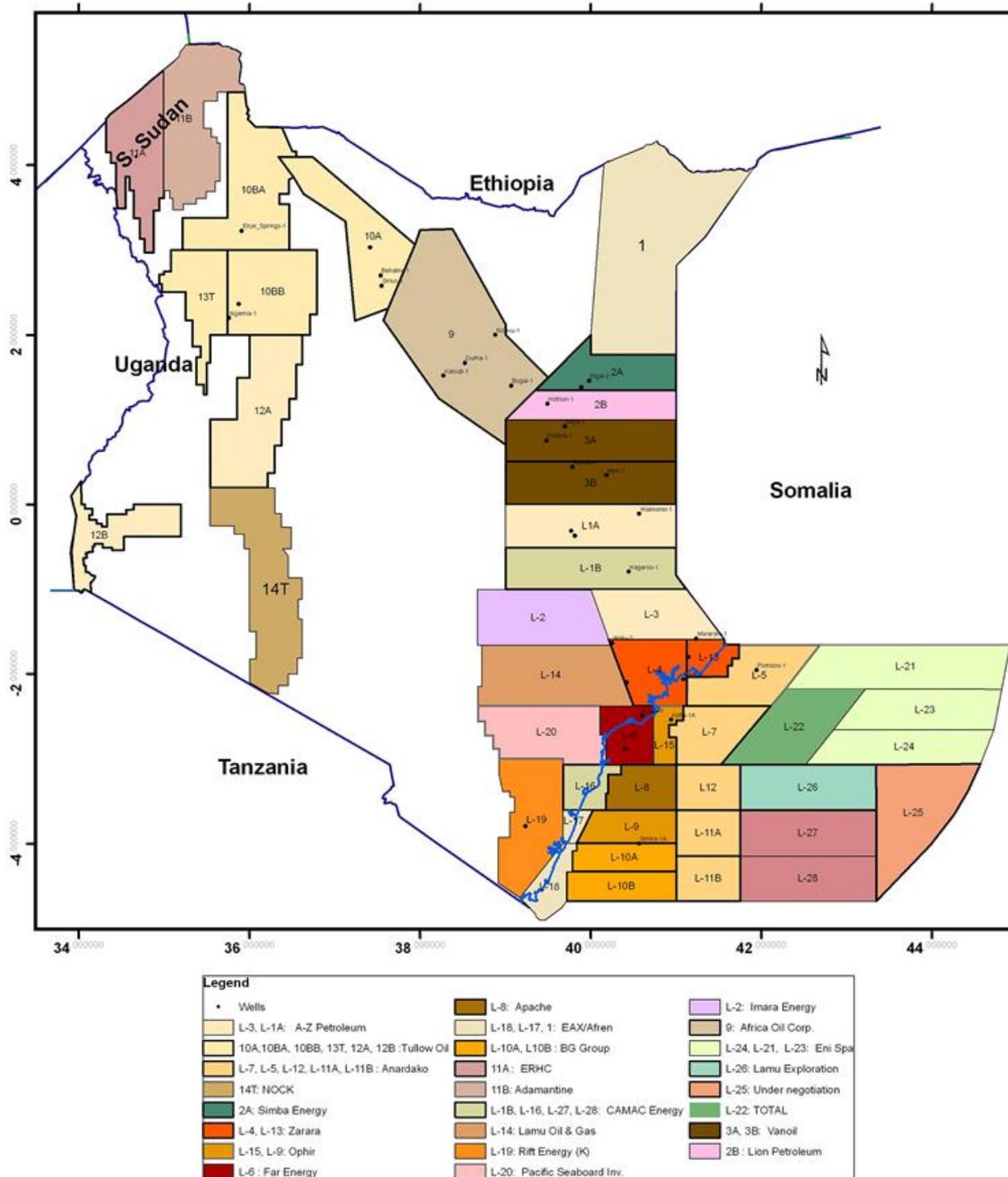
1 INTRODUCTION

The global economy relies heavily on oil and gas to fulfill majority of its energy demands, and it is a key indicator of the economic wellbeing of both developed and developing nations. The international Energy Agency (IEA) predicts that global oil demand will reach 90 million barrels/day in 2020 (World Energy Outlook, 2009). The continued increase in the world's energy demand is due, in part, to robust economic growth in China and India and an uncertain political climate in the Middle East (Mane, 2005; BP, 2008).

Until the last few years the East Africa region has been a sleepy backwater for the upstream industry, but the discovery of significant quantities of oil in Uganda in 2006 has ushered in a bonanza (Deloitte, 2013). Onshore oil discoveries in Uganda have been followed by discoveries in Kenya. Offshore world-class discoveries of gas have also been seen in Tanzania and Mozambique. Potential hydrocarbon basin across East Africa is the subject of intensive interest. There has also been an influx of majors, super-majors and big independents. Indeed so rapid has the industry's progress been over the last few years (Deloitte, 2013).

In mid-2012 oil was discovered in Kenya. This came after a long time of disappointing exploration activities in Kenya. The reserves became commercially viable after it was confirmed that there were around 300 million barrels worth of reserves. As of January 2014, Tullow said Kenya's Northern Basin could have an excess of 1 billion barrels of oil. Kenya's petroleum potential is best depicted by the four large sedimentary basins that straddle the country (sedimentary basins and exploration blocks map). These are Lamu, Anza, Manderu and Tertiary Rift basins. The sedimentary basins are divided into blocks as shown below.

Kenya Exploration Blocks



Exploration Block Map of Kenya: Government of Kenya Revised Edition 2013

Since the discovery of the oil and gas, there have been huge expectations as to how Kenya is going to be transformed as a result of the discovery of the oil and gas in commercial quantities. If managed well, the revenue generated from the natural resources, particularly oil and gas, could bring huge foreign earnings into a country. The wealth from natural resource is a strong base for income creation and sustained economy. Conceptually, the abundance of natural resources is a double-edged sword. While oil and gas discovery, for example, presents considerable opportunities for low income countries (like Kenya) to

deepen domestic revenues and grow, resource abundance carries important challenges. In spite of the socio-economic benefits that oil and gas production can bring to the nation, oil and gas exploration and production involve several activities that can have detrimental impact, either directly or indirectly, on the environment and society and therefore require special attention in striking a good balance. This paper seeks to identify these important challenges and the readiness of the Government of Kenya to deal with the challenges.

1.1 OIL AND GAS DEVELOPMENT ACTIVITIES

The oil and gas industry has three main sectors, namely the upstream, midstream and downstream. The upstream involves the exploration and production; the midstream covers the transportation of oil and gas, and the downstream deals with refining and processing of crude oil and gas products, as well as the distribution and marketing of the products (E&P Forum/UNEP, 1997). The major stages of the upstream oil activities are briefly described below (E&P Forum/UNEP, 1997; Kloff & Wicks, 2004).

1. Aerial and seismic surveys are carried out to identify favorable geological structures such as faults and anticlines in the subsurface.
2. Exploration drilling and appraisal involve drilling of oil wells to confirm the presence or otherwise of hydrocarbon and the internal pressure of such a reserve, all aimed at evaluating the nature, size and extent of the hydrocarbon reservoir to enable confirmation of its economic viability.
3. Development and production wells are drilled into hydrocarbon reservoir to extract the produced fluids, comprising oil, gas and water.
4. Decommissioning and rehabilitation involve the closure and removal of production installations and other structures at the end of the commercial life span of an oil reserve, followed by the restoration of the site to environmentally sound conditions.

2 MAJOR CHALLENGES OF OIL AND GAS DISCOVERY

It is an undeniable fact that exploration and exploitation of oil and gas resources has economic implications for a country but it also comes with major challenges. This section presents some major challenges of oil and gas discovery.

2.1 POTENTIAL ENVIRONMENTAL IMPACT ARISING FROM OIL AND GAS DISCOVERY

The exploration and production industry in any country is accompanied by many environmental challenges. Major activities in upstream operations which result in environmental challenges include seismic acquisition, drilling, development; production and transportation pose great challenges to the environment.

2.1.1 SEISMIC ACQUISITION

According to Marful-Sau (2009), seismic acquisition leads to acoustic emission and accidental spills of chemicals that pollute the sea. Research conducted in the Norwegian seas has also proven that seismic shooting could cause fish to travel tens of kilometres, and some may not return unless after a few weeks. In onshore data acquisition, vast areas of vegetation need to be cleared to improve accessibility to Vibroesis and other seismic acquisition equipment. The destruction to vegetation is made more pronounced in mangroves and forests. This activity affects the aquatic life.

2.1.2 DRILLING

During drilling, a large volume of fluids are circulated through the well and into open, partially enclosed or completely enclosed systems at elevated temperatures (Broni-Bediako and Amarin, 2010). When these drilling fluids are agitated during circulating process there is significant potential of the drilling fluid being discharged to the environment. Drilling discharge affects marine environment, thereby affecting fishing activities which is the major occupation among the coastal communities (Anon., 2010a)

2.1.3 DEVELOPMENT AND PRODUCTION

Particulates which are generated from other burning sources such as well testing contribute enormously to atmospheric pollution. Apart from the emission of carbon dioxide and carbon monoxide, nitrogen oxides and hydrogen sulphide gases are introduced into the atmosphere in quantities which depend on the nitrogen and sulphur content in the oil. In production, the major waste produced is water containing inorganic salts, heavy metals, solids, production chemicals, hydrocarbons and

occasionally Naturally Occurring Radioactive Material (NORM). These have minimal effect on the environment. Nonetheless the release of the waste water into freshwater bodies requires special care (Sam-Okyere, 2010).

2.1.4 TRANSPORTATION AND STORAGE

Oil transportation has been a major source of pollution through oil spills and leakages. Oil spills occur as a result of mechanical failure processes that are involved in oil transportation and storage.

2.2 As may be the case elsewhere, oil and gas exploration and production in the field involve the various stages that could be accompanied by intrinsic environmental challenges. The environmental impacts arising from oil and gas production activities can be broadly grouped into two, namely (i) ecosystems, and (ii) human, socio-economic and cultural (E&P Forum/UNEP, 1997).

2.2.1 NOISE

During oil and gas development, noise disturbances associated with aircraft, bulk vessels and drilling operational activities are likely to impact negatively on the ecosystem. This may arise from prospecting and survey activities already mentioned above. At certain levels, noise affects the functions of marine organisms. Fish and marine mammals, including whales and dolphins, are particularly affected mostly by sound elevation because of their dependence on sound for reproduction, feeding, and avoiding hazards such as predators and navigation (McCauley, 1994; Tyack & Miller, 2002; Popper, 2003). There have also been reported death, reduced growth, impaired hearing and stress, as some of the possible impact of noise from oil and gas operation (Fernandez *et al.*, 2005).

2.2.2 ATMOSPHERIC EMISSIONS

Atmospheric emissions are increasingly becoming the subject of concern to both industry and national governments due to its negative effect on climate. Sources of emissions associated with oil development activities, can be grouped as follows (E&P Forum/UNEP, 1997): (i) Flaring, venting and purging of gases; (ii) Combustion processes from diesel engines and gas turbines; (iii) Fugitive gases from loading operations and losses from process equipment; (iv) Airborne particulate from burning sources, such as well testing and soil disturbance during construction and vehicular traffic. Of these gas emissions, flaring is the most alarming, and has been a source of major conflict in Nigeria and elsewhere (Sala-i-Martin & Subramanian, 2003; ERA/CJP, 2005).

The principal emissions accompanying flared gas contain toxic by products such as methane and benzene, and also generate carbon dioxide, carbon monoxide, volatile organic carbons, sulphur dioxide, nitrogen sulphide and nitrogen oxide. Some of these gases (e.g. carbon dioxide), contribute to global warming, whereas the sulphur gases and carbon dioxide contribute to the formation of acid rain, which is detrimental to soil. Consequently, gas flaring has the potential to damage the Forest Reserve and the surrounding vegetation and farmlands located offshore the oil field.

2.2.3 AQUATIC POLLUTION

Discharges from oils and gas installations include produced water, process water, sewerage, sanitary and domestic wastes, and spills and leakages (E&P Forum/UNEP, 1997). These discharges arise from the drilling of exploration wells and, subsequently, the production of crude oil. Produced water is a combination of formation water from the reservoir and injection water, containing a complex mixture of inorganic and organic compounds, trace and heavy metals, drilling fluids and drill cuttings, and well treatment chemicals (E&P Forum, 1994; Sadiq *et al.*, 2002). The composition of produced water makes it potentially toxic to marine waters. Organic compounds in discharged waste water, when released into marine waters, rivers or lakes, react with and consume dissolved oxygen, thereby, depleting the water of oxygen and rendering it uninhabitable for aquatic organisms (Harremoës, 1998). Similarly, excess supply of nutrients to water bodies also stimulates excessive plant growth and causes reduction in water quality and a decrease in the population of fish and other aquatic organisms (Harremoës, 1998; WHO/EC, 2002). Anti-fouling paints on ships also contain potent biocide such as tributyltin (TBT), which causes reproduction failure of female marine snails and a decline in population (Kloff & Wicks, 2004). Oil tankers, underwater pipelines, offshore oil drilling rigs and coastal storage facilities can accidentally release crude oil into the ocean, and a significant portion of the ecosystem, both offshore and onshore. The negative effects of oil spillage on marine organisms include damage to digestion tract of marine species through digestion, absorption of oil in contaminated food, contamination of eggs leading to poor hatchery, and trapping of turtles and birds leading to death. Over the years, the petroleum industry has witnessed oil spills that have caused considerable ecological damage. Notable among these spills

were the Amoco Cadiz, which spilled about 227,000 tonnes of oil in 1978 (Patin, 1999) and the Exxon Valdez, which spilled 40,000 tonnes of oil in 1989, resulting in the death of about 250,000 seabirds, nearly 3,000 sea otters, 300 harbour seals, 250 bald eagles and up to 22 killer whales (BBC, 1989). Similarly, in 1999, the Erika oil vessel spilled about 20,000 metric tonnes of oil that affected 400 km of coastline, and killed over 100,000 birds (BBC, 2000). The explosion, in 2010, of the Deepwater Horizon, owned by British Petroleum (BP) in the Gulf of Mexico killed 11 people, and resulted in the spillage of 4.9 million barrels of oil, polluting hundreds of miles of coastline and killing 491 birds, turtles and 27 mammals within the first 40 days after the spill (Reuters, 2010; BBC, 2011).

2.2.4 TERRESTRIAL POLLUTION

During oil and gas exploration and production, potential impacts on soils arise from physical disturbances due to construction, deforestation and contamination, resulting from spillage and leakage or solid waste disposal. These activities result in land degradation, transformation and fragmentation of natural habitats, and can disable the vital ecosystem processes that support growth (Barnard & Newby, 2009). In the Niger Delta region of Nigeria, three main sources of oil pollution have been identified, namely oil spills, gas flares and waste discharges (Pyagbara, 2007). Rivers, streams and ponds have been the receiving bodies for oil spills and waste discharges, with their accompanying negative environmental impacts. Available data show that between 9 and 13 million barrels of oil have been spilt in the Niger Delta region in the past 50 years (NCF/WWF/IUCN, 2006). These spills, which occurred on land and destroyed crops, damaged the quality and productivity of soil that the communities use for farming (UNEP, 2011). The spills have also caused the death of birds and mammals, damaged fisheries and contaminated water that the inhabitants use for drinking and other domestic purposes (Amnesty International, 2009). Oil spills and other oil-related pollution have also seriously damaged the Niger Delta's mangroves, which are an important fish breeding area. The damage has resulted in a severely impaired coastal ecosystem, and compromised the livelihoods and health of the region's impoverished residents (NCF/WWF/IUCN, 2006; Amnesty International 2009), thus, negatively affecting economic activities. The reasons assigned to the frequent oil spills in the Niger Delta include corrosion of oil pipes, poor maintenance of infrastructure, spills or leaks during processing at refineries (World Bank, 1995), human error and the consequence of deliberate vandalism or theft of oil (Steiner, 2008). The damage to the ecosystem has caused the Ogoni people, who think their lives are intrinsically bound up with the survival of the environment, to stand up against the denigration of their environment (UNEP, 2011).

2.3 ILLEGAL OIL BUNKERING CHALLENGE

Illegal oil bunkering is the art of stealing oil, i.e., the dangerous practice of siphoning and transporting stolen fuel. The high level of illegal oil bunkering result when there is either high unemployment or ready market for the stolen oil.

2.4 UNEMPLOYMENT

The high expectations that oil companies will offer employment to many Kenyans could result in people moving from the rural areas in Kenya to oil fields in search of jobs in the oil companies. These expectations, if not met, could result in the youth engaging in illegal oil bunkering and other social vices for their livelihood. Political parties could take advantage of the frustrations of the people (especially the youth) to advance their own agenda.

2.5 INTERNATIONAL MARKET FOR STOLEN OIL

Over the past two decades, Kenya has been experiencing many challenges as a result of the smuggling of its natural resources across its borders. Some of these resources include ivory, timber, gold and oil. This has made the government to spend huge sums of money in combating this illegal practice.

2.6 NATIONAL CHALLENGE OF THE USE OF THE OIL'S REVENUE

A lot of views have been expressed by both Kenyans as to how best Kenya can utilize the revenue that will accrue from the oil and gas to ensure net benefit and to avoid the so called *resource curse* as seen in countries like Chad and Nigeria (Broni-Bediako and Addei, 2010). A school of thought puts it that Kenya's oil and gas revenue would be used to build industries such as petrochemical and fertilizer industries to enhance the agriculture sector. Others are also of the view that the oil revenue should be put into a consolidated fund. These are some of the challenges that the Government of Kenya will have to address. Some other challenges include:

- i. Ensuring proper accountability and transparency for the oil revenues else it, could result in the so called resource curse.
- ii. Ensuring equal distribution of the oil and gas revenue. The question is, will the major part of the revenue be used to develop Nairobi and other areas and neglect communities in the area where the oil is produced, as in Nigeria where people believe that the major part of the money is used to develop Abuja while the neighboring communities remain undeveloped.
- iii. Though Kenya has advanced greatly in her democratic path, the challenge of abandoning democracy and resorting to military should not be overlooked. Chad had one of the best policies on how to use its oil revenue but later resorted in using its revenue in purchasing arms (Gary, 2010).
- iv. The challenge of the gradual decline of citizens' duties and obligations such as payment of tax. Citizens will be expecting government to finance public services.
- v. Meeting of the huge expectations of the leaders of the host communities is another big challenge. Reports by Addei *et al.* (2010) reveal the expectations of the people in the host communities on the oil and gas industry.
- vi. Spatial utilization conflicts
- vii. Population and settlement pressure
- viii. Weak institution and management
- ix. Challenges in implementation, compliance, enforcement and monitoring.

Even though Kenya has well-formulated national policies and legal frameworks that regulate the operations of mining companies, most of the legislations on environment are not strictly enforced, and this has been attributed to several factors. Among these are weak institutional capacity to manage the environment, inadequate resources, and lack of political will, all of which have resulted in the lack of proper mechanisms for coordination, monitoring and enforcement. Furthermore, economic concerns, absence of effective sanctions to serve as deterrent to potential polluters, community dissatisfaction, and duplication and overlapping of institutional functions add up to the other foreseeable challenges (UNEP, 2002). Finally, inadequate remuneration and lack of commitment on the part of staff members of the regulatory and enforcing agencies, often serve as good grounds for bribery and corruption. Consequently, mining companies find it cheaper to pollute than to prevent environmental degradation, and the consequence is the documented mining related pollution and land degradation in the mining communities.

3 Kenya is likely to suffer from the above mentioned social Challenges and potential sources of pollution and their accompanying negative environmental impacts, if they are not well managed. Since some Oil fields are located offshore, the ecosystems of concern in these areas are the ocean, beaches, and the atmosphere. The inhabitants of towns and communities dotted along the coast traditionally engage in fishing, as their means of livelihood. Consequently, protecting the sea from any potential environmental damage is very paramount.

3.1 Historically, many new oil-exporting countries failed to give adequate attention to the environmental and social aspects of the petroleum sector in its early development stages. At a later point, it was precisely the overlooked environmental and social impacts of petroleum production that had the greatest negative political and economic ramifications for the government, the oil industry, and society as a whole. Many developing country governments have enacted laws and policies for environmental and social standards. However, the government institutions and agencies for their regulatory oversight and compliance have often been under-funded and ineffectual. Laws and policies alone are insufficient to manage environmental and social standards. Environmental and social issues touched by the oil sector are best addressed through joint collaboration by the oil industry and government, based on respect, mutually agreed objectives and a clear delineation of roles and responsibilities. It is in the best business interests of reputable international oil companies to achieve this level of collaboration. Environmental and social issues should not be compartmentalized into separate functions, but should be recognized as overlapping and interlinked domains that are best addressed holistically.

Over the past 10-15 years, governments and international oil companies (IOCs) have given increasing attention to the environmental and social aspects of oil operations. They have recognized that the reputation and credibility of both governments and private companies are jeopardized if these issues are not handled well. At the risk of over-simplification, this growing awareness of environmental and social issues grew out of initial attention to health, safety and environment (HSE) by oil companies for internal operational practices and technical processes. Over time, greater and greater attention was given to external factors affecting company performance, including explicit concern about social issues and the importance attached to corporate social responsibility (CSR). International media attention to oil spills and pollution, adverse social impacts on local communities and displaced peoples, and inequitable economic growth associated with oil revenues prompted private companies and governments alike to reconsider where their responsibilities to environmental and social concerns begin and end as well as the wider context in which they must act.

4 MANAGEMENT FRAMEWORKS FOR MINIMIZING OIL AND GAS INDUSTRY RELATED RISK

4.1 LEGISLATIONS, CONVENTIONS AND REGULATORY FRAMEWORKS

Major environmental issues related to oil and gas development have been addressed through countless global and regional treaties, national laws and a number of administrative regulations and management frameworks, promulgated by individual countries and multinational organizations such as UN agencies, the World Bank, and International Finance Corporation (IFC) (Gao, 1998) to promote natural resource conservation and pollution control. Kenya is signatory to a number of United Nations and Regional Cooperation Conventions and multi-lateral agreements, which will help in managing environmental impacts. These international conventions are binding on national governments and serve as a baseline or guide in drafting national policies, legislations and regulations. Notable among these treaties and conventions, that have been ratified by Kenya and of particular importance to the environment and oil and gas operations, includes (e.g. Kloff & Wicks, 2004). 1. International Convention for the Prevention of Pollution of the Sea by Oil, 1962; 2. International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage, 1971 ;); 3. International Convention on Civil Liability for Oil Pollution Damage, 1969; 4. Convention on Wetlands of International Importance, especially as Waterfowl Habitats, 1971; 5. Convention on the Conservation of Migratory Species of Wild Animals, 1979; 6. International Convention for the Conservation of Atlantic Tunas, 1966; 7. Montreal Protocol on Substances that Deplete the Ozone Layer, 1989; 8. Convention on Biological Diversity, 1992; 9. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties; 10. United Nation Convention on the Laws of the Sea, 1982; 11. International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78); 12. International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990; 13. The Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention); 14. Convention on the Ban of the Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa (Bamako Convention).

Nationally, Kenya has no comprehensive environmental legislation targeting the oil and gas industry. Existing legislation for ecosystem protection include, The Constitution of Kenya, Wildlife Conservation and Management Act (Cap 376), Forest Act, 2005, Penal Code Cap 63, Public Health Act (Cap 242), The Factories and other places of work Act Cap 514, Water Act, 2002, Mining Act (Cap 306) The Agriculture Act (Cap 318), The Lakes and Rivers Act, Cap 409, Laws of Kenya, Environmental Management and Coordination Act (EMCA, 1999), EMCA (Environmental Impact Assessment (EIA) and Audit (EA) Regulations, 2003, EMCA (Waste Management) Regulations, 2006, EMCA (Water Quality) Regulations, 2006 EMCA (Air Quality) Regulations, 2008, EMCA (Fossil Fuel Emission Control) Regulations, 2006, EMCA (Noise and Excessive Vibration) Regulations, 2009, EMCA (Wetlands, River Bank, Lake shore and Sea shore Management) Regulations, 2009, EMCA (Conservation of Biodiversity and Resources, Access to Genetic resources and Benefit sharing) Regulations, 2006. Other legal frameworks that target the oil and gas industry are Petroleum (Exploration and production) Act 1986, and Energy Act, 2006. Some of these legislations were formulated for both the mining and oil and gas industries, and are, therefore, more generalized. Consequently, they have not been effective in the mining industry, and are, therefore, destined to face a number of challenges in the oil sector.

4.2 RECOMMENDED MEASURES TO ADDRESS ENVIRONMENTAL CONCERNS IN THE OIL AND GAS INDUSTRY

Guided by the various international treaties and conventions, there is the urgent need for the Government of Kenya to formulate an all-inclusive oil and gas development policy with environmental issues at the center stage. The policy framework should integrate environmental legislations and management systems, and also mandate stakeholders to develop an environmental value culture at every stage of their business processes to supplement government's efforts in a cost effective manner. Consequently, the policy should be tailored along two main approaches to regulating the environmental performance of an industry, namely the 'prescriptive' and 'performance based' approaches (Technical Meeting Document, 1998).

4.2.1 THE PRESCRIPTIVE APPROACH

The prescriptive or "command and control" approach is based on legislations indicating specific requirements made by government, to be met by operators. The regulations clearly spell out structural, technical, and procedural requirements to address environmental, health and safety hazards. This makes it relatively easy for government to determine, via an inspection procedure, whether an operator is meeting the requirements. Thus, it is convenient for the Government of Kenya to adopt this approach by setting mandatory environmental codes and standards to regulate and monitor the activities of companies in the oil and gas industry. These standards must include general guidelines for the preparation of an

environmental impact assessment and detailed guidelines for the preparation of an environmental action/management plan to be submitted by firms before the commencement of operations. It is very important that environmental impact assessment be undertaken prior to the commencement of oil exploration and development, and, when discovered that it can potentially impact the environment negatively, the companies involved would be required to indicate what mitigation measures would be employed to contain the situation. The standards must also include acceptable limits of concentrations of compounds and chemicals in effluent discharges generated through the operations of the various companies. Equally importantly should be the application of the “polluter pays” principle to ensure that producers of wastes that cause environmental damage are made to pay compensation and the cost of remediation.

4.2.2 PERFORMANCE-BASED APPROACH

In the performance-based or “self-regulation” approach, which is based on agreements made between government and operators, greater emphasis, is placed on setting environmental goals or standards to be met by operators in the industry. This requires the operators to define strategies and plans in order to achieve the overall objectives and criteria set by the regulator. Accordingly, the operators are responsible for providing evidence, assuring that they are complying with the agreements. An example is a legally binding Environment Action Plan (EAP) that is formulated by the op requirements (Technical Meeting Document, 1998). The self-regulation approach focuses on self-inspection (internal audits) by company experts, in consultations with skilled external auditors, in order to check compliance and report to the regulator. It, thus, removes some of the burden of auditing and inspection from government, while allowing the operator flexibility in choosing practical measures to meet the environmental objectives (Technical Meeting Document, 1998). This approach could, therefore, be adopted by opportunity to find other ways of meeting the goals or targets set by government. Thus, the oil companies could be mandated by government to develop Environmental Management Plan (EMP) or Environmental Management System (EMS) to ensure that they operate within the environmental standards for the industry. EMS is a tool which involves continual cycle of planning, implementing, reviewing and improving the processes and actions that will effectively and efficiently enable an organization meet its business and environmental goals (Five Wind International, 2004). This means that there is a review of the system after each cycle to identify areas for further improvement to meet the national environmental standards for the industry.

The EMS, if well implemented, offers a lot of benefits including improved environmental performance, enhanced compliance, and pollution prevention, reduction in emissions, resource conservation and reduction in environmental pollution. As part of operational measures, oil companies should develop innovative environmental technologies to be employed in their operations, and develop a proper disposal of generated solid waste. The two types of approach could be achieved through the collaborative efforts of the Ministry of Environment, Water and Natural Resource, the National Environmental Management Authority (NEMA), the Kenya Bureau of Standards (KEBS), the oil and gas companies, and other stakeholders in the industry. The EMS, if well implemented, offers a lot of benefits including improved environmental performance, enhanced compliance, and pollution prevention, reduction in emissions, resource conservation and reduction in environmental pollution. As part of operational technologies to be employed in their operations, oil companies should develop innovative environmental technologies to be employed in their operations, and develop a proper disposal of generated solid waste.

4.3 RECOMMENDED ADMINISTRATIVE AND INSTITUTIONAL SUPPORT

A perfect blend of both prescriptive and performance-based approaches could serve a good purpose in pursuing environmental management in the oil and gas industry. In many countries, performance-based approaches are increasingly being adopted to complement existing prescriptive regulations. Classical examples exist in Norway, the Netherlands and Australia, where the offshore oil industry has been moving to a regime based on goal-setting approach, supplemented by the prescriptive system of regulation (Technical Meeting Document, 1998). However, the mere prescription of environmental codes and setting of standards, as well as the development of EMS, cannot provide the much needed panacea for pollution emanating from the oil and gas industry. Guided by the drawbacks encountered in mining industry, it is important that an improved and sustainable strategy be put in place to ensure that oil companies strictly adhere to regulations guiding their activities in the industry, and are not spared any documented punishment if they violate any of the legislations.

Accordingly, it is recommended that the following be considered by government in its quest to safeguard the ecosystem whilst exploiting the oil and gas resources: 1. Government should ensure strict control and enforcement of environmental policies; 2. Strengthening existing regulatory framework for environmental protection; 3. Regular and effective monitoring of oil development activities; 4. Periodic update of environmental guidelines; 5. Periodic upward review of fines/penalties to deter potential polluters; 6. Periodic review of the effectiveness of local environmental agencies; 7. Availability of resources

for staff development in the regulatory and enforcing agencies; 8. Improved remuneration to prevent violations of legislation by companies and discourage bribery; 9. Tax and duty exemptions on the importation of technologies related to environmental control to encourage firms in both industries to transfer pollution control technology to their establishments; 10. Regular inspection and maintenance of oil installations.

In addition, Kenyans should be equipped with the necessary knowledge, skills, attitude and motivation for the prevention of pollution and resource deterioration. Furthermore, establishment of conservation pressure groups, with requisite expertise should be encouraged to serve as an appropriate watch dog, providing public education and making sure that the environment is conserved. Environmental education, both formal and informal, should be embarked on to inculcate environmental values and the habits of preservation and conservation among the entire citizenry.

4.4 INTEGRATED APPROACH FOR MANAGING SOCIETAL ISSUES

4.4.1 INTENSIVE COORDINATION AND SOCIALIZATION WITH LOCAL AUTHORITIES AND OTHER STAKEHOLDERS

Engaging potentially affected stakeholders in consultation and participation in decision making is essential to smooth project execution in sensitive environments. Transparency in dealing with governments and local communities has been effective to obtain both legal and public approval, acceptance and support. Local communities' involvement is not only at the beginning phase of E&P operations but also extended to the implementation phase and continued until the completion of the operations. Due to this direct involvement, the local communities have better knowledge about the oil and gas operations. The other advantage from their participation is the improvement of communication between oil and Gas Company with the local communities which aids into smooth operations of oil and gas activity.

4.4.2 CONTRIBUTING IN SUSTAINABLE SOCIAL AND ECONOMIC DEVELOPMENT OF LOCAL COMMUNITIES

As part of commitment for sustainable development, corporate social responsibility (CSR) programs should be performed with 5 main focuses: 1. Education and research, 2. Health and Nutrition, 3. Community economic empowerment and capacity building, 4. Environment and alternative energy, 5. Foundation for preservation of local culture. In implementing CSR programs, integrated approach of partnership between Government, Company, Academic and public sector is necessary to meet the objective of community self-sufficiency and sustainability. Collaboration and clear delineation of roles and responsibilities between the County government, community and its oil company partners is required to achieve optimal environmental and social programmes with cost-effective use of available resources. This trend is evident in the growing complexity and scope of CSR and the accompanying demands placed on oil companies and the CSR oversight function of government

4.4.3 CLAIMS AND DISPUTES MANAGEMENT

Societal claims and disputes are managed with government involvement as a mediator through intensive coordination and discussion process, supported with involvement of conflict resolution experts when necessary. This approach has shown positive results in managing and solving societal claims and disputes.

5 CONCLUSION

Proactively addressing environmental and social issues at the very early stages in the development of the oil sector can help avoid later unforeseen problems. Recognizing the different social and environmental requirements that must be addressed at each stage in the lifecycle of an oil project – from screen/negotiate through the dispose phase is essential. There is also growing convergence and inter-linkage between environmental and social issues, requiring their holistic treatment. Successful oil and gas exploration and production operations in environmentally and socially sensitive area require careful and intensive approach to minimize impacts to surrounding environment as well as to surrounding communities. The actions taken to control and minimize aspect of oil and gas exploration and production operations to environment and to manage societal issues have shown positive results in minimizing the 'footprint' of exploration and production operations and to make a positive contribution in environmental and social areas.

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