SFG2851 V2

EPUBLIC OF KENYA

MINISTRY OF ENERGY AND PETROLEUM

KENYA PETROLEUM TECHNICAL ASSISTANCE PROJECT (KEPTAP)

FINAL REPORT

STRATEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT OF THE PETROLEUM SECTOR IN KENYA

DECEMBER, 2016

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ACRONYMS AND ABBREVIATIONS

AEZ	Agro ecological zones
AGO	Automotive Gas & Oils
AGOL	Africa Gas and Oil Limited
AIA	Archeological Impact Assessment
ASALs	Arid and Semi-Arid Lands
AWEMAC	Africa Waste and Environment Management Centre
Bbl/day	Barrels per day
Bcm/yr	Billion cubic meter per year
CANCO	Community Action for Nature Conservation
CBO	Community Based Organisation
CDA	Coastal Development Authority
CEC	County Executive Committee Member
CEMZA	Combined Exclusive Maritime Zone of Africa
CEPSA	Compañía Española de Petróleos SA (Spanish Petroleum Company Inc.)
CIA	Cultural Impact Assessments
CRA	Commission for Revenue Allocation
CS	Cabinet Secretary
CSO	Civil Society Organization
DBFO	Design, Build, Finance and Operate
DOSHS	Directorate Occupational Safety and Health Services
DPK	Dual Purpose Kerosene
DRC	Democratic Republic of Congo
E&P	Exploration and Production
EA	Environmental Audit
EDD	Environmental Due Diligence
EIA	Environmental Impact Assessment
EMCA	Environment Management Coordination Act
EMIS	Environmental Management and Information System
EMP	Environmental Management Plan
EOPS	Early Oil Pilot Scheme
EPFIs	Equator Principles Financial Institutions
ERC	Energy Regulatory Commission
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
FEED	Front End Engineering Design
GDC	Geothermal Development Company
GDP	Gross Domestic Product
GIS	Geographical Information system
GoK	Government of Kenya
HIA	Health Impact Assessment
HMK	Haki Madini Kenya
IBA	Important Bird Area
ICJ	International Court of Justice
IEA	International Energy Agency
IFC	International Finance Corporation
ILEG	Institute for Law and Environmental Governance
IOC	International Oil Companies

IPIECA	International Petroleum Industry Environmental Conservation Association
ITLOS	International Tribunal for the Law of the Sea
JDZ	Joint Development Zones
KCAA	Kenya Civil Aviation Authority
KCSPOG	Kenya Civil Society Platform on Oil and Gas
KEBS	Kenya Bureau of Standards
KMFRI	Kenya Marine and Fisheries Research Institute
KeNRA	Kenya National Resources Alliance of Kenya
KEPTAP	Kenya Petroleum Technical Assistance Project
KETRACO	Kenya Electrical Transmission Company
KFS	Kenya Forest Service
KIPEDA	Kenya Independent Petroleum Dealers Association
KMA	Kenya Maritime Authority
KNEB	Kenya National Electricity Board
KOGA	Kenya Oil and Gas Association
KOGWG	Kenya Oil and Gas Working Group
KOSF	Kipevu Oil Storage Facility
KPA	Kenya Ports Authority
KPC	Kenya Pipeline Company
KNPMP	Kenya National Petroleum Master Plan
KPRL	Kenya Petroleum Refineries Limited
KRA	Kenya Revenue Authority
KWCMA	Kenya Wildlife Conservation and Management Act
KWS	Kenya Wildlife Service
LAPSSET	Lamu Port – South Sudan – Ethiopia Transport
LCDA	LAPSSET Corridor Development Authority
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LSCI	Liner Shipping Connectivity Index
MDP	Ministry of Devolution and Planning
MEA	Multilateral Environment Agreement
MoE	Ministry of Education
MoEP	Ministry of Energy and Petroleum
MoIED	Ministry of Industrialization and Enterprise Development
NAFFAC	National Fossil Fuels Advisory Committee
NAP	National Action Plan
NBSAP	National Biodiversity Strategy and Action Plan
NCCAP	National Climate Change Action Plan
NCS	National Communication Strategy
NDMA	National Drought Management Authority
NDOC	National Disaster Operations Centre
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
NLC	National Land Commission
NMK	National Museums of Kenya
NOCK	National Oil Corporation Kenya
NOSRC	National Oil Spill Response Committee
NPEP	National Poverty Eradication Plan
NPGD	National Policy on Gender and Development
NRT	Northern Rangelands Trust

NT	National Treasury
NUPAC	National Upstream Petroleum Advisory Committee
NWFPs	Non-Wood Forest Products
O&G	Oil and Gas
O&S	Operation and Support
OMCs	Oil Marketing Companies
OP/BP	Operational Policies/ Bank Procedures
OPEC	Organization of the Petroleum Exporting Countries
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
OSMAG	Oil Spill Mutual Aid Group
PEC	Poverty Eradication Commission
PIEA	Petroleum Institute of East Africa
PMU	Project Management Unit
PPP	Policies Plans and Programme s
PPP	Public Private Partnership
PRSP	Poverty Reduction Strategy Paper
PSCs	Production Sharing Contracts
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SESA	Strategic Environmental and Social Assessment
SIA	Social Impact Assessment
ToR	Terms of Reference
TVET	Technical and Vocational Education Training
UN	United Nations
UNCLOS	United Nations Convention of 'the Law of the Sea
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar
VLCC	Very Large Crude Carriers
WHO	World Health Organization
WRMA	Water Resources Management Authority
WSSD	World Summit for Sustainable Development

DEFINATION OF TERMS

These definitions of terms have been obtained from The Petroleum (Exploration, Development and Production) Bill, 2015 and Environmental Management and Coordination Act, Cap 387. They include:

Best Petroleum Industry Practices- such practices, methods, standards and procedures generally accepted and followed internationally by prudent, diligent, skilled and experienced operator in upstream petroleum operations, including practices, methods, standards and

Block - acreage as defined by specific geographic coordinates for purposes of upstream petroleum operations

Compulsory Acquisition - acquisition as provided for under the relevant written law

Decommissioning - abandonment, recovery, removal and disposal, or if applicable re-deployment, of wells, flow lines, pipelines, facilities, infrastructure and assets related to upstream petroleum operations

Development - the planning, placement, construction and installation of facilities needed for production of petroleum

Downstream petroleum operation- means all or any of the operations related to refining process of unrefined oil and gas products, marketing/ distribution of refined oil and gas products (after leaving the transportation/ storage facilities of the midstream sector).

Exploration - means the set of operations carried out in onshore or offshore blocks for data acquisition using geological, geochemical, geophysical exploration and appraisal wells or any other method with a view to locating petroleum deposits Extraction;

Field- the geological structure or feature which hosts one or more reservoirs from which petroleum production maybe commercially undertaken through a defined set of facilities

Gas- methane, ethane, propane, butane or hydrocarbons which may consist of one or more of any of those gases, either in the form of gas or liquid

Local Community- a sub-county or sub-counties in which an upstream petroleum resource is exploited

Local Content- the added value brought to the Kenyan economy from petroleum related activities through systematic development of national capacity and capabilities and investment in developing and procuring locally available work force, services and supplies, for the sharing of accruing benefits

Midstream petroleum operations- means all or any of the operations related to transportation and storage of unrefined and refined oil and gas products;

Natural Gas - means hydrocarbons that are in a gaseous phase at atmospheric conditions of temperature and pressure, including wet mineral gas, dry mineral gas, casing head gas and residue gas remaining after the extraction or separation of liquid hydrocarbons from wet gas, and non-hydrocarbon gas produced in association with liquid or gaseous hydrocarbons;

Permit- means an authorisation granted to a person to enable the carrying out of any activity in the upstream petroleum operations

Petroleum - means all hydrocarbons and includes crude oil and natural gas, whether capable of being produced from conventional and unconventional reservoirs, including shale oil, oil shale, shale gas, coal bed methane gas, tar sands, and other sources of hydrocarbon reserves;

Petroleum agreement- means any agreement, license or contract or other arrangement between the Government and a contractor and/or amongst contractors to conduct operations in accordance with the provisions of this Act, which may include: (a) production sharing contracts; (b) concession agreements; and (c) service contracts;

Pollution -means any direct or indirect alteration of the physical, thermal, chemical, biological or radioactive properties of any part of the environment by discharging, emitting or depositing wastes or emitting noise so as to affect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous to public health, safety or welfare or to animals, birds, wildlife, fish or aquatic life, land, property and water sources or to plants

Production sharing contract- means a petroleum agreement entered between the Government and the contractor, which enables the contractor to explore, develop and produce petroleum within a contract area;

Strategic environmental assessment- means a formal and systematic process to analyse and address the environmental effects of policies, plans, programme s and other strategic initiatives. In the context of this report, Strategic Environmental Assessment (SEA) and Strategic Environmental and Social Assessment (SESA) are used interchangeably. But SEA is the international and NEMA official title to the process in Kenya but when referring to this we use SESA.

Upstream petroleum operations- means all or any of the operations related to exploration, development and production of oil and gas;

Venting- means controlled release of gaseous hydrocarbons or any other gases from the petroleum operation into the atmosphere;

ACKNOWLEDGEMENT

We, as Africa Waste and Environment Management Centre (AWEMAC) in collaborationwith Impulso Industrial Alternativo, SA (Spain), wish to thank the many individuals and organizations that supported the various SESA experts we engaged to make the compilation of this reporta success. The consultant is grateful for all the time, knowledge and resources that were offered to achieve the desired deliverables.

Specific appreciation goes to the World Bank staff who have worked with the consultant closely and even made time to attend some of the consultative meetings to clarify issues and answer some of the questions that came from stakeholders, while also advising the SESA experts on the best approaches to apply in various stages of SESA.

The consultant also appreciates the immense contribution of the Ministry of Energy and Petroleum personnel who selflessly worked hand in hand with the expertsand even sometimes went beyond office hours to see that SESA goals were achieved. Specific gratitude goes to The Principal Secretary, The Commissioner and the staff from KEPTAP Project Management Unit (PMU) who among other things mobilized various staff to see that SESA work was done effectively.

The National Environment Management Authority (NEMA) was a key stakeholder that actively participated in the various SESA consultations. Being the custodians of the past EIA reports done for various petroleum projects, NEMA officers at the Headquarters and at the County levels were of great help through availing various reports that the SESA experts requested to review for featuring in this SESA report.

Appreciation also goes to the many offices/organizations to which letters requesting to have meetings were sent and the various officers that gladly hosted the consultant. These among others include; Kenya Pipeline Company, Energy Regulatory Commission, Tullow Oil Kenya, Radiation Protection Board of Kenya, Ministry of Health, Kenya Revenue Authority, Commission on Revenue Allocation, National Museums of Kenya, LAPSSET Development Corridor Authority, Directorate of Occupational Safety and Health Services, Petroleum Institute of East Africa, Kenya Petroleum Refineries Limited, Kenya Maritime Authority, Kenya Ports Authority, Africa Gas and Oil Company, and Oil Spillage Mutual Aid Group.

The SESA consultant also thanks the various stakeholders who attended the regional consultative meetings held in Isiolo, Lamu, Mombasa, Lodwar, Kisumu, Eldoret and Nairobi Counties. This report would not have been a success without the issues and concerns that were highlighted in these forums.

Finally, the SESA team thanks both the local and international experts who workedtirelessly throughout the entire process. The experts' immense effort put towards making this SESA report a success is greatly appreciated.

NON-TECHNICAL SUMMARY

The oil and natural gas discoveries in Kenya have increased the national and private sector interest for onshore and offshore exploration of hydrocarbons in the country. It is believed that these discoveries may have substantial transformational impact on the Kenyan economy, triggering new developments which require petroleum sector reforms necessary to help manage environmental and social impacts. The petroleum industry is broadly divided into three categories namely the upstream covering exploration, development and production of oil and gas; midstream, covering transportation and storage of unrefined and refined oil and gas products; and downstream which involves the refining process of unrefined oil and gas products, marketing/ distribution of refined oil and gas products (after leaving the transportation/ storage facilities of the midstream sector). With this discovery of oil and gas resources in Kenya, increased socio-economic opportunities are anticipated. However, these opportunities may bring serious social and environmental challenges affecting areas of high ecological and biodiversity significance as well as communities. To fully understand the impact of the petroleum activities, the Ministry of Energy and Petroleum engaged private consultants (comprising of both local and international experts) to conduct a Strategic Environmental and Social Assessment (SESA). The purpose of the SESA process being consultations with the relevant stakeholders to collect views and draft strategic recommendations for Policies, Plans, and Programme s (PPP) that will guide environmental and socio-economic planning and decision making in the petroleum sector in the country. The SESA outputs present a unique opportunity for the country to systematically address environmental and socio-economic management issues pertaining to oil and gas activities in the context of sustainable development.

The Ministry of Energy and Petroleum is the PPPs owner. The SESA Report covered the existing Ministry's Policies, Programme s and Plans (PPPs) *upstream* (exploration, development and production of oil and gas); *midstream* (transportation and storage of unrefined and refined oil and gas products); and *downstream* (refining process of unrefined oil and gas products, marketing/ distribution of refined oil and gas products (after leaving the transportation/ storage facilities of the midstream sector)). The specific objectives of SESA included the following:

1) To help reduce risks and ensure preparedness for the consequences of oil and gas development.

2) Identify environmental and poverty-combating priorities and how these may be influenced by oil and gas development options and alternatives.

3) Assessing the country's related institutional and economic capacity to deal with the identified negative consequences of oil and gas development.

4) To recommend institutional and governance-strengthening measures.

5) At plan and programme levels, SESA will help to take environmentally sound decisions e.g. on which technologies will be used, and capacities and locations of interventions.

SESA Methodology

The methodology employed in the SESA was derived from the SESA terms of reference, input from the SESA team and using the NEMA guidelines of 2012 and other international best practices. The consultant approached the SESA study from the same angle in terms of categorisation of the policies, programme s and plans and this was useful in identification of stakeholders, environmental and social issues at various levels.

The general scope involved the following activities:

- Gathering of environmental and social baseline data to determine key environmental and social concerns/ impacts related to oil and gas development; onshore and offshore;
- Identifying key SESA challenges;
- Preparing key recommendations; and
- Prioritising Recommendations.

The scoping and main study process entailed:

- Kick-off consultation meetings with the client, World Bank, NEMA and MoEP representatives
- Desktop studies/ literature review and compilation of information
- Stakeholder mapping and analysis
- Trips/ field visits to the oil and gas sites in the upstream; midstream and downstream
- Interview of key stakeholders
- Consultation meetings/ workshops with stakeholders.
- Case studies
- Benchmarking of the study

Scoping workshops were undertaken in the following regions: North Rift; Western Kenya and parts of South Rift; North Eastern and Eastern Region; Coastal Region: Central Kenya/ Mt. Kenya Region; Nairobi Metropolitan and surrounding regions; and at National level. Two local stakeholders' meetings at Lamu and Turkana were undertaken to capture local concerns at grassroots level of communities directly impacted by on-going oil explorations and developments related to the petroleum sector. Those invited to the forums were representatives from the following four (4) categories: public sector and key ministries/ inter-ministerial lead agencies / key public institutions**,** private sector actors/ investors, universities and research institutions, and civil society and associations.

Overview of the Petroleum Sector Policies, Programme s and Plans (PPPs)

Ministry of Energy and Petroleum Policy: In the line of petroleum activities, the policy addresses issues on: upstream petroleum operations through petroleum agreements; land, environment, health and safety; devolution and provision of energy services; energy financing, pricing and socio-economic issues; gas sector development and cross cutting issues.

Ministry of Energy and Petroleum Programme s: Petroleum exploration, distribution and marketing are the three key strategic programme s of the Ministry of Energy and Petroleum (MoEP). Kenya Petroleum Technical Assistance Project (KEPTAP); which is a World Bank funded initiative, is one of the programme s/ projects of the MoEP to assist the government in building capacity to manage its petroleum sector and wealth for sustainable development impacts. The other programme includes the Early Kenyan Crude Oil Pilot Scheme which targets mid-2017 to start exporting oil to test the market response to the product.

Ministry of Energy and Petroleum Plans: Kenya Pipeline Corporation (KPC Vision 2025) which envisions having petroleum depots and pipelines at all the county headquarters in

Kenya, LAPSSET Master Plan (Petroleum Infrastructure Component),refurbishment of Kenya Petroleum Refineries Limited (KPRL) plant into a storage hub for both refined and unrefined products, draft Kenya National Petroleum Master Plan and the Energy Regulatory Commission (ERC) Strategic Plan will all be assessed during the SESA process.

Existing / potential environmental, socio-cultural, health and safety concerns and impacts of the PPPS

Environmental Impacts and Concerns

- Land acquisition, displacements and land use changes
- Impact on forestry resources and indigenous tree species
- Impacts on wildlife habitats, biodiversity hotspots and wildlife migration routes
- Impacts on Important Bird Areas (IBAs)
- Impacts on water resources
- Impact on fishery resources
- Impacts of offshore oil and gas activities on marine resources
- Oil fields hazardous waste management from onshore and offshore petroleum developments
- General emissions (such as gas flaring, diesel engine fumes, lead fumes, mercury fumes and hydrogen sulfide fumes)
- Climate change impacts

Socio-Cultural and Economic Impacts and Concerns

- Impacts on agriculture/ livestock production systems
- Impact on pastoralism traditional systems
- Population migrations/ influx management in oil exploration areas and health issues
- Preservation of historical, cultural resources and heritage sites
- Public participation process and consent from community
- Gender and equity
- Human rights
- Local livelihood and community development
- Governance and conflict management
- General community positive and negative perceptions
- Petroleum sector security concerns
- Local content concerns
- Profit petroleum sharing
- Economic impacts of adulteration of fuel
- Impact on shared infrastructure

Occupational Safety and Health Concerns

Health and safety are critical for oil and gas operations not only due to the inherent safety risk but also due to the sheer isolation involved in most oil and gas operations. The report incorporates the health and safety concerns of the petroleum sector based on consultations with stakeholders, field case studies and relevant literature available. Local statutes, regulations and standards currently in place supplemented with international standards applicable to the oil and gas industry are discussed. Moreover, other core issues outlined included, but not limited to the health and safety concerns for the indusrty, the role of private sector initiatives as well as the role of government agencies. Currently the Directorate of Occupational Safety and Health Services (DOSH), under the Ministry of Labour and East African Affairs is the Occupational Safety and Health implementing agency in Kenya, nevertheless, few gaps still exist in order for the full realization of safety in the emerging oil and gas sector. The study finally recommended best practices that can be adopted

throughout the exploration, production, transport and retail systems. Some industry specific occupational safety and health concerns are discussed under onshore and offshore subsectors.

Onshore ativities has the following health and safety concerns: air emissions, wastewater management, waste management, fuel adulteration and its associated environmental impacts, terrestrial impacts and project footprint, accidental spills, noise pollution, community health concerns, fire safety, emergency response, safe zones and emergency corridors, weather risks, security concerns among others..

Similarly, the offshore occupation concerns entail ocean oil spills management, maritime security and safety, navigation safety and aids, search and rescue, well blowouts, personnel transfer and vessel among others. The report outlines the training and capacity development needs in the onshore and offshore safety and health.

Additionaly, the following general health and safety concerns are also important for the oil and gas sector:

- Inadequate public awareness on health and safety issues/ risks of the sector
- Non-compliance to existing buffer zones/ safe distance regulations
- Inadequate enforcement mechanism and non-compliance to national and international safety standards for petroleum retain and other facilities and oil fields

- Information and advisory services on occupation safety and health
- Enforcement and compliance standards
- Construction and operations of illegal plants
- Conflicts and insecurity
- Human resources/capacity and health centres to offer health emergencies from petrol related incidents and accidents
- Limited human and technical capacity by DOSHS to implement OSHA 2007 in all the 47 counties and sub-counties
- Duplication of roles by public statutory institutions on enforcement of health and safety
- Inadequate capacity to address public road safety and disaster management by various public agencies

Key Policy Recommendations

Based on environmental, socio-economic, health and safety policy gaps identified and analyzed, the following key (priority) recommendations emerged from the SESA process:

Environmental Recommendations

- Development of guidelines for Integrated Environmental Assessment for both the onshore and offshore petroleum development activities
- Establishment of a Petroleum Unit at NEMA to handle all environmental matters for upstream, midstream and downstream sector
- Development of the inspection and monitoring procedures. Improving and building capacity on EIA follow-up, monitoring mechanisms and information dissemination to ensure enforcement and compliance to laws.
- Establishment of a national environmental analytical laboratory
- Establish a one stop petroleum sector environmental management information system
- Strengthening institutional capacity in inter-agency coordination and environmental management of the oil and gas industry both at National and County levels.
- Undertaking relevant studies to include conservation of habitats: Support mapping of wildlife migratory and dispersal routes and breeding zones and biodiversity hotspots

- A comprehensive approach to oil spill prevention and response plan should be implemented
- Undertake coordinated spatial planning to avoid natural resource degradation, including land conflicts with the Oil and Gas Industry
- Capacity building for ESIA Experts/Consultants in the petroleum sector
- Application of an Integrated Environmental Assessment Approach in Environmental Assessments by including Archaeological Impact Assessment (AIA), Social Impact Assessment (SIA), Health Impact Assessment (HIA) and Cultural Impact Assessments (CIA).
- Special scientific and socio-economic studies recommended: periodical economic valuation/ inventory of all onshore and marine resources in offshore oil blocks; environmental, health and safety audit of oil exploration activities; baseline study on local content and periodical baseline studies in the sector.
- Embrace and implement cleaner technologies for the oil and gas sector to mitigate climate change impacts
- Zoning and conservation of habitats: Support mapping of wildlife migratory and dispersal routes and animal and fish breeding zones and biodiversity hotspots

Socio-economic Recommendations

- Development of resettlement policy framework and practice standards
- Harmonize all policy and legal Local Content initiatives and existing policy and legal drafts by developing them into one comprehensive National Local Content Strategy and Act for the whole petroleum sector or extractives sector through a wide participatory process.
- Strengthening public consultation and involvement procedures by developing and implementing a public participation and consultation manual/ guidelines for oil and gas sector or extractives sector.
- Development of a National Communication Strategy for Oil and Gas Sector and implementation of a Public Education Awareness Programme
- Mainstream gender issues in petroleum sector policies in order to ensure access to jobs and opportunities are enhanced for all gender groups, people living with disabilities, marginalised and minority communities.
- Development and implementation of a national security master plan for oil and gas sector. Enhance national security strategy to ensure adequate security personnel and resources are assigned to the petroleum sector.
- Preservation of cultural properties and resources
- Preserve and integrate constitutional and community human rights into all oil and gas developments, especially in the upstream and midstream sectors
- Harmonize all policy and legal Local Content initiatives and existing policy and legal drafts by developing them into one comprehensive National Local Content Strategy and Act for the whole petroleum sector or extractives sector through a wide participatory process.

Health and Safety Recommendations

The oil and gas industry in all the sectors (upstream, midstream and downstream) will come along with myriad impacts both positive and negative, which need to be mitigated. Considering the key policy and institutional gaps for the health and safety concerns, the following key recommendations are outlined:

- Review and benchmark healthy and safety standards of the petroleum sector by an independent authority/ task force team to cover areas like safety standards for all categories of the petroleum facilities and oil fields
- Harmonization of the duplicated roles performed by NEMA, DOSH and ERC in relation to Occupational safety and health,
- Enhancement of educating for the members of the public on the existing dangers during accidental spills,
- Formulation of policies to address clear buffer zones to be maintained by the oil industry sector both in upstream, midstream and downstream sectors.
- Formulation of a comprehensive national legislation framework for oil spill prevention, preparedness, response, liability and compensation and agreements, memorandum of understanding for response between different parties that are consistent to the international and national provisions
- Establishing common, best practice approaches to offshore oil and gas safety and security regulation, to include industry engagement, this may include establishing regional government-industry cooperative agencies to provide advice and coordination
- Development of adequate disaster management structures or emergency preparedness plan in oil and gas sector through formulation of plans and policies that will provide sufficient guide to the relevant authorities,
- Maintenance of counter-terrorism capabilities, prevention strategies and operational responses to threats leading the management of maritime intelligence.
- Establish an oil and gas industry Search and Rescue (SAR) requirement and procedures for offshore sites.
- Establishing a framework for marine environmental protection including pollution, dumping and decommissioning of offshore installations;

1.0 CHAPTER ONE: INTRODUCTION

1.1 Overview Context of the Strategic Environmental and Social Assessment for Petroleum Sector in Kenya

Strategic Environmental and Social Assessment (SESA) is a range of analytical and participatory approaches that aim to integrate environmental consideration into Policies, Plans, and Programme s (PPP) and evaluate the inter-linkages with economic and social considerations. Environmental Impact Assessment (EIA) process which in various circumstances has been confused with SESA, inadequately deals with cumulative, synergistic, secondary, and/or long-term impacts which can be addressed when policies, plans, and programme s (PPP) are subjected to a SEA process. SEA can analytically and systematically integrate environmental issues into PPP formulation through a rigorous stakeholder engagement process among others. SEA is not always mandatory for all PPPs.

SEA is a family of approaches that uses a variety of tools, rather than a single, fixed, prescriptive approach. The SEA process extends the aims and principles of Environmental Impact Assessment (EIA) upstream in the decision-making process, - 9 - beyond the project level, when major alternatives are still possible (UNEP, 2002). Consistent with Agenda 21 principles, SEA is a proactive approach to integrate environmental considerations into the higher levels of decision-making.

Recent oil and natural gas discoveries in Kenya have increased the national and private sector interest for onshore and offshore exploration of hydrocarbons in the country. These recent oil and gas discoveries may have a substantial transformational impact on the Kenyan economy, and have triggered new developments which require a re-design of the institutional set up to effectively govern the petroleum sector with clearly defined roles and responsibilities. Further, the development of petroleum sector reforms is necessary to help manage environmental, social, health and safety challenges in the management of the petroleum sector upon discovery of commercially viable oil and gas deposits.

The discovery of oil and gas resources in Kenya, therefore, presents great socio-economic opportunities and challenges for the country at large, as well as various challenges for environmental protection in areas of high ecological and biodiversity significance. The Strategic Environmental and Social Assessment (SESA) presents a unique opportunity for the country to systematically address environmental and socio-economic management issues pertaining to oil and gas activities in the context of sustainable development.

1.2 The Kenya Legal Requirement for SESA

Strategic Environment Assessment (SEA) is relatively new in Kenya. The Environmental (Impact Assessment and Audit) Regulations, 2003 mentioned that lead agencies should subject all public Policies, Plans and Programme s to Strategic Environmental Assessment. However, even after gazettement of the Regulations emphasis was placed on the equally new Environmental Impact Assessment (EIA) and Environmental Audits (EA). The up-take of Strategic Environment Assessment was delayed due to inadequate expertise in the country. The publication of SEA guidelines (NEMA, 2012) and the Amendments to EMCA in 2015 have accelerated the SEA process in the country and even made it mandatory in EMCA Cap 387 under Article 57A as stated below.

Part VI of EMCA, 1999 (Rev 2015) on Strategic Environmental Assessment, Article 57A, states that:

(1) All Policies, Plans and Programme s (PPPs) for implementation shall be subject to Strategic Environmental Assessment.

(2) For the avoidance of doubt, the plans, programme s and policies are those that are—

(a) Subject to preparation or adoption by an authority at regional, national, County or local level, or which are prepared by an authority for adoption through a legislative procedure by Parliament, Government or if regional, by agreements between the governments or regional authorities, as the case may be;

(b) Determined by the Authority as likely to have significant effects on the environment.

(3) All entities shall undertake or cause to be undertaken the preparation of Strategic Environmental Assessments at their own expense and shall submit such assessments to the Authority for approval.

(4) NEMA shall, in consultation with lead agencies and relevant stakeholders, prescribe rules and guidelines in respect of Strategic Environmental Assessments.

While NEMA has not prescribed rule for SEA process in the country, it published guidelines in 2012 which are currently applicable in the country.

1.3 Purpose of this Report

As stated above, the discovery of oil and gas resources in Kenya, presents great socio-economic opportunities and challenges for the country at large, as well as various challenges for environmental protection in areas of high ecological and biodiversity significance. The purpose of this SESA study report is, therefore, to systematically address environmental and socio-economic management issues pertaining to oil and gas activities. The report presents strategic recommendations for ***Policies, Plans, and Programme s (PPP)*** that will guide environmental and socio-economic planning and decision making in petroleum sector in the country in the context of sustainable development.

1.4 SESA Objectives

As per the Terms of Reference (see Annex 1) issued to the Consultant the specific SESA objectives included the following: -

- To help reduce risks and ensure preparedness for the consequences of oil and gas development.
- Identify social, environmental and poverty-combating priorities and how these may be influenced by oil and gas development options and alternatives.
- Assessing the country's related institutional and economic capacity to deal with the identified negative consequences of oil and gas development
- To recommend institutional and governance-strengthening measures.

- At a plan and programme levels, SESA will help to take environmentally and socially sound decisions e.g. on which technologies will be used, and capacities and locations of interventions.

The SESA explored the following:

- How best to pace future exploration and development stages – for example: a stepwise approach starting from the least vulnerable areas and gradually entering the more vulnerable areas with the experience acquired.
- Identifying cumulative impacts of the oil and gas developments to national and regional socioeconomic and political developments.
- Ways to deal with conservation of biodiversity and the most valuable and sensitive areas.
- Sustainable coexistence with other sectors for example environmental conservation, cultural and heritage preservation, agriculture and fisheries.
- Outlining options for how to deal with pollution and waste at policy levels.
- Review of compensation mechanisms/ options for land acquisition, livelihoods and income
- Developing proposals for improving (institutional) capacity of different stakeholders to enforce law and deal with negative consequences of oil and gas development.

To understand the above, the following are some of the key assessment questions that guided SESA process: -

- What is the history and current general status and challenges of the oil and gas sector in Kenya?
- What are the existing Policies, Programme s and Plans (PPPs) in the petroleum sector?
- What are the likely significant effects of the existing PPPs in the petroleum sector?
- Are there relevant and adequate environmental and social management capacities in Kenya for the oil and gas sector?
- Is there adequate legislation for regulation of the oil and gas sector in Kenya?
- How does Government Ministries, Departments and Agencies with mandate in the oil and gas sector relate? Are there institutional gaps and overlaps/ confusion in their mandates and operations?
- What is the role of the county governments in the petroleum sector?
- What would be the appropriate measures to take to cushion Kenya from environmental and social problems that affect other countries that did not plan well before development of their oil and gas sectors?

- What have been the lessons (on environment, social, health and safety) learnt by Government of Kenya from the recent oil and gas exploration and discoveries in the country?

- What is the capacity of civil society organisation in building capacities of local communities in adapting and managing environmental and social issues from the petroleum sector?

1.5 Summary of Terms of Reference (ToR)

Scope of works as per the SESA ToR (see detailed ToRs in Annex 1 of this report) includes the following: -

1. Assembling of preliminary information relevant to the scope of the SESA.

2. Identification and mapping of the key stakeholders in the Oil and Gas Sector that should be consulted and analyse their interests, concerns and incentives.

3. Stakeholder consultations.

4. Review of the most relevant Environmental Impact Assessments (EIAs), Environmental Management Plans (EMPs) and environmental statements of different petroleum projects in the terrestrial (onshore) and marine (offshore) environments in Kenya.

5. SESA Report validation workshops.

6. Preparation of a comprehensive final SESA report for submission to NEMA for approval.

1.6 Contents and Organization Structure of the SESA Report

Non-Technical Summary: It summarizes and explains the proposed PPP and its objectives, the petroleum sector developments, SESA approach and methodology, public consultations, concerns, proposed monitoring programme and policy recommendations.

Chapter One: Introduction: this chapter has two parts. The first part, gives the overview context of the Strategic Environmental and Social Assessment, the requirement for SESA, purpose of this report, report structure/ organization and list of the SESA Study team. The second part outlines the background the petroleum sector in Kenya and its current status or general challenges.

Chapter Two: Overview of the Draft Policy/Plan/Programme and its Relationship with Other Activities: It outlines the existing the Draft Policies/Plans/Programme s for the petroleum sector (upstream, midstream and downstream) in Kenya. It gives the licensing regulatory context and background information on onshore and offshore activities. It briefly outlines potential activities following licensing (prospectivity, exploration, field development, production, transportation, distribution and marketing of refined products and consumption. The relationship between sectoral PPPs to other government policies, plans and programme s is explored.

Chapter Three: SESA Approach and Methodology: Outlines the approach used to study the whole petroleum sector in the country, SESA consultation process through stakeholder involvement, consultations and engagement at local, regional and national

levels. This was supplemented by selected case studies, GIS applications to understand the impacts of the oil and gas sector to natural socio-economic resources; desktop literature reviews, reports review and licencing process.

Chapter Four: Environmental Information: Since the study had a national approach, a general overview/ baseline of existing natural resources (biodiversity, habitats, flora and fauna (conservation sites) and likely impacts from onshore and offshore oil and gas activities. Climate change related risks and impacts, impact to large-sized migratory species and cross-regional/ trans-boundary impacts and concerns and likely evolution of the baseline status are discussed.

Chapter Five: Social and Socio-Economic Information: While it is difficult to draw a clear line between environmental and social issues, this chapter provides baseline information and Existing Problems related to: Population, human health, education, literacy, poverty levels, material assets (infrastructure, other natural resources), cultural heritage (including architectural and archaeological heritage sites), vulnerable communities and inhabitants, seasonal nomadic communities, gender considerations and local content. The chapters attempts to the likely evolution/ impacts of the current socio-economic baseline status.

***Chapter Six: Occupational Safety and Health Information*:** the chapter explores the existing petroleum industrial occupational safety and health concerns and likely impacts/ evolutions from the planned upstream, midstream and downstream developments in the country. The chapter also reviews the oil spill preparedness, emergency response and crisis management systems in place for the petroleum sector.

Chapter Seven: Legal, Regulatory and Institutional Reforms: This covers the oil and gas licensing systems/ process for exploration and production environmental and social safeguards in oil and gas GoK contracts, review of Environmental Impact Assessment (EIA) and Environmental Audit (EA) process, environmental and resettlement policy and legal framework, habitats regulations assessment and assessment of institutional capacities of key government agencies.

***Chapter 8: Alternatives Analysis*:** This section outlines the various alternatives that could be considered for compensation.

***Chapter 9: Recommendations*:** This outlines a set of recommendations arranged into two categories: priority areas and other recommendations

1.7 The SESA Study Team

The expert team composed the local and international experts. The local team Africa Waste and Environment Management Centre (AWEMAC) handled most of the fieldwork activities, stakeholder consultations and general day-to-day administration of the project. The international consultants under Impulso Industrial Alternativo, SA (Spain) (IMPULSO) were generally in charge of quality assurance as well as benchmarking of the SESA process and findings with international standards such as those of IOGP (International Association of Oil and Gas Producers). The list of experts engaged and their roles are outlined in Table 1 below.

Table 1: SESA Study Team Composition

S/N	NAME OF STAFF	POSITION
	LOCAL EXPERTS	
1.	Prof. Jacob K. Kibwage, *(NEMA Reg. No 126)*	*Team Leader/ Environmental Expert*
2.	Dr. Benson Agaya (*NEMA Reg. No* 8289)	*Social Development Expert*
3.	Eng. Peter Mwangi *(NEMA Reg. No 477)*	*Safety and Occupational Health Expert*
4.	Ms. Grace Moraa Momanyi (NEMA Reg. No 7631)	*Civil Society and community engagement expert*
5.	Mr. Peter Magati	*Economist*
	INTERNATIONAL EXPERTS	
6.	Mr. Abubakar Said Imam Abasheikh	*Environmental Expert*
7.	Mr. Eliseo Gomez	*Engineer*
8.	Ms. Margarita Hernando	*Lawyer/Legal Expert*
9.	Mr. Enrique Garcia Garcia	*Social Development Expert*
10.	Mr. Victor Del Coos	*Occupational Safety and Health Expert*
Field Assistant / Technical Assistant		
11.	Mr. Dominic Mutiso Munyao (NEMA Reg. No 2203)	*Field Assistant / Technical Assistant*
12.	Ms. Abida Buoro (NEMA Reg. No. 2967)	*Field Assistant / Technical / Assistant*
13.	Mr. Clifford Siocha (NEMA Reg. No. 8173)	*Field Assistant/ Technical Assistant*
14	Ms. Lydia Boke (NEMA Reg. No. 6767)	*Field Assistant/ Technical Assistant*
15	Ms. Eva Mukiri	*Administrator/ Field Assistant*
16	Calvince O. Ouko (NEMA Reg. No 2203)	*Field Assistant/ Technical Assistant*
17.	Dr. Agnes Wanjiru Njeru	*Technical Assistant*

1.8 Background to the Petroleum Sector in Kenya

The modern way of life is highly dependent on petroleum. Petroleum products are used and are relied on daily basis in many ways: from the fuels for various modes of transport and generation of electricity to production of fertilizers, pesticides and even clothes. However, these resources are finite. A large percentage of the petroleum (oil and gas) provides fuel for transportation and industries as well as heating, cooking and lighting in homes, institutions and businesses. Some of the petroleum is refined into chemicals which are the building blocks for many products that are used in everyday life such as rubber, plastics, paints, nylon, vinyl, polyester cosmetics, food additives and medicines. The oil and gas industry is usually divided into three major sectors: *upstream, midstream* and *downstream*. Details of

the current status of these 3 sectors are briefly outlined below starting with the historical development of the sector.

1.9 General Overview of the Development of the Petroleum Sector in Kenya

The history (see Figure 1 and 2 below) of petroleum and gas explorations in Kenya spans over 60 years (National Oil Cooperation of Kenya, website *http://nationaloil.co.ke/site/).* The table below below presents the historical perspectives in detail.

Table 2: History of Oil and Gas

Period	Site	Outcome
1950s	Lamu bay and surrounding islands	Ten wells were drilled by BP and Shell Oil explorations companies, but none of the wells were fully evaluated or completed for production despite indications of oil staining and untested zones with gas.
	Mandera Basin	Photo geological field geology, gravity, aeromagnetic and seismic surveys were conducted by the Frobisher Ltd., Adobe Oil Company and Burmah Oil Company but did not materialize into drilling programme s
1975	Lamu Basin	Explorations conducted by Texas Pacific in 1975 encountered oil and gas shows in the Cretaceous rocks
1976	Anza Basin (Anza-1 and Bahati-1)	Explorations conducted by Chevron and Esso companies. Hydrocarbons and microfossils were suspected from the drills
1982	Lamu Basin offshore portion (Simba-1, Maridadi-1 and Kofia-1)	A consortium of Cities Services, Marathon and Union exploration companies conducted Seismic data revealing that salt diapiric structures were present along the Kenyan margin/coasts
1986	Garissa-1 , Kencan-1	Joint venture between GOK and Petro-Canada International Assistance Corporation
1986-1990	8 wells drilled in Anza Basin and Mandera Basin (i.e. Ndovu-1, Duma-1 and Kaisut-1 etc.)	Consortium led by Amoco and Total Exploration conducted surveys in many parts of North Eastern Kenya (Anza and Mandera). The wells were dry but with indications of oil and gas
	Eliye Springs-1 and Loperot-1, located west of Lake Turkana in a Tertiary Rift Basin.	Shell Company explorations encounter wells with non-commercial reserves, but it was believed that the explorations weren't deep enough
1991-1995	Lamu Basin	National Oil Cooperation of Kenya (NOCK) initiated an in-house study of the Lamu Basin as part of a long-term strategy to re- evaluate the existing geological, geophysical and geochemical data relating to each of the sedimentary basins in Kenya. Lamu embayment (both onshore and offshore) was divided into ten (10) exploration blocks, each with a specific exploration play. New interests were generated and new entrants into the exploration industry
2000-	Tertiary Rift Valley	NOCK Tertiary rift study led to quantification of

Period	Site	Outcome
2010		potential source and reservoir rock units in the study area as well as the petroleum system at play in the sub-basins
2010-2016	Tertiary Rift Valley (Turkana)	Tullow Oil Kenya makes major oil discoveries in Turkana in 9 confirmed commercially viable wells

Source: National Oil Cooperation of Kenya, 2016

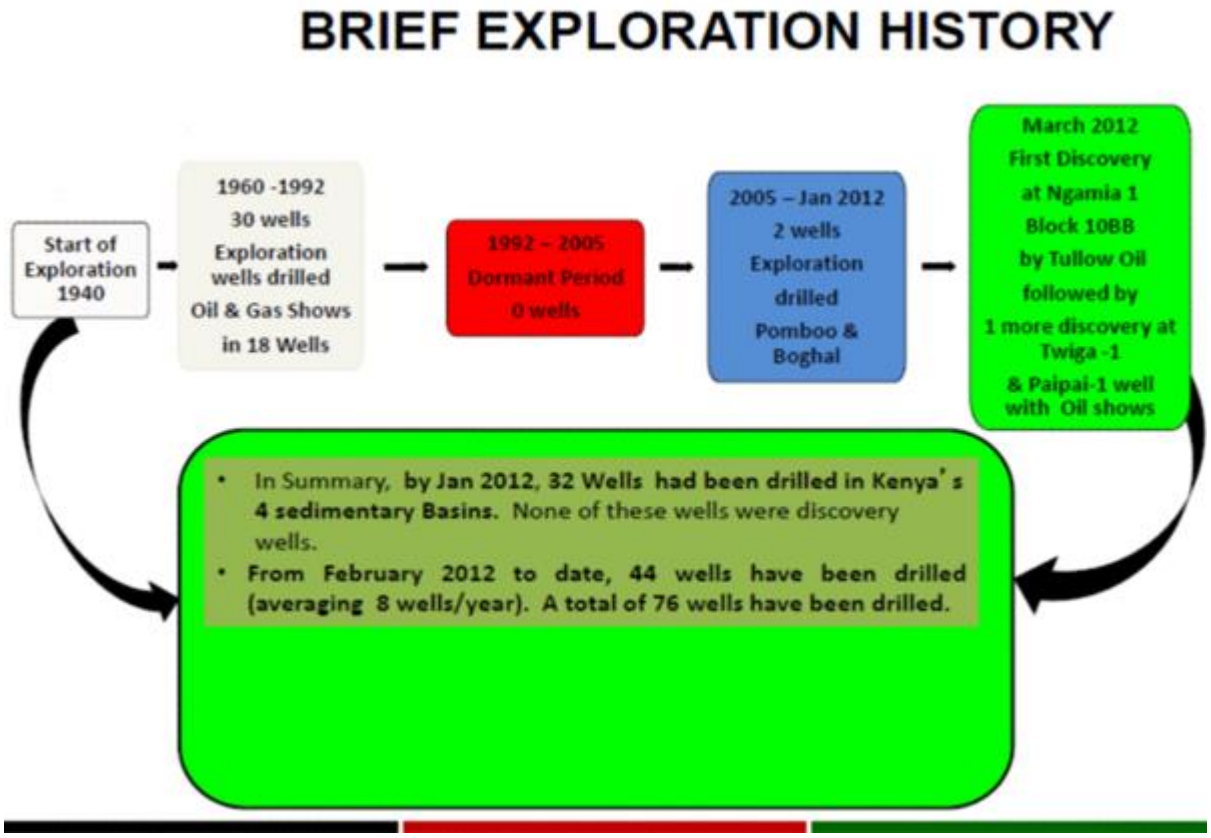


Figure 1: Historical Summary of Kenya's Oil and Gas Explorations

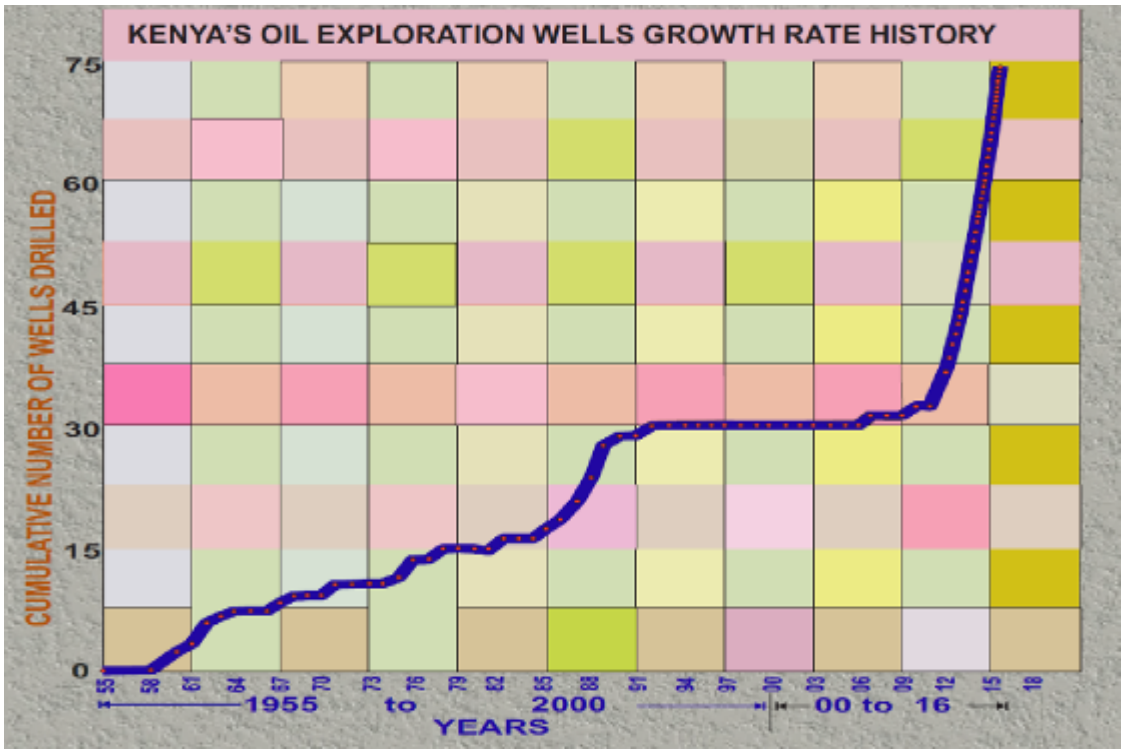


Figure 2: Kenya's Oil Exploration Wells Growth Rate History

1.9.1 Kenya Prospective Sedimentary Basins

Kenya has 4 prospective sedimentary basins: ***Mandera*** *(51,441.98Km²),* ***Anza*** *(76,107.63Km²), the* ***Tertiary Rift*** *(116,619.13Km²) and* ***Lamu*** (252,297.65Km²). The Lamu basin being the largest extends offshore (see figure 3 below).

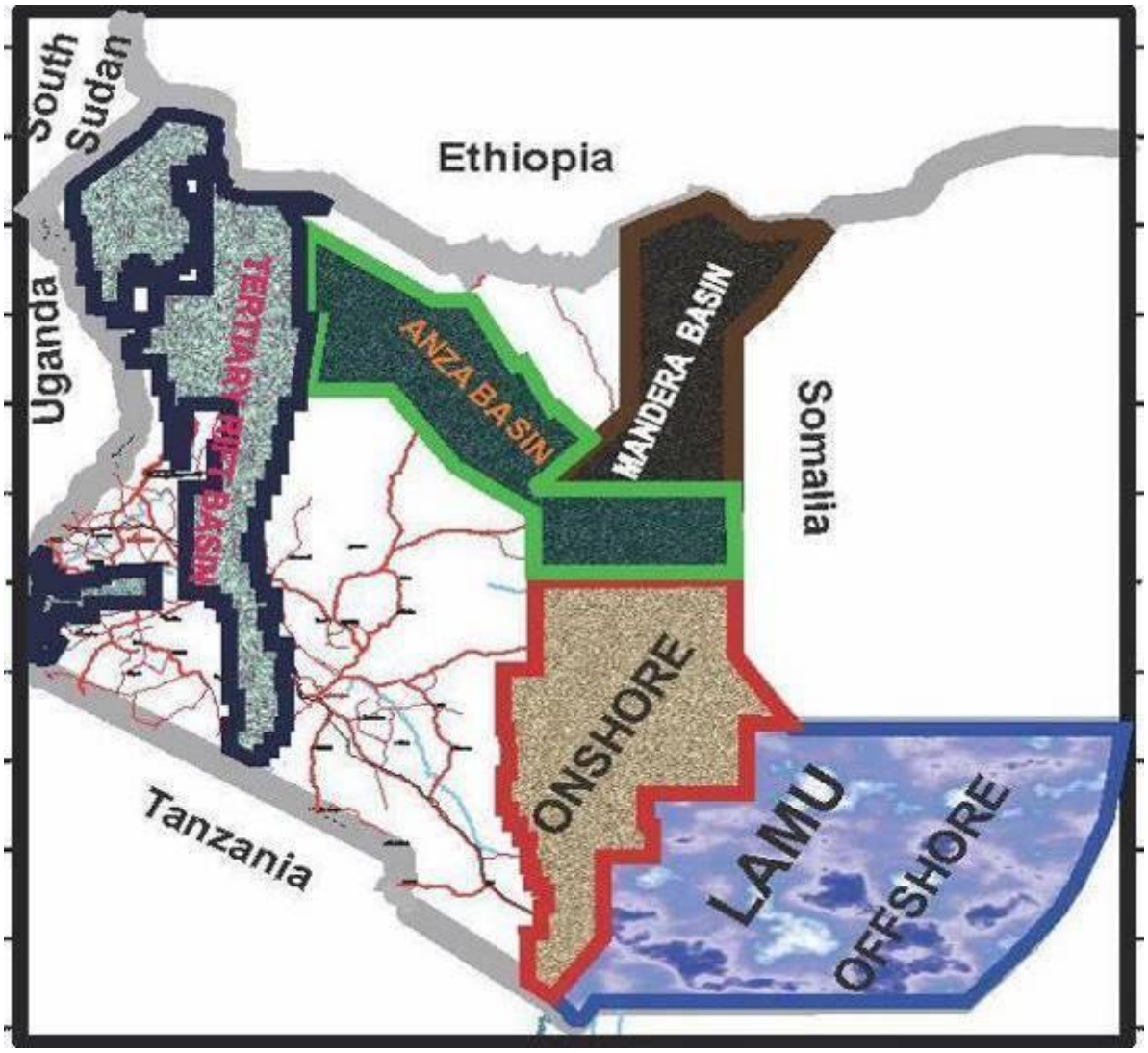


Figure 3: Kenya Oil and Gas Sedimentary Basins

1.9.2 Petroleum Exploration Blocks

In the Kenya Gazette Notice No. 3344 dated 13th May 2016, issued under the Petroleum (Exploration and Production) Act, 1986 (*Cap*. 308), the Cabinet Secretary for Energy and Petroleum constituted sixty-three (63) Petroleum Exploration Blocks of which thirty seven (37) are located in the Lamu Basin, seven (7) in the Anza Basin, five (5) in the Mandera Basin, and fourteen (14) in the Tertiary Rift Basin (MOEP, 2016). The public notice shows all the blocks defined by their longitudes and latitude, their sizes and block maps. The Gazette Notice No. 3974 of 2012 was revoked. Figure 4 and Table 3 below shows details of these oil blocks.

Table 3: Kenya Oil Blocks and their Sizes

No.	OIL BLOCK	AREA (KM²)
	MANDERA BASIN BLOCKS	
1.	BLOCK 1	23,797.79
2.	BLOCK 1A	12,083.66
3.	BLOCK 2A	7,801.72
4.	BLOCK 2B	5,461.31
5.	BLOCK 2BA	2,297.50
	Sub-total for Mandera Basin	***51,441.98***
	ANZA BASIN BLOCKS	
6.	BLOCK 3A	8,903.58
7.	BLOCK 3AA	3,287.69
8.	BLOCK 3B	9,081.83
9.	Block 3BA	3,338.47
10.	Block 9	15,781.95
11.	Block 9A	15,848.82
12.	BLOCK 10A	19,865.29
	Sub-total for Anza Basin	***76,107.63***
	TERTIARY RIFT BASIN BLOCKS	
13.	BLOCK 10BA	15,986.33
14.	BLOCK 10BAA	5,527.48
15.	BLOCK 10BB	6,172
16.	BLOCK 10BC	6,794.3
17.	BLOCK 11A	8248.29
18.	BLOCK 11AA	3,751.23
19.	BLOCK 11B	14,317
20.	BLOCK 12A	15,390
21.	Block 12AA	5,130
22.	Block 12B	6,200
23.	Block 12 BA	1,278.00
24.	Block 13T	4,719
25.	Block 14T	17,209.50
26.	Block 15T	5,896
	Sub-total for Tertiary Rift Basin	***116,619.13***
	LAMU BASIN BLOCKS	
27.	BLOCK L1A	12,569.67
28.	BLOCK L1B	12,197.99
29.	BLOCK L2	11,680.88
30.	BLOCK L3	8,960.84
31.	BLOCK L4	5,664.50
32.	BLOCK 4A	1,818.82
33.	BLOCK L5	2,352.43
34.	BLOCK L6	4,986.07
35.	BLOCK L7	5,520.70
36.	BLOCK L8	5,128.83
37.	BLOCK L9	5,110.06
38.	BLOCK L10	4,962.03
39.	BLOCK L10B	5,585.35

No.	OIL BLOCK	AREA (KM²)
40.	BLOCK L11A	5,008.72
41.	BLOCK L11B	4,962.58
42.	BLOCK L12	4,981.78
43.	BLOCK L13	2,178.45
44.	BLOCK L14	11,010.76
45.	BLOCK L14A	3,672.63
46.	BLOCK L15	2,331.03
47.	BLOCK L16	3,619.79
48.	BLOCK L17	1,274.69
49.	BLOCK L18	3,532.56
50.	BLOCK L19	8,802.31
51.	BLOCK L19A	3,040.59
52.	BLOCK L20	10,786.05
53.	BLOCK L21	15,669.53
54.	BLOCK L22	10,425.38
55.	BLOCK L23	10,311.59
56.	BLOCK L24	9,930.80
57.	BLOCK L25	10,569.13
58.	BLOCK L26	13,952.65
59.	BLOCK L27	10,585.88
60.	BLOCK L28	10,448.47
61.	BLOCK L29	3,224.57
62.	BLOCK L30	3,146.66
63.	BLOCK L31	2,292.88
	Sub-total for Lamu Basin	***252,297.65***

Source: Republic of Kenya, Ministry of Energy and Petroleum, 2016

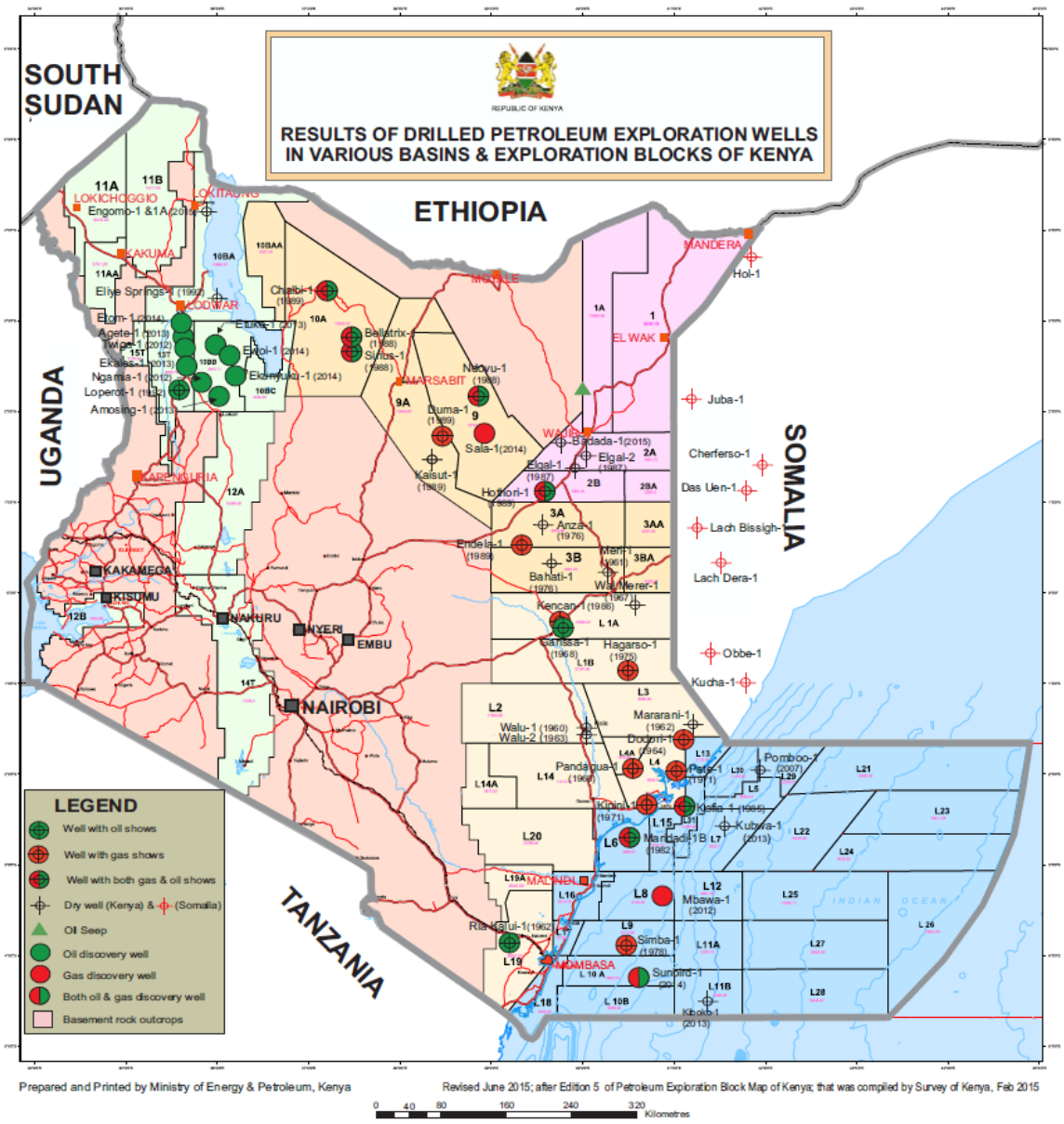


Figure 4: Map showing oil Exploration Blocks in Kenya and Results of Drilled Petroleum Exploration Wells in Various Basins and Exploration Blocks of Kenya

1.9.3 Upstream Petroleum Life Cycle

The oil and gas extraction industry can be classified into four major processes exploration, development, production and site abandonment and decommissioning) (see Figure 5 below).

Exploration: involves the search for rock formations associated with oil or natural gas deposits, and involves geophysical prospecting and/or exploratory drilling.

Development: Occurs after exploration has located an economically recoverable field, and involves the construction of one or more wells from the beginning either abandonment if no hydrocarbons are found, or to well completion if hydrocarbons are found in sufficient quantities. It also establishes the treatment systems needed to preserve the environment.

Production: is the process of extracting the hydrocarbons and separating the mixture of liquid hydrocarbons, gas, water, and solids, removing the constituents that are non-saleable, and selling the liquid hydrocarbons and gas. Production sites often handle crude oil from more than one well. Oil is nearly always processed at a refinery; natural gas may be processed to remove impurities either in the field or at a natural gas processing plant.

Site abandonment and decommissioning: involves plugging the well(s) and restoring the site when a recently-drilled well lacks the potential to produce economic quantities of oil or gas, or when a production well is no longer economically viable.

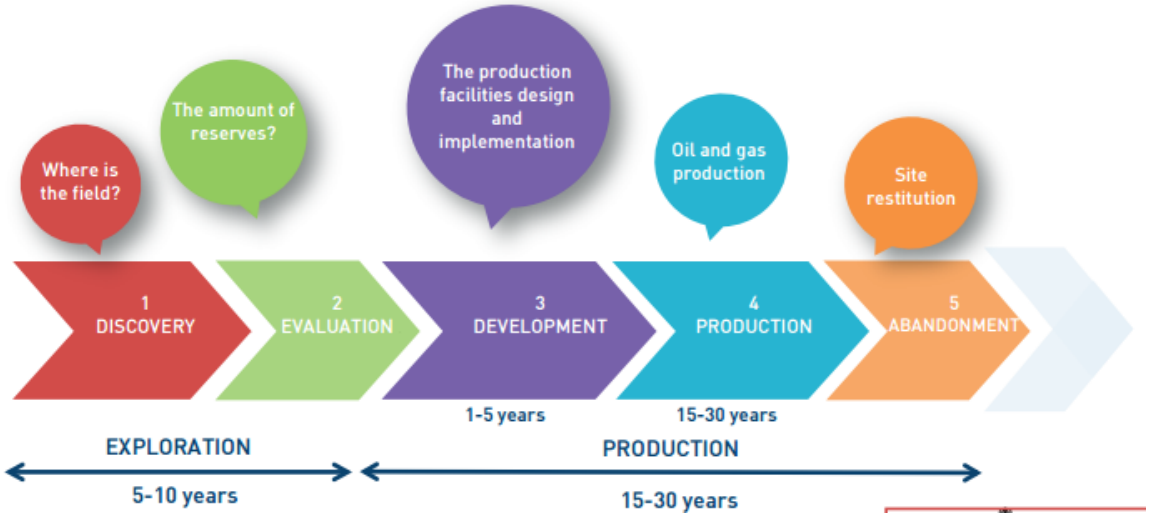


Figure 5: Site abandonment and decommissioning stages

1.9.4 Upstream Petroleum Sector in Kenya

The upstream oil sector is also commonly known as the exploration and production (E&P) sector. The upstream sector includes the exploration for potential underground or underwater crude oil and natural gas fields, drilling of exploratory wells, and subsequently drilling and operating the wells that recover and bring the crude oil and/or raw natural gas to the surface. In Kenya, the exploration for oil and gas dates back to the 1950s and has been conducted in four sedimentary basins: *Lamu* (both onshore and offshore), *Mandera*, *Anza*, and *Tertiary Rift* (including Lokichar). However, most of the wells that were drilled in the past came up dry (see Table 4 and Table 5).

The upstream sector activities have intensified in the recent years especially in the Tertiary Rift. This industry has seen the activity of companies like Tullow Oil, Africa Oil Corporation, Taipan Resources, Delonex Energy, the National Oil Corporation of Kenya (NOCK), Vanoil Energy Ltd, Maersk, Toyota Tsusho and Swala Energy among others double their efforts and operations in the upstream sector both *onshore* and *offshore*.

1.9.4.1. On-shore Explorations

Over the last five years, considerable exploration activity has taken place with majority of the wells being drilled in the East African Rift and exploration activity is set to increase further in the next decade. To date, the discoveries have been gas in offshore areas along the East African coastline. Other discoveries have been made in the East African rift and Tullow Oil reported an estimated resource potential of over 750 million barrels of oil by mid of 2016. Oil has also been identified in Mandera with Lion Petroleum estimating an unconfirmed

resource potential of some 1.5 billion barrels. Unrisked gas discoveries have also been reported in Coastal/Offshore Lamu and onshore in the Anza, Graben area.

In 2010, after signing agreements with Africa Oil and Centric Energy, the UK-based firm Tullow Oil acquired a 50% interest in the exploration licence blocks 10BA, 10BB, 10A, 12A and 13T covering Turkana, Marsabit and Baringo counties. Two years later, Tullow Oil made the first discovery of crude oil in the South Lokichar Basin at the Ngamia-1 well. In 2012 Tullow also 'farmed in' to another exploration block (12B) covering Kisumu County and became the main operator in a joint venture with Swala Energy. Since 2012, Tullow has drilled more than 11 wells in Turkana County, with an estimated 750 million recoverable barrels of crude oil (See green area in the figure 6 below and Plates 1 and 2 on on-going explorations in Turkana). The company continues to review options for re-starting the exploration campaign in the South Lokichar basin to de-risk the overall upside potential of 1 billion barrels.

Other (seismic) exploration activities have taken place near the South Sudan and Ethiopian borders by companies such as CEPSA (Compañía Española de Petróleos S.A.) and Adamantine. Out of the 63 blocks gazetted as of May 2016, more than 40 had been licensed to oil exploration and production companies and operated by over 20 international oil companies and the National Oil Corporation of Kenya (NOCK) (see the Tables 5 and 6 below). This means an uptake of over 65% of the oil blocks for exploration.

Table 4: Distribution of Basinal Wells

Basin	No. of wells	Wells with Shows	Dry wells
LAMU	20	(10) 2 Discoveries (1G & 1 O)	6
ANZA	17	(9) 1 Discovery (G)	7
MANDERA	2	(0) One oil SEEP	2
TERTIARY RIFT	35	(4) 9 Exploration Discoveries (20 including appraisal wells with Oil, 1 O & G)	1

Source: MoEP, 2016

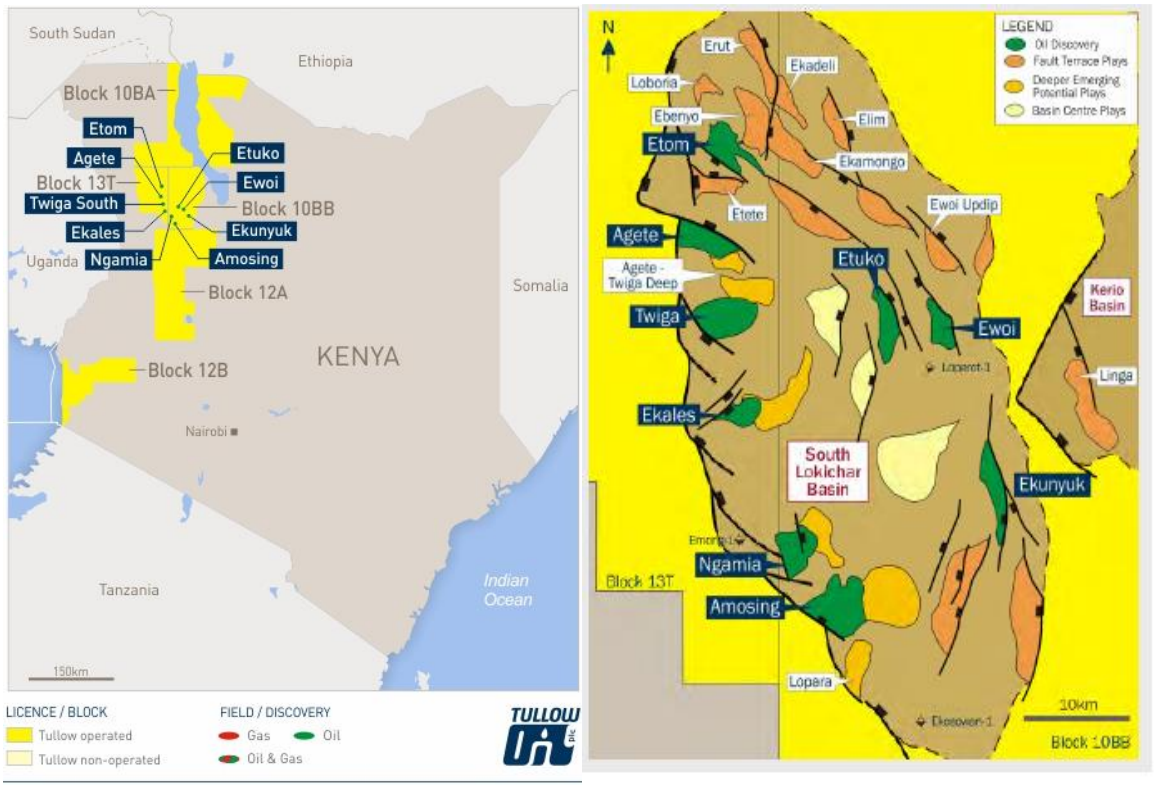


Figure 6: Turkana Oil Discoveries

Source: Tullow Oil, 2016

Table 5: Summary of Hydrocarbon Discoveries in Kenya by Mid - June 2016

9 Discoveries in Turkana County by Tullow Oil Kenya	
Ngamia-1	Block 10BB
Twiga-1	Block 13T
Etuko-1	Block 10BB
Ekales-1	Block 13T
Agete-1	Block 13T
Amosing-1	Block 10BB
Ewoi-1	Block 10BB
Ekunyuk-1	Block 10BB
Etom-1	Block 13T
Others	
Mbawa-1 (Gas)	Block 8 (Offshore Lamu)
Sala-1 (Gas)	Block 9 (Anza)
Sunbird-1 (Both Oil & Gas)	Block L10A (Offshore Lamu)

Source, MOEP, 2016

Table 6 : Licensed Petroleum Companies as at June 2016

COMPANY NAME	LICENSED BLOCKS	TOTAL
Africa Oil Corporation	9	1
Afren/EAX	1:L17:L18	3
Anadarko	L11A;L11B;L12	3
'A-Z Petroleum	1	2
BG Group	L10A;L10B	2
Camac Energy	L1B;L16;L27;L28	4
Cepsa	L11A	1
ENI	L21:L23;L24	3
FAR Energy	L6	1
Imara Energy	L2	1
Lamu Oil & Gas	L14;L26	2
Lion Petroleum	2B	1
NOCK	14T	1
Ophir/Dominion	L9	1
Milio Energy	L20	1
Rift Energy	L19	1
Simba Petroleum	2A	1
Total E.P Kenya	L22	1
Tullow Oil (K) B.V	10BA; 10BB; 10A;12A;13T	5
Van Oil Energy Ltd	3A;3B	2
Zarara Oil & Gas	L4; L13	2

Source: MoEP, 2016

Plate 1: An Aerial View of the Operational Site for Oil Drilling in Turkana Region

Plate 2: Oil and Gas Wells in Lamu and Rift Valley Oil Blocks

1.9.4.2 Offshore Explorations

Significant activities have been registered in the offshore activities of the Kenyan coast. The offshore exploration in Kenya is believed to hold a greater potential and it is the next frontier of East African oil and gas development. Kenya's offshore blocks are largely in the Lamu basin, which formed during the separation of Madagascar from Africa and has Middle to Late Jurassic source rocks. Most exploration activities are focused in the Lamu Basin following successful trend from Mozambique and Tanzania.

In a Kenya Gazette notice, No. 3344 (GOK, 2016), the Ministry of Energy and Petroleum gazetted 63 oil blocks with their new coordinates and location in what annuls the previous 46 blocks gazetted in 2012. In the notice, 37 (58% of total oil blocks in Kenya) of the blocks are located in the Lamu basin, 7 (11.1%) in the Anza Basin, 5 (7.9%) in the Mandera Basin, and 14 (22.2%) in the Tertiary Rift Basin.

The offshore potentials have been estimated to the tune of several billion barrels of oil and trillions cubic feet of gas prospective resources on a gross, un-risked, best-estimate basis. At the moment, gas discoveries have been realized at Mbawa-1 (gas) and sunbird (oil and gas).

Kenya's offshore potential has drawn significant investment from companies looking to survey and explore the Lamu Basin for oil and gas. Some of the many companies with a stake in the 24 blocks off Kenya's coast include: Apache Corporation, Anadarko Petroleum (an independent U.S.-based oil firm), Premier Oil, BG Group, Pancontinental Oil and Gas, Australian Petroleum Exploration Company, FAR Ltd, CAMAC Energy Inc, Total, Cove Energy, among others.

The Energy and Petroleum Policy for Kenya 2016 (page 27) indicates that the General Challenges in Upstream Petroleum include:

- Attraction of capital for petroleum exploration and production activities which are highly capital intensive.
- High cost of acquisition of new technology.
- Inadequate manpower, technical capacity and local content in oil and gas exploration and production activities.
- Inability to access potential exploration sites/blocks which are located on private land, cultural heritage, and conservancy areas and game parks/reserves.
- Inherent weaknesses in Cap. 308 and in the model PSC which include inadequate provisions for:
    - Compensation regime.
    - Competitive bidding for blocks.
    - Community awareness and participation.
    - Natural gas fiscal terms.
    - Mechanism for working out Government revenue out of monetary gains from transfer of PSC interests.
    - Defined criteria for evaluating PSC terms.
    - Environmental protection, conservation and management.
    - Harmonization with the 9th Schedule of the Income Tax Act.
- Ineffective enforcement of upstream laws and regulations.
- Inadequate policy for sustainable utilization of petroleum revenue, its management and sharing of benefits between national government, county government and local community.
- The lower wellhead price of natural gas be it caused either by having to compete with lower cost alternative fuels in the domestic market or as a result of lower netback prices into the export markets and longer project lead times, makes it extremely challenging to economically develop a natural gas industry based on oil-based fiscal terms.
- High cost and inexistence of gas infrastructure to support gas discovery and development both offshore and onshore.
- Inability to disaggregate into component elements of supply chain e.g. cost of wholesale gas, transportation and distribution in order to price the gas.
- Flaring of gas from oil producing fields; a practice that is most often linked with the simultaneous production of oil and natural gas where there is no ready market for the gas. This is performed by safely burning off the associated gas. This approach was historically accepted as an industry standard. However, the increasing focus on the impact of oil and gas production on the environment combined with the increasing value of gas makes indiscriminate flaring untenable. Nonetheless, there are instances when it is necessary to flare associated gas. This is normally in relation to preventing excessive pipeline pressure and/or in response to a specific emergency (such as equipment failure).

- High expectations from the public especially local communities.

Most of these challenges have been addressed in the Petroleum Bill of 2015.

1.9.5 Midstream Petroleum Sector in Kenya

The midstream sector involves the transportation, storage and wholesale marketing of crude or refined petroleum products. Oil transportation is a major industry in and of itself, with a range of transportation options available, depending on the situation at hand. The most important methods include pipeline, rail, barge and truck. Each method has its own advantages and is desirable in certain situations, and minute amounts of oil may use several of these transportation methods during its transit time. Pipelines and other transport systems can be used to move crude oil from production sites to refineries and deliver the various refined products to downstream distributors. The major stakeholder at this stage in Kenya include; the O&S (operation and support) investors, Kenya Pipeline Company Ltd and Kenya Petroleum Refineries in Mombasa as shown in Plates 3 and 4. The existing mid-stream facilities like the Kenya Oil Refinery and other storage and handling/ receipt facilities off-shore were also included in this study.

Plate 3: Kenya Petroleum Refineries in Mombasa

Plate 4: Product Receipt at Entry Point KOSF (Kipevu Oil Storage Facility) Mombasa Port

1.9.6 Downstream Petroleum Sector

The downstream sector commonly refers to the refining of petroleum crude oil and the processing and purifying of raw natural gas, as well as the marketing and distribution of products derived from crude oil and natural gas. It partly overlaps with the mid-stream sector described above. The downstream sector touches consumers through retailing of products such as gasoline or petrol, kerosene, jet fuel, diesel oil, heating oil, fuel oils, lubricants, waxes, asphalt, natural gas, and Liquefied Petroleum Gas (LPG) as well as hundreds of petrochemicals. Based on the current official licensing agency, the Energy Regulatory Commission (ERC), the following are the current seven (7) *categories* of registered and licenced oil and gas companies in the county:

- Companies Licensed for Import, Export and Wholesale Petroleum Products (Except LPG)
- Companies Licensed for Import and Export (Transit) of Petroleum Products (Except LPG)
- Companies Licensed for Export and Wholesale of Petroleum Products (Except LPG)
- Companies Licensed for Storage of Petroleum Products (Except LPG)
- Companies Licensed to trade in Lubricants and Fuel Oil (Except LPG)
- Companies Licensed as LPG transporters
- Companies Licensed as LPG traders

Kenya Pipeline Company (KPC) Ltd is the major player in the downstream sector. KPC is a state corporation with the mandate to own and operate a multi-product pipeline network and facilities for transportation, storage and distribution of refined petroleum products across/throughout Kenya (see Plate 5 below).

In furtherance of this mandate and for purposes of business expansion, KPC is in the process of acquiring the Kenya Petroleum Refineries Limited (KPRL). KPRL began operations in 1963 as a joint venture between Shell and BP who were later joined by other International Oil Companies (IOCs). The Government of Kenya (GoK) has been a 50% shareholder of KPRL since 1971, with IOCs holding the balance of 50%. The second refinery plant was added in 1974. In 2009, Shell, BP and Caltex sold their 50% shareholding to Essar Energy Oversees Ltd who committed to GoK on KPRL upgrade. The objective of bringing on board Essar was to finance the modernisation and improve efficiency of the facility to ensure competitiveness and environmentally friendly refining of petroleum products. This was not achieved and eventually the Refineries were shut down in September, 2013.

Table 7 below highlights some of the current storage capacity in the country. Some of these storage facilities and planned expansions have been reviewed in the SESA process. KPC's total storage/ depot facilities are located at Kipevu, Moi Airport, Jomo Kenyatta International Airport, Nairobi Terminal, Nakuru, Eldoret and Kisumu (see Figure 7 below for Existing Oil Pipeline & Terminal Network in Kenya). The total storage capacity at each KPC depot is as shown below:

Table 7: KPC Depots in Kenya

Depot	Total Capacity (M^3)
NAIROBI TERMINAL	100,580
JOMO KENYATTA INTERNATIONAL AIRPORT	54,141
MOI AIRPORT MOMBASA	7,349
KIPEVU OIL STORAGE FACILITY	326,233
NAKURU DEPOT	30,553
ELDORET DEPOT	48,089
KISUMU DEPOT	45,288
GRAND TOTAL	**612,233**

Source: KPC, 2015

Existing *Pipeline & Terminal Network*

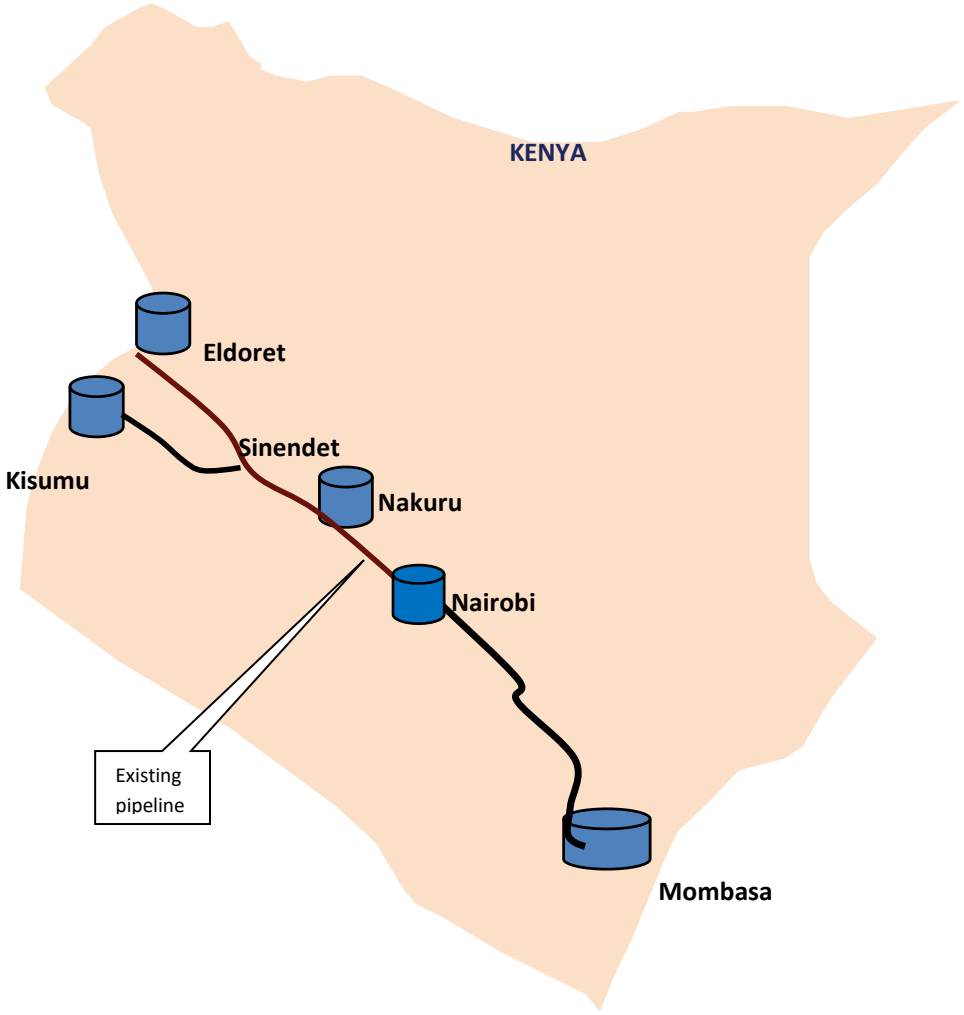


Figure 7: Existing Refined Oil Pipeline and Terminal Networks

Plate 5: An Aerial View of the KPC Facility in Nairobi's Industrial Area

The Kenya Petroleum Refineries Ltd (KPRL) on the other hand has an integrated facility located in Mombasa, Kenya, for importation, storage and refining of crude oil; storage of refined petroleum, blending and dispatch of petroleum products. The assets include the following: *refineries, petroleum storage tanks and integrated/ interconnection pipe works.*

Refineries: KPRL has a hydro skimming refinery that has two independent parallel refining streams, Complex-1 (Crude Distiller, Kero-minus Hydrotreater, Reformer and a Bitumen Plant) and Complex-2, with a combined processing capacity of 4 million metric tonnes per annum of crude oil. Complex-1 was commissioned in 1963 while Complex-2 (Crude Distiller, Naphtha-minus, Hydrotreater, Kero/Gasoil Hydrotreater and Reformer) was commissioned in 1974.

Petroleum Storage Tanks: KPRL has 45 tanks of various sizes which are dedicated to specific products (Crude oil, LPG, Tops, Naphtha, Mogas, Dual Purpose Kerosene - DPK, Automotive Gas & Oils - AGO, Industrial Oil, Fuel Oil and Bitumen) located at Changamwe and Kipevu/ Port Reitz with a total net working capacity of 484,393M^3.

Integrated/ Interconnection Pipe Work/: for White Oils and Crude. KPRL has also a jetty facility. Some segments of these facilities are owned by KPC.
Currently, the facility is undergoing a due diligence study for possibilities to be use by KPC as a storage facility.

The Kenya Petroleum Refineries Limited was originally set up by Shell and the British Petroleum Company BP to serve the East African region in the supply of a wide variety of oil products. The Company was incorporated in 1960, under the name East African Oil Refineries Limited. The first refinery complex which has distillation, hydrotreating, catalytic reforming and bitumen production units was commissioned in 1963. The second refinery train was commissioned in 1974 and also has distillation, hydrotreating and reforming units.

Key Historical dates of KPRL are:-

1959: Colonial Government Agreement with 'Consolidated' (50% Shell, 50% BP)
1960: East African Oil Refineries Limited Incorporated
1963: Complex I completed and commissioned
1963: Esso and Caltex become Shareholders
1970: Grease Plant Constructed
1971: Government acquire 50% Shareholding
1974: Complex II completed and commissioned
1983: Change of name to - Kenya Petroleum Refineries Limited.
1994: Deregulation leading to introduction of base load and processing fees changes
1996: New Control Center (DCS) commissioned
1997: Esso sold their shares
1998: KPRL Laboratory ISO 9002 Certified
2005: Commencement of production of unleaded mogas
2007: New Laboratory completed and commissioned
2009: Essar acquired 50% of shares from Shell, BP and Chevron
2013: Refinery closed down and processing stopped and started storage of petrol for other companies as main activity
2016: Essar exits from shareholding of KPRL and shares 100% acquired by GoK

1.9.7 Natural Gas and Liquefied Petroleum Gas Sector in Kenya

Natural gas has the potential of meeting future energy needs of the country and offers a number of significant environmental benefits over other fossil fuels mainly due to its chemical simplicity which make it burn cleaner than all other fossil fuels. The monetization of natural gas is frequently more complex than the commercialization of hydrocarbon liquid reserves. Currently, Kenya depends on two major sources of gas: Liquefied Petroleum Gas (LPG) and Liquefied Natural Gas (LNG). LPG represents a cleaner alternative to solid fuels and kerosene in the short-term and is particularly attractive for urban and peri-urban households given the lower availability of firewood and the ease and efficiency of LPG distribution and retail due to the greater population density. The current market for LPG in Kenya is underdeveloped, with 5-7% of households relying on LPG as a primary cooking fuel. LPG penetration is much higher in urban areas at 21% and only 1% of rural households use LPG as a primary fuel. The greater Nairobi region accounts for 60% of the market, Mombasa makes up 15% of the market, with the remaining market scattered throughout other major urban centres in Kenya like Nakuru, Kisumu, Eldoret, Nyeri among others. The national uptake is expected to increase to reach 8%-12% by 2020. As indicated in the figure 8 below, number of players involved in the gas value chain increases downstream making it complex in enforcement of environmental, health and safety compliance.

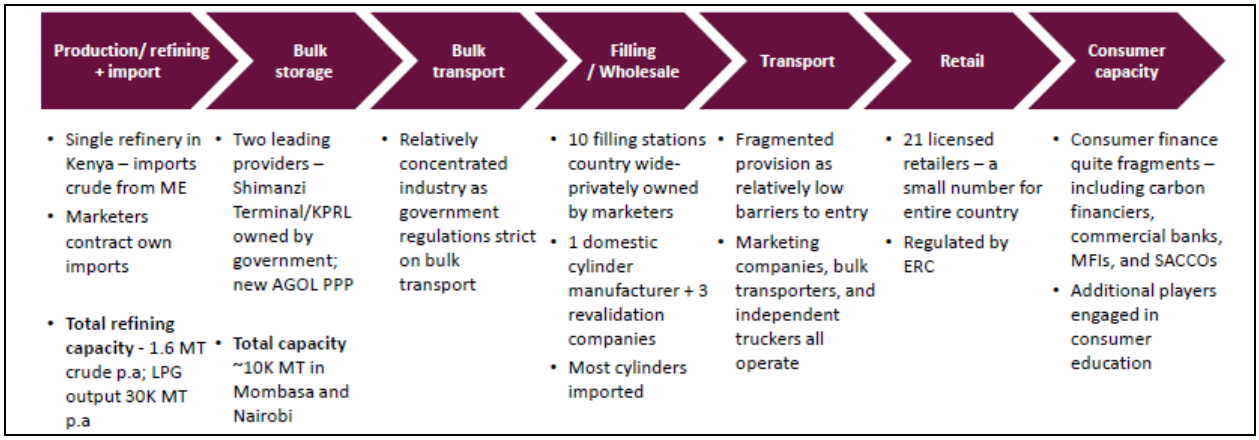


Figure 8: Gas Value Chain in Kenya
Source: Dalberg, 2013

As outlined earlier, there have been three major natural gas discoveries in Kenya as indicate in the Table 8 Below. However, the general sector development is constrained by several factors listed below.

Table 8: Major Natural Gas Discoveries in Kenya

Mbawa-1 (Gas)	Block 8 (Offshore Lamu)
Sala-1 (Gas)	Block 9 (Anza)
Sunbird-1 (Both Oil & Gas)	Block L10A (Offshore Lamu)

The Energy and Petroleum Policy for Kenya 2016 mentions the following challenges in the Gas Sector: -

1. Lack of a legal, regulatory and fiscal framework for natural gas development, production and export options.

2. Lack of infrastructure for handling natural gas, such as natural gas liquefaction plants and pipelines.

3. Lack of facilities to exploit natural gas reserves, e.g., petrochemical plants, and fertilizer plants.

4. Both initial cost of LPG equipment and the cost of the fuel—and accessibility. Relatively high LPG prices in Kenya reflect an under-developed market that constrains investment across the value chain and keeps retail prices high for end users. The price of LPG in Kenya is among the highest in the world.

5. The availability of very low cost charcoal in Kenya further limits the adoption of LPG. Annual fuel costs for LPG in Kenya are 2-3 times higher than equivalent annual fuel costs for purchased charcoal or kerosene. Hence, large scale adoption of LPG will be limited until the gap in relative prices is reduced.

6. Experimental business models in Kenya to reduce the cost of gas for poor consumers are in early stages.

7. Limited storage, distribution and retail capacity across the country with limit access outside the core markets of Nairobi and Mombasa.

8. Due to historical weaknesses in supply and importation capability, shortages have been common in recent years. Access in rural areas is extremely low due to limited distribution of infrastructure.

9. Mistrust in the gas market due to perceptions/realities related to partial filling, contamination of fuel, and other deceptive practices by grey/black market players are seen as greatly limiting the sustained growth of the market.

Some of these issues have been addressed by the petroleum Bill of 2015. However, the sector may require major institutional restructuring of the gas sector by creating new government entities to address most of these concerns.

1.9.8 Upstream Licensing Regime and potential activities

Under the Petroleum Act, the Cabinet Secretary's has the power to divide Kenya and its continental shelf into blocs. No person may engage in any petroleum operations without the Cabinet Secretary's permission. The Petroleum Act permits the government to conduct petroleum operations either through an oil company established by the government for that purpose (i.e. NOCK) or through private contractors that are licensed by the government (acting through the Cabinet Secretary of Energy and Petroleum) under petroleum agreements. A model form petroleum agreement is scheduled to regulations made under the Petroleum Act and is a form of production sharing contract (the Model Form PSC). The Petroleum Act sets out certain obligations to the contractor that are implied into any PSC but that are, in any event, dealt with in more detail in the Model Form PSC. The Ministry of Energy and Petroleum administers the application process relating to the entry into a PSC. This can be by way of competitive bidding process or through bilateral negotiations. The Cabinet Secretary may require evidence of the financial and technical qualifications of any applicant. The Model Form PSC forms the basis for negotiations. As at the time of writing, there have been no bidding rounds. Under the Petroleum Act and Regulations made thereunder, the Cabinet Secretary may also grant non-exclusive exploration permits to carry out geological and geophysical surveys in respect of any open block. The Cabinet Secretary may grant more than one exploration permit for any block. No entity other than a Kenyan incorporated or registered company may enter into a petroleum agreement with the government.

The upstream oil and gas activities in Kenya are governed by the Petroleum (Exploration and Production) Act Cap 308 of 1984, as revised in 1986. The standard practice for licensing has been developed and provided within the existing laws and regulations and in the upcoming Petroleum (Exploration, Development and Production) Bill, 2015. The licencing procedures require the operator to enter into petroleum agreement with the Government and obtain a non-exclusive exploration permit in respect of a block for the purpose of obtaining geological, geophysical and geochemical information. Application of an Oil and Gas exploration and production license is done through the Cabinet Secretary for a petroleum agreement, or will be applied for to the petroleum authority in future for a non-exclusive exploration permit. The law provides that an application shall be accompanied by requisite information. Permitting is issued separate for the exploration and operation phases.

Some of the potential activities following licensing, is that the operator will engage in business relationships with players directly within and those outside the oil and Gas sector as a move to initiate them into the sector. These will include players within the International Oil Company clusters, Service companies and Equipment Suppliers. The process will transform into mobilization and occupation of the block.

Main activities will include setting up a site central on fields and in the main urban centre and entering into other sub-contracts with the service companies. The operator will facilitate organization of the local community to integrate them into the project activities following existing structural procedures, through formally organised groups supported by statutory provisions. The operator may also choose to go into a joint venture with another operator, or lease out the block to another company but only as prescribed by written laws and contracts.

2.0 CHAPTER TWO: THE PETROLEUM SECTOR IN KENYA: POLICIES, PROGRAMME S AND PLANS

2.1 Introduction

This chapter outlines the existing Policies, Programme s and Plans (PPPs) in the petroleum sector in Kenya. These PPPs define the sector activities, environmental and social impacts that SESA was focused on. This information has been extracted from various Ministry of Energy and Petroleum, government agencies or official publications which include:

- *Government of Kenya (2004), Sessional Paper No. 4 on Energy*
- *Government of Kenya (2015), Draft National Energy and Petroleum Policy*
- *Government of Kenya (2013), Ministry of Energy and Petroleum Strategic Plan 2013-2017*
- *Energy Regulatory Commission (2013), Strategic plan 2012/13-2016/17*
- *PricewaterhouseCoopers (2015). "Towards a Petroleum Sector Master Plan for Kenya." PWC, Washington, DC.*
- *Government of Kenya (2011), Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor (LAPSSET) Master Plan.*
- *Kenya Pipeline Corporation (KPC) Vision 2025 (2015) (Strategic Plan 2015-2025).*

A sample of County Integrated Development Plans for counties that will play a key role in the upstream and midstream petroleum developments were reviewed.

- *Turkana County Integrated Development Plan, 2013 – 2017*
- *Isiolo County Integrated Development Plan 2013-2017*
- *Lamu County Integrated Development Plan 2013-2017*

2.2 Petroleum Sector Policies

In this section the policy guideline for the oil and gas sector are outlined as provided in the draft Energy and Petroleum Policy of 2015. The overall objective of the Draft Energy and Petroleum Policy of 2015 is to ensure sustainable, adequate, affordable, competitive, secure and reliable supply of energy to meet national and county needs at the least cost while protecting and conserving the environment. The policy also attempts to streamline the sector in line with Kenya's Vision 2030 and the Constitution of Kenya 2010.

The petroleum sector is also guided by the previous policy development like the policy set out in Sessional Paper No. 4 of 2004 and is governed by a number of statutes, principally the Energy Act, No. 12 of 2006, and the Petroleum (Exploration and Production) Act, Cap 308. The aspiration of this Sessional Paper on Energy was to lay the policy framework upon which cost-effective, affordable and adequate quality energy services will be made available to the domestic economy on a sustainable basis over the period 2004-2023. This Sessional Paper recognizes that the success of socio-economic and environmental transformation strategies pursued by the Government at present and in the future is to a large extent, dependent on the performance of the energy sector as an economic infrastructure. With a reflection on the

Sessional Paper No. 4 of 2004, the following policy action plans have been outlined in the 2015 Draft Policy for the Oil and Gas sector with a major focus on:

- *Upstream Petroleum Operations through Petroleum Agreements*
- *Land, Environment, Health and Safety*
- *Devolution and Provision of Petroleum Energy Services*
- *Energy Financing, Pricing and Socio-Economic Issues*
- *Gas Sector Development Policies*
- *Cross Cutting Issues*

2.2.1 Upstream Petroleum Operations through Petroleum Agreements

The Government shall undertake upstream petroleum operations through petroleum agreements which may include production sharing contracts, concession agreements, and service contracts.

1) Given the discovery of petroleum, the Government shall:
    - Establish a regulatory agency for the upstream petroleum operations;
    - Substitute the National Fossil Fuels Advisory Committee (NAFFAC) with the National Upstream Petroleum Advisory Committee (NUPAC) responsible for upstream petroleum exploration and development matters; and
    - Undertake the requisite process of ensuring transparency and accountability in extractive industries taking into account best industry practices and existing legal framework.
2) Development of an adequate petroleum production capacity in the country, and also developing the petroleum supply infrastructure to meet market requirements to match the increasing demand for petroleum products locally and in the region. These developments will include setting up a new refinery at Lamu given its strategic location. This will make oil and gas products more competitive in the region, enable creation of wealth, ensure supply of security and stability of their prices.
3) The Government will ensure that there are strategic petroleum reserves in the country. Increased use of LPG shall be encouraged with a view to eliminate the use of kerosene, charcoal and firewood in households. The Government is also evaluating the possibility of using natural gas to support commercial and industrial activities including transportation.
4) The average consumption of petroleum products in Kenya has been increasing over the years. To ensure security of supply of petroleum products, the Government will facilitate construction of adequate import and off-loading, storage distribution and fuel dispensing facilities through public private partnerships as appropriate.
5) The quality of petroleum products will be constantly reviewed to conform to international standards. To this end the institutional capacity will be enhanced to enforce fuel quality specifications for both domestic and export market. The Government intends to restructure (National Oil Corporation of Kenya) NOCK to

have midstream/downstream business separated from upstream business with a view to enhancing capacity of the upstream to fully conduct the activities there.

2.2.2 Land, Environment, Health and Safety

On Land, Environment, Health and Safety, the policy recognizes that:

1) Land is a critical resource in the development of petroleum infrastructure. However, due to competing interest in land utilization, the sector faces challenges in developing its infrastructure. Prudent environmental management is key to ensuring sustainable development of the sector.

2) In carrying out its planning and development mandate regarding energy regulation, electricity and gas reticulation, the Ministry of Energy and Petroleum will ensure that every county government shall set aside suitable land for energy infrastructure development purposes.

To achieve the above policy goals, the National Government commits itself to facilitate:

a) Development of a National Resettlement Action Plan Framework for energy and petroleum related projects; including livelihood restoration in the event of physical displacement of communities.

b) Access to land where exploration blocks fall on private land, community land and cultural heritage areas including game parks/reserves.

c) Establish strategies and mechanisms to eliminate kerosene as a household energy source by 2022.

d) Creation of disaster response units in each county and in relevant energy sector entities.

2.2.3 Devolution and Provision of Petroleum Energy Services

The following are the policy guidelines:

Under the Constitution, the functions of energy policy including gas reticulation and energy regulation have been assigned to the National Government while planning and development of gas reticulation and energy regulation are assigned to the County Governments. To avoid uncertainty and/or overlap of responsibilities, a framework on the functional devolution of roles between the two levels of government has been developed in consultation with all stakeholders.

2.2.4 Energy Financing, Pricing and Socio-Economic Issues

Under the policy, the Government shall:

a) Explore and adopt all viable financing options from local and international sources for cost effective utilization of all its energy resources, and in so doing shall endeavour to maintain a competitive fiscal investment climate in the country.

b) Support Public Private Partnerships in the development, operation and maintenance of energy and petroleum infrastructure and delivery systems.

Through the policy, the Government shall also set up a Consolidated Energy Fund to fund the following petroleum –sector activities (among others):

- Infrastructure development

- Acquisition of strategic petroleum reserves
- Energy and petroleum sector environmental disaster mitigation
- Response and recovery

2.2.5 Gas Sector Development Policies

MOEP plans to facilitate construction of natural gas infrastructure for electricity generation and other uses. It also plans for CNG technology that shall be applied for transport starting with public transport initially on pilot basis in areas with supply of natural gas.

2.2.6 Cross Cutting Issues

1) The policy provides for the establishment of the Energy and Petroleum Institute to undertake training, research, development, dissemination, nurture talent, innovation and to enhance capacity building in the sector. This is because research, development and dissemination as well as human resource development are key in achieving the objectives of this policy. To achieve this, the Government shall: -

    a) Promote a conducive environment to attract investments in the energy and petroleum sector taking into account the needs and ability of the people of Kenya

    b) Develop and implement a local content policy and regulations to facilitate participation of Kenyans in the energy and petroleum sector, including utilization of locally available goods, services and human resources. Local content in the sector will be well developed for enhanced national productivity.

    c) Put in place a framework for pro-active and sustained engagement between the two levels of government, investors and communities in energy and petroleum resource areas.

The policy document concludes that full and timely implementation of this policy will go along in facilitating transformation of Kenya into a globally competitive, newly industrialized, middle income and prosperous country with a high quality of life to all its citizens in a clean and secure environment by 2030. The oil and gas sub-sector will have to develop adequate infrastructure since the preliminary findings show its high potential.

2.3 Oil and Gas Programme s

Key Strategic Programme s of the Ministry of Energy and Petroleum in accordance with the Ministry Strategic Plan of 2013-2017 (MOEP, 2013), published government reports, Ministry website and agencies under the MOEP are discussed under the following headings:

1. *Petroleum Exploration Programme*
2. *Petroleum Distribution and Marketing Programme*
3. *Kenya Petroleum Technical Assistance Project (KEPTAP)*
4. *Early Kenyan Crude Oil Pilot Scheme*

2.3.1 Petroleum Exploration Programme

In reference to the MOEP Strategic Plan, 2013-17 and KPC Vision 2025, the objective of this programme is to facilitate and supervise fossil fuel exploration for discoveries of commercial stocks in the country's sedimentary basins for exploitation and to ensure availability and security of fossil fuels energy. Recent discoveries of commercial oil has thrust Kenya under sharp focus of currently twenty one (21) international oil and gas exploration companies at

various stages of explorations; some being in the preliminary stages of geological and geophysical data acquisition while others are carrying out exploratory drilling. The programme targets are:

i. Subdividing and creating new oil petroleum explorations blocks: Oil and Gas exploration blocks have been sub-divided and increased from 21 in 2008 to 46 in 2012 and increased to 63 in 2016.

ii. Increased exploration and oil discoveries over time by increasing number of wells in the future. Petroleum exploration is being undertaken both on-shore and off-shore in the country's four major Sedimentary Basins listed earlier in this report. The Government has taken the initiative to spearhead primary technical data acquisition in the exploration blocks in order to make them attractive to oil and gas exploration companies and by June 2015 there were over 70 exploratory wells, over 90,000-line km of two dimensional (2D) and more than 6,300 km^2 of three dimensional (3D) seismic data.

iii. *South-Sudan-Lamu Crude Oil Pipeline:* A memorandum of understanding between the Government of the Republic of South Sudan and the Government of the Republic of Kenya was signed in January 2012 to develop a pipe line between the oil fields of South Sudan and Lamu town in Kenya. A final draft of an Inter-Governmental Agreement (IGA) was submitted to the Republic of South Sudan in December 2012 for approval to facilitate its execution.

iv. *Lokichar-Lamu Crude Oil Export Pipeline:* In April 2016, it was agreed by the Governments of Uganda and Kenya that the two countries would develop separate, standalone export pipelines for their crude oil resources. Tullow Kenya is working with the Government of Kenya and its partners on a range of options for the independent development of the Kenya resources including early production using existing infrastructure which would provide valuable reservoir data ahead of a full field development with an export pipeline. Other development progress has included preparation for Front End Engineering Design (FEED).

v. Continued monitoring, supervising and reporting on the results of oil and gas exploration activities in the country.

vi. Enhancing a primary data acquisition, analysis and interpretation in the open blocks to make them attractive to investors.

vii. Enhancing partnerships in data exchanges to reduce cost in exploration and access to new technology.

viii. Strengthening the National Oil Corporation of Kenya (NOCK) as the government's agency in participation in blocks where commercial discoveries of oil and gas have been made.

ix. Establishing a geochemical and petro physical laboratory.

x. Establishing a national petroleum data centre.

xi. Establishing a drilling service unit.

2.3.2 Petroleum Distribution and Marketing Programme

According to the Ministry of Energy and Petroleum Strategic Plan and KPC Vision 2015, four (4) key development areas have been prioritised to enhance the petroleum distribution and marketing programme. They include:

1. *The construction of additional storage tanks*
2. *Instantiation of additional pumping stations*
3. *Replacing of old oil pipelines*
4. *The extension of the pipeline networks and coverage*

National Oil Corporation of Kenya (NOCK), Kenya Pipeline Company (KPC) and Energy Regulatory Commission (ERC) take leading roles in this development programme. KPC is a state owned cooperation with 100% government stake. The mandate of KPC is to provide efficient, reliable, safe and cost effective means of transporting petroleum products from Mombasa to the hinterland. KPC serves Uganda, Rwanda, Eastern Democratic Republic of Congo, Northern Tanzania, Burundi and Southern Sudan. In order to position KPC strategically to exploit the oil and gas potential in Kenya and the region, KPC has developed a ten-year strategic plan dubbed Vision 2025 whose aim is to transform the company into a world class organization which is diversified in the oil and gas business as captured in its new Vision 2015 re-branded as *'Africa's Premier Oil and Gas Company'* and with a mission of *'Transforming lives through safe and efficient delivery of quality oil and gas from source to customer (*see figure 9 below*)'*. It is this vision that will govern KPC expansion agenda to African countries namely Uganda, South Sudan, Rwanda, Burundi, the DRC, Tanzania, Malawi and Zambia among others.

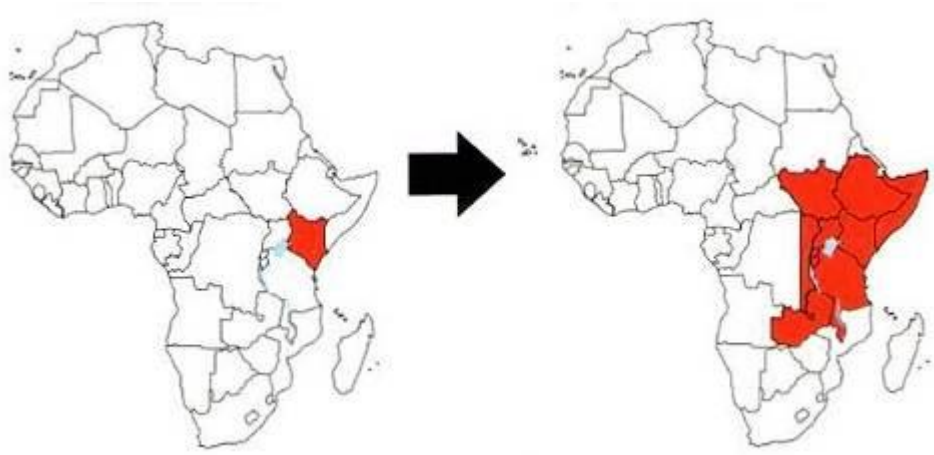


Figure 9: KPC's Vision of Regional Activity up from Kenya to over 9 Countries

Some of the panned investments programme s for KPC in the coming years include:

- The construction of a new 20-inch pipeline to replace the aging 14-inch Mombasa-Nairobi pipeline. The current Mombasa-Nairobi pipeline is faced with system constraints that make it unable to meet the current demand and so the new 450-kilometer pipeline due to be completed this year is a vision 2030 flagship project expected to meet demand for petroleum products until the year 2044. The on-going construction of Mombasa-Nairobi 20-inch multi-product oil pipeline (see Plate 6 below) was considered during the SESA work and overall existing distribution

pipeline network for refined oil in the country with the planned ones. The new pipeline is a transformational project whose impact on the regional economy will be huge and justifies why it had to be captured in the SESA work. Among the project's benefits are enhanced product flow from the current seven hundred and thirty(730) thousand litres per hour to one (1) million litres per hour so as to meet local and regional demand for petroleum products up to the year 2044; application of global best practices on health, safety and environmental management issues in line with Equator Principles; creation of employment opportunities for Kenyans; enhanced safety and government revenue by providing the safest means of transporting petroleum products.

- Installation of a 10-inch 122 kilometer pipeline from Sinendet in Nakuru County to Kisumu which is intended to increase volumes of product moved by an additional 360,000 litres per hour. This new Pipeline is a response to inadequate supply of petroleum products in Kisumu due to limitations of the existing 6-inch diameter pipeline laid in 1992.

- The construction of a modern bottom-truck loading facility in Eldoret, currently underway, to be completed soon. This Eldoret truck-loading facility together with the Kisumu one are the twin approaches by KPC to cater for the rising demand for the petroleum products not only in Western Kenya but also in the region.

- In addition, KPC is in talks with key private investors with a view of acquiring more facilities in Mombasa and Nairobi to act as additional storage and truck-loading facilities. Case in point is KPC's plans for acquisition of the Kenya Petroleum Refineries Ltd (KPRL) facility in Mombasa which will boost KPC's storage potential. KPC is in the process of taking over KPRL after the government of Kenya agreed to pay half a billion shillings owed to India's Essar Energy effectively acquiring Essar's 50 percent stake to the refinery and through KPC, the government intends to convert the refinery into a storage facility as the country gears up for commercial oil production. KPRL has 45 tanks for various products with a total networking capacity of over 484 Million litres.

- Construction of four additional refined petroleum products storage tanks at Nairobi Terminal. Since KPC's inception, volumes of products moved through its pipeline have been increasing over the years rising from 800 million litres per year in 1978 to over 5.8 billion litres in 2015. With a bigger pipeline coming up, KPC is putting up additional storage tanks in the Nairobi Terminal to more than double the storage capacity of diesel and super petrol from the current 100 million litres to 223 million litres.

- Install integrated security system: Closed Circuit Television Systems (CCTVs) including integrated access control systems will be installed in all KPC's depots.

- Construct a Storage Terminal at Konza to provide adequate stocks for Nairobi and its environs and reduction of demurrage costs and to enhance road safety along the Nairobi-Mombasa Highway.

- Developing a tank-form all storage facility of at least 80,000MT of Very Large Crude Carriers (VLCC) size tankers at Mombasa petroleum trading hub to ease the current shortage of oil and gas storage. The facility will be developed and expanded in a modulator manner to provide berthing for Very Large Capacity Cargo (VLCC) size tankers.

- Constructing Eldoret-Tororo (127km)-Kampala-Kigali refined petroleum oil products pipeline to provide an efficient, economic and safer mode of transporting petroleum products to Kampala, Rwanda and Burundi.

- Installation of a third pumping set and all associated facilities at Samburu, Maungu, Manyani, Mtito-Andei, Makindu, Sultan Hamud and Konza pump stations in the existing Mombasa-Nairobi oil pipeline to sustain a high flow rate and avail more windows for equipment maintenance.

- Construct Nairobi LPG storage, bottling and distribution facilities to ensure availability and accessibility of LPG at cost effective prices, promote use of LPG as a household fuel among the urban poor and the rural population and enhance socio-economic development in Kenya and the region.

- Expansion of oil pipelines to regions and county headquarters.

- Expand NOCK's retail market share to 20% by 2017 to increase security of supply and cushion the public against escalating oil prices.

- Developing skills and enhancing local content in fossil resources explorations and production through training and technical collaborations.

Plate 6: On-Going Construction of Mombasa-Nairobi Refined Oil Pipeline

2.3.3 Kenya Petroleum Technical Assistance Project (KEPTAP)

Kenya Petroleum Technical Assistance Project (KEPTAP) is a World Bank funded initiative/ programme to assist the government of Kenya in building capacity to manage its petroleum sector and wealth for sustainable development impacts. While it is being implemented as a project, its components form a capacity building programme that is likely to go beyond the period envisaged. KEPTAP has five components namely:

1) Petroleum Sector - Reforms and Capacity Building;

2) Revenue and Investment Management - Reforms and Capacity Building;

3) Sustainable Impact of Oil and Gas Industry – Reforms and Capacity Building;

4) Project Management.

This six (6) year project, funded to the tune of USD 50 million became effective in October 2014 and is being implemented by twenty-one (21) agencies (beneficiaries) (see Table 9 below). The project beneficiaries (implementing agencies) include government entities that have roles in the exploitation of Oil and Gas resource as well as the civil society organizations. The influence of SESA process in their implementation of final recommendations will differ from agency to agency. The overall project/ programme coordination and management reside in the Ministry of Energy and Petroleum.

Table 9: KEPTAP Beneficiaries and likely Influence of SESA in its Project Activities

SN.	KEPTAP BENEFICIARY	LIKELY INFLUENCE OF SESA IN ITS KEPTAP ACTIVITIES
1.	Ministry of Energy and Petroleum	Influenced but involvement in SESA has little to do with SESA outcome
2.	National Environment Management Authority	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
3.	Directorate of Occupational Health and Safety Services	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
4.	National Oil Corporation of Kenya	Slightly influenced but SESA outcome may not out lightly shape its KEPTAP Operations
5.	Civil Society Organizations	Influenced but involvement in SESA has little to do with SESA outcome
6.	Energy Regulatory Commission	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
7.	Kenya Pipeline Company	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
8.	Kenya Maritime Authority	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
9.	Ministry of Health	Highly influenced. Its involvement in KEPTAP will be shaped by SESA Outcome.
10.	Kenya Revenue Authority	Not influenced
11.	Commission on Revenue Allocation	Not influenced
12.	Central Bank of Kenya	Not influenced
13.	The National Treasury	Not influenced
14.	Kenya Bureau of Standards	Not influenced
15.	Ministry of Industrialization and Enterprise Development	Slightly influenced but SESA outcome may not out lightly shape its KEPTAP Operations
16.	Ministry of Education, Science and Technology	Not influenced
17.	Ministry of Devolution & National Planning	Not influenced
18.	Presidential Delivery Unit	Not influenced
19.	National Disaster Operation Centre	Influenced but involvement in SESA has little to do with SESA outcome
20.	Office of the Auditor General	Not influenced

Source: MoEP, 2016

Key objective of KEPTAP is to strengthen Upward and Downward linkages in the oil and gas industry. Specific objectives include:

a) Promoting value-addition activities downstream to reduce dependency on exports of primary goods,

b) Generating employment through provision of services upstream and downstream,

c) Designing local content policies, facilitating diversification away from natural resources,

d) Promoting appropriate standards and the productive sector with natural resource projects.

The project supports capacity-building in the administration of revenue to be generated from the oil sector. This includes capacity building in forecasting and collection of oil revenues and taxes; verification and auditing of recoverable costs proposed by oil companies; transfer of funds as prescribed in the legislation and reporting on oil revenue collection. Other special activities and studies supported under KEPTAP include the following:

Gender Assessment in the Petroleum Sector: A dedicated gender assessment will also be conducted to identify any potential gender-specific impacts and opportunities of the sector – including how men and women may differently experience risks and benefits of the sector.

Strategic Environment and Social Assessment (SESA): This project is supporting current Strategic Environment and Social Assessment (SESA) of the Petroleum Sector in Kenya.

Development of an Effective Communications Strategy on the Extractive Industries Sector: This will define clear responsibilities for communications. A sector-specific National Communications Strategy (NCS) will empower a greater proportion of the Kenyan public to effectively access, understand and participate in the on-going dialogue on using the petroleum deposits as a source of national wealth.

Public Information and Awareness Campaign: Since awareness on Oil and Gas (O&G) sector developments among stakeholders is low in Kenya, KEPTAP will also support public information and awareness campaigns. The objective of this activity is to ensure that target groups are identified, informed, expectations aligned and that roles and responsibilities are clarified. Different target groups will require different information content, level of information complexity and communication channels to achieve the objectives.

***Institutional Review*:** Will provide a functional diagnosis of key institutions that have responsibility in O&G resource exploitation with a focus on mandates, objectives and responsibilities, organizational management structures, processes and procedures, as well as human, technical and financial capabilities while considering the growth of the sector. The institutional reviews and corresponding inter-institutional coordination mechanisms represent a complex and highly important task for the success and sustainability of Kenya's petroleum sector.

***Transaction Advisor (for Petroleum Agreements)*:** Will provide support to the GoK Negotiation Team on license negotiations and other negotiations (e.g. pipelines, processing facilities, etc.) related to the development of O&G operations. Negotiation team will require a core capacity in economic modelling and negotiation skills in addition to access to specialized technical/commercial/legal expertise plus international experience to match private sector parties with whom to negotiate. SESA will provide an appropriate basis for development of policies to mitigate potential environmental and social risks consistent with international good practice. It is envisaged that SESA will identify gaps in regulations, capacity building needs, public consultation and participation mechanisms needed.

2.3.4 Early Crude Oil Pilot Scheme

In addition to progressing the full field development work in Kenya, an Early Oil Pilot Scheme (EOPS) transporting oil from South Lokichar to Mombasa utilising a combination of road from Lokichar to Eldoret and rail or by truck from Eldoret to Mombasa KPRL facilities for export through Mombasa Port is being assessed to provide reservoir management

information to assist in full field development planning (see figure 10 below). The EOPS would utilise existing upstream wells and KPRL oil storage tanks to initially produce and export approximately 2,000 barrels per day by mid-2017, subject to agreement with National and County Governments (Tullow Oil, 2016). This scheme of early monetization of Kenyan crude oil prior to the construction of a crude oil export pipeline envisages: -

1. Completion of early oil production facilities at Lokichar by Tullow Kenya.

2. Road trucking of the crude oil from Lokichar to Eldoret through Leseru by road. This involves the upgrading of the estimated 297km Eldoret – Kitale – Lokichar – Amosing road. It will also involve opening of roads within oilfileds and related infrastructure like bridges and drainage systems.

3. Rail or/and road transport of the crude oil from Eldoret to Mombasa.

4. At Mombasa, the crude oil will be received, stored and later exported through Kenya Petroleum Refineries Ltd (KPRL) and KPA Port facilities.

SESA consultations were held on this short-time proposed scheme to understand government preparedness on handling environmental and social issues especially in the upstream sector.

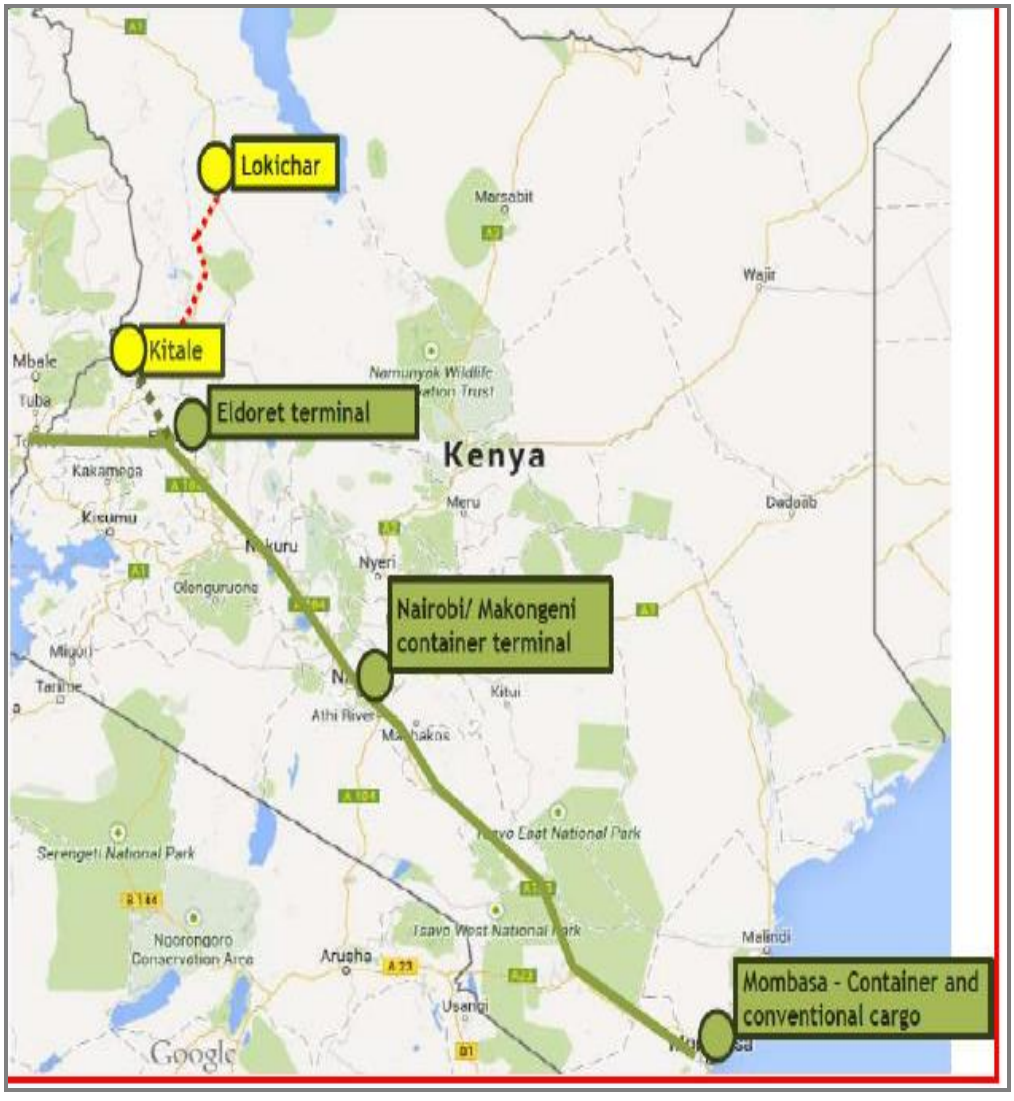


Figure 10: Proposed Route for Implementation of Early Oil Pilot Scheme

2.4 Kenya National Petroleum Sector Master Plans

The key plans under review here include:

1. The LAPSSET Master Plan (Petroleum Infrastructure Component)
2. The Draft Kenya National Petroleum Master Plan (KNPMP), 2015

2.4.1 LAPSSET Master Plan (Petroleum Infrastructure Component)

The Lamu Port South Sudan-Ethiopia Transport (LAPSSET) Corridor project is a transport and infrastructure project in Kenya that when complete, will be the country's second transport corridor. Both crude oil and refined petroleum transport pipelines are planned as part of the LAPSSET project. The refined product pipeline proposed is to supply for local demand as well as 30% of consumption for Ethiopia. It extends from Lamu to Isiolo and from Isiolo to Moyale through the *Isiolo Tank Termina*l (990km in Kenya, 570km in Ethiopia). Kenya's other transport corridor is the Mombasa port and Mombasa–Uganda transport corridor that passes through Nairobi to Kisumu and much of the Northern Rift. The LAPSSET project (see figure 11 below) will involve the following components:

- A port at Manda Bay, Lamu
- Standard gauge railway line to Juba and Addis Ababa, the South Sudanese and Ethiopian capitals
- Road network
- Oil pipelines (to South Sudan and Ethiopia)
- Oil refinery at Bargoni, Lamu
- Three international airports (Lamu, Isiolo and Lodwar)
- Three resort cities (Lamu, Isiolo and Lake Turkana shores)

After the oil discovery in Turkana, on 23rd April 2016, the Kenya and Uganda Governments agreed to pursue two separate crude oil export pipelines for the development of Kenya's South Lokichar oil fields and Uganda's Lake Albert oil fields. The Uganda pipeline route will be through Tanzania from the Ugandan town of Hoima to the Tanzanian port of Tanga. The pipeline development is being led by Total and the Government of Uganda. In Kenya, Tullow and its upstream partners Africa Oil and Maersk Oil, along with the Government of Kenya, through a negotiated Joint Development Agreement will implement the Kenya crude oil pipeline which will run from South Lokichar to the port of Lamu. It is anticipated that for both the Kenya and Uganda pipelines, technical, environmental and social studies and tenders required to proceed to Front End Engineering Design (FEED) will commence in the second half of 2016 with the objective of commencing FEED in 2017. The FEED is basic engineering which comes after the conceptual design or feasibility study. The FEED design will focus on the technical requirements as well as rough investment cost for the crude oil pipeline project. The FEED can be divided into separate implementation packages covering different portions of the project.

The pipeline shall run from Lokichar to a marine terminal and offloading facility at the Port of Lamu. The pipeline shall employ the highest technical, health, environmental, social and safety standards to facilitate transportation of the crude oil from the oil fields to the market.

A feasibility study and preliminary engineering designs was undertaken and the Final Report adopted in June 2015. The crude oil in the Lokichar Basin is waxy and is characterized by high pour point and a wax appearance temperature above 63°C. The Project will thus involve construction of a heated pipeline from Lokichar to Lamu with a length of approximately 855km plus all other necessary facilities.

At its inception the LAPSSET project envisioned the cooperation and infrastructure spanning across the four countries of Kenya, Uganda, South Sudan and Ethiopia. The oil pipeline for example was planned from Lamu to Hoima in Uganda through Lokichar Turkana with branches to South Sudan and Ethiopia through Moyale. However, Uganda has since withdrawn from the project as they rerouted the Hoima Lokichar pipeline to a new route via Tanzania.

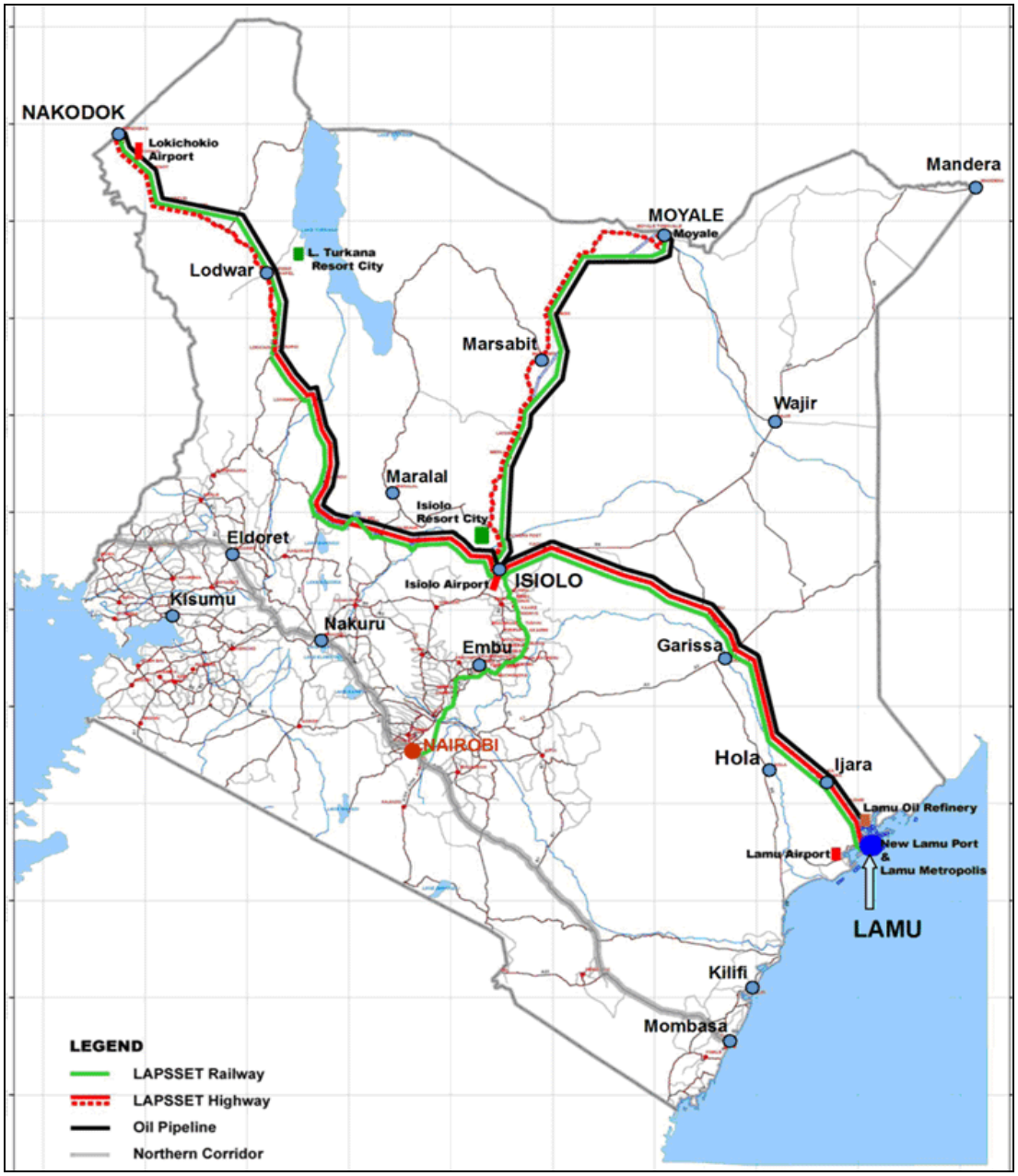


Figure 11: LAPSSET Corridor Which Includes the Crude Oil Product Pipelines

Industries expected to be established for mid-stream that SESA included in the study are: -

- Refineries
- Petrochemical Industries in Lamu and Isiolo
- Manufacturing Industries along the Transport Corridor
- Thermal Power Generation

2.4.2 Draft Kenya National Petroleum Master Plan (KNPMP)

The objective of the Kenya National Petroleum Master Plan (KNPMP) is having more efficient and economically viable pipeline services in Kenya. This draft that is currently being reviewed for publication outlined the following planned facilities for the period 2017-2040. This proposed petroleum infrastructure (shown in Table 10) will have various environmental and social impacts that need to be addressed at the policy, programme and master plan levels to ensure sustainability of the sector.

Table 10: Proposed Oil and Gas Infrastructure as per the Kenya Petroleum Master Plan, 2015

Type	*Construction time (years)*	*Likely construction start*	*Likely Operations start date*
Gas			
Mombasa 800MW CCGT Gas Fired Power Plant	2	2017	2019
800MW CCGT Gas Fired Power Plant	2	2018	2020
200MW CCGT Gas Fired Power Plant	2	2018	2020
800MW CCGT Gas Fired Power Plant	2	2023	2025
800MW CCGT Gas Fired Power Plant	2	2028	2030
800MW CCGT Gas Fired Power Plant	2	2033	2035
800MW CCGT Gas Fired Power Plant	2	2038	2040
1mtpa Ammonia Plant			
1 mtpa Methanol Plant			
15 Bcm/yr LNG 2 train facility			
500km Offshore gas pipeline			
Oil			
Lokichar- Eldoret- Mombasa Crude Oil Pipeline (sharing way leave with existing product pipeline)	2	2021	2023
Mombasa Nairobi Product Pipeline (currently under construction)		2014	2016
New Mombasa Nairobi parallel product pipeline	2	2037	
Nairobi Eldoret new product pipeline	2	2017	2019
Nairobi Eldoret new product pipeline expansion	2	2023	2025
Sinendet Kisumu new product pipeline	2	2019	2021
Nakuru to Isiolo Spur line	2	2024	2026

Conversion of KPRL to Storage and Oil Trading Hub	2	2016	2018
Lamu to Mombasa (KPRL?) Spur line	2	2024	2026
Mombasa Refinery	2	2024	2026
Lamu Refinery	2	2024	2026
New Storage facilities around the country (primarily Mombasa, Nairobi ,Lokichar and Lamu for crude) to gradually achieve 90 days' supply by 2040 (30 days crude, 60 days product)			

Source: Petroleum Master Plan for Kenya, 2015

Note: The KNPMP strategy drafted by PwC is yet to be published, therefore the expectations will be managed since it is yet to be decided if it shall form the scope of the National Petroleum Master Plan (NPMP).

2.4.3 Relationship of National Petroleum Sector PPPs with County Integrated Development Plans

A sample of County Integrated Development Plans for counties that will play a key role in the upstream and midstream petroleum developments were reviewed to understand their linkages with national PPPs. These include the:

- Turkana County Integrated Development Plan, 2013 – 2017
- Isiolo County Integrated Development Plan 2013-2017
- Lamu County Integrated Development Plan 2013-2017

All the three counties sampled recognize the potential of petroleum resources to the county economic development. However, a scan through the above three plans reveals a major disconnect between the national plans discussed in this chapter and the County Physical Development plans. The counties have generally not customised or domesticated national policies, plans and programme s locally. The Lamu County is the only one that tries to outline the key components of the LAPPSET Master plan but limited interpretation and integration into county plans.

3.0 CHAPTER THREE: SESA METHODOLOGY

This chapter outlines the methodology used in SESA process. An open and systematic process was followed, involving key stakeholders to identify significant issues associated with the petroleum sector PPPs in Kenya, possible alternatives and suitable recommendations for desired outcomes. The key stakeholders mapped and prioritised were then consulted and their interests concerns and incentives analysed accordingly. The objective of public consultations was to frame the methodology and content of the SESA, with substantial stakeholder inputs.

3.1 SESA General Approach Applied

Scientifically, the basis for applying SEA to policies, plans, and programme s in the petroleum sector falls into three main categories; strengthening project level EIAs, addressing cumulative effects, and advancing the principles of sustainability (Dalal-Clayton and Sadler 2005). In order to fully understand the concerns of the oil and gas sector, policies, plans and programme s on the society and environment, a Strategic Environmental and Social Impact Analysis (SESA) was undertaken to provide a framework of recommendations to guide the sector.

The Strategic Environmental and Social Assessment (SESA) conducted for the sector focused on *Policies, Plans, and Programme s (PPPs)* for upstream, midstream and downstream sub-sectors (see diagram below) in order to guide environmental and socio-economic planning and decision making in the whole petroleum sector in the country. The key stakeholders in the oil and gas sector were identified and mapped, consulted, and their interests, concerns and incentives analysed. The study process involved an open and systematic process with the objective of stakeholder consultations being to frame the methodology and content of the SESA, with substantial stakeholder inputs (see figure 12 below).

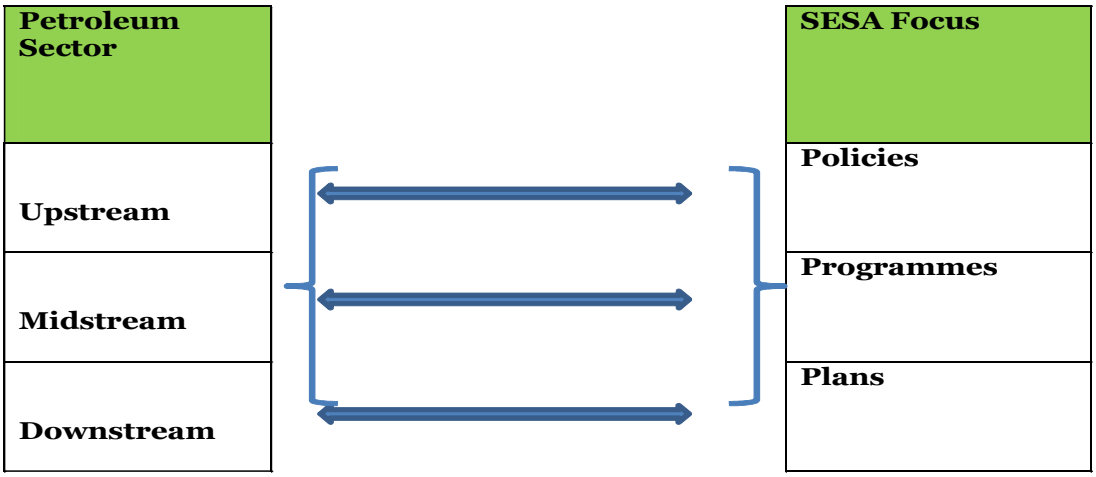


Figure 12: General SESA Study Approach

In summary, SESA study was done through: -

- Kick-off consultation meeting with the client, World Bank, NEMA and MoEP representatives
- Desktop studies/ literature reviews
- Stakeholder mapping and analysis
- Consultation meeting with Civil Society representatives.
- Regional and local consultation meetings
- Interview of key stakeholders through one-on-one meetings
- Case studies / trips/ field visits to the oil and gas development sites in the upstream; midstream and downstream
- Feedback meetings were done through the planned validation workshops.

3.2Stakeholder Analysis and Mapping

The first step in stakeholder analysis was to identify/ map which stakeholders are active in the Kenya Petroleum sector through desktop literature reviews, consultations with key institutions like MoEP and NEMA, which were interested groups that actively participated in the development of the ToR for this assignment. World Bank environmental and social specialists, private sector actor's associations (especially, PIEA), Kenya Civil Society Platform on Oil and Gas- (KCSPOG), relevant CSOs and County Governments (County Ministries of Energy and Environment), County officials in charge of environment and energy sectors also participated in identifying and prioritising grassroots actors in various regions/ counties.

The next step was to work out their legal mandates and interest, so that it was clear who to focus on. At this stage, it was important to prioritise the stakeholders depending on their active role and interest in the sector. Having gained a good understanding of the most important stakeholders, their involvement was strategized and executed through a stakeholder engagement plan.

3.3Stakeholder Engagement Plan

The main purpose of the stakeholder engagement plan developed and used (see Table 11 below) was to;

- To engage the stakeholders through consultative forums (see Table 12) to analyze their interests, concerns and recommendations regarding the petroleum sector development for incorporation into the SESA for effective regulation and management of the **upstream**, **midstream** and **downstream** petroleum sectors.
- Secure and sustain support for the SESA process among key stakeholder groups.
- Creating awareness and averting negative publicity on the growing oil and gas sector.

Table 11: Stakeholder Engagement Plan

Stakeholder Category/ organization, group or individual	**Potential role in the SESA activity**	**Engagement strategy**	**Follow-up strategy plans for feedback or continued involvement**
▪ ***Public Sector and Key Ministries/ Inter-ministerial Lead Agencies and Key Public Institutions***	▪ Formulate and implement petroleum sector policies, plans and programme s ▪ To be responsible in implementation of SESA recommendations	▪ Invitation to participate in regional and national consultative meetings ▪ Special consultations at the organizational levels ▪ Case studies to specific projects/ programme s	▪ Invitation to National and regional SESA validation workshops ▪ Implement the final recommendations ▪ Participate in Monitoring and evaluation of the implementation of SESA recommendations
▪ ***Private Sector Actors/ Investors and Associations***	▪ Understand the current trends in the oil and gas market ▪ Have information on current challenges faced by the sector ▪ Understand the gaps in the existing laws and policies	▪ Invited to participate in regional and national consultative meetings ▪ Special one on one consultations at the organisational levels	▪ Invitation to National and regional SESA validation workshops ▪ Participate in Monitoring and evaluation of the implementation of SESA recommendations
▪ ***Political Leadership***	▪ Political leaders have a great influence on the various policies, plans and programme s ▪ Play major role in creating awareness on government PPPs ▪ Understand petroleum politics	▪ Invitation of some political leaders to participate in regional and national consultative meetings ▪ Special consultations with the leaders from the oil hotspots including Member of Parliament from Turkana, Members of Parliament from North Eastern Region, Lamu County	▪ Invitation to National and regional SESA validation workshops ▪ Participate in formulation of laws to fill in the gaps identified by SESA process ▪ Incorporation of their views in the SESA report for implementation by the Government agencies.

Stakeholder Category/ organization, group or individual	**Potential role in the SESA activity**	**Engagement strategy**	**Follow-up strategy plans for feedback or continued involvement**
		Commissioner etc.	
▪ ***Civil Society Organizations (NGO's and CBOs)***	▪ They are the voices of the civil societies which have a great influence on the people. ▪ Most of them even deal with the people on the ground hence have a lot of data to be retrieved during the study. ▪ Helped to ensure that gender and other vulnerable group's issues and concerns were incorporated in the entire SESA process.	▪ Invitation to participate in regional and national consultative meetings	▪ Invitation to National and regional SESA validation workshops ▪ Implement the final recommendations especially on community-related issues ▪ Participate in Monitoring and evaluation of the implementation of SESA recommendations
▪ ***Professional Associations/ Experts/ Research and Academic Institutions***	▪ Lead in research and consultancy ▪ Undertake EIAs, SEAs and Environmental Audits	▪ Invitation to in regional and national consultative meetings. Some of those engaged include EIA experts, Universities, colleges and secondary school representatives and Turkana professionals Group representatives to participate	▪ Invitation to National and regional SESA validation workshops ▪ Participate in Monitoring and evaluation of the implementation of SESA recommendations

3.4SESA Communication Strategy

A Communications Strategy was used as a tool to reach the various SESA stakeholders at the national and county levels. Communications strategy objectives were: -

- To educate and raise awareness concerning the SESA among all stakeholders using relevant media and languages (English, Swahili and local languages where it is necessary)
- Apply all means of communication to ensure full participation to the SESA process
- To continuously communicate adequate and useful information about SESA and its outputs to the stakeholders

Key target stakeholders in communication were those outlined in the engagement plan and these were divided into the following five (5) general categories: -

- Public Sector: Key Ministry Agencies and Lead Agencies, Key Public Institutions
- Private Sector Actors/ Investors / Associations
- Civil Society Organizations (CSOs) and professional associations
- Academic and Research Institutions
- Elected leaders/ politicians from oil potential areas (Northern and North Eastern Kenya)

Messages delivered were tailored according to the target audience and region. Some of the messages include;

- Facts about the petroleum sector policies, plans and programme s
- General benefits of the SESA Process
- Specific benefits of the SESA process implementation to the national agencies, counties and communities for support and contribution towards meeting the basic goals of sustainable development of the sector.

Communication channels used included: -

- National Forums
- Regional Forums
- Local Forums
- Key stakeholder interviews
- Request for Memorandums/ Written comments
- Radio and Print media for public contributions
- NEMA Website
- Kenya Gazette publication

Invitations to the forums/ meetings were done through multiple means using official letters sent at least two (2) weeks in advance, emails, physical deliveries, social media (WhatsApp), telephone calls and text messages to targeted stakeholders. Reminders were also sent out to ensure full participation in the process. Validation workshops in future were advertised through local media to further improve the participation levels.

3.5SESA Stakeholders Consultation and Participation

The programme of consultation activities is detailed below showing the stakeholder meetings and workshops held for the period April to October 2016 (Minutes and Attendance Sheets as Annex 2). This was aligned to the NEMA SEA guidelines of 2012 to ensure smooth undertaking and meet the NEMA procedures and standards expected.

Table 12: SESA Consultation Workshops

S/N	Stakeholder Workshops/ Region	Venue	Date Consulted	Participation by Gender		
				M	F	Total
1.	***Civil Society Workshop-****Nairobi City*	*Laico Hotel-Nairobi*	19th April 2016	**12**	**6**	**18**
2.	***Nairobi Metropolitan and Surrounding Regions-*** *Nairobi City* (*Nairobi, Nakuru, Kiambu, Narok, Kajiado, Machakos, Kitui and Makueni Counties*)	*Fairview Hotel, Nairobi*	5th May 2016	**19**	**13**	**32**
3.	***Lamu Local Consulation Workshop***	*Msafini Hotel, Lamu*	12th May 2016	**39**	**16**	**55**
4.	***Coastal Region-*** *Mombasa* (*Mombasa, Kwale, Kilifi, Tana River, and Taita-Taveta Counties*)	*Kenya School of Government, Mombasa*	24th May 2016	**33**	**9**	**42**
5.	***North Rift Region*** – *Eldoret town*(*West Pokot, , Trans Nzoia, Uasin Gishu, Elgeyo-Marakwet, Nandi and Baringo Counties*)	*Sirikwa Hotel, Eldoret*	7th June 2016	**30**	**10**	**40**
6.	***Western Kenya and parts of South Rift Region***– *Kisumu City* (*Siaya, Kisumu, Homa Bay, Migori, Kisii, Nyamira, Kakamega, Vihiga, Bungoma, Busia, Kericho and Bomet*	*Kisumu University Hotel, Kisumu*	9th June 2016	**26**	**15**	**41**

	Counties)					
7.	***Isiolo Regional Workshop*** *(Laikipia, Meru, Samburu and Isiolo Counties)*	Galaxy Hotel, Isiolo	13th June 2016	**26**	**8**	**34**
8.	***Turkana Local Meeting***	St. Teresa Pastoral Centre-Lodwar Town	23rd June 2016	**37**	**6**	**43**
9.	***National Workshop*** (*National Stakeholders and Selected/ Other Remaining Counties; Nairobi, Nyandarua, Nyeri, Kirinyaga, Murung'a, Tharaka Nithi, Embu, Mandera and Garissa)*	Intercontinental Hotel, Nairobi	30th June2016	**81**	**26**	**107**
10.	***Total Number of Key Stakeholders Consulted through Workshops***			**303** **(73.5 %)**	**109** **(26.5 %)**	**412**

After the scoping workshops, the scoping report was compiled. No sooner had the report been approved by the Natioanl Environment Management Authority than the validation workshops started. They were organized and held in the same towns and venues (where possible) as the scoping workshops. They were meant to affirm that all that the stakeholders had said during scoping had actually been incorporated in the SESA report. The list of the stakeholders who had attended the scoping workshops was used to do the invites for the validation workshops. The validation workshops were held as indicated in the table 13 below.

Table 13: SESA Validation Workshops Held

S/N	Workshop	Venue	Date
1.	Lamu Local Validation Workshop	Msafini Mango Top Hotel	1st November, 2016
2.	Coastal Region validation workshop	Kenya School of Government, Mombasa	4th November 2016
3.	*North Rift Region Validation Workshop*	Sirikwa Hotel – Eldoret Town	8th November, 2016
4.	*Western Kenya and parts of South Rift Region*	Kisumu University Hotel, Kisumu	11th November, 2016
5.	*Isiolo Regional Validation Workshop*	Northern Galaxy Hotel	15th November, 2016
6.	*Turkana Local Validatiob Meeting*	St. Teresa Pastoral Centre-Lodwar Town	22nd November, 2016
7.	*National Validation Workshop*	Nairobi Safari Club-Lilian Towers	8th December 2016

Plate 7-16 below represent some of the SESA forums held in Nairobi and other parts of the country. Overall participation in SESA of males was around 73.5% and 26.5% for women. While most invitations to stakeholder organizations were open for nomination of participants, the participation gives an implication of gender discrimination in nominations and possible disparities in representation in this sector. Despite the low nominations by and participation of women, their issues were captured fully since key women organisations like *Maendeleo Ya Wanawake* and some women CBOs were involved at both national and County levels.

Plate 7: Consultation Workshop for Stakeholders in Nairobi Metropolitan and Surrounding Regions Held at Fairview Hotel Nairobi on 5th May 2016

Plate 8: Local Consultation Workshop for Stakeholders in Lamu County held at Msafini Shela Hotel, Lamu Town on 12th May 2016

Plate 9: Local Consultation Workshop for Stakeholders in Isiolo County held at Galaxy Hotel, Isiolo Town on 13th June 2016

Plate** 10**: Consultation Workshop for Stakeholders in Coastal Region held at Kenya School of Government, Mombasa Town on 24th May 2016

Plate 9: Consultation Workshop for Stakeholders in North Rift Region held at Sirikwa Hotel, Eldoret Town on 7th June 2016

Plate 10: Consultation Workshop for Stakeholders in North Rift Region held at Sirikwa Hotel, Eldoret Town on 7th June 2016

Plate 12: Consultation Workshop for Stakeholders in Western and Parts of South Rift Region held at Maseno University Hotel, Kisumu City on 9th June 2016

Plate 14: Consultation Workshop for Stakeholders in Turkana County held at St. Teresa Pastoral Centre, Lodwar Town on 24th June 2016

Plate 15: Consultation Workshop for Stakeholders in Turkana County held at St. Teresa Pastoral Centre, Lodwar Town on 24th June 2016

Plate 16: National Consultation Workshop for Stakeholders at Intercontinental Hotel, Nairobi on 30th June 2016

Plate 117: Consultative Meeting with the Petroleum Institute of East Africa

3.5.1 One-on-one Key Stakeholder Consultations

Key stakeholders consulted through one on one meeting with the SESA consultants at various institutions/ organisation in their offices countrywide are listed in the Table 14 below and Plate 17. Their views have been captured in this report and detailed minutes annexed (see Annex 3). These organisations were also sampled as case studies for detailed discussions on PPPs of the sector in order to identify policy gaps to be addressed. These consultations

were running parallel with consultation workshops in Nairobi, Lamu, Mombasa, Eldoret, Kisumu, Isiolo, and Turkana.

Table 14: Key Stakeholders Consulted

S/N	Stakeholder Consulted	Venue	Date Consulted
	NAIROBI CONSULTATIONS		
1.	National Environment Management Authority (NEMA)	NEMA HQ Offices	20th April 2016
2.	Directorate of Occupational Health and Safety Services (DOSHS)	DOSHS Offices	20th April 2016
3.	Kenya Revenue Authority (KRA)	KRA HQ Offices	10th May 2016
4.	Commission for Revenue Allocation (CRA)	14th River Side Drive,	10th May 2016
5.	Energy Regulatory Commission (ERC)	Upper Hill	17th May 2016
6.	Kenya Pipeline Corporation –Nairobi Headquarters	Kenya Pipeline, HQ Industrial Area	17th May 2016
7.	Tullow Oil Kenya	Tullow Oil Offices at West End Building, Nairobi	31st May 2016
8.	Petroleum Institute of East Africa (PIEA)	Nairobi Office	16th June 2016
9.	Ministry of Health- Nairobi	Ministry of Health Offices, Nairobi	28th June 2016
10.	National Museums of Kenya	National Museums office Nairobi	5th July 2016
11.	Principal Secretary- State Department of Petroleum	Ministry of Energy offices Nairobi	6th July 2016
12.	Energy Regulatory Commission	Nairobi Office	25th July 2016
13.	LAPSSET	Nairobi Office	25th July 2016
14.	North Eastern Kenya Leaders	Fairview Hotel, Nairobi	8th September 2016
15.	National Oil Corporation of Kenya	AON Minet House - Nairobi	27th September 2016
16.	Tullow Oil Kenya- Social Performance Manager	Tullow Offices - West End Towers	3rd October 2016
17.	North Eastern Kenya Leaders	Intercontinental Hotel, Nairobi	6th October 2016
18.	Shell BG	Nairobi	13th October 2016
	LAMU CONSULTATIONS		
19.	Lamu County Commissioner	County Commissioners' Office	11th May 2016
20.	Lamu County NEMA Office	NEMA Office	11th May 2016
21.	Ministry of Health and Environment	Bush Garden Restaurant	11th May 2016
22.	National Museums of Kenya (NMK) - Lamu	National Museums Office	12th May 2016
	MOMBASA CONSULTATIONS		
23.	Kenya Petroleum Refineries Ltd (KPRL)	KPRL Offices, Mombasa	23rd May 2016
24.	Kenya Pipeline Corporation (KPC)	KPC Offices, Nairobi	23rd May 2016
25.	Kenya Ports Authority (KPA)	KPA Offices, Mombasa	23rd May 2016

26.	Kenya Maritime Authority (KMA)	KMA Offices, Mombasa	24th May 2016
27.	Oil Spill Mutual Aid Group (OSMAG)	OSMAG (HASHI Offices)- Changamwe, Mombasa	25th May 2016
28.	Africa Gas and Oil Limited (AGOL)	AGOL Offices in Miritini	25th May 2016
29.	National Museums of Kenya-Fort Jesus	National Museums' Office-Fort Jesus	
	ELDORET CONSULTATIONS		
30.	Kenya Pipeline Company	Eldoret Station	7th June 2016
	KISUMU CONSULTATIONS		
31.	Kenya Pipeline Company	KPC office Kisumu	9th June 2016
	ISIOLO CONSULTATIONS		
32.	County Commissioner	Isiolo Town	13th June 2016
	TURKANA CONSULTATIONS		
33.	Turkana Political leaders	Fairview Hotel	21st June 2016
34.	Tullow Oil- Lokichar	Lokichar - Turkana	22nd June 2016
35.	CEC-Ministry of Tourism, Trade and Industrialization – Turkana County Government	TurkanaCounty Government Offices	24th June 2016
36.	CEC-Ministry of Health and Sanitation- Turkana County Government	Turkana County Government Offices	24th June 2016
37.	Ministry of Environment- Turkana County Government	Turkana County Government Offices	24th June 2016
38.	Kenya Wildlife Services	Turkana County Government Offices	24th June 2016
39.	National Environment Management Authority (NEMA)	Turkana County Government Offices	24th June 2016

3.5.2 Participation from Public Sector

The table 15 below shows wide participation from both national and county government levels. Since land was a key issue for discussions, the regional land offices were actively involved. Over 50% of the county government ministries in charge of Energy/Environment, Physical Planning, Infrastructure, Health, Agriculture, Livestock and Fisheries among others participated in regional and national consultation forums. Over 12 NEMA county offices sent representatives to the consultation forums and their input was valuable to the whole process. Active participation and major contributions were also recorded from national/ regional offices of Kenya Forestry Service (KFS), Kenya Wildlife Service (KWS), National Drought Management Authority (NDMA), Water Resource Management Authority (WRMA) and National Museums of Kenya (NMK) among others.

Table 1516: Public Sector and Key Ministries / Agencies that Participated in SESA

▪ Office of the President- Interior Coordination o Lamu County Commissioner o Turkana County Commissioner o Isiolo County Commissioner o Chiefs/Assistant Chief Officers	▪ Kenya Bureau of Statistics
▪ Attorney General Office	▪ National Land Commission Offices o Kisumu o Lamu o Baringo o Kilifi o Mombasa
▪ Ministry of Energy and Petroleum (MoEP)	▪ Kenya Revenue Authority(KRA)
▪ Kenya Pipeline Company (KPC)	▪ Kenya Petroleum Oil Refineries Limited (KPRL)
▪ Energy Regulatory Commission (ERC)	▪ Commission on Revenue Allocation
▪ Ministry of Environment, Natural Resources & Regional Development Authorities	▪ Lamu County Wildlife Compensation Committee
▪ Ministry of Mining	▪ Kenya Investment Authority
▪ Ministry of Agriculture Livestock & Fisheries/ State Department of Fisheries	▪ Council of Governors
▪ Ministry of Labour & East Africa Affairs/ Directorate of Occupational Health and Safety	▪ National Disaster Operation Center ▪ National Oil Spill Response Committee (NOSRC)
▪ Ministry of Health	▪ National Gender and Equality Commission
▪ County Governments (Ministries in – Charge of Energy/Environment, Physical Planning, Health, Agriculture, Livestock and Fisheries etc.) - Nairobi, - Mombasa - Turkana - Kisumu - Kisii - Bungoma - Kakamega - Vihiga - Isiolo	- Elgeyo-Marakwet - Baringo - Isiolo County Assembly - Kwale - Kilifi - Tana River - Taita- Taveta - Kiambu - Kitui - Makueni - Migori - Kericho - West Pokot

- Uasin Gishu	- Trans Nzoia
▪ Kenya Civil Aviation Authority (KCAA)	▪ Kenya Ferry Services
▪ Kenya Navy	▪ LAPSSET Corridor Development Authority (LCDA)
▪ Coastal Development Authority (CDA)	▪
▪ National Transport and Safety Authority	▪ The Competition Authority of Kenya
▪ Kenya Electricity Generating Company	▪ Coast Water Services Board
▪ Kenya Marine and Fisheries Research Institute (KMFRI) and its Regional Offices o Kisumu	▪ National Environment Management Authority (NEMA) - Headquarters (Nairobi) - Meru County - Kisumu - Kakamega - Homa Bay - Siaya - Kericho - West Pokot - Nandi - Mombasa - Kwale - Taita Taveta
▪ Kenya Forestry Service (KFS) and its Regional Offices - Siaya - Mombasa - Trans Nzoia	▪ Kenya Wildlife Service (KWS) and its Regional Offices - Nandi - Kisumu - Mombasa - Isiolo - Turkana
▪ National Drought Management Authority	▪ Radiation Protection Board
▪ Water Resource Management Authority (WARMA) and its Regional Offices - Lakipia - Isiolo - Kisumu	▪ National Museums of Kenya - Nairobi - Lamu - Mombasa - Meru - Kisumu - Nandi
▪ Kenya Maritime Authority (KMA)	▪ Directorate of Occupational Health and Safety (DOSH)

3.5.3 Private Sector Actors/ Investors that Participated in SESA

Active participation cut across the upstream, mid-stream and downstream actors as listed in the Table 16 below. Over 25 companies/ associations participated at mainly both the national and regional levels. Private companies with business and working experience in the sector also participated (for example, PriceWaterhouseCoopers (PwC))

Table 17: Participation of Private Sector Actors/ Investors

Petroleum Sector	Stakeholders
Upstream Petroleum Sector Actors	Tullow Oil, Africa Oil Corporation, National Oil Corporation of Kenya (NOCK), Shell BG
Midstream Petroleum Sector Actors	Kenya Pipeline Company Ltd, Kenya Petroleum Oil Refineries in Mombasa, LAPSSET Corridor Development Authority (LCDA)
Downstream Petroleum Sector	▪ National Oil Corporation of Kenya ▪ Gulf Energy ▪ KenolKobil ▪ Gulf Africa Petroleum Corporation (GAPCO)Dominion Petroleum Kenya Ltd ▪ Libya Oil Kenya Ltd ▪ KIPYA Africa ltd ▪ Galana Oil Kenya Ltd ▪ Roy Hauliers ▪ Hass Petroleum ▪ Africa Gas and Oil Company ▪ CMC Motors Group Ltd
Cross-Cutting/ Private Sector Associations and Private Companies that participated in the SESA consultations	▪ Petroleum Institute of East Africa (PIEA) ▪ Kenya Private Sector Association (KEPSA) ▪ Kenya Oil and Gas Association (KOGA) ▪ Kenya Independent Petroleum Dealers Association (KIPEDA) ▪ Kenya National Chamber of Commerce and Industry (NCCI) ▪ Oil Spill Mutual Aid Group (OSMAG) ▪ Environmental Institute of Kenya (EIK) (Association of EIA Experts) ▪ PriceWaterhouseCoopers (PwC) ▪ SP Advisory ▪ Kurrent Technologies

3.5.4 Participation by Civil Society Organizations

A total of 56 Civil Society Organizations (NGOs and Community Based Organizations) (see Table 17) participated in the SESA consultation process. The process started with CSOs in Nairobi to understand the sector and map regional organizations active in the O&G sector. The Kenya Civil Society Platform on Oil and Gas (KCSPOG) also submitted a filled up checklist. They also provided some of the previous studies undertaken in the sector by various NGOs.

Table 1819: Civil Society Organizations that Participated in SESA

▪ Kenya Civil Society Platform on Oil and Gas (KCSPOG)	▪ Kenya Land Alliance
▪ Oxfam	▪ Community Action for Nature Conservancy
▪ Likoni Community Development Programme	▪ Kwale County Natural Resources Network
▪ Catholic Organization for Relief and Development (Cordaid)	▪ Pastoralist Development Network of Kenya
▪ Kerio Community Development Assistance	▪ World Wide Fund for Nature
▪ Lamu Beach Management Units	▪ Institute for Law and Environmental Governance-(ILEG)
▪ Kenya Oil and Gas Working Group (KOGWG)	▪ Natural Justice
▪ Kitale Nature Conservancy	▪ Kids for Planet Kenya
▪ Sana International- Kisumu	▪ Save Lamu
▪ Lamu Marine Conservation Trust	▪ Awer Conservancy
▪ Shungwaya Welfare Association	▪ Northern Rangeland Trust
▪ *Maendeleo ya Wanawake*	▪ Kenya Association Resource Agency (KARA)
▪ Kikozi Programme	▪ Natural Justice
▪ Kenya Coastal Development Project	▪ *Sauti ya Wanawake*
▪ Community Action for Nature Conservation (CANCO)	▪ Cicila namullen foundation- Turkana
▪ Kenya Civil Society Platform on Oil and Gas	▪ Starren Environmental Solutions
▪ Isiolo Girls Environmental Group	▪ Kenya National Resources Alliance of Kenya (KeNRA)
▪ Friends of Lake Turkana	▪ Institute for Human Rights and Business
▪ Information Centre for the Extractive Sector in Kenya	▪ Kenya Natural Resources Alliance
▪ Farm Concern International	▪ ASEGIS
▪ Kerio Youths Association	▪ Livelihood Management Agroforestry (LIMA)- Turkana
▪ AKIDEIN	▪ Turkana Pastoralists Development Organ. (TUPADO)
▪ Lorengelup Committee Development Organization (LOCADO)	▪ *Maisha Mema Nyumbani*
▪ Alemun Pastoralists Initiative (APEI)	▪ Turkana Environment Resources Association Network (TERA)
▪ Lapur Community- Turkana	▪ Nakwalele Development Organization

	Development
▪ Turkana Youth Network	▪ Centre for Training and Integrated Research (CETRAD)
▪ Agency for Pastoralists Development	▪ Guycs Group- Isiolo
▪ Pastoralists Women for Health Environment and Education	▪ Coastal Oceans Research Development – Indian Ocean

3.5.5 Academic and Research Institutions

As shown in the Table 18 below, academic staff from over 10 public and private universities/ research institutions were involved in this study. Members of staff from relevant schools of energy, environment and social studies were invited to both National and regional workshops near their locations.

Table 18: Academic and research institutions that Participated in SESA

▪ Academic and research institutions - Technical University of Kenya - Kenyatta University - Jomo Kenyatta University of Agriculture and Technology - University of Nairobi - Mount Kenya University - Lamu Boys High School	- Strathmore University - University of Eldoret - Kenya Methodist University - Maseno University - Pwani University - Technical University of Mombasa - South Eastern Kenya University - Isiolo Girls' High School

3.5.6 Participation by Leaders

Leaders are the voices of the people they represent. They are also the authority through which one gets to communicate to the local people in the various setting. SESA consultations involved discussions with various elected, nominated and appointed leaders from various capacities. The table 19 below show the various leaders who were consulted in the various regions;

Table 19: Leaders Consulted

Region	Leader
Nairobi	Principle Secretary State Department of Petroleum
Lamu	Lamu County Commissioner Chair Amu Council of Elders
Turkana	Turkana County Commissioner Member of Parliament Turkana Central Member of Parliament Loima Member of Parliament Turkana North
Isiolo	Isiolo County Commissioner
Mandera	Member of Parliament Mandera North Member of Parliament Mandera West Member of Parliament Mandera East Member of Parliament Banissa
Garissa	Member of Parliament Garissa Township Member of Parliament Dadaab
Wajir	Member of Parliament Tarbaji

3.6 Analytical Methods Used

The SESA process applied two methods to collect and analyse relevant data into detail. This was through case studies and application of GIS technologies as explained in the following two sub-sections.

3.6.1 Case Studies for Upstream, Midstream and Downstream Projects/ Facilities

Case studies were sampled from upstream, midstream and downstream petroleum projects/ facilities both existing and planned to understand the key positive and negative impacts of various development programme s and plans. Field visits and study of the environmental concerns of one upstream site (oil exploration sites in the Rift Valley), mid-stream sites (LAPPSET corridor – Lamu, Isiolo and KPRL) and downstream facilities (O&G depots and distribution pipelines and retail facilities in Mombasa, Nairobi, Nakuru, Kisumu and Eldoret) was undertaken (see Plate 18-20 below). Some EIA reports were also sampled on a case-by-case basis to understand the whole EIA process used and existing gaps in the sector in terms of skills among EIA experts, investors/developers, NEMA staff and relevant lead agencies.

When involving private oil & gas sector for consultation, dedicated consultations as case studies were held with Tullow Oil who are partners with Africa Oil and Shell BG to represent upstream actors to gain understanding of their experiences and recommendations after testing the current Kenyan environmental policies/regulations by actual activities in the field. NOCK was also invited to various forums to share their exploration experiences. This helped to understand what policies are working and what is not working for them and the existing gaps.

Plate 12: Consultants Undertaking a Field Case Study on 24th May 2016 at the Lamu Port Construction Site under LAPSSET Programme

Plate 13: Consultants Undertaking a Field Case Study on 24th May 2016 in Lamu Town

Plate 14: Case Study in a Section of the Disputed Land Sites along LAPSSET Corridor near Isiolo Town

3.6.2 Application of GIS in SEA and Spatial Analysis

Spatial techniques involving GIS analysis in Arc Map were employed to develop map overlays useful in illustrating the potential direct influence of the oil and gas activities in the upstream and midstream against the important natural resources in the country. In order to achieve this, baseline data was collected from the National Survey of Kenya. The data was used to superimpose the different types of maps onto one another. The data collected were the geographic shape files including Kenya base map and other important natural resource maps of Kenya including water resources, fishing resources, forest resources, wildlife, Important Bird Areas (IBAs), as well as the Arid and Semi-Arid Lands (ASALs). The maps were imported into Arc Map 10.2.2 software for analysis. Here, the maps were superimposed and overlaid with the oil and gas blocks as well as the LAPSSET corridor, the existing KPC

pipelines and other proposed infrastructure in the oil and gas sector. Map outputs have been exported and integrated into this SESA draft report. From this, it was possible to analyse and explain the possible impacts of the on-going and future drilling and exploration programme s on important natural resources. Application of GIS tools helped to promote the incorporation of spatially specific information in SEA process and potential for improving the information available to the public.

3.7 Benchmarking

Benchmarking was done against environmental and social governance of oil producing nations such as Ghana, United Arab Emirates (UAB), Angola, UK among others use as examples for illustrations. SESA/SEA reports from some of these countries were reviewed to understand their content and structure and they influenced on the current structure used herein. This was done against a benchmark standard of best management practices for minimizing environmental and social impacts of oil and gas industry. The study considerations and recommendations were also guided by World Bank/ IFC Environmental and Social Performance Standards listed below:-

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labor and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

SESA considerations and recommendations were also benchmarked with Equator Principles listed below:-

- Principle 1: Review and Categorization
- Principle 2: Social and Environmental Assessment
- Principle 3: Applicable Social and Environmental Standards
- Principle 4: Action Plan and Management System
- Principle 5: Consultation and Disclosure
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review
- Principle 8: Covenants
- Principle 9: Independent Monitoring and Reporting
- Principle 10: EPFI Reporting

There was also reference into standards, best practices, codes and other documents developed by relevant other international organisations/ institutions like:

- International Association of Oil and Gas Producers (IOGP)
- International Petroleum Industry Environmental Conservation Association
- United Nations Environment Programme (UNEP)
- World Health Organisation (WHO)
- Abu Dhabi National Oil Company (ADNOC)
- International Association for Impact Assessment (IAIA)

4.0 CHAPTER FOUR: ENVIRONMENTAL INFORMATION AND IMPACTS OF PETROLEUM SECTOR

4.1 Issues Studied During SESA

The detailed study was undertaken through fourstages:

Stage 1: Identification of environmental and social impacts, safety and occupational health risks, and possible mitigation measures at policy level,

Stage 2: Description of the regulatory and institutional framework and assessment of capacity and identification of policy gaps, and

Phase 3: Analysis of the emerging issues/gaps and gap-filling options.

Phase 4: Recommendations

Chapter Four, Five and Six deal with stage one on the impacts associated with this sector. These concerns were obtained through interviews, stakeholder consultations and field case studies. Stakeholder concerns were evaluated on the basis of social, economic and environmental impacts, the severity of the impacts and the numbers of people likely to be impacted. Impacts associated with oil and gas production vary by phase, and include direct, indirect, and cumulative impacts which may occur on land, offshore, continental shelves, deep sea, ASALs, wetlands, forests, animal parks and other fragile ecosystems. These impacts occur at various stages of the value chain stages listed below.

- Upstream Exploration (Seismic surveys - onshore and offshore)
- Drilling/field development activities (Upstream)
- Transportation and production (Midstream)
- Processing, retailing and distribution (Downstream)
- Decommissioning/restoration of petroleum oil fields/ wells and other mid-stream and downstream facilities

The following concerns of greater importance were selected and prioritised for detailed studies during SESA.

a) Land use changes

b) Impact of the oil and gas activities on forestry resources

c) Impacts on wildlife habitats and biodiversity hotspots

d) Impacts of oil and gas activities on water and fisheries resources

e) Impacts of oil and gas activities on water resources

f) Impacts of offshore oil and gas activities

g) Waste management from onshore and offshore petroleum developments

h) Climate change impacts and the oil and gas activities

4.2 Background of Petroleum and its Environmental and Social Impacts

This chapter gives a general overview of the Kenyan environment and the potential negative impacts on it as a result of petroleum exploration and development activities in addition to the infrastructural development identified in the PPPs chapter. Kenya has significant biodiversity and enjoys a unique tropical climate with varying weather patterns due to differing topographical dimensions. The country has a wide variety of ecosystems namely mountains, forests, arid and semi-arid areas (ASALs), freshwater, wetlands, coastal and marine areas, all offering many opportunities for sustainable human, social and economic development. These ecosystems are natural capitals which provide important regulatory services (such as forests and mountains which regulate water flow and sustain biodiversity), provision services (for example forests providing timber and fuel wood), cultural services (such as aesthetic, recreational or spiritual values and uses) and supporting services (like soil formation, nutrient cycling and primary production).

The survival and socio-economic wellbeing of Kenyans is ultimately intertwined with the environment. Most Kenyan citizens depend directly or indirectly on environmental goods and services. In addition, Kenya's environmental resources contribute directly and indirectly to the local and national economies through revenue generation and wealth creation in sectors such as agriculture (including fisheries and livestock), water, energy, forestry, trade, tourism and manufacturing.

The promulgation of the Constitution of Kenya 2010 marked an important chapter in Kenya's environmental policy development in the context of climate change. Hailed as a 'Green' Constitution, it includes elaborate provisions with considerable implications for sustainable development. These range from environmental principles and implications of Multilateral Environmental Agreements (MEAs), to the right to a clean and healthy environment as enshrined in the Bill of Rights. Chapter V of the Constitution is entirely dedicated to land and the environment. It also incorporates a host of social and economic rights which are of environmental character such as the right to water, food, and shelter, among others.

Kenya has fairly adequate Environmental and EIA policies and legal frameworks. However much of the emphasis is on project approval processes, rather than on a life cycle approach to minimizing environmental and social impacts at the strategic level. Environmental monitoring and project follow-up are considered part of the EIA. Nevertheless, in most cases actual enforcement is inadequate, environmental monitoring is insufficient and monitoring data is not widely disclosed to the lead agencies, public and affected stakeholders. Moreover, most counties have insufficient control and enforcement mechanisms during the post-EIA approval phase due to limited human, technical and financial capacity.

Impacts associated with the oil and gas sector vary by phase of the value chain, and include direct, indirect, and cumulative impacts. Oil and gas impacts may occur on land, offshore, on continental shelves, deep sea, in Arid and Semi-Arid Lands ("ASALS"), wetlands, forests, animal parks and other fragile ecosystems.

Developing the oil and gas upstream and mid-stream industry is a challenge, considering the sensitivity of environmental issues in the country. The on-going and planned upstream activities (exploration, production, decommissioning and restoration), mid-stream (transportation by pipeline, rail, oil tanker or truck, storage, and wholesale marketing of crude or refined petroleum products), and downstream activities (refining, distribution by tankers, retailing, and consumer networks for various petroleum

products) are important for development of the country's petroleum industry value chain. In discussing the environmental concerns these activities address different issues. Since commercial production of petroleum onshore is envisaged and offshore exploration is on-going, the environmental concerns to be faced are terrestrial, atmospheric and marine in nature.

4.3 Land Acquisition, Displacements and Land Use Changes

Land and natural resources occupy an important place in the political history, social organisation and economics of Kenya. A large proportion of the population lives in rural areas and derives their livelihood directly from the land. Of the total land surface area, approximately 17% is of high and medium potential while 83% is classified as ASALs. The Constitution of Kenya categorises land into three types: public, private and community land. Land concerns will be critical issues in the upstream oil and gas exploration activities in terms of expected displacements, resettlements, compensation, land-use changes, rapid unplanned urbanisation, and population immigration and growth. Lokichar, Isiolo, Lamu, Mombasa, Nairobi, and other towns will experience exponential growth in their populations due to the planned infrastructural facilities in these areas; resulting in more urbanization and land use issues.

Oil and gas industry projects and operations especially in the upstream sector mostly occur in locations where land is owned by communities rather than private individuals with few exceptions in places like Elgeyo Marakwet County. There are several laws and policies that govern tenure and land use rights in the country. They include the National Land Policy- 2009, the Constitution of Kenya- 2010, the National Land Commission Act- 2012, the Land Act- 2012, the Land Registration Act 2012 and the Community Land Act- 2016. The land laws are sufficiently clear on how to compensate for land acquired by the state or private entities for development of oil and gas infrastructure and enterprises. However, compensation for land is not generally pegged on the relevant laws as other factors such as public perceptions about the net worth of investments as well as cultural and political interests tend to override the law in many instances. In addition, there is the challenge of defining local communities for the purpose of compensation since the definitions of community tends to shift with changes in the phase of oil and gas development project.

Concerns have also been raised regarding skewed and biased compensation for land acquired for oil and gas assets and infrastructure. The law on compensation tends to emphasise commercial interests while ignoring other interests such as intergenerational claims to ancestral land. There are also concerns regarding the multiple agencies responsible for regulating and adjudicating on land resources at National and County government levels.

The impact of displacement is dependent upon the population density in the affected regions. Kenya's population density is stronger on southern, western and centrals parts of the country. These areas will be greatly affected in case of oil discovery warranting mass displacement of communities. The specific areas of concern include the western, central and coastal regions, as can be seen in Figure 13. The tertiary basin, particularly, the blocks extending on the lake basin would, consequently experience grater impacts, seeing this region is densely populated. The challenge in these areas is the displacement of large numbers of locals in case of an oil discovery. The cost of resettlements arising from these displacements is undoubtedly huge.

The Mandera and Anza basins, however, are in areas with low populations thus the impacts such as dislocations and resettlements may be minimal.

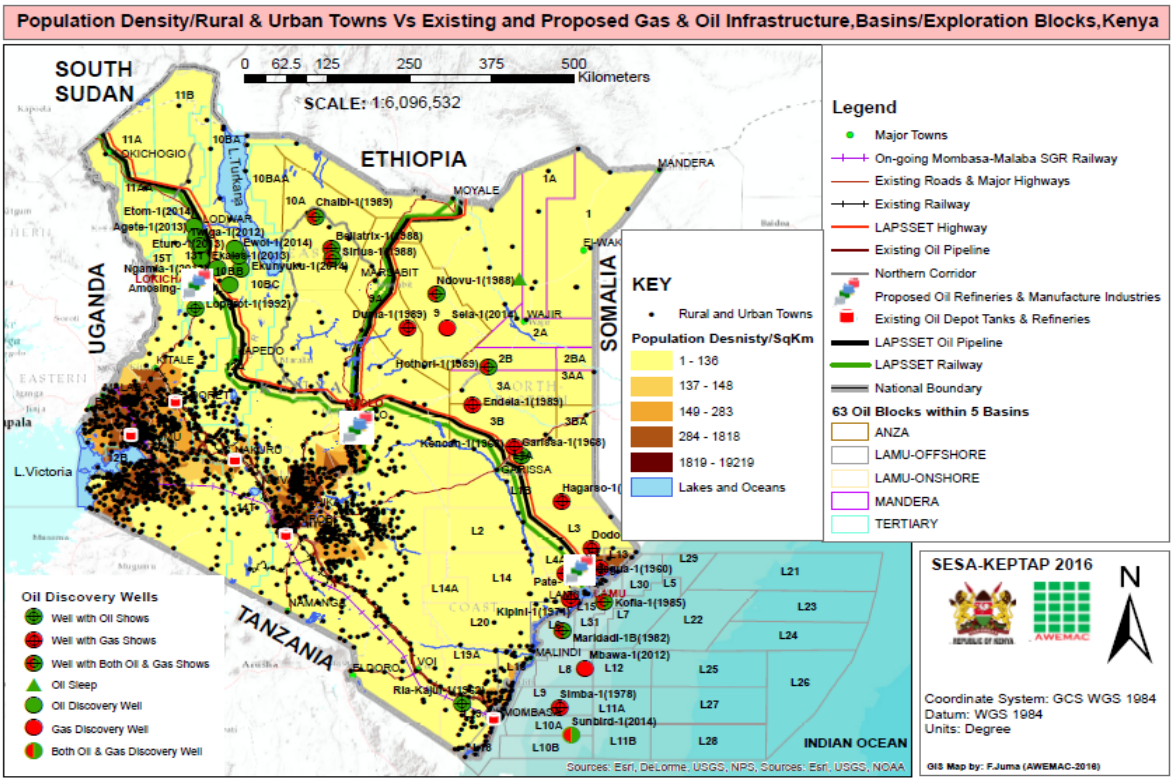


Figure 13: Kenya's population density and distribution and the oil and gas infrastructure

Case study: Land acquisitions and disputes in Isiolo and Meru counties

4.4 Impacts on Agro Ecological Zones (AEZ) and Land Uses

Agro Ecological Zones (AEZs) are geographical areas exhibiting similar climatic conditions that determine their ability to support rained agriculture. At a regional scale, AEZs is influenced by latitude, elevation, and temperature, as well as seasonality, and rainfall amounts and distribution during the growing season.

Kenya is divided into seven major agro ecological zones, this division is according to the temperature and moisture profiles indicated in figure 14 with most of the north east, northern regions and part of the coastal areas are arid. Majority of the oil blocks basins fall in these areas. It can be observed that most of the oil basins don't fall within the agriculturally productive areas of the central and western Kenya. However, the oil and gas activities on southern end of the tertiary basin may significantly affect some of these humid and wet areas.

Generally, the oil and gas activities can affect land use systems in different AEZs. For example, oil and gas activities in oil blocks along the fragile coastline which varies from semi-arid to semi-humid with and uses such as crop farming, fishing, tourism and marine system ecological preservations. The north- eastern region of Kenya which is largely semi-arid to arid has pastoralism a dormant land use. In the north rift region, which is mainly semi-arid, and a mix of sub-humid areas the major land use is pastoralism and partly large scale agricultural farming. The central rift where on-shore oil and gas activities in some blocks will take place in agricultural areas. This will lead to a detectable shift in land use which may lead to increased global warming and climate change leading to altered temperature gradients and temperature zones being one of the governing factors in the

selection of what crops can be cultivated in what areas of a given AEZ. Land use impacts would occur during the drilling/development phase if there are conflicts with existing land use plans and community goals; existing recreational, educational, religious, scientific or other use areas; or existing commercial land use (e.g., agriculture, grazing, or mineral extraction). In general, the development of oil and gas facilities would change the character of the landscape from a rural to a more industrialized setting.

Since the people at the oil and gas exploration areas depended hugely on their environment for farming, pastrolism and fishing, any incidence which affect these resources would surely affect their subsistence. On the consequences of oil spills on the environment and wildlife oil kills plants and animals in both in terrestrial and the estuarine zones; oil settles on beaches and kills organisms that live there; it also settles on ocean floor and kills benthic (bottom-dwelling) organisms such as crabs; oil poisons algae, disrupts major food chains and decreases the yield of edible crustaceans; it also coats birds, impairing their flight or reducing the insulative property of their feathers, thus making the birds more vulnerable to cold; oil endangers fish hatcheries in coastal waters and as well contaminates the flesh of commercially valuable fish. Fishing resources thus become damaged through physical contamination, bio-accumulation, and damaging of spawning grounds, as well as habitat destruction, depending on the circumstances of the spill and time of response which thus has a direct impact on livelihoods that depend on such resources. On land, oil spills destroy crops and damage the quality and productivity of soil that communities use for farming, while on water, it damages fisheries and contaminate water used for drinking and other domestic purposes thereby reducing any improvement in livelihood activities of people in oil producing areas.

The flaring of Associated Gas during oil production result in emissions comprising particulate matter (smoke), sulfur and nitrogen oxides, benz[a]pyrene and dioxin and unburned fuel components such as toluene, benzene and xylene which may result to acid rain. Acid rain is another problem within caused by gas flaring can lead to loss in biodiversity, with forest and economic crops being destroyedincluding oil spillage and gas flaring affects livelihood in the form of productivity losses to both crop and fish harvest. The major livelihood sources (including land and water) for the majority of households in the region have been greatly affected. Depending on the severity, oil spills on land affects soil stability leading to reduced growth and productivity for farmers in communities in the regions.

The process of land acquisition in many parts of the country is characterised by disputes and confusion arising due to land ownerships and illegal transfers observed when land has been identified and earmarked project developments. Many local communities feel displaced from their traditional lands of heritage without good consultation and through unscrupulous means that often include denial to full access of information on land acquisition process.

In many cases, project developments often pass through contentious boundaries and lands and this normally translate to land disputes and civil conflicts. If unchecked, the conflicts are likely to lead to widespread escalation of poverty, social – economic disfranchisement, displacements and apathy amongst the people. A case study of such land disputes include the LAPSSET project that will pass through the Meru - Isiolo borders. The LAPSSET project is arguably the single most important project that has happened to the marginalized Northern Kenya since independence. While the project is a boon to the region, it is slowly turning out to be the source of conflict among the communities living along its path since it is to pass through the disputed boundary between Meru and Isiolo Counties. The disputed areas

include Gambella, parts of Ngaremara Location like Attan, Kiwanja, Lewangila and Chumvi Yare, Ramadhan, Gambella, Shaba Hills, Gotu and Magado. Attan, Kiwanja, Lewangila and Chumvi Yare are located a stone throw away from the proposed Isiolo Resort City at Kipsing Gap. On the Meru side, the conflict is largely in Ndumuru, Gachiuru, Leeta, Njarune, Bulo and Kiutinne (see Figure 15 below). With Isiolo being identified as the next frontier for mega business, land speculators have been salivating at the prospect of making a kill as investors move in to set up shop. In this case, such plans of national importance should be designed in a way to avoid such contentious boundaries bearing conflicts within counties or communities. Further recommendations on this have been addressed in the ninth chapter of this report.

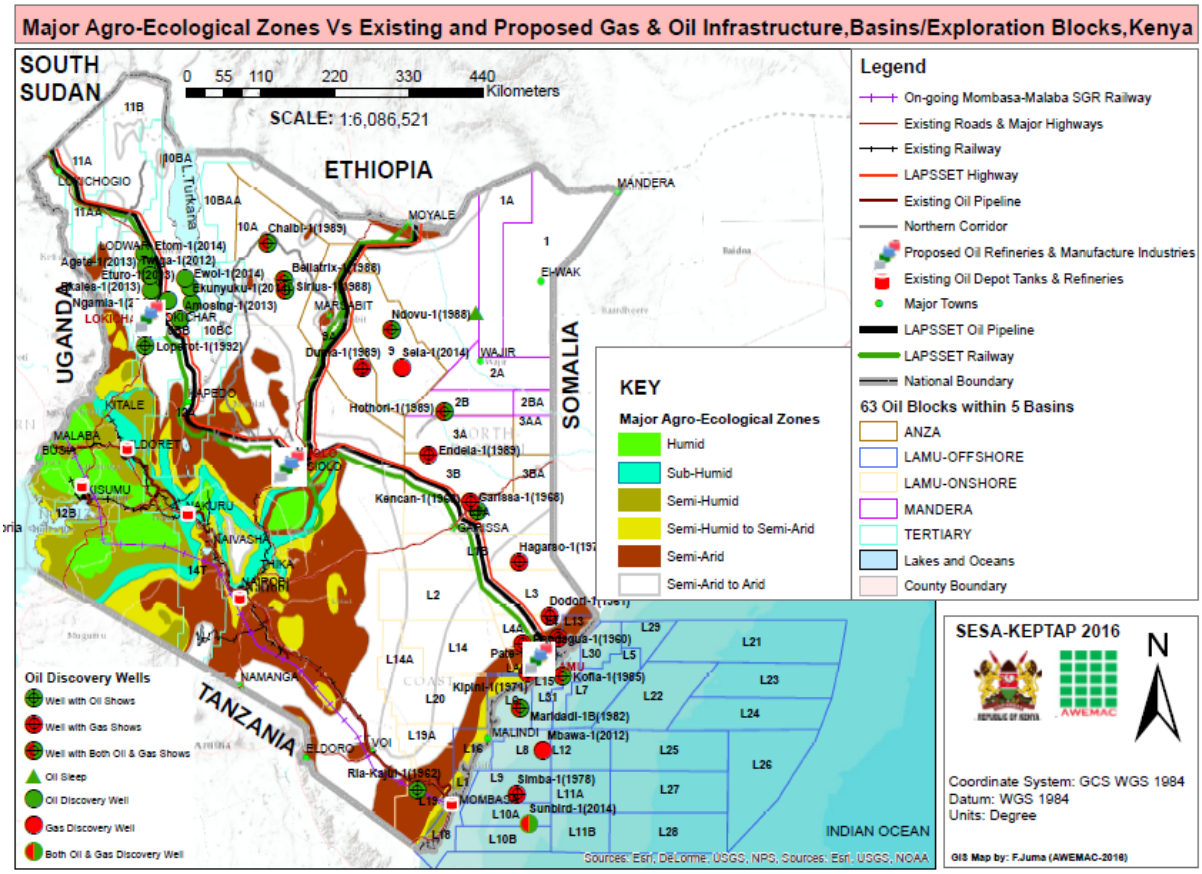


Figure 14: **Kenya's AEZ overlaid with the existing oil and gas infrastructure**

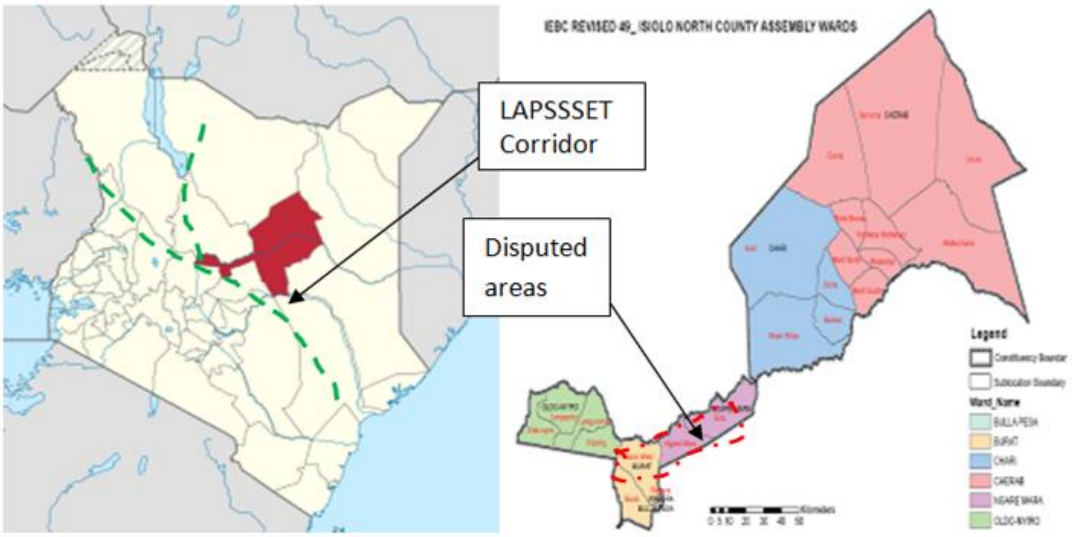


Figure 15: A Section of the Disputed Areas (not drawn to scale) between Meru and Isiolo Counties

4.5 Impact of the Oil and Gas Activities on Forestry Resources

Key natural forests include; the mountain forests (Mt Kenya, the Aberdares, Mau, and the Kikuyu escarpment), dry zone forests (Marsabit, Taita hills and Namanga hills forests), western rain forests (Kakamega, Nandi and small patches of Nyanza and Western provinces), and coastal forests including mangrove forests (Shimba hills and Arabuko Sokoke forests). Oil and gas upstream activities may have adverse impacts on forests. However, at present most of the areas with oil and gas potential are in the ASALs of Kenya.

The country's ASALs, which cover about 80% of Kenya's total land surface and hold 25% of the human population are unique in nature and require special attention to strengthen not only the economic base of the inhabitants but also the national economy. Kenya's dry lands, although rich in biodiversity, are often, stressed by frequent drought incidences, also considering that livestock keeping is the main economic activity of these dryland areas, adverse environmental impacts have direct impacts on the economic and social wellbeing of residents. However, as population pressure grow on the high and medium agricultural potential areas, there is migration into the dry land areas resulting in depletion of grazing lands and forest resources as well as tree cover degradation. Currently, oil exploration is already taking place in Arabuko Sokoke forest in the Coastal zone and measures will need to be taken to ensure the forest is preserved since the Arabuko Sokoke Forest (ASF) is the last remaining indigenous forest in Kenya as well as the largest and most intact coastal forest in East Africa. Exploration within the forest that is home to a number of endangered and endemic animal species will lead to conflicts (on sustainability and economic development) between oil interests and local people and wildlife.

Petroleum industry infrastructural development may include camps/ buildings, production sites, manufacturing facilities (such as natural gas processing facilities), power generation, refineries, roads, ports, railways, ICT infrastructure, pipelines, airports and electricity transmission. The environmental impacts of such infrastructural development are distinct and unique and include effects on flora and fauna, social and psychological disruption, vegetation clearance, excavation works and spillages during construction and operation (see Plate 21 below).

Plate 21: Clearance of Indigenous Dry Land Forest to Establish Campsites and other Facilities for Oil Exploration Sites in Turkana

Kenya has resources of *Gum arabic* and *Gum resins* with commercial production confined to the northern part of the country. These resources have potential for generating wealth and uplifting the living standards of the local communities in the drylands. They fall into the category of Non-Wood Forest Products (NWFPs); renewable resources that could be sustainably exploited for household income and still conserve biological diversity and ecosystem functions while increasing overall productivity of the land. They can serve as raw materials for enterprises based on them thus providing opportunities in employment generation thereby uplifting the socio-economic status for the local communities. This is especially important to Kenya's drylands since there exists fewer options of alternative resources for supporting livelihood because of the difficult environmental conditions, which result from scant and erratic rainfall and poor soils. One advantage about these resources is their ability to produce gums and resins in the dry season when foliage is scarce, thereby allowing the communities to be occupied in a meaningful economic activity. The potential prospects for these resources are even greater if properly developed. It is feared that the activities of oil and gas explorations in some parts of the dry land areas of Northern Kenya may cause endangering of these important species of tree and biodiversity through logging and soil contamination in case of accidental oil spills.

It is worth noting that a substantial amount of Kenya's forest resources is indigenous and they take significantly longer periods of time to be established, thus the need for protection.

Mangrove forests

Mangrove forests may also be affected in the event of oil spills from exploration, production and transportation activities especially the Lamu-Mombasa mangrove stretch. Mangrove forests are valued as carbon sinks in that they sequester a large quantity of carbon and therefore help in countering the effects of climate change. This is made possible through their high productivity and by also trapping carbon in biomass and below the ground. The mangroves create a conducive habitat for inshore finfish and crustaceans. They also support highly productive offshore fisheries (see figure 16 below).

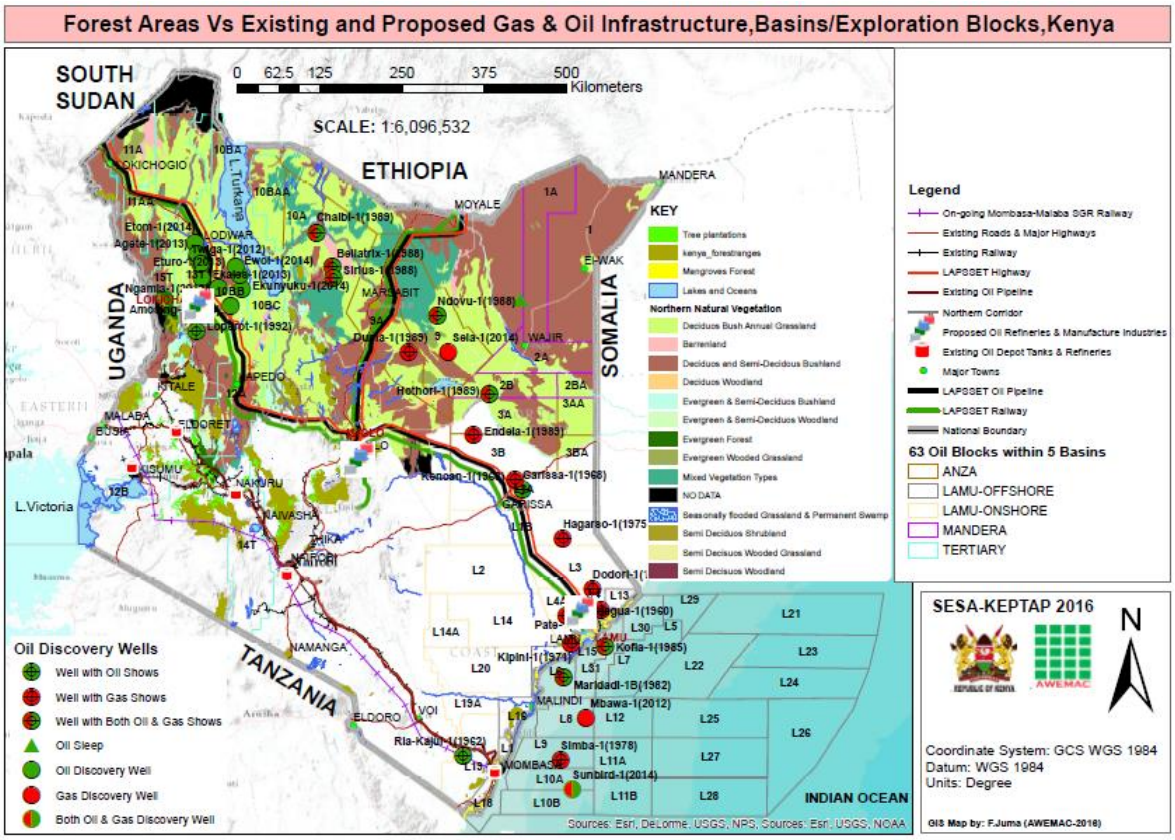


Figure 16: Kenya's forest resources and mangroves overlaid on the oil and gas infrastructure.

The following forest resources are either currently or likely to experienced increased impacts from the oil and gas explorations in the four basins.

- The Kenya's evergreen highland forests i.e. the Abardare and Mt. Kenya which border the southern end of the Tertiary basin
- The planted forest of the Central and Rift Valley highlands
- The coastal mangrove forest (see Plate 22) resources and marine parks (see figure 17 below) at the coast especially in the Lamu regions are likely to be highly changed through clearing and the port construction activities
- The woodlands of the northern Kenya, these areas are characterised by woody, resistant bush lands, which extends the bigger part of the Northern Kenya. Some of the trees species are indigenous, deciduous and pose semi desert adaptations.
- The savannah grasslands and scattered bush lands of the coastal and southern parts of the country.
- The Arabuko Sokoke Reserve and the Shimba Hill Forest of the coastal areas are experienced increased activities in the L16, L18 and L19 blocks of the Lamu oil and

gas basins.

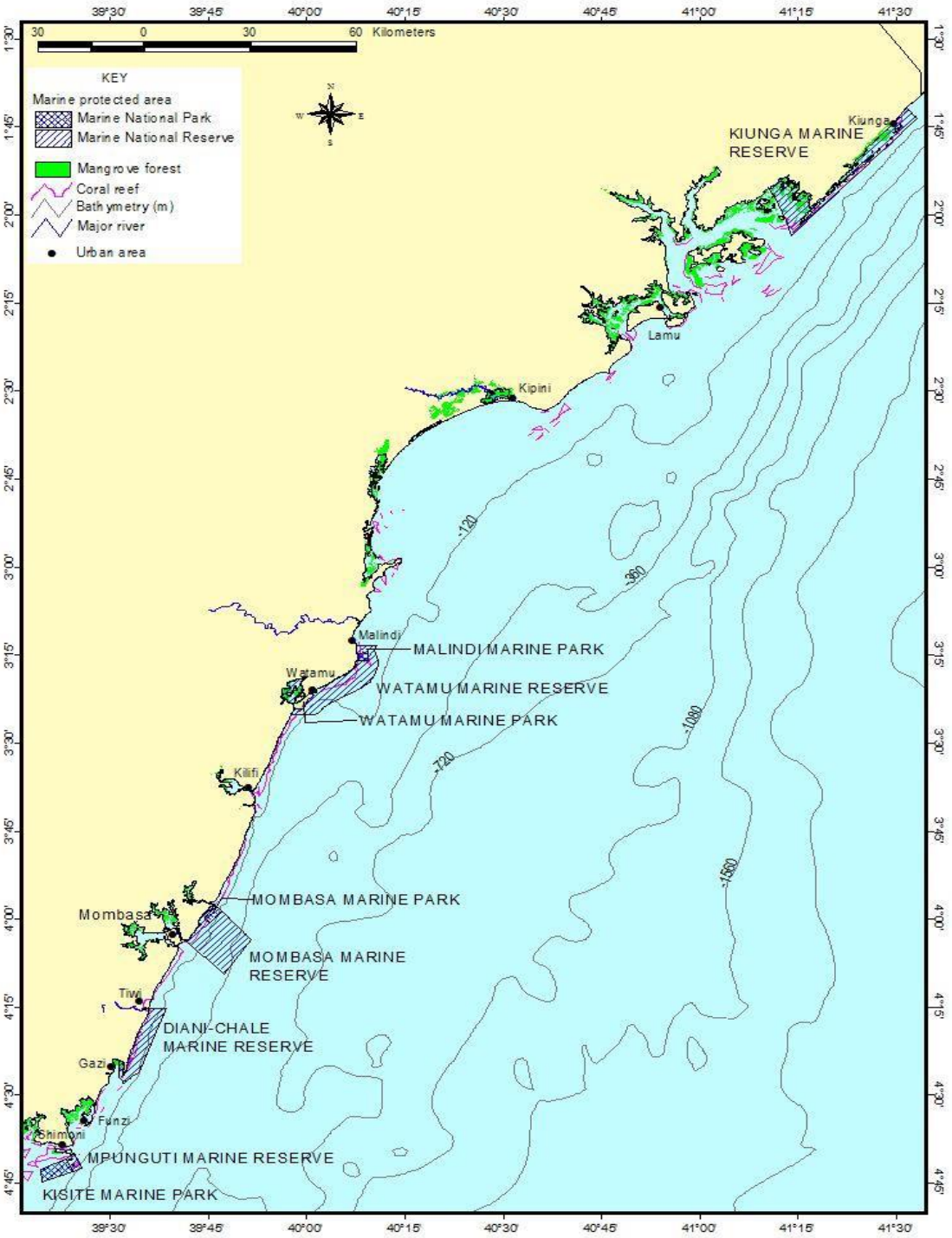


Figure 17: Location of Known Mangrove and Coral Reef (Map adapted from KMFRI, 2011).Source: KMFRI, 2011

Plate 22: On-Going Mangrove Forest Clearance to Create Space for LAPSSET Corridor in Lamu

4.6Impacts of Oil and Gas Activities on Indigenous and other Plant Species

Indigenous plants are those plants whose presence in particular regions is the result of only natural process, with no human intervention. Native vegetation and rare plants support wildlife, the environment, and people. Destruction of native vegetation (by a variety of activities), invasion by foreign plants and animals, over collection, and other environmental damage are eroding our natural plant communities.

Negative impacts to biodiversity [resulting from oil and gas development] may mean habitat conversion, degradation and fragmentation; air, water and soil pollution; deforestation; soil erosion and sedimentation of waterways; soil compaction; contamination from improper waste disposal or oil spills; and loss of productive capacity and degradation of ecosystem functions. Table 20 below summaries some of the impacts that may result from the activities of oil and gas.

Table 20: Probable Impacts of oil and gas explorations on indigenous tree species in Kenya

Development Process	**Source of Impact**	**Impacts to Plants**
Drilling and Completion	Muds and cuttings, which may contain chemical additives, salts, metals and hydrocarbons, are often stored in pits and buried on site. This may sterilize soils.	Soil Sterilization
Stimulation	Many fracturing chemicals are hazardous, and may contaminate soil if spilled on site.	Contaminated soil
Produced Water/Fluids	Salts, metals, hydrocarbons or traces of chemical additives in produced water may contaminate soil if spilled on the surface or stored in earthen pits. Produced water can also be toxic to plants at high concentrations.	Contaminated soil Contaminated water Direct harm to plants
Separation and Dehydration	Pits or tanks that store wastewater may leak or overflow and contaminate soil and water.	Contaminated soil and water Health and safety impacts
Gas	Soil and water pollution may occur due to spills	Contaminated soil

Compression	or leaks of diesel or other fuel used to power the compressors.	Contaminated water
Access Roads	Roads compact soils and can introduce non-native plant species. Off-Road Vehicles (ORVs) using non-existent tracks	Direct loss of plant habitat Direct harm to plants Introduction of competitive non-natives Prevent new plant growth
Construction/Siting	Well pad construction converts plant habitat and causes soil compaction.	Direct loss of habitat for endangered tree species Direct harm to endangered plants species Endangered Plant Species' habitat conversion/fragmentation
Development Process	Source of Impact	Impacts to Plants

To limit the long-term impacts of essential oil and gas development on plant communities and sensitive species, industry can:

- Avoid disturbance in particularly sensitive or important plant communities;
- Minimize disturbance wherever possible (e.g., using smaller well pads, fewer roads, or preventing the introduction/spread of weeds); and reclaim areas after disturbance

4.7 Impacts on Wildlife Habitats and Biodiversity Hotspots

Kenya's wildlife is one of the richest and most diversified in Africa with several of its protected areas and wetlands being internationally recognised and protected as World Heritage Sites, RAMSAR sites and Man and Biosphere Reserves. Kenya's wildlife resource also constitutes a unique natural heritage that is of great importance both nationally and globally. The Kenya National Bureau of Statistics (2016) indicates that wildlife and tourism accounts injected about KES 84.6 Billion in the year 2015/ 2016. Wildlife also plays a critical ecological function that is important for the interconnected web of life supporting systems. Major impacts may include the destruction of terrestrial protected wildlife habitats due to upstream oil and gas exploration and production activities and pollution of coastal and marine ecosystems such as coral reefs, mangrove forests and beaches especially in the Lamu area due to offshore petroleum activities. Small migratory species such as turtles and crabs crawl and swim in shallow waters along the ocean shoreline, from South coast to Lamu and will be the most susceptible to even the slightest oil contamination with water systems, their habitat. See the spread of such species as shown in figure 19.

Kenya's four basins with petroleum prospects (Coastal Lamu, Anza Graben, Offshore and East African Tertiary Rift) with a total surface area of over 485,000km^2, and areas proposed for midstream infrastructure like pipelines, are the home to many wild animals. Majority of the protected areas are found within the gazetted petroleum blocks, these areas have unique flora and fauna and scenic landscapes, which place them in strategic positions to benefit from ecotourism as well as the larger tourism industry. Environmental impact assessments and cost-benefit analysis in comparison with the tourism and ecotourism sectors should therefore, be considered in future investments options. Already, exploration in some areas near protected wildlife reserves and indigenous natural forests has generated protests from environmental groups since there is uncertainty and limited information on the potential environmental damage of such activity.

The following biodiversity hotspots likely to be affected by the proposed development of the LAPSSET corridor include:

- The Tana River ecosystem and Primate National Reserve
- Samburu Nature reserves/Park
- Arawala Nature Reserve
- Ndoto Hills ecosystem
- Losai National Reserve in Marsabit
- Shaba Nature Reserve
- Boni Forest in eastern Lamu county
- Marsabit Ecosystem reserve and Park
- The Meru National Reserve
- Rahole National Reserve
- The Coastal Mangroves forests
- Lake Turkana
- Mt Nyiro
- Mt Kulal
- Central Island National Park
- Loima Hills
- Southern Island National Part
- Baringo Ecosystem

The following wildlife biodiversity and protected sites may be affected by the ongoing activities of the oil and gas explorations in the four basins:

- The Lamu basin which directly affects several national parks and sanctuaries like the Tsavo National Park/Reserves, the marine national parks at Watamu-Mombasa, Kilifi, Kwale and Lamu; sanctuaries, the Tana delta wildlife sanctuary, The Lamu mangrove reserves among others. Block L16, L8 and L10A directly sit on the locations of the Watamu and Mombasa Marine Parks, respectively.

- The Anza basin extends through the Marsabit National Park and reserves and the Sibiloi National Park as well as the flood plains of the Lorian swamps in Wajir County, which is an important wetland and wildlife sanctuary.

- The Malki Mali Nationa Park in the Northern Mandera exploration block
- The Tertiary block (Block 12B) extend throughout the Winam gulf, which is an important fisheries hotspot (fish breeding) in the Lake Victoria region.

- The tertiary basin often overruns the important great wildlife corridors in northern Kenya, especially, near Isiolo and Samburu areas

- The Arabuko Sokoke Reserve and the Shimba Hill Forest of the coastal areas are experienced increased activities in the L16, L18 and L19 blocks of the Lamu oil and gas basins.

- The Coastal and Northern Kenya has some unique herbal medicinal plants used by traditional herbalist for treatment of various diseases. This will require being identified, isolated and protecting from destructions or avoiding loss of the species.

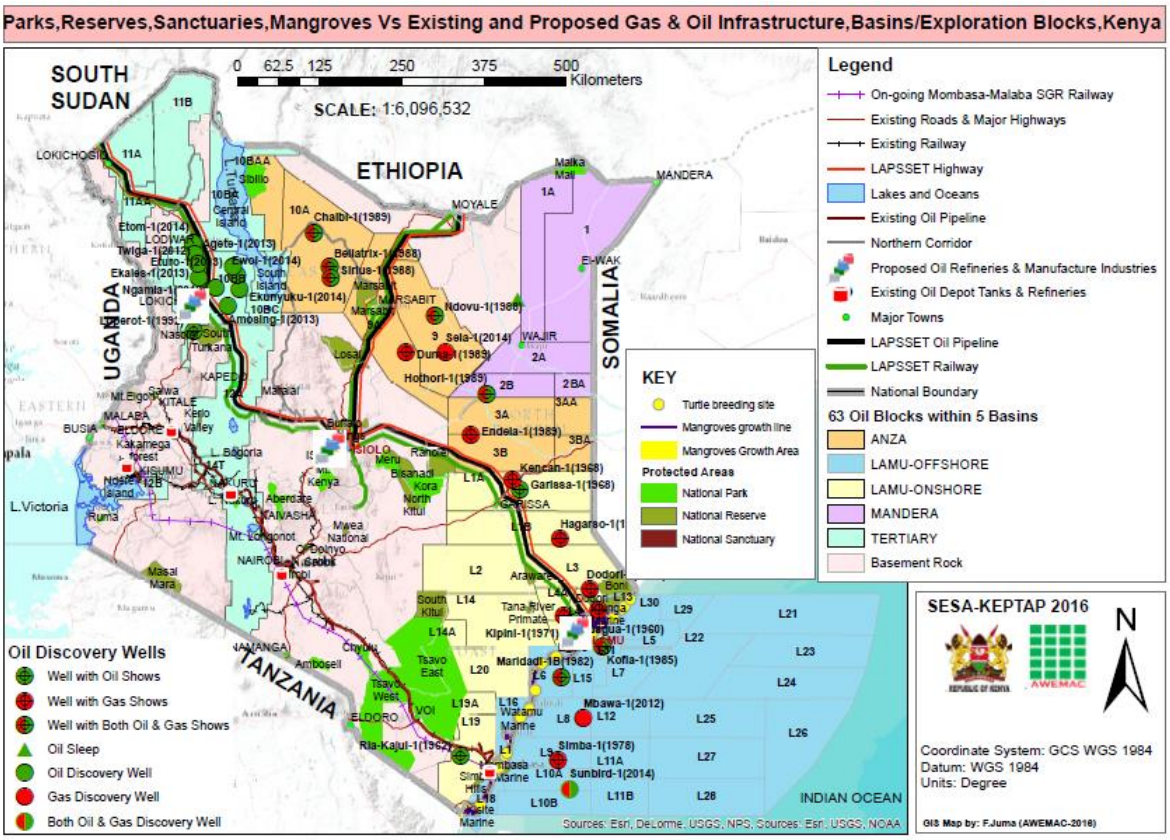


Figure 19: Protected areas, wildlife sanctuaries and biodiversity hotspots and the existing and proposed oil and gas infrastructure

4.8 Wildlife Migration Routes

Wildlife migration routes (see figure 20) are corridors that animal species depend on for migration. Wild-life migration is critical to the survival of certain species and one of Kenya's Vision 2030 flagship projects is to secure wildlife corridors and migratory routes. Corridors have become an important conservation component as urbanization increases, which lead to the fragmentation of habitats thus forcing some animal species to migrate in search of food and due to conflict with man. In Kenya, movement of the African elephant between National Parks/ Reserves and forests has been identified as important to the survival of these intelligent creatures. With an increase in conflict with man, elephants regularly use corridors. Some of routes will be affected especially from the LAPPSET corridor oil infrastructure planned.

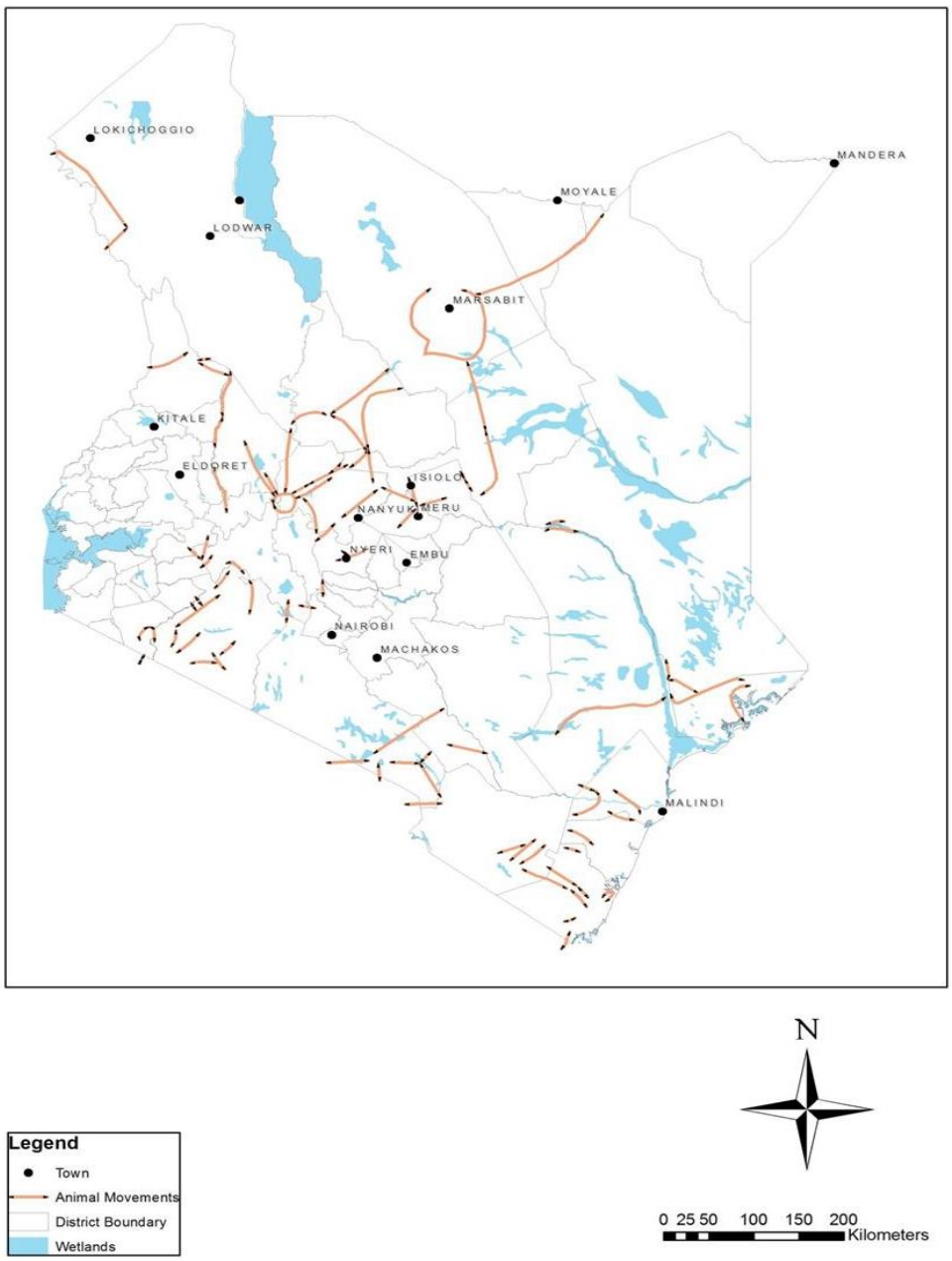


Figure 20: Kenya's Wildlife Corridors
Source: Kenya Wildlife Service (KWS)

4.9 Important Bird Areas (IBA)

Important Bird Areas (IBAs) are key sites and habitats that have been identified for the conservation of birds and other biodiversity. There are currently 60 IBA sites in Kenya that have a variant of endangered bird species (Figures 21 and 22 below). These include woodlands, grasslands, forests and dry lands.

IBAs include sites that are protected and unprotected. The dangers/ pressure endangering IBAs have been identified as human activities such as overgrazing, agricultural encroachment, illegal logging, urbanization, etc. Some of the proposed facilities in the Kenya Petroleum Master Plan and LAPPSET Master Plan will affect some of these sites.

Besides the Important Bird Areas (IBA), there are also Endemic Bird Areas (EBA) which are **areas** of land identified by Bird Life International as being important for habitat-based **bird** conservation because it contains the habitats of restricted-range **bird** species, which are thereby **endemic** to them

The List below provides gazetted important bird areas in Kenya as reported by UNDP.

INTERNATIONAL LEVEL OF IMPORTANCE	NATIONAL IMPORTANCE	STATUS	DESCRIPTION OF STATUS	AREA SITE NO.
Aberdare Mountains	Aberdare Mountains	4	Improvement/Slight improvement/minor improvement	1
Amboseli National Park	Amboseli National Park	1	Major Decline	2
Arabuko-Sokoke forest	**Arabuko-Sokoke forest**	**4**	**Improvement/Slight improvement/minor improvement**	**3**
Busia grasslands	Busia grasslands	2	Decline/Slight decline	4
Cherangani Hills	**Cherangani Hills**	**2**	**Decline/Slight decline**	**5**
Chyulu Hills forests	Chyulu Hills forests	4	Improvement/Slight improvement/minor improvement	6
Dakatcha woodland	Dakatcha woodland	0	Unknown	7
Dandora ponds	Dandora ponds	1	Major Decline	8
Diani forest	**Diani forest**	**2**	**Decline/Slight decline**	**9**
Dida Galgalu desert	Dida Galgalu desert	0	Unknown	10
Dunga swamp	**Dunga swamp**	**2**	**Decline/Slight decline**	**11**
Dzombo Hill forest	**Dzombo Hill forest**	**0**	**Unknown**	**12**
Gede Ruins National Monument	**Gede Ruins National Monument**	**3**	**Stable/No change**	**13**
Kakamega forest	Kakamega forest	5	Major improvement	14
Kaya Gandini	**Kaya Gandini**	**3**	**Stable/No change**	**15**
Kaya Waa	**Kaya Waa**	**3**	**Stable/No change**	**16**
Kianyaga valleys	Kianyaga valleys	0	Unknown	17
Kikuyu Escarpment forest	Kikuyu Escarpment forest	5	Major improvement	18
Kinangop grasslands	Kinangop grasslands	2	Decline/Slight decline	19
Kisite island	**Kisite island**	**2**	**Decline/Slight decline**	**20**
Kiunga Marine National Reserve	**Kiunga Marine National Reserve**	**4**	**Improvement/Slight improvement/minor improvement**	**21**
Koguta swamp	Koguta swamp	2	Decline/Slight decline	22
Kusa swamp	Kusa swamp	2	Decline/Slight decline	23
Lake Baringo	**Lake Baringo**	**2**	**Decline/Slight decline**	**24**
Lake Bogoria National Reserve	**Lake Bogoria National Reserve**	**3**	**Stable/No change**	**25**
Lake Elmenteita	**Lake Elmenteita**	**3**	**Stable/No change**	**26**
Lake Magadi	**Lake Magadi**	**2**	**Decline/Slight decline**	**27**
Lake Naivasha	**Lake Naivasha**	**4**	**Improvement/Slight improvement/minor improvement**	**28**
Lake Nakuru National Park	**Lake Nakuru National Park**	**4**	**Improvement/Slight improvement/minor improvement**	**29**
Lake Turkana	**Lake Turkana**	**2**	**Decline/Slight decline**	**30**
Machakos valleys	Machakos valleys	0	Unknown	31
Marenji forest	**Marenji forest**	**2**	**Decline/Slight decline**	**32**
Masai Mara	Masai Mara	2	Decline/Slight decline	33
Masinga reservoir	Masinga reservoir	4	Improvement/Slight improvement/minor improvement	34
Mau forest complex	**Mau forest complex**	**4**	**Improvement/Slight improvement/minor improvement**	**35**
Mau Narok - Molo grasslands	**Mau Narok - Molo grasslands**	**1**	**Major Decline**	**36**
Meru National Park	Meru National Park	5	Major improvement	37
Mida Creek, Whale Island and the Malin	**Mida Creek, Whale Island and the**	**4**	**Improvement/Slight improvement/minor improvement**	**38**
Mount Elgon	Mount Elgon	2	Decline/Slight decline	39
Mount Kenya	Mount Kenya	2	Decline/Slight decline	40
Mrima Hill forest	**Mrima Hill forest**	**5**	**Major improvement**	**41**
Mukurweini valleys	Mukurweini valleys	2	Decline/Slight decline	42
Mwea National Reserve	Mwea National Reserve	2	Decline/Slight decline	43
Nairobi National Park	**Nairobi National Park**	**2**	**Decline/Slight decline**	**44**
North Nandi forest	North Nandi forest	2	Decline/Slight decline	45
Ol Donyo Sabache	Ol Donyo Sabache	0	Unknown	46
Ruma National Park	Ruma National Park	4	Improvement/Slight improvement/minor improvement	47
Sabaki river mouth	Sabaki river mouth	0	Unknown	48
Samburu and Buffalo Springs National Re	**Samburu and Buffalo Springs Nat**	**3**	**Stable/No change**	**49**
Shaba National Reserve	**Shaba National Reserve**	**2**	**Decline/Slight decline**	**50**
Shimba Hills	**Shimba Hills**	**2**	**Decline/Slight decline**	**51**
Sio Port swamp	**Sio Port swamp**	**2**	**Decline/Slight decline**	**52**
South Nandi forest	South Nandi forest	2	Decline/Slight decline	53
South Nguruman	South Nguruman	3	Stable/No change	54
Taita Hills forests	**Taita Hills forests**	**1**	**Major Decline**	**55**
Tana River Delta	**Tana River Delta**	**0**	**Unknown**	**56**
Tana River forests	**Tana River forests**	**1**	**Major Decline**	**57**
Tsavo East National Park	**Tsavo East National Park**	**2**	**Decline/Slight decline**	**58**
Tsavo West National Park	**Tsavo West National Park**	**2**	**Decline/Slight decline**	**59**
Yala swamp complex	**Yala swamp complex**	**2**	**Decline/Slight decline**	**60**

Figure 21: Gazetted important bird areas in Kenya as reported by UNDP.

Source: UNDP

The Areas in bold are in close proximity to LAPPSET or Oil and Gas activities in Kenya.

Some of the important bird areas with possible direct threats from the oil and gas activities in ANZA Oil Basin and Isiolo outskirts include:

- The Marsabit national reserve areas
- The Sibiloi national park
- The rift valley regions from the Mara ecosystem to the LakeTurkana Border in the Tertiary basin
- Dakatcha Woodland
- Dida Galgalo Dersert

Endemic bird areas with potential impacts:

Areas affected by ongoing oil and exploration in the TertiaryOil basin;

- The Aberdare forest ecosystem and range
- The Mau and the Mara ecosystems ranges
- The rift valley highlands from the Mau catchment to the Cherangani hills of North Rift valley
- The Lake Kajiado at the tip of the southern Tertiary block
- The Lake Victoria basin especially the Winam Gulf region

Those affected by the LAMU oil basin;

- The coastal strip spanning from Kwale County to Lamu County
- The coastal regions especially near Lamu and Kilifi (Block L16, L18, L6, and L13)

It's Important to note that the Mandera exploration basin does not appear to have documented presence of the IBA and EBA.

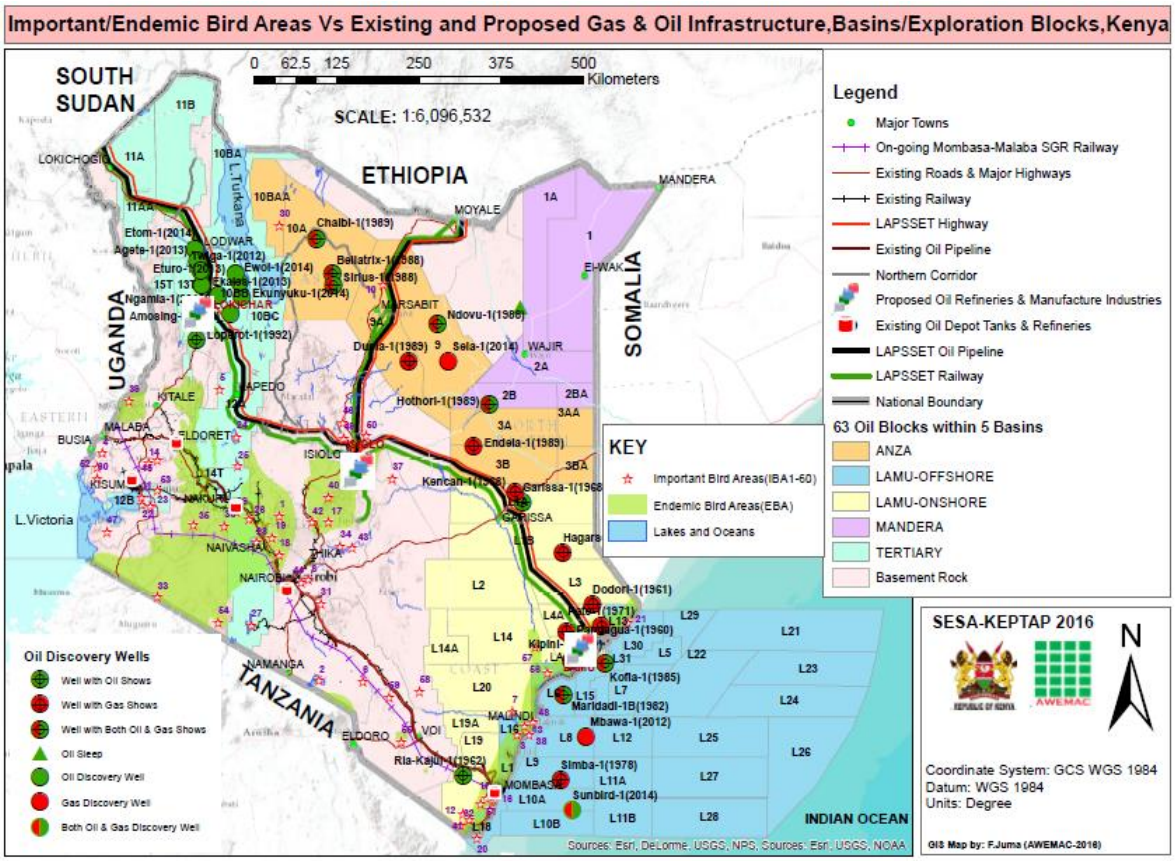


Figure 22: Important bird areas and the proposed and existing oil and gas infrastructure Areas in Kenya.

4.10 Impacts of Oil and Gas Activities on Water Resources

Kenya's principal rivers are the 710-kilometer-long Tana and the Athi River both flowing southeast to the Indian Ocean. Other rivers include the Ewaso Ngiro flowing northeast to the swamps of the Lorian Plain, and the Nzoia, Yala and Gori, which drain into Lake Victoria. The main lakes include Turkana, Victoria, Baringo, Bogoria, Elementaita, Kanyaboli, Magadi, Naivasha and Nakuru. Lakes and rivers traversing through the oil and gas basins (East African Rift, Anza Graben, and Coastal Lamu) will have a significant risk of pollution. The water bodies at risk include Lake Turkana, Victoria, Baringo and Bogoria, the Indian Ocean, River Tana and the Ewaso Ngiro River. Midstream and downstream infrastructure development may also put other water bodies at risk.

Impacts to water resources could occur due to water quality degradation from increases in *turbidity*, sedimentation, and *salinity;* spills; cross-*aquifer* mixing; and water quantity depletion. During the drilling/development phase, water would be required for dust control, making concrete, consumptive use by the construction crew, and in drilling of wells. Depending on availability, it may be trucked in from off-site or obtained from local *groundwater* wells or nearby surface water bodies. Where surface waters are used to meet drilling and development needs, depletion of stream flows could occur. Drilling and well development often remove enormous amounts of groundwater, referred to as produced water. The generation of produced water can create several problems: water may be depleted from nearby aquifers; and produced groundwater that is saline or contaminated with drilling fluids can contaminate soils or surface waters, if brought to the surface and not reinjected to

a suitable subsurface unit. Produced water also may contain organic acids, alkalis, diesel oil, crankcase oils, and acidic stimulation fluids (e.g., hydrochloric and hydrofluoric acids).

Drilling activities may affect surface and groundwater flows. If a well is completed improperly such that subsurface formations are not sealed off by the well *casing* and cement, aquifers can be impacted by other non-potable formation waters. The interaction between surface water and groundwater may also be affected if the two are hydrologically connected, potentially resulting in unwanted *dewatering* or *recharging*. Soils compacted on existing roads, new access roads, and well pads generate more runoff than undisturbed sites. The increased runoff could lead to slightly higher peak storm flows into streams, potentially increasing erosion of the channel banks. The increased runoff could also lead to more efficient *sediment* delivery and increase turbidity during storm events. During development, water quality can be affected by:

- Activities that cause soil erosion or dust that can be washed into water bodies;
- Weathering of newly exposed soils, causing leaching and oxidation that can release chemicals into the water;
- Discharges of waste or sanitary water;
- Use of herbicide and dust suppressants (e.g., magnesium chloride); and
- Contaminant spills.

In addition, increased sediment loading could potentially increase salinity levels. Primary waste during production is produced water, which can comprise 98% of material brought to the surface. Conventional natural gas wells typically produce less water than oil wells. Substances found in high concentrations in produced water include chloride, sodium, calcium, magnesium, and potassium. Other contaminants can include Policyclic Aromatic Hydrocarbons (PAHs), lead, arsenic, barium, antimony, sulfur, zinc, and Naturally Occurring Radioactive Material (NORM). Other wastes include residual wastes that remain after separation of the oil and natural gas.

The Anza, Mandera and the Lamu oil basins are have some of Kenya's major flood plains. The impacts of the oil and gas explorations, which may indirectly affect forest and vegetation cover, may have long term implications on the life and sustainability of the river drainage systems.

Oil and Gas activities will likely affect expose the groundwater systems to contamination and over exploitation due to increased population grown in some towns marked for development. According to Water Resource and Management Authority, WARMA, ground water systems in Kenya have been classified aquifers on the basis of their importance and vulnerability. It is also flexible enough that different catchment areas may ascribe different values to their aquifers (thus for example Basement aquifers in one region could be considered "minor" aquifers while in another they could be classified as "poor").

Classification of Aquifers in Kenya

Class	Description	Examples
Strategic aquifer	Aquifer used to supply significant amounts/ proportions of water in a given area and for which there are no available alternative resources, or where such resources would take time and money to develop; significant trans-boundary aquifers	Sabaki, Tiwi, Nairobi, Central Merti, Nakuru, Kabatini, Lake Naivasha Lamu Island
Major aquifer	High-yield aquifer systems with good quality water.	Daua and Elgon volcanics
Minor aquifer	Moderate-yield aquifer systems with variable water quality.	Mandera Jurassics
Poor aquifer	Low- to negligible-yield aquifer systems with moderate to poor water quality.	Basement System
Special aquifer	Aquifer systems designated as such by WRMA	Isinya

In case of any contamination, aquifer monitoring will form the sites to monitor oil leakages.

4.10.1 Aquifer Monitoring for Pollution and over Abstraction

Aquifer monitoring is best done via boreholes selected based on their accessibility and suitability; this presents some problems because all too often boreholes are not in a true static state when water levels are taken. Ultimately, dedicated monitoring boreholes will be constructed to allow the collection of data of the highest quality, using either manual or automated digital methods.

The criteria for selecting groundwater monitoring sites include the following:

- The aquifer class;
- The abstraction or pollution pressure on an aquifer;
- The availability of boreholes or wells that can be used for monitoring purposes.

Some groundwater systems in Kenya are already stressed due to current water over abstraction. Such identified areas include:

- The Nairobi volcanics that are associated with over-abstraction, water level decline and water quality deterioration.
- The Mombasa Island Pleistocene sands and limestones and related aquifers due to pollution and saline intrusion.
- The Mumias granites due to pollution and salinization.

4.10.2 Vulnerability of Groundwater to Oil and Gas Exploration Activities: Case of Turkana County, in Northern Kenya

The Turkana region is one of the most arid regions in Kenya, with soaring temperatures that burn the earth and suck out moisture. The local people practice pastoralism and are always looking for water to survive. Aquifers are, quite simply, stores of water that are trapped underground in geological formations. Often tapped by wells, aquifers have been a source of water for centuries. A study commissioned in Turkana County by both Ministry of Water, WATEX (GIS/Remote Sensing Company), and UNESCO, it was reported in the water exploration that the county is endowed with five major aquifers in Turkana namely:

- Lodwar –Loperot
- Kachoda
- Gatome
- Lokitipi and
- Nakalale

Looking at the distance proximity between the drilled oil and gas wells in Turkana County, Lodwar-Loperot aquifer located in Oil block 10BA is very close and geographically endemic to any future oil spill contaminations. The poor sandy soils and general undulations of the slope towards the aquifer along Turkwel river as it flows in Lake Turkana makes the aquifer quite vulnerable in an already water scarce region that suffers from periodic droughts and high poverty. Major oil blocks from the south area include 13T and 10BB.

Other aquifers in the region suffer from the same geological and topographical susceptibility challenges. The ground water generally flows along fissures on fault – line that flows from the hilly and mountainous areas of South Turkana, Loima Mountains towards Lotikipi Aquifer, the largest aquifer in the arid areas that has once been reported to have water, adequate to support the livelihoods of Turkana and the rest of Kenyans for 70 Years (UNESCO 2012). Major oil blocks within this aquifer include 11B,11A and 11Aa (see figure 23 below).

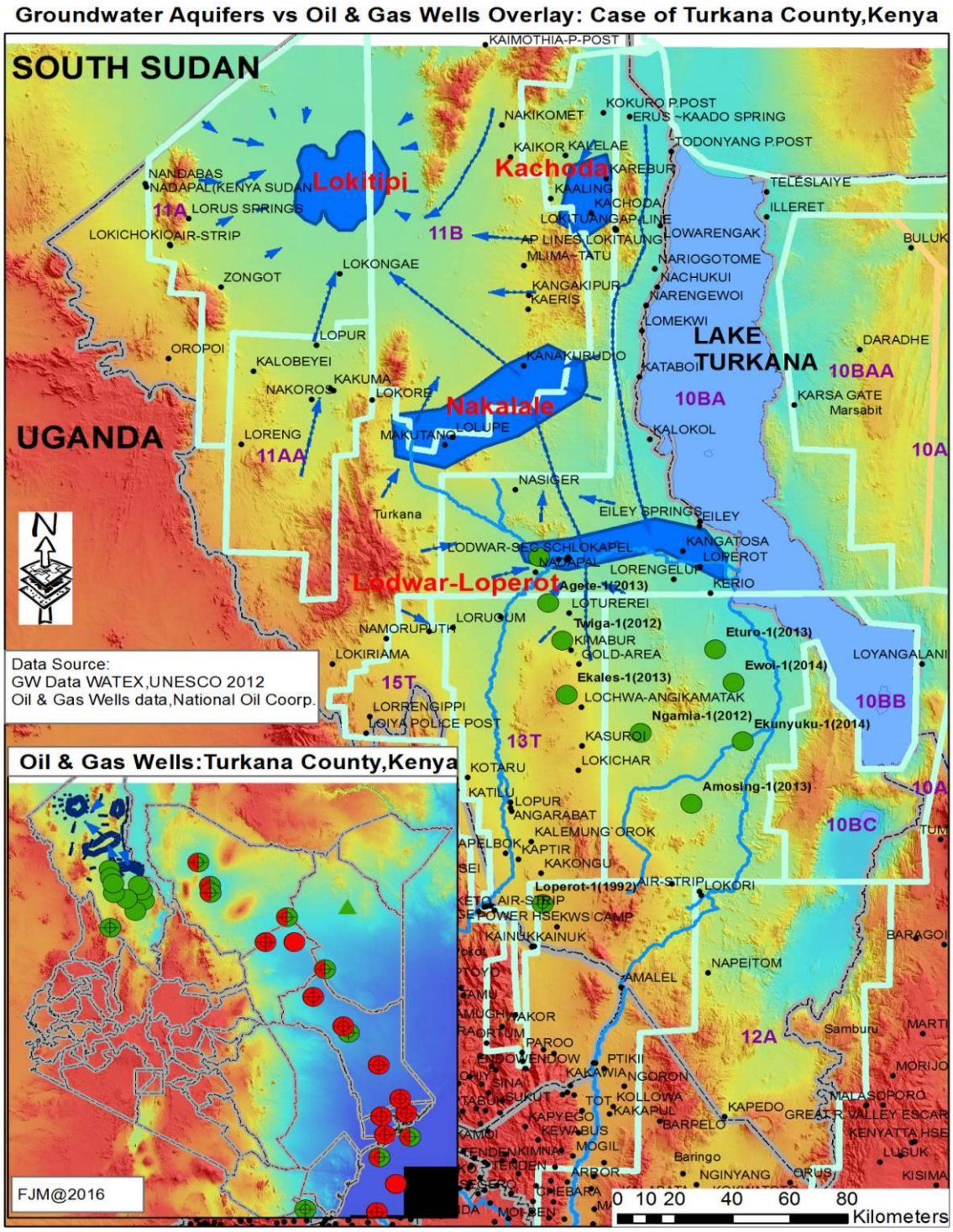
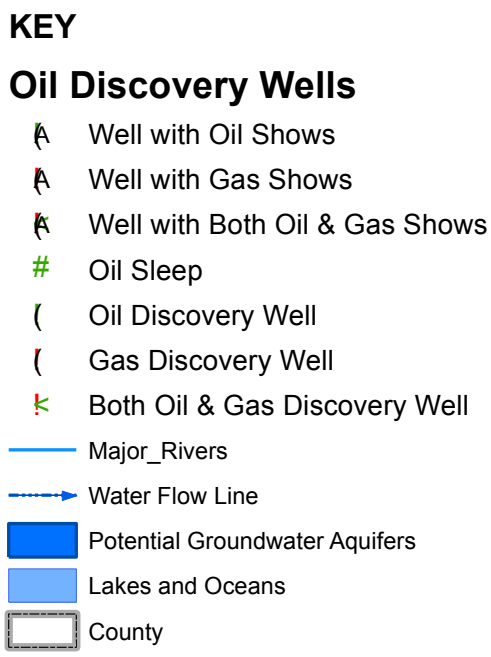


Figure 23: Overlay of Oil & Gas Wells Verses Five Aquifers in Turkana County



The Aquifer maps for the Tana, Athi and Lake Victoria South Catchments have been developed. The Aquifer Maps for Rift Valley, Lake Victoria North and Ewaso Ng'iro North Catchment Areas are under development by WARMA. It will be important to overlay these maps to various oil blocks to ensure the ground water is protected and conserved for local communities, livestock and agriculture.

4.11 Impact on Inland Fishery Resources

As stated above, the Republic of Kenya is endowed with vast water resources in the Indian Ocean, lakes, rivers and man-made dams and has fish production potential estimated at over 150,000 metric tonnes per year. Kenya is divided into five catchment regions:

- The Lake Victoria Basin
- Rift Valley Basin
- Athi River Basin,
- Tana River Basin
- Ewaso Ngiro River Basin

There are also 6 drainage basins with approximately 45 rivers drain into these systems. The Tana and Athi Rivers are the largest of Kenya's rivers, accounting for 90% of hydroelectric power generated in the country. Some of the major rivers in Kenya include: Tana River, Athi River, Mara River, Nyando River, Tsavo River, Nzoia River, Sabaki River, Yala River, Ewaso Ng'ro River, Sondu-Miriu River, Turkwell River, Kerio River etc.

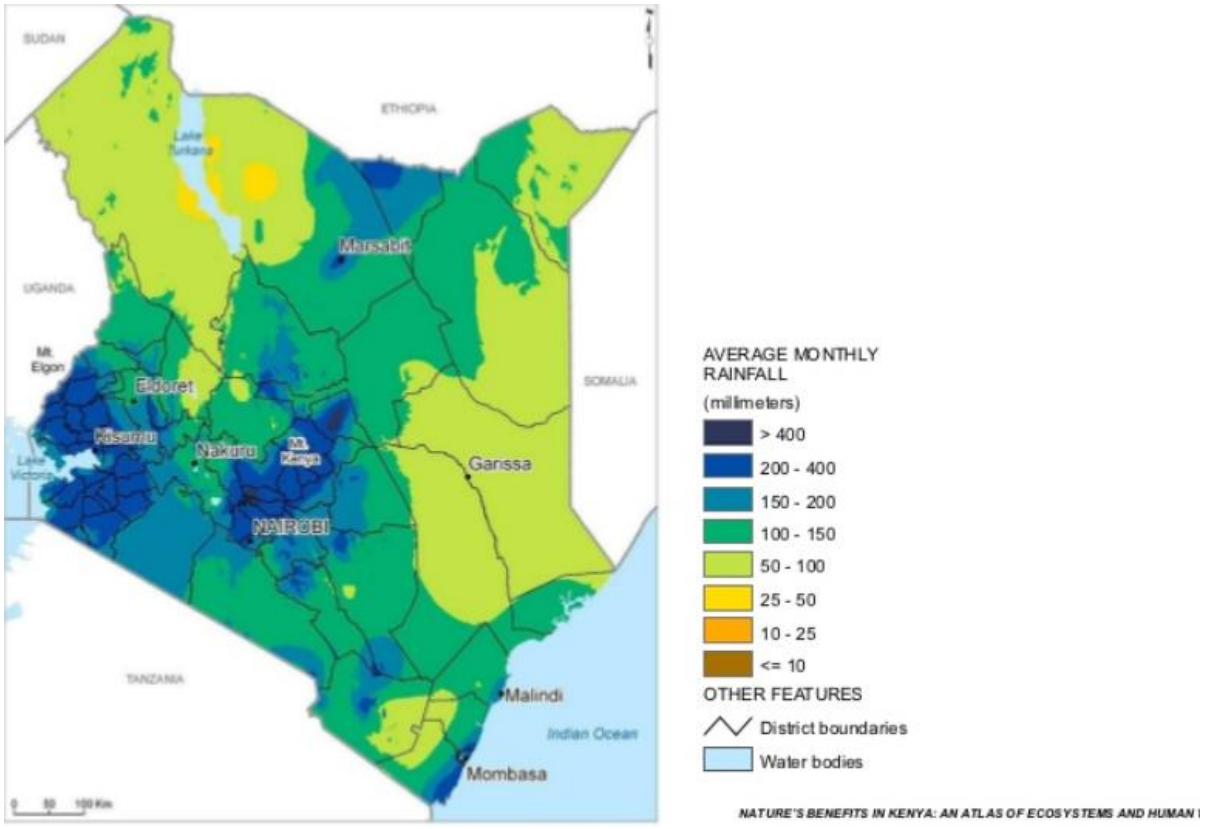
Kenya is one of the 168 member parties since October 1990 with 6 Ramsar sites covering a total surface area of 265,449ha designated as Wetlands.

The sites include:

- Lake Nakuru
- Lake Naivasha
- Lake Baringo
- Lake Elementaita
- Lake Bogoria

- The Tana Delta

According to the Economic Review for Agriculture done in 2015 by the Ministry of Agriculture, Livestock and Fisheries indicate that fisheries production contributes about 0.8% of the national GDP and supports the livelihood of over half a million Kenyans either directly or indirectly. About 96% of the total fish production is derived from fresh waters, while the Indian Ocean contributes the remaining 4%. Lake Victoria accounts for 71% of the country's total annual production. Lake Turkana (see the figure 24 below), which is near Kenya's premier oil exploration zone, is Kenya's largest freshwater body (7,400 km^2) and produces about 4,000MT of fish annually. Other freshwater bodies of commercial importance include Lake Naivasha, Baringo, Jipe and the Tana River dams. The livelihoods of people who depend on these water bodies for their protein and employment will be at risk in the event of pollution by petroleum related activities.
The rainfall patterns in the country vary by season and geographically. The rainwaters flows from highland to aquifers to lowland, through rivers into lakes and Indian Ocean.



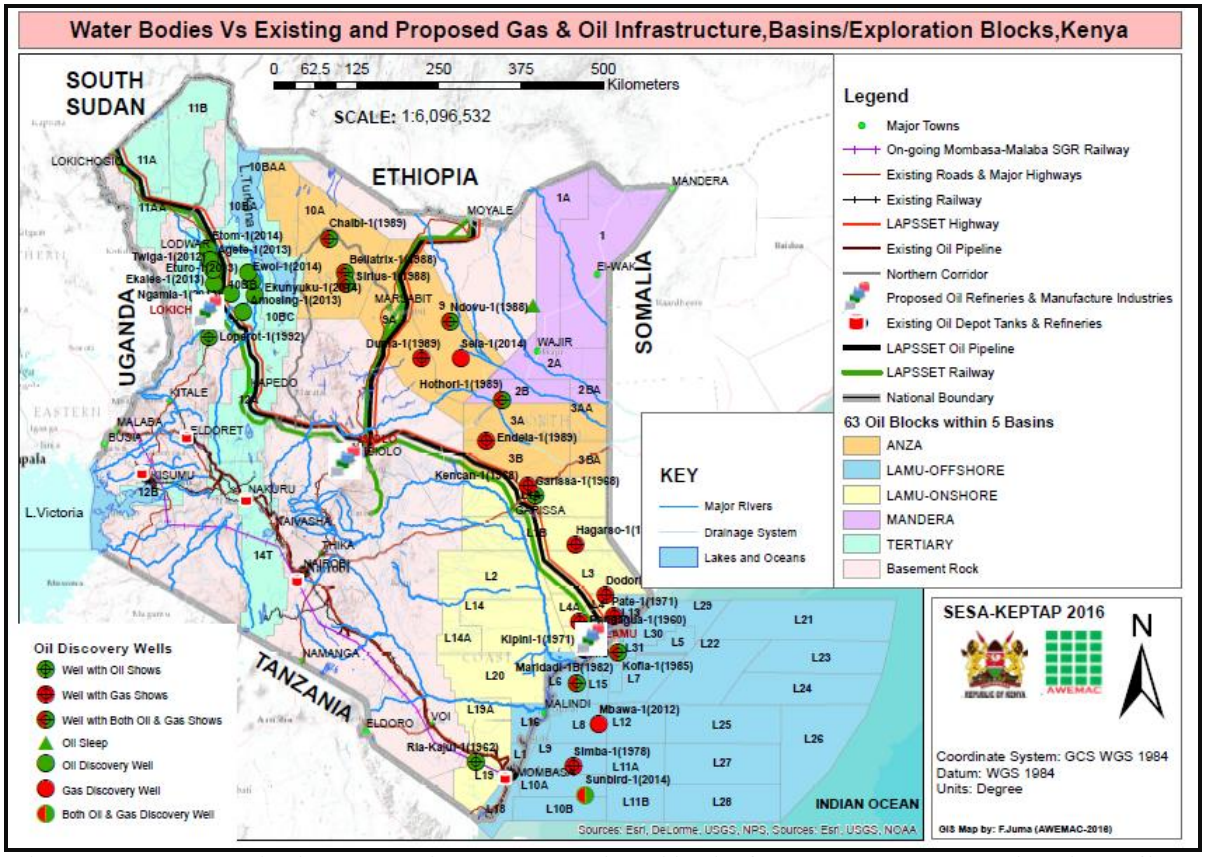


Figure 24: Existing and proposed oil infrastructure and the flood plains/wetlands of Kenya

Some of the important water resources (see figure 25 below) with likely impacts from the ongoing oil and gas explorations in the country include:

- The flood plains/wetlands of the northern Kenya whose boundaries overlap the Lamu, Anza and the Mandera oil basins specially in blocks 3BA, 3AA and 2A
- Lamu basin especially block L2, L12, which may impact the Arthi river delta, the Tana River and Delta and
- Rift Valley lakes i.e Lake Nakuru, L. Naivasha may be affected by the activities of the Tertiary oil basin
- The Turkwel river drainage basin into the Lake Turkana on the upper part of the Tertiary basin
- Lake Tukana and its ecosystems
- The river catchments areas of central and central rift Valley (i.e Mt. Kenya, Abardare, Mau catchment, The Cherangani) and their drainage system mostly towards the Lake Victoria and the Indian Ocean
- The lake Basin (Tertiary block 12A) sensitive for its unique value as an important fish-breeding ground

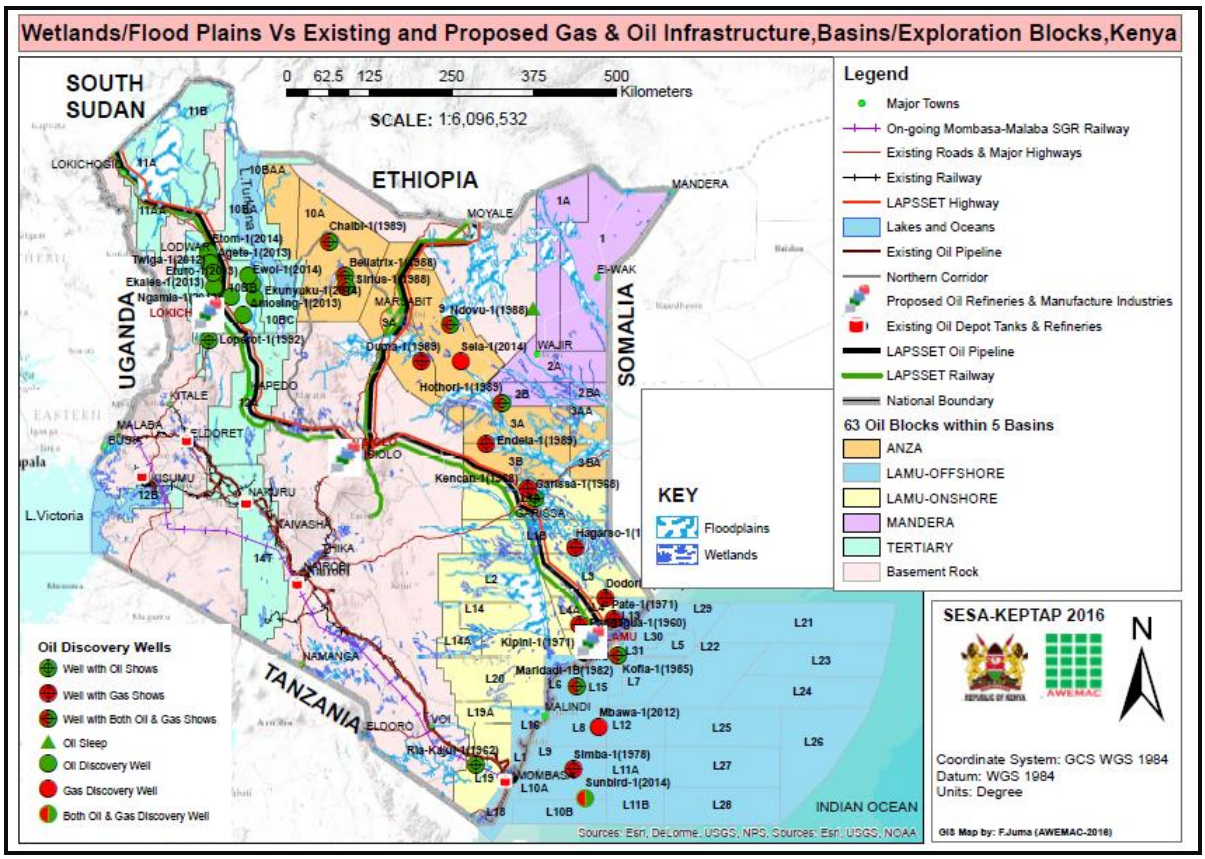


Figure 25: Kenya's river drainage systems and the existing and proposed oil and gas infrastructure

4.12 Impacts of Offshore Oil and gas activities on Marine Resources

The Kenyan coast features a diverse marine environment including estuaries, mangroves, sea grass beds, intertidal reef platforms and coral reefs that are vital for the diversity and reproduction of marine organisms. These are some of Kenya's most valuable ecosystems, they are protected by six marine national reserves and parks. The Kenyan coastal economy is highly dependent on natural resources on which various activities are based namely agriculture, maritime trade, tourism, fishing and mining among others. These resources also support various cultural and spiritual values of the local people. The oil and gas exploration and production activities may negatively influence the coastal wetlands, coastal forests, mangrove swamps, coral reefs, tidal flats, beach/dunes and marine fishery resources.
There are serious environmental impacts associated with each stage of offshore drilling. The following are some of the environmental concerns, which arise from the oil and gas activities in the offshore.

a) Oil Exploration-Seismic Surveys

Seismic surveys are conducted to locate and estimate the size of an offshore oil reserve. In order to conduct surveys, ships use 'airgun arrays' to emit high decibel explosive impulses in order to map the sea floor. The noise from seismic surveys can damage or kill fish eggs and larvae and impair the hearing and health of fish, making them susceptible to predators and making it challenging for them to locate prey or mates or communicate with each other. These disturbances can disrupt important migratory patterns, forcing marine life away from suitable habitats meant for foraging and mating. In addition, seismic surveys have been implicated in whale beaching and stranding incidents.

b) Drilling and Processing Oil

The process of drilling releases thousands of gallons of polluted water into the ocean, known as “drilling muds” (containing toxins like benzene, zinc, arsenic, radioactive materials, and other contaminants that are used to lubricate drill bits and maintain pressure); unfortunately, these discharges are unregulated. Contaminates from oil drilling can accumulate on the sea floor often smothering organisms and causing malformations, genetic damage, and mortality in fish embryos. Fragile sea floor habitats are also greatly disturbed by drilling and construction of oil pipelines to transport oil back to shore. Of course, wetlands and beaches near the coasts can also be harmed wherever pipelines run across land. Air pollution is yet another major problem associated with drilling. Over its operational lifespan, a single rig can pollute as much as 7,000 cars driving 50 miles per day.

c) Oil Spills

Oil spills have the potential to damage entire ecosystems. The BP oil spill released approximately 200 million gallons of oil into the Gulf of Mexico, fouling beaches and coastal wetlands, killing birds, fish, and marine mammals; and devastating the recreation and fishing based coastal economies, and oil spills can also take numerous years to clean up.

The coastal environment is also at risk from marine transportation activities at the port and shipping along the coastline. The National Environmental Action Plan of 2008-2013 (GoK, 2008) estimated that at any given time, there are 50 ships on the major shipping lanes off the Kenyan coast, of which approximately 9 are oil tankers with capacities ranging from 50,000 to 250,000 metric tonnes. Most of this coastal tanker traffic passes 250 nautical miles off shore; however, with Mombasa serving as the major port for Kenya as well as *U*ganda, Rwanda, Burundi, Eastern DRC and parts of Ethiopia, Southern Sudan, North Eastern Tanzania and Somalia. Any major oil spill will likely have a big impact on the local economies. It should be noted that oil pollution may result from normal activities such as ship to shore transfers and upland tank storage at the port.

Offshore oil and gas development will increase the threats to oil pollution incidences as a result of the production process, offshore storage facilities, pipelines and increased tanker traffic for transportation of the products. Currently the Maritime operations at the Mombasa Port in transportation of oil products has had experiences of oil spills. With the ongoing development of the Lamu Port and Kisumu Inland Port the incidences of oil spills may be on the rise. It will be thus prudent to have emergency oil spill strategies adopted at these ports to protect marine life (see Plate 23) and aquatic life and operations.

Plate 15: Turtles can be Adversely Affected by Oil Spillage. The Kenyan Coast is an Important Turtle Area

4.13 Waste Management from Onshore and Offshore Petroleum Developments

Solid and liquid wastes generated during the exploration, development and production of crude oil and gas include: drilling fluids, muds, produced water, cuttings, wastewater, sewage and sanitary waste and domestic waste. The characteristics of upstream, mid-stream and downstream waste differ and need different facilities and management systems. If these are not handled well, they may lead to water and environmental pollution in general.

Major Challenges are currently facing the oil drilling waste management, these challenges include but not limited to; human factors, technological factors *(e.g. unavailability of oil field waste landfills at the exploration sites)*, economic factors, policies and legal factors. Case studies in Turkana indicated that local communities seem to be uninformed about the impacts and health effects of the waste and yet still consider the hazardous facets of waste as 'resourceful'. Some of these are useful in the construction of '*Manyattas*'. For instance, they use high-density polythene liners used to make silicate and mud waste pits to construct their shelters as shown in Plate 24 and 25 below. These are highly hazardous and end up contaminating scarce water resources during rainy season. Moreover, the community illegally acquires the used chemical containers to store water for use during the dry spells. If left unclean, these wastes may cause long-term effects to the users. The acquisition sometimes occurs because the community is also given the contract under promotion of local content to handle general waste and in such moments finds opportunity to get away with the hazardous components of the wastes.

The technology used to manage the hazardous waste in the oil exploration industry is not adequate to handle the classes and volumes generated. This also goes in line with the fact that the technological solutions used in other countries have not been incepted into the Kenyan regulations and policies. These include Thermal Desorption Units (TDUs) (see Plate 26 below) for the recovery of Oil based Muds and bioremediation, using biologically modified organisms. TDUs heat the mud indirectly at 400^{o}C and thus recover the drilling oils, but not complete destruction of hazardous chemicals. The other big challenge with TDU is the limited human capacity locally to handle this technology and thus importation of both equipment and human resource, which makes it a very expensive venture. Bioremediation makes the use of biologically modified organisms to feed on the

hydrocarbons and thus decompose it. In this way, the mud becomes suitable for use as organic matter for agriculture. This technology also has the challenge of capacity gaps in the country, besides the fact that, the use of biologically modified organisms are prohibited in the Kenyan law, thus putting a restriction on their use.

High temperature incineration remain the only sole methodology of handling hazardous waste and that has been licensed and recognized by the Kenyan law. This technology, is however costly and Kenya does not have the capacity to handle the volumes produced by the oil drilling industry. The private sector cannot offer the solution as this is very expensive. The incineration sites only exist in Nairobi and this increases the cost of transport of the hazardous wastes. The incineration plants have however developed soil-washing technology in a bid to reduce the volumes of waste going through the incinerators. These acts as a pre-treatment and a reduction process before incineration.

Waste from the oil field is usually transported in NEMA licensed trucks to the disposal sites. These trucks cover long distances (over 850Km away) on dust roads, with insecurity and thus make the cost of transportation very high, adding to the cost of waste disposal and eventually cost of oil and gas exploration and drilling especially in the early oil production scheme. On average, a truck will take at least five days to travel to the oil field to collect waste and return to the disposal site located in Stony Athi, Machakos County, near Nairobi. During this process of collection and transportation, a waste tracking form is usually filled upstream and this in turn is signed by the waste receiver to confirm the receipt of the very particulars collected from the field. This tracking form is a legal document from NEMA and all waste transporters must fill it. This is also to ensure that the transporter accounts for all the waste and reports any spill just in case it so happens.

Plate 24: Existing Temporary Storage Facilities for Hazardous Oil Drill Waste in Turkana

Plate 25: Waste Collection at Site in Turkana Oil Wells for Transportation to Nairobi Treatment Plant

Plate 26: Thermal Desorption Unit in Machakos County (near Nairobi)

The major sources of wastes include; the Port of Mombasa (waste oil from the ships), petroleum retail facilities countrywide, KPC depots, KPRL, industries that use fuel oil etc. The waste is characterized by general solid waste (domestic waste) and sludge (waste oil). The Shipping Companies at the Port of Mombasa handle these types of waste through private waste companies directly contracted by various Shipping Agents. While international standards require this waste to be controlled by KPA, there is lapse on this due to private economic interests on this type of waste leading to concerns on its disposal, health and safety impacts. Most waste oil treatment facilities, mainly in Nairobi and Mombasa, do not meet international standards and are run by the informal sector though licensed by NEMA.

4.14 Gas Flaring and Environmental Concerns

Oil production involves the burning of hydrocarbon gases. The flaring–off of natural or associated gas is done as a by-product of the drilling of crude oil from reservoirs in which oil and gas are mixed. The flares involve the release of dangerous hydrocarbon mostly methane and others, which include sulphurous oxides and the oxides of nitrogen into the atmosphere. The flares raise the temperature of the surrounding environment to temperatures beyond normal of 13-14,000^{o}C and causing noise pollution around the vicinity of the flares. The result of this unchecked emission of gases is the release of several tons of Carbon dioxide and

methane among others, which may contribute more to global warming. Another problem associated with gas flaring is *Light Pollution*. Light pollution subjects the living organism around the vicinity of the flare to 24-hour daylight. This affects diurnality and night time patterns in animals. The flares drive away game; it affects the reproduction of fish as well as sending fish to deep-sea areas. The gases released during gas-flaring, mixes with the moisture and other forms of precipitation in the atmosphere to form acid rain.

4.15 Climate change impacts and the oil and gas activities

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a "change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods". Kenya like other Sub-Saharan African countries faces the uncertainty and potential risks of climate change due to the ever-increasing vulnerability. The petroleum sectors become a key and important sector in terms of contributions and the potential to champion mitigation and the adaptation agenda.

This uncertainty the oil and gas sector emanate from the harm that crude oil production has on the environment. Crude oil emits a variety of pollutants such as carbon (IV) oxide, carbon monoxide, sulphur dioxide, nitrogen-oxide, volatile organic compounds and particulate matter. These emissions are pollutants directly linked to climate change where these gases insulate the planet and act as greenhouse gases, which lead to global warming and climate change. Oil extraction and other activities in the upstream and downstream both lead to increases in the levels of greenhouse gas emissions instead of reducing it as per the COP21 agreement.

The construction of petroleum refineries like the discussion of having a refinery in Lamu would greatly have a share in the greenhouse gas emissions. Refineries around the world are the largest consumers of energy. This means that the refinery will make use of petroleum fuels to run and this in itself will act as a pollutant to the environment.

The impact on the health sector brought about by carbon emissions is one to take into account. The sudden increase in carbon emissions in the Turkana area will lead to an increase in the respiratory diseases suffered by the community living around the area where factories and refineries are situated and more so by the workers who will be working in the oil mines. The question is whether Kenya's health sector can handle the surge in these infections or will this people be left to suffer these consequences of the oil mining on their own being that our health sector is miles away from being efficient.

Apart from the emissions related concerns for climate change, the other climate related impacts of the oil and gas sector include:

a) Clearance of vegetation
b) Increased land pressure resulting in increased deforestation
c) Increased industrialization and urbanizations
d) Aerosol production
e) Impacts on the carbon cycle and reservoirs
f) Overreliance on the oil and gas and neglect of other sector like agriculture and forestry

4.16 Trans-boundary Environmental Concerns

Trans-boundary pollution is the pollution that originates in one country but is able to cause damage in another country's environment, by crossing borders through pathways like water or air. Pollution can be transported across hundreds and even thousands of kilometres. The incredible distances that pollution can spread means that it is not contained within the

boundaries of any single nation. One of the problems with trans-boundary pollution is that can carry pollution away from a heavy emitter and deposit it onto a nation whose emissions are relatively low. Another problem with trans-boundary pollution relates to the fact that 'All things connect', the heavy pollution that is evident in the developed world also becomes evident in remote areas.

Kenya shares borders with five other East African countries: Ethiopia, Sudan, Uganda, United Republic of Tanzania, and Somalia. Inevitably, many of its ecosystems and natural resources are trans-boundary.

The four trans-boundary environmental aspects of importance to Kenya and her neighbours are:

- Trans-boundary protected ecosystems;
- Trans-boundary water resources;
- Trans-boundary movement of people;
- Trans-boundary movement of pests and disease

Some of the trans-boundary concerns/ issues of the oil exploration and development programme s and plans raised by stakeholders include:

- Marine oil spillage
- Pollution
- Destruction of fish breeding cycles
- Insecurity
- Destruction of wildlife habitats
- Gas Flaring

The on-going Indian Ocean offshore exploration activities around Lamu are the main activities likely to have trans-boundary concerns. Already Kenya and Somalia are in the international court of justice on boundary extents. Kenya claims 90° trajectory tangent into international waters, while Somalia claims a progressive boundary downwards into Kenyan shoreline. Boundary and impact related disputes are likely to continue in the near future due to potential oil reserves around the region. Some trans-boundary pollution from on shore and offshore oil and gas activities will also have impacts at international and regional levels in terms of safety of offshore drilling activities and liability and compensation in case of accidents. Air emissions from potential oil refineries will also have regional and international concerns.

The country also shares a number of drainage basins with other countries: The Umba, Mara and Pangani basins shared with the United Republic of Tanzania; The Sio, Malaba and Malakisi basins shared with Uganda; The Omo and Daua basins shared with Ethiopia and the Nile basin shared with nine other countries. One of the oil blocks is actually at Winam Gulf in Lake Victoria, which is a shared resource in the East African countries. Any future exploration at this block will have to be subjected to EAC laws. Boundary disputes also exist in offshore oil blocks between Kenya and South Sudan and in the Ilemi Triangle in Turkana that measure between 10,320 and 14,000 square kilometres. The territory that is claimed by South Sudan and Kenya borders Ethiopia. It hosts one of the potential oil blocks in the country.

4.17 Conclusion

As per the discussion in this chapter, environmental and social impacts, safety and occupational health risks, and possible mitigation measures at policy level have been identified. A description of the regulatory and institutional framework, assessment

of capacity and policy gaps were also identified. Emerging issues/gaps have been analyzed and gap-filling options provided. Recommendations to address issues discussed have been outlined in the last chapter of this report.

5.0 CHAPTER FIVE: SOCIO-ECONOMIC INFORMATION AND IMPACTS OF PETROLEUM SECTOR

Chapter five outlines the socio-economic information and impacts/concerns of the petroleum sector policies, plans and programme s covering exploration, drilling/ development, production and decommissioning of the projects under the PPPs.

5.1 Sector Specific Socio-Economic Impacts of Oil and Gas Activities in Kenya

5.1.1 Impact on Livestock Production and Pastoralism Traditional Systems

Livestock rearing and production is the major activity in ASALs and contributes a considerable proportion of GDP and agricultural labour force. Oil exploration and production in ASALs may affect areas for grazing, and livestock corridors (see Plate 27). It may also influence residents to abandon their traditional livestock-related/pastoralism lifestyles. This has already been reported in parts of Turkana County where oil has been discovered. Some communities especially among the pastoralist communities have alleged increased impacts of seismic studies by the oils exploration studies on their livestock. The effects are alleged to be affecting the reproductive potentials of the animals. This strongly came out in the Isiolo, Turkana and Eldoret meetings and particularly from counties where cattle rearing is common. This may in the long run change the dependence on traditional income and food sources to oil and gas-related exploration and production jobs and activities.

Plate 27: Pastoralism is the Main Source of Livelihood in Most Oil Exploration Areas in Kenya

5.1.2 Population Migrations/ Influx Management in Oil Exploration Areas and Health Issues

Oil exploration is currently extensively conducted in Turkana and Lamu Counties. The two regions have low populations with Turkana having a population of 855,399 as per the last census in 2009 with total households recorded being 123,191 and the persons per square kilometre being 12 against a national average of 66 persons (Republic of Kenya 2015). Lamu on the other hand has a total recorded population of 101,539 persons with the total number of households being 6,372 and persons per square kilometre being 16 (Republic of Kenya 2015). With increased opportunities in the areas, it is expected that the migration of persons to these areas in search of greener pastures will go up especially as the number of unemployed and underemployed youth in the country is high. The areas should therefore brace themselves for an increase in resource strains including housing and water. This will also lead to human health and sanitation concerns. Further, employment opportunities are expected to be shared with people from other Counties in the country.

5.1.3 Preservation of Historical, Cultural Resources and Heritage Sites

In Kenya, oil and gas industry operations occur in some of the world's most environmentally and culturally sensitive regions (see figure 26 below) including archaeological, architectural, cultural, natural and social heritage sites and resources including National Parks. The collaboration between oil and gas exploration companies and the national research and conservation institutions especially in the upstream sector have ensured that the capacity for recognition and avoidance of these sites has significantly improved. Currently the national cultural heritage resources are managed and regulated under the National Museums and Heritage Act, 2006. The Kenya Heritage Authority Bill 2015 currently under consideration by Parliament, seeks to repeal the National Museums and Heritage Act, 2006 to align the law to the Constitution of Kenya and in particular to devolve the functions of the preservation, protection and management of national heritage resources to the Counties. Article 40 (1a) of The Kenya Heritage Authority Bill 2015 provides for development and publication of policies and principles for management of heritage resources in Kenya.

It is however observed that there are currently no guidelines and procedures for undertaking heritage impact assessments and audits to guide the oil and gas industry operations. In addition, there is inadequate professional skills capacity in heritage resource identification, mapping, preservation and protection to cover the whole country and in particular at the County level. There are also numerous heritage resources and in particular sacred sites that are currently community control that require official regulation and protection.

The old Lamu Port, lakes within the Rift Valley and the Lake Turkana National Park are designated as UNESCO World Heritage Sites, and adequate measures to ensure their preservation needs to be taken. Limited mechanisms to preserve local cultural resources, national heritage and archaeological and historic sites are key issues in areas with petroleum potential including parts of the Rift Valley and in the Anza Graben and Coastal Lamu basins.

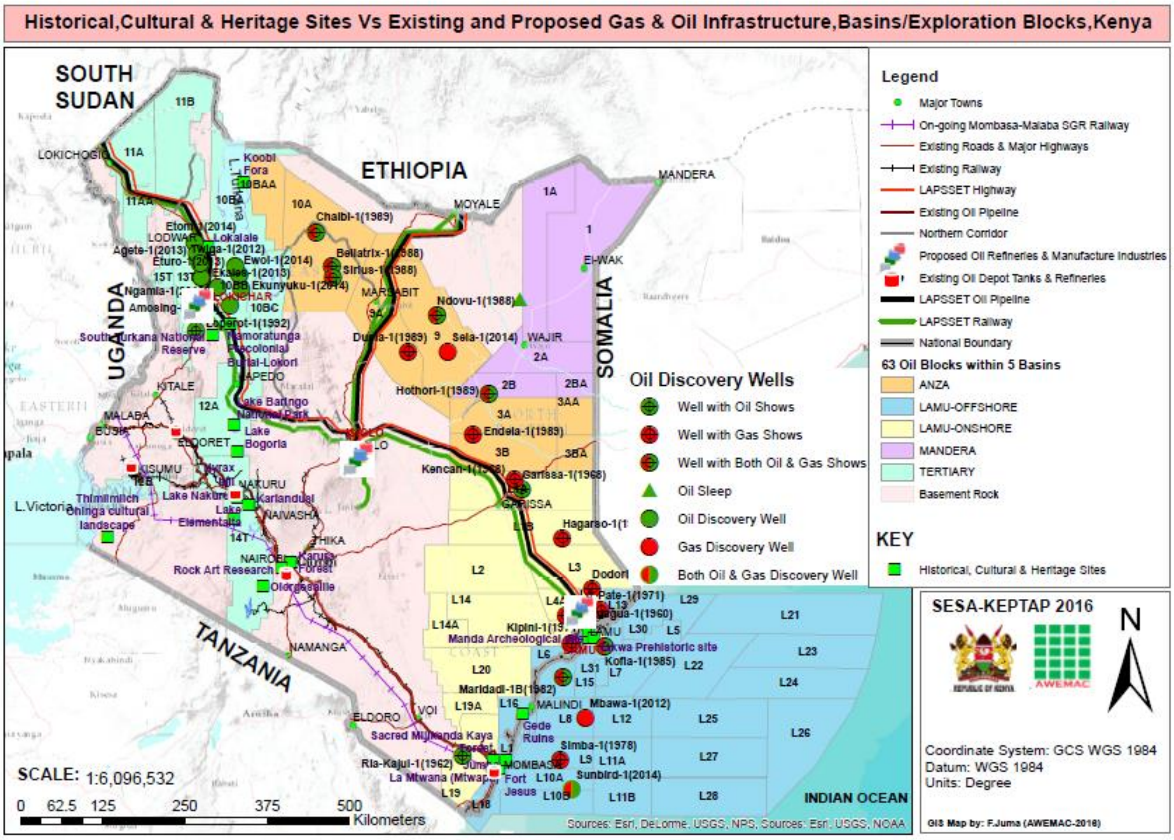


Figure 26: Historical, cultural and heritage sites and the existing oil and gas infrastructure.

The historical sites likely to be affected by the LAPSSET corridor from Lamu to Turkana and Moyale, include:

- The Manda archaeological sites in Lamu;
- The Takwa prehistoric site near Lamu Island;
- Lake Baringo national park;
- Namoratunga Precolonial burial site in southern Turkana;
- South Turkana national reserve; and
- Lokalale site in central Turkana.

Some of the historical sites also fall within the grater oil block under explorations and some of these upstream activities may negatively affect such sites, some of these sites include: Sites on the tertiary oil basin;

- Lake Baringo national park;
- Namoratunga Precolonial burial site in southern Turkana;
- South Turkana national reserve which fall in the Tertiary oil block;
- LakeNakuru;
- lake Elementaita;
- Lake Naivasha;
- Karura Forest;
- Hyrax hill in Nakuru;
- Lake Bogoria in Baringo; and
- Thim lich Ohinga in South Nyanza (Tertiary block 12A).

Sites within the Lamu basin include

- Lamu old town buffer zone;
- Fort Jesus in Mombasa;
- Sacred Mijikenda Kaya Forest (Kaya Kauma, Kaya Giriama, Kaya Kanondo);
- The Gede ruins in Block L16, L18;
- The Manda archaeological sites in Lamu; and
- The Takwa prehistoric site near Lamu Island.

5.1.4 Public Participation Process and Consent from Community

Article 69 of the Kenyan Constitution 2010 provides for public participation in the management and conservation of the environment and natural resources. The principal objective of public participation is to ensure that there is accountability, legitimacy, openness and transparency in policy formulation and implementation in the oil and gas sector. However, like with other laws and policies on public participation, there are inadequate guidelines to facilitate meaningful and informed public participation. Further, civil society organizations have expressed concerns that the majority of citizens have limited or no capacity to participate effectively in reviewing EIA reports and to monitor projects for compliance with licensing conditions. Another reported critical challenge to public participation is the inadequate community level interest groups and associations in the oil and gas sector to form the focal point for public consultations as is the case with water and forest associations.

There are also concerns that attempts to ensure that there is effective public participation is often undermined by the numerous and divergent interest groups that tend to claim to represent the genuine interests of communities in places like Turkana, Isiolo and Lamu. Some of the interest groups that may not share the same perspective and may claim to be the genuine voice of the local communities are professional groups, business communities, elected leaders, religious leaders, local administration and occupational groups like herders, fisher folk and farmers. There are also no specific local consultation procedures to harmonize or reconcile the often numerous and competing interests and perspectives.

The nomadic culture of the herding communities that live in most of the areas of oil and gas operations tends to create some difficulties in contacting and consulting them on matters that concern them. On the occasions that they have moved from their regular settlement areas their involvement in decision making is often not guaranteed. Further, it is also recognised that in such marginal communities with high levels of illiteracy, political and commercial interests are likely to undermine public consultation programme s and to skew participation in favour of men and the few local elite. There are also concerns that the written information as well and information rendered in either English or Kiswahili languages will negatively impact on the right and opportunity of the majority illiterate populations in oil and gas producing areas to effectively participate in decision making in this sector. It was also noted that there are not regular or specific consultation forums to engage with communities and interest groups on important activities and programme s such as oil and gas development. Further, in places like Isiolo and Turkana with long standing inter-ethnic conflicts and suspicion, official information to form the basis of participation is rarely disclosed or shared with local communities and leadership.

5.1.5 Gender and Equity

The Constitution of Kenya 2010 article 27(8) and the National Gender and Equality Commission Act 2011 clause 7(b) provide the legal basis for gender mainstreaming in all sectors and spheres in the country. It is however recognized that the implementation

procedures and guidelines to realise gender equality and equity as envisaged in the relevant laws are largely inadequate. In Kenya, gender inequalities persist across many areas of development, particularly in employment, poverty, reproductive health, political participation and the fulfilment of human rights. For instance, except for female students' enrolment in universities that currently stands at about 35 per cent, in almost all other crucial development sectors women have a representation of less than the constitution threshold of 33 per cent. For this reason, it is anticipated that gender inequality is likely to be perpetuated particularly in the oil and gas industry labour market and supply chains. Many traditions in Kenya, for instance, do not regard women as holding equal rights to men with regard to ownership of land, access to education, and a share in compensation for family property. It therefore means that women are likely to be further marginalised in terms of opportunities for education and training in fields of oil and gas development and to be excluded from sharing in compensation for land acquired for the development of oil and gas assets. It observed that in instances where traditional cultural values and practices inhibit the access of women and even persons with disabilities to opportunities, there are no mechanisms to enforce legal and industry equity standards.

Gender interest representatives have also pointed out that there are no specific training and skills development programme s to meet the needs of women who are currently underrepresented in the oil and gas industry workforce. Further, the obligation to provide a quota of not less than a third of positions in public sector organizations are not often applicable to the private sector and in particular the contractors engaged by the international oil companies.

It is also observed that high population influx into the upstream communities has the potential to expose women and girls to sexual and economic exploitation. The increase in movement of populations to places of new oil and gas developments are also likely to increase incidents of abandoned or neglected wives, partners and children as new relationships are build and old ones are broken and also as oil resources and benefits dwindle.

5.1.6 Human Rights

The Constitution of Kenya, 2010 has elaborate provisions for the recognition, protection and respect for human rights and fundamental freedoms with the aim of preserving the dignity of individuals and communities as well as the promotion of social justice (Article 19 paragraph 2 of the Kenyan Constitution 2010). Due to the pervasive nature of human rights and the potential for emergence of extensive networks of partners and suppliers in the oil and gas sector, there is a wide scope for ambiguity as to which agency bears the duty to respect, promote and protect human rights in every specific situation.

It is noted, for example, that prior to the coming into force of the Right to Information Act 2016, the practice was that contract information management between the national government and oil companies precluded information sharing with the County governments and local communities. In the same way agreements between local community leaders and private oil and gas companies are never fully disclosed to the all the concerned stakeholders within the local communities. Likewise, decisions on routing and siting of oil infrastructure and assets tend to be taken by the state with minimum consultations taking place mostly at the stage of land acquisition negotiations. Other potential rights challenges have been noted with regard to displacement of people to give room to oil and gas infrastructure development. There is a concern that without the operationalization of the Evictions, Resettlement and Rehabilitation Bill 2014, there is potential for violations of human rights in the process of undertaking evictions to create room for oil and gas infrastructure.

Further, it is observed that the traditional approach to security management in Kenya precludes procedures for public access to security related information. Since some oil and gas infrastructure is likely to traverse contested boundaries and also attract increased attention from potential criminal networks, concerned communities have demanded assurance on transparency and accountability on oil and gas security operations. Members of the local communities in the oil and gas producing areas and the public in general have often expressed concerns about inadequate information and guidance on the human rights redress mechanisms and procedures. This situation has tended to encourage attempts and threats by communities to attack sites and interfere with oil and gas operations on the basis of unresolved grievances.

Members of local communities and advocacy groups have also expressed concerns that very scanty information is often available to them about the activities of oil and gas companies operating in their areas. This undermines their rights to be informed and to give feedback both to the oil and gas companies and national regulatory authorities. For example, local populations in Isiolo and the surrounding areas believe that their land would be alienated permanently for the establishment of oil and gas infrastructure without any clarity on the land rights of the future generations. Concerns have also been raised about labour hiring and compensation practices that tend to perpetuate ethnic, gender and regional discrimination in nearly all sectors in Kenya. There are fears that such patterns are likely to extend to the nascent oil and gas sector especially among national contractors.

5.1.7 Local livelihood and Community Development

According to the International Petroleum Industry Environmental Conservation Association (IPIECA, 2004) oil and gas industry development and operations have potential environmental and social impacts on the societies of host countries, regions and communities. These impacts can be direct and indirect; intended and unintended; positive and negative; cumulative and non-cumulative.

Recent discoveries of commercial oil and gas reserves in Kenya are thus bound to impact and trigger a wide range of socio-economic changes in the country in general. The wide range of current and future oil and gas industry developments and operations therefore necessitate a critical understanding of the current state of events and the necessary adjustments in policies and strategies to adapt and prepare for future developments in the sector.

The private oil and gas companies are generally committed to contributing to skills development in the communities in which they operate in Kenya. The companies achieve these objectives through policies on employing qualified members of local communities and localisation of some roles. In addition to skills development and employment, oil and gas companies also provide on voluntary basis support for infrastructure like roads and services in the fields of education and healthcare to local communities. The fundamental gap however remains the policy to commit the governments at County and national levels to partner and provide budgetary support for these services in the underserved oil and gas operation areas. It is also noted that the predominant populations of oil and gas producing areas tend to be indigenous and vulnerable communities that suffer discrimination and exclusion from and by the mainstream social and economic systems.

It is also a common practice in oil and gas operations to recommend a distance of 50km buffer zone between oil drilling and production sites and local settlements. In Kenya, most of the oil and gas development sites occur in semi-arid and arid areas that are predominantly inhabited by pastoral communities that migrate with their livestock seasonally in search of water and pasture. Such large buffer zones would inevitably adversely affect access to these vital resources necessary for the survival of herding communities and also affect human and livestock migration routes.

There are varying interpretations of how the oil and gas developments should contribute positively to the development needs of local communities. However, most of the programme s are viewed as discretionary acts of philanthropy by private investors in this sector. Whereas there are community development benefits that accrue to communities in oil and gas development areas such as boreholes, classrooms, and graded roads these are not recognized to contribute significantly to long term development of skills and capacity to win contracts and trade formally with private companies. Thus there were concerns raised that there are no definite social investment plans and programme s for investors in this sector. In addition, the focus on oil and gas as the key source of livelihood opportunities in the medium term in areas like Turkana is said to be mistaken. This is attributed to the fact that communities are not properly sensitized and educated that a significant part of oil production and transportation is highly automated and that oil is not only a non-renewable resource but is also susceptible to international shocks. The community development programme s have been noted not to focus on vital long term policies and programme s such as savings and investment, matching funds to support development during slumps or when the oil and gas are depleted, alternative livelihood programme s and banking skills for unbanked local populations.

5.1.8 Governance and Conflict Management

Kenya has two distinct and interdependent levels of government, the National and County governments in accordance with Article 6(2) of the constitution. However, the control, exploitation and management of mineral resources including oil and gas are the responsibilities of the National government. In this respect licensing and contract information relating to upstream operations are only known to the national government authorities and international oil companies currently operating in Kenya. Further, it is observed that most of the policies and procedures applied in the upstream and midstream oil and gas sectors are based on voluntary assent to international protocols or code of practice and standards by oil companies operating in Kenya. For instance, the Government of Kenya has not developed a code of ethics to give full effect to Chapter Six and Article 10 of the Constitution (on Leadership and Integrity) and to guide operations in the oil and gas industry. In addition, it is noted that there are numerous regulatory and licencing agencies in the petroleum sector in Kenya. Such proliferation of regulatory authorities poses the risk of increasing the financial burden and human resource requirement to sustain the institutions.

Concerns have been raised that whereas the international oil companies have programme s for governance and public affairs there are no corresponding programme s at either national or county government levels. Such programme s and procedures would enable the government of Kenya to engage effectively with the various non-state actors on important issues such as communication and disclosure in the oil and gas sector.

To have these issues addressed, The Natural Resources (Benefit Sharing) Blll,2014 proposes to establishes a system of benefit sharing in resource exploitation between resource exploiters, the national government, county governments and local communities; to establish the Natural Resources Benefits Sharing authority; and for connected purposes.

5.2 General Community Positive and Negative Perceptions and Concerns

Being located in ASAL regions of Kenya, most of the potential oil and gas zones face numerous socio-economic and political challenges. Among these are: high poverty levels, historical political marginalisation (see figure 27 below), low school enrolment levels, nomadic livestock husbandry; poor housing, limited access to health, water and sanitation

facilities and services, insufficient teaching aids and facilities, low transitional rates from primary to secondary schools, and early marriages leading to increased school dropout.

Most Marginalised (0.27-0.518)		Moderately Marginalised (0.519-0.584)		Well off Above 0.6
TURKANA	MIGORI	ISIOLO	NYANDARUA	NAKURU
WAJIR	BOMET	KAJIADO	MURANGA	KIRINYAGA
MANDERA	TAITA TAVETA	KISUMU	EMBU	KISII
MARSABIT	BUSIA	ELGEYO MARAKWET	KERICHO	NYAMIRA
SAMBURU	KILIFI	MACHAKOS	KAKAMEGA	UASIN GISHU
WEST POKOT	TRANS NZOIA	MAKUENI	VIHIGA	NYERI
TANA RIVER	THARAKA NITHI	NANDI	LAIKIPIA	MOMBASA
NAROK	HOMA BAY	SIAYA	LAMU	KIAMBU
BARINGO	GARISSA	MERU	BUNGOMA	NAIROBI CITY
KWALE	KITUI			

Figure 27: County Marginalization Index

Source: Commission on Revenue Allocation, 2012

The majority of residents living in the town centres in these regions engage in small-scale businesses. The businesses range from *jua kali* (artisanship), retail, wholesale, catering, distribution, and rental housing. Others are kiosks, hardwares, bars, private clinics and chemists, entertainment establishments (pool halls and video shows), carpentry, and tailoring workshops. A review of existing EIA and Environmental Audit reports available from NEMA offices in relation to the Oil and Gas sector revealed a range of positive and negative impacts and perceptions as summarised below.

5.2.1 Positive Impacts and Expectations

- Employment opportunities in the sector for both skilled and non-skilled labour from the community
- Provision of social amenities through Corporate Social Responsibility (CSR) projects such as building classrooms and sanitary facilities for schools, and drilling of boreholes in the area
- Creation of access roads and thus improvement of the infrastructure in the area
- Increased business opportunities and market creation for local goods
- Technological transfers from skilled labourers to the unskilled labourers
- Improved livelihoods of the community members, families and dependents who get job opportunities with oil and gas exploration companies and support services companies
- Improved levels of literacy in the community as a result of the bursaries and sponsorship programme s offered by investors
- In-migration as a result of influx of people in the area in search of employment opportunities.

5.2.2 Negative Social Related Impacts and Perceptions

- The oil and gas exploration, transport and production operations could have adverse impacts on the health of community members if toxic gases and dust generated by vehicular traffic are released into the atmosphere.
- Displacement of community members from their ancestral lands.
- Discovery of oil might cause conflict among neighboring communities if proper conflict prevention and resolution mechanisms are not put in place.
- Favouritism and nepotism during the recruitment process through the use of community social workers, politicians and local administration.
- Increased vehicular traffic in the area would result in disturbance of livestock in their grazing areas.
- Loosening of soil and compaction in some areas as a result of movement of heavy trucks and machinery in the project area
- Interference with pastures which the community highly value due to their pastoral culture.
- Felling of trees to pave way for access roads and the proposed test well drilling sites will destroy the already fragile ecosystem.
- Air pollution from exhaust emissions
- Gender imbalance in the oil and gas sector –men, women, youths and children may experience risks and benefits of the sector differently.
- Offshore pollution of fishing grounds in the deep sea.
- Increased accidents from pipelines and oil tankers.

The above perceptions imply that oil and gas companies setting up businesses in the country need to understand the social profile of these regions and integrate social issues into their operations for purposes of reducing risks and uncertainties. Integrating social issues into the planning process increases the likelihood of project success and gives a project a social licence to operate. There are several social risks related to the oil and gas sector. These include volatile economic growth, limited job creation, violent conflicts and business interruption, corruption, environmental degradation and pollution impacts to livelihoods, gender violence and discrimination, injuries to people, damage to assets and properties, and spread of HIV and AIDS and other communicable diseases among communities impacted by oil exploration, production, distribution and marketing outlets.

5.3. Petroleum Sector Security Concerns

Security concerns have taken centre stage in both the government and private sector circles since the August 1998 United States Embassy bombing in Nairobi's Central Business District that killed 213 and injured over 4,000 people. This is particularly due to the adverse impacts that threats to security have on business development and economic growth. Although the 1998 attacks were directed at the American Embassy, the vast majority of casualties were local citizens.

Since late 2011, Kenya has also seen an upsurge in frequent violent terrorist attacks on shopping malls/centres, churches, public transport vehicles and other forms of gatherings. Government officials believe that the attacks are being carried out by the Al-Shabaab terrorist group based in Somalia in retaliation for *Operation Linda Nchi*, a coordinated military mission between the Somali National Army and the Kenyan military that began in October 2011, when troops from Kenya crossed the border into the conflict zones of southern Somalia. One major attack was on September 2013, where unidentified gunmen attacked the upmarket Westgate shopping mall in Nairobi. The siege, which lasted for about 4 days, resulted in about 70 deaths and over 175 people were reportedly wounded in the mass shooting.

Mandera County in North East Kenya also experienced killings of over 60 people in a span of less than a month (November / December 2014). In July 2014, Lamu County experienced terror related executions of over 100 Kenyans. In April 2015, Garissa County, was on the receiving end of a terrorist attack whereby over 100 students were killed coupled with many other attacks between 2013 to date. Several crime incidents are also on record in various parts of the country. One other historical non-terror related event was the 2007 post-election violence which resulted in approximately 1,500 deaths, mainly in the Rift Valley region.

Due to the increased execution of terrorism related incidents and other forms of violent crimes mainly in Nairobi, Rift Valley, Northern, North Eastern, Lamu and Mombasa in the Coast, the petroleum industry stakeholders have become more alert to the need for effective mechanisms that assure Kenya's and the East Africa region's energy security. The security issue is also of importance since a number of terrorism related/ insecurity incidents have been recorded in Kenya's prospective oil and gas sedimentary basins. It is of importance to note that the oil and gas industry is a capital intensive industry that attracts foreign investments and large extents expatriates who may become easy target to the terrorism (ransom) activities in these remote locations.

Security remains a major priority for the residents of areas with potential for upstream projects. At the village levels, security for homesteads and livestock is provided by heads of households. Village elders in collaboration with location chiefs often resolve domestic disputes, and their decisions are respected by the residents. All the villages have Kenya Police Reservists ("KPR") recruited and trained by the Kenya Police Service ("KPS"). However, some members of the local communities living in oil exploration areas feel that the KPR unit has prioritised protection of oil exploration installations at the expense of protecting them from criminals like cattle rustlers, bandits and militia from neighbouring communities or countries. In Turkana County in particular, there have been reports of residents converging on oil rig sites in an attempt to gain protection during inter-community raids. It is important for GoK to implement a strategy to ensure adequate resources are in place to ensure the security of both the local communities and upstream installations.

Cyber-crime is also on the rise in Kenya and globally. The world's largest oil producing company, Saudi Aramco, was the victim of a significant cyber-attack on August 15, 2012. The oil giant announced that 30,000 of its workstations had been infected by a virus. Moreover, on August 27 Qatar's natural gas pumper RasGas was hit by a similar attack, resulting in the company being taken offline for several days. Both Saudi Aramco and RasGas managed to limit the damage, as the attacks did not affect extraction or processing, but such a bold attack had serious repercussions on the IT strategies of oil and gas organisations operating in the Middle East and the world at large.

5.4. Local Content Concerns

Local content is becoming the most strategic determinant for acquiring a social license to operate, while leaving a positive legacy in a country. The Petroleum Exploration, Development and Production Bill (2014) defines *Local Content* as the use of Kenyan local expertise, goods and services, people, businesses and financing for the systematic development of national capacity and capabilities for the enhancement of the Kenyan economy. In its basic definition it is the commitment to generate in country capability to support the long-term development of the emerging oil & gas sector; it represents the opportunity to maximize the use of local human capital, goods / material resources and services, promote real and effective partnerships, as well as benefit local business and communities through: -

- Local business development (goods and services)
- Local employment (re-skilling, job development, redeployment)

- Creating sustainable local economic development

The oil and gas upstream sector is currently dominated by foreign investments in terms supply of technical exploration and production skills, goods and services. On the other hand, local content is characterised by semi-skilled and unskilled labour, and limited supply of goods and services. This implies that the cost of skilled labour, goods and supplies are high at the beginning but through a well-planned and structured local content strategy, the cost of local technical skills will be cheaper in the long run. The local trained technical workforce will lead to labour costs savings and also be available for future regional developments. The aim of the local content strategy is to reverse the dependence of the sector on international technical skills and supply of goods and services for the sector.

Consultations with companies undertaking oil exploration in the country, registered the following as key challenges or limiting factors in local content development that need to be addressed during the Master Plan period: -

- Un-competitiveness of local firms
- Limited relevant experience and technical capabilities
- Poor production quality and reliability,
- Low compliance to international health, safety and environmental standards
- Weak public sector regulation and inefficient bureaucracies
- Defining the meaning of local content in the context of National and County Governments devolution governance structure in the Country
- Cultural diversity, ethnicity and clannism

The above mentioned the Petroleum (Exploration, Development and Production) Bill,.2015 and Local Content draft regulations include all energy sources: electrical, mechanical, hydraulic, pneumatic, chemical, nuclear or thermal power for any use, and includes electricity, petroleum *(oil and gas activities)*, coal, geothermal, fluid, biomass and all its derivatives, municipal wastes, solar, wind and tidal wave power. The meaning, application and contextualisation of local content is facing major challenges from Counties and local communities that host upstream activities. It will be important to review and harmonise the proposed local content legislation, and consolidate it into one single Bill focusing on the oil and gas sector. A public participation process covering all areas with oil and gas potential, and the country at large will be required. Successful Local Content delivery will require all stakeholders (including County Governments and host communities) to become engaged in the general framework of its development. Foreign investors should also be expected to use their Supply Chain systems to improve Local Content opportunities across all partners.

The Petroleum Exploration, Development and Production Bill (2014) and relevant draft regulations on the same Bill require that a long term and annual local content plan shall be developed by investors and contain the following sub-plans:

(a) Employment, Training and Succession Plan (including industrial attachment and apprenticeship);
(b) Research and Development Plan;
(c) Technology Transfer Plan;
(d) Legal Services Plan; and
(e) Financial and Insurance Services Plan

The existing draft law has specified minimum local content levels and requirements for goods and services for any energy operations in Kenya. The proposed Upstream Petroleum Regulatory Authority to be established under the Petroleum Exploration, Development and Production Bill (2014) shall monitor and enforce local content in upstream petroleum operations.

The private sector through Oil and Gas companies like Tullow are already working with the Government to implement initiatives and programme s which help new suppliers to develop their standards, processes and systems to support the oil and gas industry. For example, Tullow is currently financing Lodwar Polytechnic to develop semi-skilled and skilled labour in Turkana. The company also has enterprise development initiatives where their international suppliers train local firms on the required standards and best practices to enable them compete for contracts effectively. Ghana is a good case study to benchmark on local content implementation due to the speed of enactment of legislation. J.Emefa & S. Armah. (2015) indicate that the rationale for instituting such legislation is highly laudable, the alignment of the legislation, the social, economic and political context and stakeholder involvement do not support effective implementation. Implementers of the legislation in Ghana therefore need to ensure that concerns and recommendations are taken into consideration to ensure that Ghana derives the maximum benefits intended. On the other hand, local content legislation came into place in Nigeria in 2010, whereas exploration begun in the 1930s. Given that this legislation was implemented long after Nigeria's oil & gas sector had already entered the production stage, significant job and business opportunities which could have accrued to the country via such legislation were lost. It is significant to note that opportunities for local content in the upstream oil and gas sub sector are highest during the development phase.

Most of the international oil and gas companies currently operating in Kenya have individual company policies spell out their commitment to supporting local content. In most circumstances the policies on local content are guided by licence conditions or by the need to protect their company reputations. The local content policies generally focus on spending with Kenyan suppliers and sensitisation of contractors on the need to optimise local content.

However, there are significant shortages of suitably qualified staff and suppliers in critical operation areas such as coded welding and drilling and production expertise. In Kenya, most oil and gas development and operation areas also tend to fall in areas historically and economically considered marginalized. These are areas where adult literacy is less than 20% and well below the national average of approximately 70%. Such high levels of illiteracy also undermine in a significant way the efforts to develop local content. Furthermore, the responsibility for professional skills development seems to have been transferred to the private oil and gas companies without spelling out the role of the government of Kenya in addressing this need.

Concerns have been raised about the relevance of scholarships currently offered to Kenyan's by the International Oil Companies (IOC). In the upstream sector, local communities have pointed out that the majority of the young people sent on scholarships abroad have often returned disillusioned that their skills and competence are in fields that are not relevant to opportunities in the oil and gas sector. Local leaders have also pointed out that contracts in areas like management of field camps and supply of goods and services to the oil and gas companies are largely skewed in favour of international companies and as such do not benefit Kenyan nationals.

The narrow definition and confusion of local content for employment of individuals from the immediate neighbourhood of oil and gas operation areas is seen to undermine the long term needs for capacity development in this sector. By restricting the meaning of local to sub-county units, individuals who would otherwise build their capacity by moving to new sites when operations shift to new locations have often been forced to quit due to political pressures on employment decisions. It is thus pointed that there is no sensitization or awareness framework to inform citizens on the meaning and operationalization of local

content. Since this is an emerging sector, it has also been observed that there is no specific progression plan toward achieving local content that should focus on the three distinct content levels; highly technical and professional skills and services that lie at the core of oil and gas exploration and production; skills and services directly connected to the oil and gas sector; and skills and services that are not directly related to oil and gas but are of general development value.

5.5. Economic Challenges, Impacts and Opportunities in the Petroleum Industry

The sector impacts the Kenyan economy in many ways such as employment, exchange rate, government revenues through taxation, stimulating infrastructure, consumption and production/manufacturing in the country. For instance, a well-developed and managed sector could help reduce the high youth unemployment, increased revenue and foreign direct investments reduce the strain to the exchange rate through increasing the foreign reserves and easing strain on the exchange rate of Kenyan shilling against major currencies through reduction of fuel import. However, there are challenges that could come from investing in the sector. These include corruption and tax avoidance/evasion, environmental and social costs from the negative externalities, appreciation of the Kenyan shilling that could slow growth in other sectors such as tourism and horticulture, fluctuation of oil prices that could destabilize the economy among others. Below is a detailed account of the challenges and opportunities in the sector

5.5.1 Employment at the National and Local Level

Currently, there is one (1) refinery, one (1) pipeline company and over 30 licensed oil importing and marketing companies in the country (ERC, 2016). At the upstream, there are more than 23 international oil exploration firms operating in Kenya. Through these firms at the upstream, mid-stream and downstream, employment is created. The main avenue of employment in the sector is at the downstream where 20,961 people are employed with fuel stations having a total of 19,169 and KPC employing 1,792 people as at 2015 (Republic of Kenya, 2016). The mid-stream is currently moribund with only 282 employees at the KPRL while at the upstream; there is no concrete information on the number of employees. However, data from Tullow Oil indicates that employment is currently less than 1000 – a drop from about 3000 in 2014. The drop is however attributed to the slowdown in activities due to depressed oil prices in the global market but the numbers are expected to increase as more exploration resumes with recovery of the prices of oil. Most of the growth in employment in the sector, especially at the downstream, is attributed to a vibrant consumer market for fuel in the market- a factor attributed to an increase in the standards of living due to economic performance of the Kenyan market. Employment at the mid-stream will be increased during and upon the completion of the new refinery. Figure 28 shows the employment change in the sector indicates that there was a 179% increase in employment since 2005.

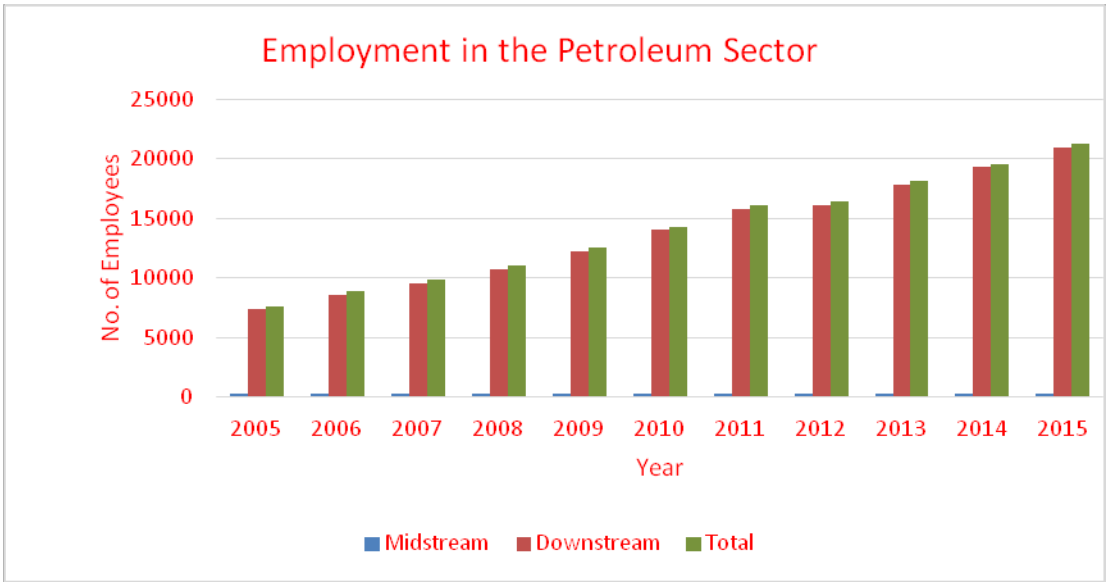


Figure 28: Employment in the Petroleum Sector in Kenya

While the figure 29shows employment in the sector is currently limited at the downstream, it is important to note that the sector is at a nascent stage and employment opportunities are expected to increase. Some reports indicate that Kenya's oil potential could eventually top 10 billion barrels in Kenya's section of the Rift Valley Basin that is the longest (Bloomberg 2013). This would mean more wells being drilled and employment created depending on the drilling programme . Other sectors necessary during this period like construction, transportation, waste management, provision of supplies and goods such as drill chemicals and other necessary social amenities could generate more employment opportunities. Onshore explorations are also on-going and this may result to more opportunities for employment at the upstream. Upstream exploration is usually on a 24-hour basis- with each crew working on shifts. It therefore follows that this planned rotation and working schedule could mean more employment opportunities as exploration continues in the country. Actual number of people employed in the industry at the upstream – both onshore and offshore is therefore dependent on the drilling programme by the licensed companies especially the number of wells planned. Some data suggests that a single well could create about 145 jobs consisting of 21 directly and 124 indirectly (Petroleum Association of Canada 2015).

While it is expected that other industries may come up as a result of exploration and refining fuel, a detailed mapping of industries that will be developed needs to explore the number of opportunities that will be created. Employment opportunities that will be created will be from various sectors that include waste management, chemical plants, transport and construction among others. Therefore, there is need to ensure that the communities have this expectation managed and also work to direct revenues from the sector to stimulate growth and employment opportunities in other sectors.

Technical capacity in the sector is generally low. However, stakeholders have realized this and are building capacity of citizens. For example, MOEP through KEPTAP has undertaken to address these challenges of capacity deficit in order for the country to manage the petroleum sector and wealth for sustainable developments through various programme s. In addition to KEPTAP initiatives, there are courses being offered by the Petroleum Institute for East Africa and sponsorship programme s by petroleum companies like Tullow. The county governments are also investing in the locals as can be seen in Lamu County which has undertaken training of youth in various port related skills in anticipation of the change in

economic dynamism in the area. Turkana County has also invested in local personnel by enrolling and sponsoring them in courses at a local university in the county.

Counties are however demanding a greater share of jobs from the sector in their counties. For instance Lamu and Turkana Counties demand that 75 per cent of jobs from the sector in their counties. A comprehensive policy framework should be undertaken to help locals manage the increase in wage as a result of employment opportunities in these areas and avoid misuse of the wages earned from the sector. There is also need for Counties to understand the forward and backward linkages between counties and sectors. For instance, crude pipeline transverses multiple counties and employment during construction is likely to be interrupted if there is no clear employment and local content policies. In Turkana, water that will be used during oil production is expected to come from a different areas or sources. There is therefore need to have a local content policy definition on employment and agreement between counties and national government to adequately address this challenge and ensure fairness in employment across communities that contribute to this resource. More so, when the petroleum infrastructure transverses counties.

Another issue common from the oil producing areas is discontent by local communities. The communities in Turkana, for example, feel that procurement is not undertaken locally, even when goods and services can be adequately availed. Areas mentioned include procurement of supplies like food to those working on the oil blocks and renting of vehicles for use by the firms. There is therefore need to engage the communities constructively to ensure they are part of the development process in the sector.

It is also important for a comprehensive employment skills analysis of the petroleum sector to be conducted, especially at the upstream and midstream to ensure maximum unemployment is created and expectations are managed. Kenya's oil resources are relatively small compared to all other countries in Africa where the resource has been discovered. In addition to this, the sector has been performing poorly in the recent past yet. Despite this, no study has been undertaken to evaluate the number opportunities that will be created in the sector creating a possibility of a glut of young people expected to be absorbed in the sector. Already, some youth trained by Tullow in foreign universities at postgraduate levels have come back to Turkana County from their studies abroad and are finding employment hard to come by. Not only should expectations be managed, but training should be relevant in areas that transverse the petroleum and other related sector.

5.5.2 Revenue and Benefit Sharing from the Oil and Gas Sector

Revenues generated from reserves are usually shared between the country and exploration company as per the Production Sharing Contracts (PSCs). With the confirmed barrels in blocks 10BB and 13T, revenues projected will be shared as per the laid out framework in the PSC signed by the Kenyan government with Tullow Oil and Africa oil. Unfortunately, this PSC is not in the public domain meaning that the actual sharing of revenues and costs cannot be ascertained at this point. The government has however allayed fears stating that the PSC is a standard document as others that have been disclosed with the proposed Energy Bill 2015 providing that future PSCs will be in the public domain and the government will have a right to publish the same. There is however need to have progressive monitoring of exploration costs and work with communities around the areas where exploration activities are taking place to avoid any form of conflicts or interruptions. Periodic interruptions of activities increase the costs of production meaning that revenues from the resource reduce upon recovery. Cooperation between the firms and community, together with government moderation is therefore important to reduce interruptions that negatively impact on operations and recoverable costs as per the PSCs. With the recent publication of public disclosure on information, the community have an opportunity to access critical information for their involvement.

The bulk discovery of oil is in one of the poorest parts of Kenya- Turkana, which has a high poverty rate with data suggesting that the number of people living under the poverty line is 94%. With the area being volatile as a result of proliferation of arms, the local community should not feel aggrieved in revenue sharing. Currently, the Petroleum (Production, Development and Production) Bill (2015) has proposed formula for sharing oil revenues in the country. Section 85(2) proposes the revenue to be shared between the national government, the county government and local communities in the ratio 70:20:10 respectively. Turkana also benefits from the formula given by the Commission on Revenue Allocation (CRA) on how to share the country's revenue, where they received the 2nd largest share given to counties because of the land size and high poverty index. The CRA formula weights 18% to poverty while 8% of the weight is allocated to land mass. Poverty and unproductive land mass are the major contributors Turkana's slow rate of economic progress.

The Energy Bill, 2015 also proposes the establishment of a petroleum sovereign fund whose role will be to help the government build a saving base and to develop infrastructure that would propel the country towards the achievement of her development goals. The World Bank report of Kenya's Economic Memorandum 2016 advises that the policy decisions that need to be made include a decision of the proportion of the revenue that should be saved or spent, mode of allocating additional spending that is financed by oil revenues and coming up with institutional mechanisms that ensure prudence in implementing the first two policy decisions (World Bank, 2016).

Despite the laws in place, there are glaring gaps that need immediate address to ensure inclusivity of all stakeholders. Firstly, there is need to map the energy sector to be in line with the responsibilities of both the central and county governments as enshrined in the new constitution. There is also need to address conflicts between laws especially on revenue sharing formulas as can be seen in the Mining Act- 2016 and the Petroleum Exploration and Production Act Cap 308. Definition of who the local community consists of will also help in prevention of conflict that may arise as a result of revenue distribution because economic costs and benefits resulting from this resource cuts across borders and communities/ clans in the oil exploration blocks.

5.5.3 The Dutch Disease and the Nature of the 'Oil Curse'

The 'Dutch disease' is a term coined in the 1970's after the discovery on natural gas which resulted to a slowdown in industrialization process in the Netherlands. This phenomenon comes about as a result of a country promoting economic policies focused entirely in the petroleum sector, excluding other important traditional sectors. It is expected that the discovery will have a huge fiscal impact to the economy with estimated production expected to peak at about $8.9 billion in 2033 (PWC 2015). Other reports estimate annual revenues from oil reserves to range from $800 million to $3 billion (Omolo and Mwabu 2015).

In the Kenyan context, the forex earnings as a result of the sale of oil and gas can result to an appreciation of the Kenyan currency making exports of tea, coffee, horticulture and tourism expensive. If not properly managed, this can result to collapse of the mentioned traditional foreign earners resulting to underdevelopment in other areas dependent on them and massive job losses. However, if the estimated fiscal revenues can be used to finance the country's infrastructure while at the same time bridge the skill gaps in all sectors, the country will be able to achieve its development goals.

Lamu County's biggest contributor to internally generated revenue is tourism with Amu Island classified as a UNESCO heritage site and is therefore protected from other economic activities that could change its infrastructure. Expansion of the county with regards to petroleum infrastructure development (Lamu Port, refinery and petro-chemical processing

industries) will therefore happen outside the island. However, should the tourism industry suffer from unmanaged negative impacts, and then the livelihoods of the residents will be impacted negatively. Disruption of livelihood of fishermen will also come to residents' dependent on fishing near the island as they don't have equipment for deep sea fishing. This will also be disrupted with the zoning of the area around the port and disruption of marine life. However, some will be absorbed in opportunities as a result of the port. While Lamu may experience some negative impacts on tourism, Turkana County stands to benefit because there is no concrete economic activity outside pastoralism. The economy is expected to be diversified if the resources are harnessed well.

In addition to the Dutch disease, there is the usual expectation that when a country starts producing oil is that the new resource will improve the country's wellbeing with a positive infrastructure change, reduction of illiteracy rates, better healthcare and general improvement of the living standards. However, if not properly managed, the sudden influx of money could cause a deterioration of the macroeconomic conditions of the country. This influx of money could result to increased inflation due to the increased purchasing power, making the prices of ordinary household goods and services beyond the reach of the majority of the citizens. Concentration of this gain to the elite individuals could elicit political tension and instability. The Energy Bill- 2015 provides for the creation of a sovereign fund that could help manage such an eventuality. If properly managed, this fund can emulate the Norwegian Oil Fund that is the largest sovereign wealth fund worth $810 billion and is subject to ethical guidelines laid down by the Petroleum Fund's Advisory Council on Ethics. Through a similar approach, prudent management of the windfall could result to better political stability and result to increased savings to prevent inflation in the initial stages of production.

In order to emulate countries like Norway, there is need to address gaps identified in our policies and laws and management of resources because the resource is finite and should be harnessed not only to complement other sectors but enhance livelihoods of those who participate in economic activities in the country. In order to protect non-oil revenues streams some countries provide that local governments will not get more than 100 per cent of non-oil revenues in the event the share of revenue distribution from oil is higher. It therefore means that should in a particular year share of revenues from oil be higher as per law, the national government holds the excess revenue in trust to stabilize future budgets of the local government. This is expected to ensure that non-oil livelihood sources are protected and are in competition with the oil revenues. However, counties where the resources have been discovered have high poverty rates and poor infrastructure and communities could feel aggrieved if they are to be denied legitimate revenues.

At the national level, we can adopt a policy where no debt can be securitized based on future oil revenues with a Petroleum Fund Investment Advisory Committee established to offer prudent advice of management of the Petroleum Fund that should be held in foreign currency. There is also need to develop a framework on how the fund can be managed to support other economic livelihoods and one that will be used to arbitrate conflict between national and county government and the local community.

Planning is of essence for prudent spending of resources. Counties should therefore invest in efficient economic planning departments to advise them on areas to invest in order to achieve maximum benefits. However, economic planning departments in various counties, including Turkana are at collusion with the national government planning department. With counties having low technical capacity, there is a danger of resources being managed without undertaking analysis on benefit and costs resulting in poorly social, infrastructure and economic projects.

5.5.4 Economic Crime and Corruption (Tax avoidance/Evasion by the Oil Companies)

It is estimated that about a third of Kenya's budget is wasted through economic crimes with Kenya consistently ranking poorly in corruption index. The sector is vulnerable to tax evasion and avoidance mainly because a lot of firms operating in the country are registered in tax havens. It therefore follows that these firms could transfer costs to Kenya or shift the revenues to the tax havens resulting to loss of revenue to the country. A recent report presented by a group of civil societies in Kenya indicate that there is need to audit 27 multinationals with stakes in 41 petroleum blocks who have registered themselves in tax havens. Their survey shows 12 of 27 firms own right to blocks through subsidiaries in tax havens while 17 use tax havens in their wider corporate structures. Examples given include British Tullow Oil that has a subsidiary in Netherlands while its partner in the oil rich block 10BB in Lokichar - Canada's Africa Oil has subsidiaries in Netherlands and Barbados. ERHC Energy, Octant Energy Corp, Vanoil Energy and Swala Energy have subsidiaries in Virgin Island; Rift Energy and Ophir Energy have subsidiaries in Bermuda; Midway International and Swiss Oil have subsidiaries in Mauritius; Anadarko Petroleum and Adamantine Energy, Camac International and Marathon Oil operate with subsidiaries in Delaware while Total and Eni SPA operate with subsidiaries in Netherlands.

While Kenya has made successful strides towards controlling economic crimes through legislation, there have been few successful prosecutions. There are also multiple laws that cover the same crime and having different penalties. This brings the possibility of someone having a less punitive penalty depending on how the case is argued. There is therefore need to merge penalties and laws that cover economic crimes. For instance, someone can be charged under the 9th schedule of the Income Tax Act, Anti-corruption and Economic Crimes Act or Leadership and Integrity Act. While they are different in nature, they may be used for some crimes that cut across their mandate.

5.5.5 Crude and Refined Fuel Transport Challenges

The biggest challenge is the construction of the pipeline to transport the crude oil. Initially, Kenya had agreed to construct the pipeline to Lamu with Uganda also making use of the same. However, the Ugandan government decided to transport its crude oil through the Tanga port, thus derailing the Lamu pipeline project. Despite this set back, Kenya is now planning to construct a 850km pipeline from Lokichar to Lamu with the costs expected to reach $3billion (Sambu 2014). The pipeline costs are expected to be high because of the need to heat the pipeline to lower the oil's viscosity, avoid the oil coagulating therefore allowing it to flow. This will increase the energy costs and therefore cost of transportation making the pipeline the longest heated pipeline in the world. In addition to this, there are plans of Kenya exploring the possibility of connecting Lamu to Addis Ababa in partnership with Ethiopia under LAPSSET project through a Product Oil Pipeline running from Lamu to Isiolo, Isiolo to Moyale (Kenya) and Moyale to Addis Ababa (Ethiopia);. It therefore follows that prudence has to be undertaken to ensure that the crude oil is transported under the lowest but efficient methods. Alternatively, while dewaxing can be done at the upstream to reduce the transportation costs, suggestions are that this is not feasible at the current state. It is therefore important that a comprehensive financial feasibility analysis is undertaken to ensure that the costs are at a minimal level and the best cost option of transportation is chosen. This will ensure maximum benefits are derived from the resource, while at the same time reducing energy and environmental costs.

The early oil production scheme reports also indicate that initial production of oil will be transported by special tankers from Turkana to Eldoret for transportation via train to Mombasa refinery for storage and export. There is need to construct a road from the oil fields to Eldoret as transportation is not possible at the current state of the road. While the

government has already embarked on this road construction, this distance is also quite long (over 300kms) and more security and health and environment safety investment needs to be undertaken, as the mode is riskier because of potential risk as a result of oil spills. This will also make it one of the longest road transportation of crude in the world. Further, there is need to have special tankers for the transportation with those investing on the same expected to recover their costs and margins in order to invest on the same. There is therefore need to understand the investment costs needed and payback period of this investment. Considering the short duration this early oil is expected to last, one will need to find out if such investment is financially, economically and environmentally/socially feasible for the short period this mode is expected to be utilized before pipeline completion. These are issues that need to be clear from the onset with an economic, financial and environmental and social feasibility studies urgently undertaken and disclosed to the public.

The current capacity of transporting refined products is low as the economy grows with increase in Kenya's manufacturing and consumer base. There is need to increase the pipeline beyond its current capacity. Kenya Pipeline Corporation has actually embarked on and expansion plan with the announcement that it will expand the 35-year-old 14 inch with a 20 inch 450 km line so as to enable it increase its output from the current 730,000 litres per hour to 1,000,000 litres per hour. This will enable it keep pace with the country's and regional expansion. Construction is also undergoing of a 10 inch 122 kilometer pipeline from Nakuru to Kisumu which is expected to increase volume of fuel moved by 360,000 litres per hour. Expansion of storage facilities to counties is also part of KPCs vision 2025 and requires investment in transportation to these facilities. KPC is therefore exploring ways of partnering with the private sector and counties to make this possible and ensure adequate supply in the market.

5.5.6 Multiple Registration and Revenue Collecting Agencies

This occurs in two fronts. First between agencies in the central government e.g. where firms pay exploration licenses to the Ministry of Energy and Petroleum with the Kenya Revenue Authority having no direct control and details of payment, while other taxes like corporation tax, VAT and PAYE being paid directly to the Kenya Revenue Authority. There are also fees that are payable to the Energy Regulatory Commission (ERC) and The National Environment and Management Authority (NEMA) which the KRA is not directly involved. The other set of fees are trading licenses payable to the county governments where exploration takes place, with the central government not being party to this. Investors in the sector lack information disclosure on fees and taxes to be paid as there is no clear e-registry of all laws and policies in the sector. In order to decrease the cost of doing business, there is need to centralize revenue collection and create an e-registry of all tax laws and regulations to be followed by investors in the sector. This includes environmental conservation, commercial and development control laws.

5.5.7 Kenya Oil Refinery Challenges

Kenya currently spends approximately 6% of its GDP on fuel imports with the total amount spend in 2014 being Ksh 334.37 Billion (Republic of Kenya 2015). Being net importer, there strain to the foreign reserves creating an inflationary pressure on prices of goods and services in the market. Refining the crude could therefore reduce this strain and have a positive impact to the economy. As figure 29 below shows, Kenya has been forced to increase importation of refined fuel as a result of increased domestic consumption while at the same time, the refinery collapse means the country has to rely fully on imports. This is seen from the convergence of domestic sales and imports meaning that the fuel consumption locally is imported.

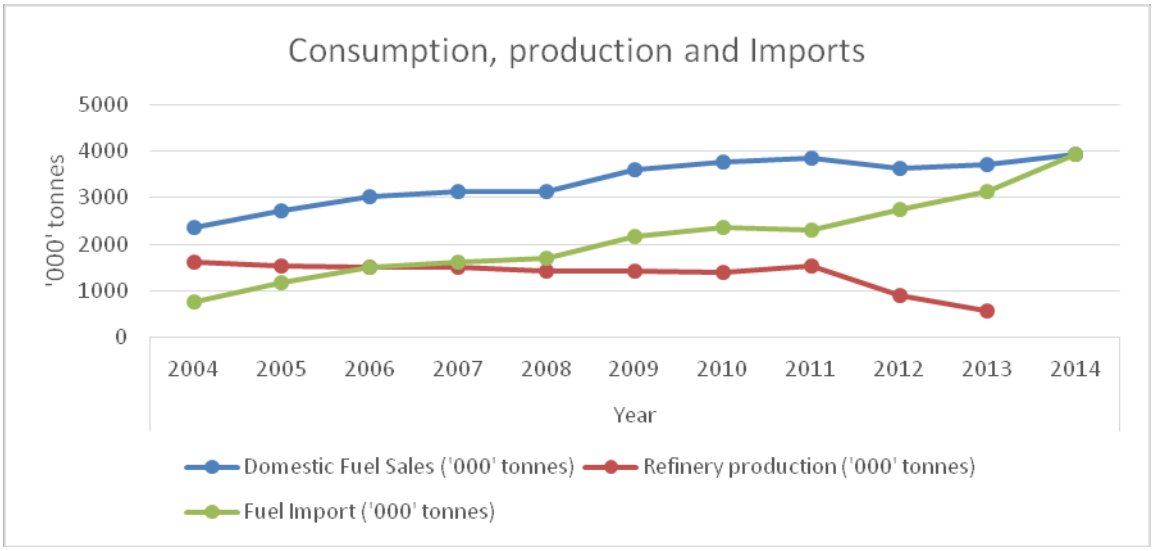


Figure 29: Relationship between Consumption, Local Production and Import of Fuel
Source: Republic of Kenya (Various)

Inefficiency in production at KPRL resulted to it ceasing operations in 2013. The refinery is currently being used as a storage facility with official reports indicating plans of a KPC takeover of the facility. Until it ceased production, KPRL was mandated by law to meet 40% of the fuel needs of the Kenyan domestic market. However, the marketers complained about the quality and the fact that the fuel costs were higher than the imported. While its capacity is about 80,000 barrels a day, the refinery was producing below this and could not produce unleaded fuel for the market. An upgrade of the refinery was expected to cost US$ 1.2 billion - an amount that was seen as too high to undertake.

Another oil refinery has been proposed under the LAPSSET project in Lamu with a capacity of 125,000 barrels per day and at a cost of US$ 2.8 billion (LAPSSET Feasibility report 2010). A look at other oil producing countries in Africa shows that processing crude is more often inefficient. For instance, Nigeria's 4 refineries were designed to produce about 450,000 barrels of oil per day but produce less than half their capacity mainly because of poor infrastructure and corruption. In addition to this, the fuel refined locally is more expensive than the imported. Care should therefore be taken on the choice of refinery construction and relooking at whether modernizing the existing refinery would under the current circumstances make an economic sense.

5.5.8 Low Fuel Storage Reserve Capacity in the Country

Kenya's fuel reserves would last between 5 and 15 days against the required 90 days by the International Energy Agency (IEA). We have poor storage infrastructure and dilapidated pipeline that requires overhaul because of age. There is therefore need to develop a strategic reserve management plan to cushion the country against crisis and to stabilize the supply chain and prices as required in the Energy Policy and laws. There is an urgent need by KPC to develop new oil product distribution and storage facilities in the country. The government plans, through KPC, to convert KPRL into a storage facility will partly address this problem. KPRL has 45 storage tanks with a total networking capacity of 484 million litres. In order to meet crude oil storage for the early oil production scheme, KPC plans to convert 17 of the tanks into crude storage tanks. KPC has already integrated 5 tanks with a total capacity of 54 million litres into storage facilities for refined fuel through an arrangement with KPRL. However, more storage facilities are being put up in Nairobi terminal to double KPCs storage

capacity from the current 100 million litres to 233 million litres. Additionally, KPC through its vision 2025 plans to engage private investors to invest in storage facilities in the country. There is therefore need for the private sector to be involved from the onset to ensure adequate investment is available for this purpose when needed.

5.5.9 Government Control Fuel Pricing

Despite the excitement in future revenues from oil and gas in the country with revenues expected to peak to up to $8.9 billion, it is worth noting that oil prices are unpredictable and volatile. It is therefore important that the revenue streams are looked at with care especially as has been experienced in 2014 when prices dipped by more than half trading at less than $30 per barrel. Generally, fuel prices in Kenya are determined by the Energy Regulatory Commission (ERC) who factor in global crude prices, local taxes, demand and supply of specific fuel products and importation costs. There have been complaints about how the final prices are arrived at as some stakeholders don't see the global trends reflected in the local prices with some faulting the open tender system and price control system in the sector. There is call for the sector to self-regulate with markets being allowed to import its own products and compete for customers in the open market.

5.5.10 Oil Licensing Regime / System in the Downstream

In the downstream, licensing regime of fuel stations need to be centralized to ensure uniform safety, environment and service standards are maintained. There are various permits for operations that seem to legitimize operation of service stations. For instance, one obtains a business permit from county governments as this is seen as a business. However, counties not only monitor location of these fuel stations but have insufficient capacity to monitor health and safety of the businesses. Alternatively, ERC which has the regulation capacity, but lack the legal backing to override decisions made by county governments but monitor quality of fuel sold. There is need for a cohesive licensing regime for fuel stations to ensure locations, pricing and quality of fuel is as standardized.

5.5.11 Adulteration of Fuel

There has been an increase in cases of adulterated fuel in in East Africa Region. Recently ERC-Kenya took action against 56 stations that were found culpable for selling adulterated fuel meant for the export market. These stations were fined between Ksh 300,000 and Ksh 1.1 million (ERC, 2016). Adulteration poses serious, health, environmental, operations and economic hazards. Contaminated petrol and diesel could cause engine malfunction resulting to exhaust fumes that are of great health concerns. Furthermore, diversion of fuel meant for the export market means that the country loses on much needed revenue because of unpaid / avoidance of taxes meaning that it loses on money that could have otherwise been used to fund health, education and infrastructure projects. Countries that rely on fuel coming through Kenya also lose confidence in products coming from the country and could progressively prefer importation from other countries meaning the country further loses on taxes and business opportunities. This is indicated in figure 30 which shows that Kenya has lost more than 50% of fuel exports to neighbouring countries because of among other things adulteration resulting to poor quality fuel leaving our borders. ERC has launched the retailer self-test kit to assist petroleum retailers test fuel products on delivery before accepting fuel into their storage tanks. They also have introduced random testing using contractors and a toll free number to the public for reporting incidences of malpractice in the market. Given that kerosene is the main component of adulteration in diesel and petrol, there are oil marketers that have stopped selling kerosene at their retail stations in order to minimize cases of adulteration.

In Uganda, the Uganda National Bureau of Standards (UNBS) has tried to curb the vice by using a fuel marking system as well as mobile laboratories that monitor all players, although they have not built enough capacity to completely rid the industry of the vice (J. Adengo, 2016, July 6).

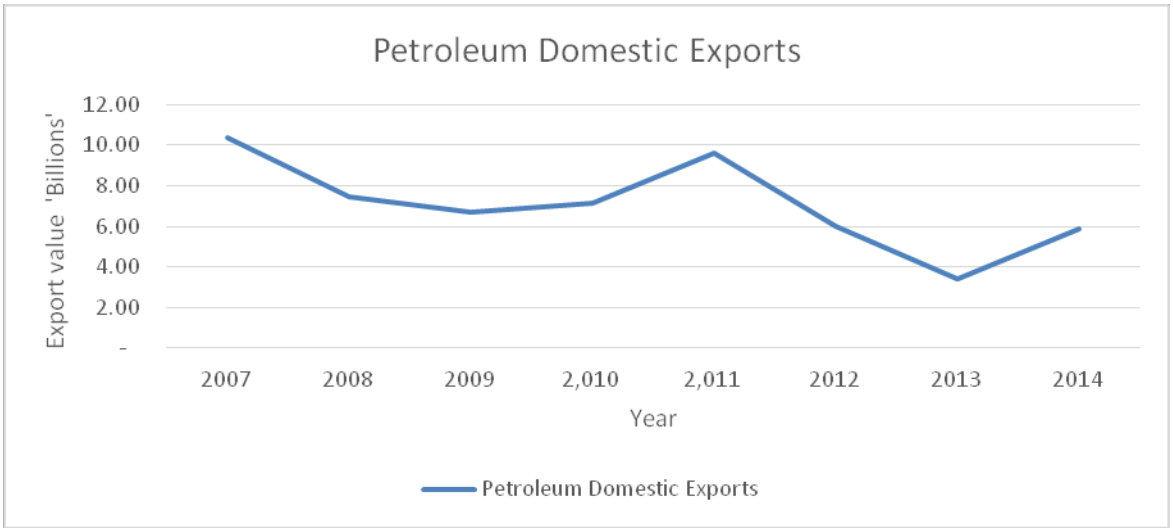


Figure 30: Domestic Exports of Petroleum 2007-2014
Source: Republic of Kenya (Various)

5.6 Potential Environmental, Political, Social and Security Risks of Petroleum Sector in Kenya

5.6.1 Environmental Risks

Earthquakes and Tsunamis: The seismicity of Eastern Africa is dominated by the East African rift system, which runs through the west of Kenya and the Davie fracture just south of Mombasa. Kenya faces a relatively low earthquake hazard, with hazard levels highest in the northeast and south-west. There have been earthquakes in the past, but no significant damage has occurred. Mombasa and the rest of the Kenyan coast have a moderate degree of tsunami hazard and according to estimates, the coast is vulnerable to 2m high waves and water reaching 500m inland. There was a tsunamic event in 2004, but the impact was relatively minor (Toyota Tsusho Corporation (2015).

5.6.2 Political Risks

A recent study by Patey, L (2014), on potential political, social, and security risks in the oil and gas sector in Kenya, indicates that any business activity is inherently political. This is particularly relevant in a country such as Kenya where politics are so closely tied to business. As a result, the nascent oil industry will not be completely insulated from growing risks in a shifting political landscape. International Oil Companies have received ample support from both former and current governments in Kenya. With the current good will to the petroleum sector, the Kenyan government is likely not delay the start of oil production by slowing foreign investment with restrictive regulations. But the onset of production may very well coincide with political changes in Kenya, as the next general elections are scheduled for August 2017. The incumbent, or a potential new government, may put forward new policies for the oil industry, in an effort to leverage the government's financial position and to gain support from political constituencies, particularly in oil regions and those regions where related infrastructure development is expected.

With the 2010 constitution, and the establishment of a National Land Commission in 2012 and Community Land Act 2016, this may have consequences for oil governance in Kenya. It

is likely that there will be a multi-tier governance structure over the oil industry, as parliament will continue to have greater ratification powers over other bodies of government, according to the new constitution. Regulatory responsibility may be shared between national and county governments, as well as various constitutional commissions and existing and proposed government companies and agencies. This presents a complex political and regulatory landscape for investors to navigate, and may increase the cost of doing business and political risk. Disputes will continue to stall progress in the oil industry, until the different levels of government in cooperation with international oil companies and local communities develop formal mechanisms to settle these grievances.

Fearing a potential loss of negotiating power, local communities and county governments will also respond to the entry of new oil companies, and may make renewed demands that delay the industry from advancing forward. There is also regional political risk from un-demarcated international borders between Kenya and its neighbours. Somalia has already taken Kenya to the International Court of Justice in The Hague over maritime border claims of some offshore concessions. Such disputes may also arise onshore if oil exploration in Turkana County reaches the disputed Ilemi Triangle between Kenya, South Sudan, and Ethiopia.

5.6.3 Social risks and insecurity

The successful advancement of the 2010 constitution offers potential economic and social development boons and can help reverse high levels of inequality in Kenya. Such a process, however, offers challenges to the oil industry as communities in oil regions and their political representatives' grapple with the convergence of new economic resources and increased political power. But a failure by the Kenyan government to successfully implement political devolution could be even more damaging to the timely development of the oil industry. This outcome could see aggrieved counties contest oil resources with the national government and international oil companies. If the objectives of devolution in the new constitution are fulfilled and political power and economic resources shift from the centre to county level, particularly in restless peripheral regions such as Turkana, then conflicts over scarce resources can be mitigated. The process so far is positive and if the trend continues, the risks will be minimal in working in the remote oil fields in Turkana and other potential areas. And Kenya's relatively strong civil society, media, and a reformed judicial system can act to prevent these traits from developing, if mechanisms to settle political and social grievances are conceived and executed.

There has been widespread oil exploration over the past 60 years in Kenya. But to date commercial oil discoveries have only been found in Turkana County. Turkana is a large and remote region bordering Uganda, South Sudan, and Ethiopia. It is part of Kenya's arid and semi-arid lands (as are counties within the Anza, Mandera, and Lamu Basins) and it is also one of Kenya's poorest regions, where the vast majority live under the poverty line. The Turkana population, estimated at over 1 million with a density of two people per square kilometre, is largely pastoralist; the tending of livestock (cattle, sheep, and goats) providing both livelihood and identity. Development in Turkana has been slow before devolution through a new constitution in 2010. The county has insufficient infrastructure, skilled labour, and security, with a large flow of small arms through porous borders fuelled by conflicts in neighbouring countries. Working in such remote and underdeveloped regions is not uncommon in the international oil industry, but Turkana is nonetheless a difficult and expensive environment to operate in.

In Turkana, expectations are high that oil will bring fast-paced economic growth and development. Managing these expectations according to both the long timeframe for oil development and the limitations of what are still relatively small oil discoveries, is regarded as one of the main challenges facing the Kenyan government and international oil companies in relations with local communities. It will be important to create awareness that the oil and

gas industry cannot be the game changer in such remote areas but it can be a stimulus for development and livelihood development and diversification. This can also be improved through transparency on oil contracts, accountability and disclosure on environmental impacts assessment findings and recommendations. If the national government manages the oil industry in a relatively transparent manner, then the distribution, budgeting and expenditure of oil revenues may not create grievances among local populations.

Just as political tensions are present around oil at the national–local level, they also exist between local communities and their political representatives, together with wrangling among elected leaders. Inadequate capacity, in county governments and local communities, to assess the social and environmental impact of the oil industry, to negotiate business involvement, and to manage possible future revenues, creates concern that governance challenges in Kenya will simply be relocated from the national to the county level through political devolution. How the county level government will distribute its oil revenue share is critical where clan boundaries are not the same as sub-county boundaries. Local communities not in the sub-counties where oil is produced, but nonetheless affected by oil operations and infrastructure, may make strong demands for revenue shares. The risk cuts across all northern and north-eastern communities in the country. In a SESA consultative meeting with Mandera County elected leaders emphasized that this issues are urgent and must be sorted out by having county laws to handle the revenue sharing based on traditions, religion and sub-country and other community boundaries before revenues start flowing into the counties in future.

Even though still in the exploration and development phase, social grievances among the local population have constrained oil operations in Turkana, Marsabit, Baringo, Kerio Valley and some of the oil blocks. Some of the regions have witnessed demonstrations by hundreds of local residents over insufficient of employment and business opportunities. This has to do with local interpretation of international and 'Kenyan' understanding of 'local content'. Generally, consultations with upstream actors revealed that majority of Kenyans confuse 'local content' with 'opportunity sharing'.

Tullow Oil has occasionally responded to these grievances through Memorandums of Understanding (MoUs) that underline the company's commitment to using local staff, goods, and services, agreement on a formal grievance resolution procedure, commitment in its social investments programme and expansion of community resource and liaison officers in Lodwar, Lokori, and Lokichar. There are also acute concerns among local residents that their political representatives will exploit their positions to advance their own interests in collaboration with oil companies. This may lead to political conflicts in every election cycle of five (5) years in the Country.

Local content will be a critical political and social issue for oil operations in Kenya. The national government has been working to leverage Kenyan companies' activities and provision of goods and services in the oil industry. But local content cannot be easily separated from often-divisive politics in Kenya and close links between business and political interests. International oil companies will be hard pressed to navigate, at times, competing interests among the national government, county elected leaders and local communities. But as investment levels rise during the development phase, oil companies will be expected to increase their engagement with Kenyan companies, labour, and investments in local communities. Since there is a limit to engagement with local communities in Turkana, for example, due to insufficient of skills and capacity to work in the oil industry, tensions between the national and local level should be expected as other Kenyan companies and non-Turkana labour move in to fill the vacuum, until the Turkana people can play a deeper role in the oil industry through training.

Employment issues are hotly contested at the local level and have a history that predates oil. The Kenyan government and NGOs and international organizations have been the largest employers in Turkana, Coastal, North Eastern and other upstream oil potential areas to date, but nonlocal Kenyans hold the majority of the jobs. Albeit the insufficient the skills and education to participate, the uneven distribution of jobs has nonetheless created discontent among the local community youths. This has amplified recent hostility towards the oil industry regarding hiring practices. These negative experiences fuel mistrust towards current operators.

The struggle over scarce resources in Turkana is spilling over into oil. After the discovery of oil in Lockichar Basin, the Turkana and Pokot historical differences and conflicts threaten to serve as a new frontier of a traditional rivalry over cattle, water, and pastures. Due to these decades of conflicts, the government and IOCs should not downplay the level of conflicts. While it is expected that all of the upstream oil companies operating in Kenya are signatories to the Voluntary Principles on Security and Human Rights (a set of human rights guidelines for extractive industry companies) some capacity to deal with insecurity in a manner compatible with international best practice is required within the Kenyan security forces. The Kenyan government effort to formulate and fully implement the LAPPSET Corridor Security Master Plan may reduce this kind of risks to the oil and gas sector.

The demands for more benefits from the oil industry are not necessarily just a product of overblown expectations among local communities, they are also a result of witnessing the damage that oil development may cause. Local communities are not unaccustomed to dealing with oil companies. Oil exploration has gone on for some six decades across large areas of Kenya with some negative experiences for local communities. During the SESA study, some communities accused oil companies of interference with livestock routes, grazing areas and hazardous waste disposal. For example, leaders from Isiolo and Marsabit, Counties claim that waste dumped in abandoned oil wells is the source of increased incidences of cancer and other chronic ailments among humans and livestock. This issue demands the government intervention through specialised research to demystify or confirm the claims. If these social grievances go unaddressed then the operations of the oil industry will be delayed and limited in these areas.

Expectations of local communities focus on employment by the oil companies and their service contractors, supply of goods and services, flow of revenues to both the County and National government that will be used to finance public services, and social investment by companies. Tensions surrounding expectations have already led to protests by communities against the exploration companies, most notably against Tullow Oil in October 2013 that led to the overrun of the accommodation camp, destruction of property, and eventual work stoppage and evacuation of staff. Minor protests have also been experienced by other companies and in other sites such as Mandera and Garissa. For communities directly affected by exploration activity, social protests and blockades are some of the ways to express dissatisfaction and draw attention to their concerns. This has led to different views of the immediate and underlying causes of unrest and how they should be addressed, including in relation to security. For some, the government and companies have reached agreements on exploration without sufficient public involvement, particularly communities, and not done enough to manage expectations, create trust and demonstrate that demands and expectations seen as legitimate and reasonable will be addressed over time. For others, certain demonstrations have been politically motivated, coordinated by local political figures keen to bring attention to their campaigns or to generate revenues for their own means by being vocal. Though some unrest has been accompanied by violence and loss of or damage to property, some experts warn against exploration companies operating in Kenya viewing such acts primarily as security incidents. They argue that responses by the government and companies focused on the increased presence of security forces around the installations can lead to heightened tensions and prolonged conflict, though this is not necessarily the

approach that companies have always taken. Various sides have also proposed that companies should invest in genuine community engagement that will foster a better understanding of the complex interaction between the company, its staff and contractors and public security. Advocated is the need for companies to be mindful of diverse social pressures, including inter and intra-communal conflicts, and how these might exacerbate security and human rights issues. Meanwhile, many stakeholders argue that government at national and country levels ought to play a stronger role – both in ensuring and supporting community engagement based on meaningful dialogue, and in promoting the overall conditions required for the potential benefits of oil and gas activities for communities to be recognised and realised. Stepping up investment in local training and services, for example, could ease tensions and create a more sustainable basis for tackling security concerns (Institute for Human Rights and Business, website (2015): https://www.ihrb.org/)

5.6.4 Conclusion

As per the discussion in this chapter, key socio-economic information and impacts relating PPPs of the petroleum sector have been captured, some of them include; the Impact on livestock production and pastoralism traditional systems; Population migrations/ influx management in oil exploration areas and health issues; Preservation of historical, cultural resources and heritage sites; Public participation process and consent from community; Gender and Equity; Governance and Conflict Management. Gaps within the existing PPPs have been adequately addressed. Recommendations to address concerns discussed have been outlined in the last chapter of this report.

6.0 OCCUPATIONAL SAFETY AND HEALTH IN OIL AND GAS OPERATIONS

6.1 Introduction

The following chapter broadly presents the Occupational Safety and Health (OSH) concerns in the oil and gas operations in the country. It also incorporates concerns of the petroleum sector based on consultations with stakeholders, field case studies and relevant literature available. Local statutes, regulations and standards currently in place supplemented with international standards applicable to the oil and gas industry are discussed herein. Health and safety issues are critical for oil and gas operations not only due to the inherent safety risk but also due to the sheer isolation involved in most oil and gas operations. With the sector currently making an entry in Kenya, it is of critical importance to gauge where the sector currently stands in regards to health and safety and what potential impacts or risks the sector will face in future. The role of management of safety and health in the oil and gas sector occupies a systematically integrated and well-structured approach. Needless to say, the development of the Upstream and Midstream sectors of the petroleum sector in Kenya will present significant new challenges in the management of Occupational Safety and Health to the implementing agency, the Directorate of Occupational Safety and Health Services (DOSHS), under the Ministry of Labour and East African Affairs. The downstream petroleum sector, which has been in existence for a long time, has been treated more or less like any other workplace as there are currently no industry specific laws and policies that address petroleum safety issues in this sector.

6.2 Heath Concerns in the Oil and Gas Sector

Basic health areas of concern highlighted by the Ministry of Health and local communities in the exploration areas in Turkana, Isiolo, Marsabit and Mandera include but not limited to respiratory infections, vector-related diseases, Sexually Transmitted Infections (STIs), soil and water borne diseases, food and nutrition-related issues, accidents and injuries, exposure to potentially hazardous materials, psychosocial, impact on cultural health practices, health systems infrastructure and capacity (including, but not exclusive to: physical infrastructure; staffing levels and technical capabilities of health care facilities at local, district and provincial levels). The notable concern was how hazardous wastes are disposed around exploration oil wells.

This calls for policy makers to consider entrenchment of Health Impact Assessment (HIA) in the EIA process in the country. HIA is a means of assessing the health impacts of policies, plans, programmes and projects in diverse economic sectors using quantitative, qualitative and participatory techniques. HIA helps decision-makers make choices about alternatives and improvements to prevent disease/injury and to actively promote health, which is one of the goals of sustainable development. The World Health Organisation (WHO) supports tools and initiatives in HIA to dynamically improve health and well being across sectors. A well-executed HIA can prevent new projects delays by anticipating, soliciting and appropriately incorporating stakeholder concerns and suggestions into the overall project design. Similarly, existing operations can also benefit by the timely assessment and evaluation of a broad range of impacts. One of the key benefits of the HIA

process for stakeholders is the awareness that health is a relevant and significant cross-cutting issue.

6.3 Private Sector Initiatives to Improve OHS of the Sector

The Petroleum Institute of East Africa (PIEA), launched on 8th July 1999, is one of the private sector active and effective initiatives that provides a forum as a focal point for interaction between all interested parties in the Oil and Gas Industry. It is a non-profit organization registered as a Limited Liability Company with over 70 members of different categories. The PIEA's mission is to provide a forum for expertise and excellence in the oil industry in the East African region with the aim of promoting professionalism and free enterprise in petroleum business supported by the highest business and operating standards, adherence to Environment, Health and Safety ideals. One of its core functions is to lobby for the enactment of comprehensive guidelines necessary for the advancement and safety for the Petroleum Industry.

Another positive sector development initiative is the establishment of the School of Petroleum Studies which was incorporated in 2007 as a wholly owned subsidiary of Petroleum Institute of East Africa (PIEA) with the prime objective of offering specialized training with a curriculum focused on downstream, midstream and upstream oil and gas. It has an international certification as a Training Provider by the Energy Institute, the global membership body for the energy industry. It offers courses tailored for the petroleum sector which include financial, management and operations of oil and gas facilities, Information Technology, policy and law, EHS, quality standards, human resource management, transportation, marketing and international trade.

During the SEA scoping consultations, it was a suggested that PIEA should be the key body with capacity to command countrywide response to petroleum emergencies. PIEA should have both the manpower and equipment capacity to respond to emergencies relating to the petroleum industry.

6.4 Development of Petroleum Transportation Safety System

(i) **Ports**

In Kenya, transportation of petroleum and derived products is mainly done via the road network or the pipeline. Importation and exportation of petroleum products is done through the Port of Mombasa, which is under the jurisdiction of the Kenya Ports Authority and Kenya Maritime Authority. Health and safety risks posed at the port include: oil spills, which then increase fire risks; exposure to noise from machinery, and mobile equipment operating on the dock and in ships' holds; slips, trips and fall of persons from heights; collisions, allisions and groundings: A barge or tanker ship hull containing crude oil can suffer severe structural damage and spill cargo as the result of a collision with another ship, an allision with a fixed structure such as a seawall, pier or bridge, or a grounding.

(ii) **Pipelines**

The Kenya Pipeline Company (KPC) provides product movement infrastructure including storage and oil pipeline services. The proximity of pipelines to groundwater sources can cause serious contamination that may have a detrimental impact on communities. Depending on the products being transported, in the event of a spill,

diluents may evaporate rapidly in the air and can lead to high airborne levels of toxic components. This impacts the health and safety of the emergency responders as well as the surrounding communities

Other Risks associated with pipelines that may have an impact on health and safety include:

- Declining quality of pipeline performance due to material deterioration cracks from corrosion, erosion and defective welding.
- Accidents may result from undetected failures due to insufficient or delayed monitoring.
- The existing regulatory framework has yet to require improved monitoring standards more efficient external sensors would improve the performance of current sensors therefore ensuring proper detection of oil spills
- Existing and proposed pipelines run through diverse ecological areas that may be home to endangered species and are sensitive to environmental degradation. Spill response planning resources ought to be developed

(iii) **Rail**

Apart from air contamination that may arise from a spill, causing respiratory damage to residents in surrounding communities, the biggest threat to human life comes from the potential for a fire or explosion.

(iv) **Roads**

The Energy (Licensing of Petroleum Road Transportation Business) Regulations, 2013 administered by ERC, provide for licencing of all petroleum products by road. The regulations provides for licensees to report accidents or incidents involving the transportation of petroleum which causes loss of life, personal injury, explosion, oil spill, fire or any other incident or accident causing significant harm or damage to the environment or property. The petroleum department under the Principal Secretary for Petroleum is tasked with taking the lead in the formulation, review and enforcement of rules, regulations and codes for the petroleum sector and identifying gaps in EHS and developing interventions to address the gaps to ensure that the ERC EHS department clearly understands standards and rules that it is expected to regulate. This includes the review and enhancement of existing standards amongst other responsibilities.

Tanker trucks provide flexibility, linking extraction sites and refineries to pipelines and rail terminals. In Kenya, trucks are primarily used for long distance transportation of oil. Risks associated with long distance haulage of oil include:

- En route collision: As compared to other modes of transport, tanker trucks operate in close proximity to the general public and share the same infrastructure (i.e., highways, roads, neighborhoods). Trucks can also operate in densely populated areas. This increases the risk of accidents, including collisions and accidents at crossings. Collisions may involve multiple vehicles and can occur at high speeds, which may increase the risk of fire and explosion
- Inadequate Infrastructure: Since trucks are often used to transport oil to and from fuel deposit facilities and pipelines, poorly maintained and monitored infrastructure at delivery points and fuel loading terminals could contribute to accidents, including fire and explosion

- Truck Design: Tanker trucks are typically loaded through bottom lines, which do not drain completely into the tank because they are at the lowest point on the container. The structurally fragile bottom lines can contain more than 180 litres of the oil, referred to as 'wetlines,' and may contribute to an event leading to fire and explosion

Kenya has experienced several road accidents involving petrol tankers that have led to loss of many lives in the past three decades. Following the collapse of the National Road Safety Council in the mid-eighties, there has been very little formal co-ordination between various ministries, agencies and the private sector involved in road safety. The participation of private sector and civil society organizations has been limited due to an unclear legal framework for their effective involvement and partnership with the government. Through the support of the Ministry of Transport and Supported by the GoK/SIDA Roads 2000 Project, the Government of Kenya published a draft National Road Safety Action Plan of 2005-2010. As a follow-up on this Action Plan, the National Transport and Safety Authority (NTSA) was established through an Act of Parliament; Act Number 33 on 26th October 2012. The objective of forming the Authority was to harmonize the operations of the key road transport departments and help in effectively managing the road transport sub-sector and minimizing loss of lives through road accidents. NTSA currently co-ordinates all activities of persons and organisations dealing in matters relating to road safety including prevention programme s to reduce accidents related with petrol tankers. There is also a major safety risk posed by transportation of petroleum products through Congested Streets in Major Towns (e.g. Eldoret, Nakuru, etc.) (see Plate 28 below). Construction of bypasses in all major towns would serve to diversion of these trucks away from the congested town centres.

Plate 28: Health and Safety Challenges of the Downstream Petroleum Sector

Road crashes are a major public safety problem that imposes a range of socio-economic burdens that may affect sustainable development of countries and also the achievement of Sustainable Development Goals especially in Africa and other developing countries. In responding to this global epidemic, the UN declared 2011-2020 as the UN *Decade of Action for Road Safety*. In January 2010, TOTAL, a global Oil and Gas Company, and the World Bank entered into a partnership to use their combined knowledge and experience in Africa to improve the safety in roads. The two partners through technical support of UN-WHO launched the *Africa Road Safety Corridor Initiative* (ARSCI) on 27 April 2011 in Malaba town on the Kenya / Uganda border. An NGO, *Safe Way Right Way*, was subsequently established to mobilise private sector and implement ARSCI project goals.

The purpose of Safe Way Right Way is to mobilise private sector firms and other actors in promoting road safety on the Northern Transport Corridors in tandem with World Health Organisation's Safe System Approach and is based on self-regulation road safety. The Northern Corridor that links the port city of Mombasa with Nairobi, Kampala, Kigali and Bujumbura is the primary access for part of Central African Republic, Eastern Democratic republic of Congo, Sudan and Southern Ethiopia. Safe Way Right Way has managed to bring together expertise and best practices from a range of partners representing diverse sectors, which have a singular objective of contributing towards the reduction in the number of road crashes on the corridors. The NGO operates on five (5) pillars: *Road Safety Management, Safer Roads and Mobility, Safer Vehicles, Safer Road Users,* and finally *Post Crash Response.* Some petroleum companies, especially those with road-based distribution vehicles in the downstream, are supporting this initiative to reduce the oil and gas tanker accidents in the Country. Some of the achievements are Black Spot Mapping in the whole country, capacity building of drivers and young generation / school children on road safety issues as a long term sustainability strategy.

The private petroleum sector actors have further established highway safety programme s to reduce the impact and losses on road accidents involving petrol tankers. The Petroleum Institute of East Africa has developed the Highway Emergency Response Plan (HERP) and the Petroleum Drivers Handbook to make up the Petroleum Road Transportation Safety Systems. PIEA has also been undertaking capacity building in the petroleum sector to ensure road safety in the East African region. These initiatives need to be mainstreamed to the National Government disaster response system for efficiency and effectiveness. It also requires technical and financial support from the National Government through the National Transport and Safety Authority (NTSA).

ERC has also developed the Energy (Licensing of Petroleum Road Transportation Business) Regulations, 2013, which provides for licensing of petroleum tankers and certification of drivers. ERC has further developed EHS Best Practices for Road Transport, which now needs harmonization and a collaboration framework between ERC and NTSA. However, there lacks comprehensive and regular environmental, health and safety audits of all major urban roads and highways in terms of compliance to laws, limited signage and other road safety infrastructure and low level of public awareness on risk of transportation of petroleum products. The transportation of oil products in Lake Victoria and the Indian Ocean may also not be compliant to the standards and HSE laws.

Road Safety starts from the design stage; it's not only the petroleum transportation vehicles that are victims of failure to incorporate safety concerns into the design of road projects. Road agencies should incorporate the Multi-criteria analysis principle of road design which provides that regardless of the economic benefits that come with developing road infrastructure, safety always comes first and ranks highest. The road can only be appreciated if the target beneficiaries live to use the road. It is therefore crucial that safety concerns are incorporated into the design of all road projects.

6.5 Industry-Specific Negative Impacts

Operations associated with oil and gas exploration and production can lead to physical disturbance, damage, alteration or contamination of natural ecosystems, degraded soil and subsoil quality, impacts to surface and groundwater quality and quantity with potential

consequent effects on vegetation, fauna, aquatic resources and human health. Significant social effects may also impact the cultural identity of local communities. Oil and gas operations may also escalate the pressure on the marine and coastal environment, which is already under stress by an intensive commercial fishery. If not properly managed, the oil and gas operations and associated emissions and pollutant discharges to the marine environment can pose a threat to the short and long term sustainability of local marine and coastal ecosystems. The need to address these operational effects will only intensify over time, so preventive measures are needed now as a cost-effective solution.

Unclear legislation governing offshore oil and gas development may result in potential conflicts with both small scale and commercial fisheries that can be both directly and indirectly affected.

Occupational safety and health concerns of the petroleum industry can only be divided into two; mainly Onshore and Offshore.

6.8.1 Onshore Occupational Safety and Health Concerns of the Petroleum Sector

(i) Air Emissions

The main sources of air emissions (continuous or non-continuous) resulting from oil and gas operations include: combustion sources from power and heat generation, and the use of compressors, pumps, and reciprocating engines (boilers, turbines, and other engines); emissions resulting from flaring and venting of hydrocarbons; and fugitive emissions. Principal pollutants from these sources include nitrogen oxides (NO_X), sulfur oxides (SO_X), carbon monoxide (CO), and particulates. Additional pollutants can include: hydrogen sulfide (H2S); volatile organic compounds (VOC), methane and ethane; benzene, ethyl benzene, toluene, and xylenes (BTEX); glycols; and polycyclic aromatic hydrocarbons (PAHs).

All reasonable attempts should be made to maximize energy efficiency and design facilities to minimize energy use. The overall objective should be to reduce air emissions and evaluate cost-effective options for reducing emissions that are technically feasible.In Kenya, there is no industry specific regulation governing air emissions however the Environmental Management and Co-ordination (Air Quality) Regulations, 2009 is applicable. Among the provisions in the regulations include: general prohibitions, permissible levels, controlled areas, stationary sources, mobile sources, occupational air quality limits, licensing, methods of measurement, analysis & laboratories, inspection and monitoring and reporting.

It is worth noting some of the standards that exist and are covered in the law in relation to siting of oil and gas facilities including:

1. KS 25006 (Kenya standards 25006) which defines safety distances to residential areas, and buildings near petroleum stations (see Photo 29)
2. KS 1938 of 2012 The handling, storage and distribution of liquefied petroleum gas in domestic, commercial and industrial installations, which spells out the safe distance however the same lack for petroleum stations.

Plate 29: A Sectional View of the KPC Facility in Industrial Area, Nairobi in close Proximity of Human Dwellings in the Neighborhood

(ii) Waste Water Management

Oil and gas facilities for instance reservoirs contain water (formation water) that is produced when brought to the surface during hydrocarbon production. The produced water stream can be one of the largest waste products, by volume, managed and disposed of by the onshore oil and gas industry. Produced water contains a complex mixture of inorganic (dissolved salts, trace metals, suspended particles) and organic (dispersed and dissolved hydrocarbons, organic acids) compounds, and in many cases, residual chemical additives (e.g. scale and corrosion inhibitors) that are added into the hydrocarbon production process.

Feasible alternatives for the management and disposal of produced water should be evaluated and integrated into production design. The main disposal alternatives may include injection into the reservoir to enhance oil recovery, and injection into a dedicated disposal well drilled to a suitable receiving subsurface geological formation. Other possible uses such as irrigation, dust control, or use by other industry, may be worth considering if the chemical nature of the produced water is compatible with these options. Produced water discharges to surface waters or to land should be the last option considered and only if there is no other option available.

Aside from process water, other wastewaters routinely generated at any given oil and gas facilities apart from formation water include black water, grey water, surface run-off, tank bottom water, fire water, equipment and vehicle wash water and general oily water. Pollution prevention should be addressed with appropriate post treatment systems before final disposal, that allow water treatment technologies to meet water quality standards. An oil – water interceptor is requisite in any given downstream facility in an effort to mitigate effect on the receiving environment.

The third schedule of the Environmental Management and Coordination (Water quality)

regulations 2006, provides standards for effluent discharge into the environment whereas the fourth schedule provides a monitoring guide for discharge to the environment, the parameters listed in this guide need to be revised to include contaminants anticipated in produced water from upstream activities. Alternatively Produced water guidelines for upstream activities, both onshore and offshore should be developed incorporating the Zero-Harmful Discharge principle or using the risk based approach. The guidelines should offer specifics for handling and discharge of water from: Conventional oil and gas fields; Aging oil fields; Flow back and produced water from shale gas fracturing; Reservoir over-pressurization; Tailings water etc. The sixth schedule of the Water Quality regulations 2006, provide monitoring guidelines for discharge of treated effluent into the environment and the seventh schedule has provisions for application for an Effluent Discharge Licence (EDL) for any facility disposing off wastewater to the environment that contains traces of petroleum products.

The Water act 2002 (Part Iv-Water Supply and Sewerage) address the measures to be put in place to deal with waste water produced from any source.

(iii) Waste Management

Typical non-hazardous and hazardous wastes routinely generated at any given oil and gas facilities other than permitted effluents and emissions include general office and packaging wastes, waste oils, paraffin, waxes, oil contaminated rags, hydraulic fluids, used batteries, empty paint cans, waste chemicals and used chemical containers, used filters, fluorescent tubes, scrap metals, and medical waste, among others.

Waste materials should be segregated into non-hazardous and hazardous wastes for consideration for re-use, recycling, or disposal. The fourth schedule of the Waste Management Regulations 2006 lists all wastes considered to be hazardous. Waste management planning should establish a clear strategy for wastes that will be generated including options for waste elimination, reduction or recycling or treatment and disposal, before any wastes are generated. A waste management plan documenting the waste strategy, storage (including facilities and locations) and handling procedures should be developed and should include a clear waste tracking mechanism to track waste consignments from the originating location to the final waste treatment and disposal location.

The waste management regulations 2006 clearly outlines the methods proposed for disposing: Non-hazardous waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical wastes and radioactive substances. Any waste handler must be duly registered as per the type of waste being collected. A licence must also be obtained for establishing and managing any disposal site.

In Kenya, oil field waste is transported by road to a centralized waste disposal facility located in Stony Athi, Machakos County. This poses a challenge in terms of transportation of the waste oil from areas located far from the facility.

(iv) Downstream Fuel Adulteration

This is the introduction of illegal or unauthorized foreign substance into gasoline or similar substance as shown in Plate 30. The foreign substances are also called adulterants, which when introduced alter and degrade the quality of the base transport fuels. Gasoline is a major transport fuel in Kenya. Adulteration of the fuel at the point of sale and during transportation has become an acute problem in the country. Transport fuels (gasoline and diesel) are often adulterated with other cheaper products or by-product or waste hydrocarbon stream for monetary gains. For example, gasoline is widely adulterated with kerosene. With large number of adulterants available in the market, both indigenous and imported, the magnitude of the problem of fuel adulterations has grown into alarming proportions in the past few years. There are insufficient monitoring frequency and enforcement of standards by the ERC.

Plate 30: Fuel Adulteration Centres in the Downstream Sector

(v) Inadequate Facilities for Gas Quality Testing

There is a concern on the gas testing facilities as well as maintenance of standards due to the numerous players emerging in the sector. ERC suggests licencing of gas testing facilities, which are growing in number within the country and enactment of policies governing testing conflict between ERC and KEBS.

(vi) Noise Pollution

Oil and gas development activities can generate noise during all phases of development including during seismic surveys, construction activities, drilling and production, aerial surveys and air or road transportation. During operations, the main sources of noise and vibration pollution are likely to emanate from flaring and rotating equipment. Noise sources include flares and vents, pumps, compressors, generators, and heaters.

Several measures to prevent and minimize noise are in place as presented in the national

legislation for excessive noise and vibration control. The two main legislations governing the noise prevention and control are:

- The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 and,
- The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005.

The above two legislation provides for; permissible noise levels, noise prevention programme , applicable engineering controls to reduce noise limits, hearing protection, licensing, offenses and penalties.

There also exists a General IFC Environmental, Health, and Safety general EHS guideline for noise management applicable to oil and gas industry.

(vii) Terrestrial Impacts and Project Footprint

Project footprints resulting from exploration and construction activities may include seismic tracks, well pads, temporary facilities, such as workforce base camps, material (pipe) storage yards, workshops, access roads, airstrips and helipads, equipment staging areas, and construction material extraction sites (including borrow pits and quarries)

Operational footprints may include well pads, permanent processing treatment, transmission and storage facilities, pipeline right-of-way corridors, access roads, ancillary facilities, communication facilities (e.g. antennas), and power generation and transmission lines. Impacts may include loss of, or damage to, terrestrial habitat, creation of barriers to wildlife movement, soil erosion, and disturbance to water bodies including possible sedimentation, the establishment of non-native invasive plant species and visual disturbance. The extent of the disturbance will depend on the activity along with the location and characteristics of the existing vegetation, topographic features and waterways.

(viii) Accidental Spills

Spills from onshore and offshore facilities, including pipelines, can occur due to leaks, equipment failure, accidents, and human error or as a result of third party interference (see Plate 31).

A report published by the East African, expressed that Kenya is in danger of oil spill disasters from single hull ships that call at Mombasa port with large quantities of oil cargo. (The East African, August 2005). This was in view of the limited capacity Kenya has in dealing with maritime disasters of such scales. Past spillages have been of smaller quantities but have proven quite a challenge to manage. A tanker carrying 20,000 litres of fuel capsized at the Kenya Ports Authority in Mombasa and spilled oil on a road, making it impassable. Port workers made frantic efforts with technical difficulties to stop the oil from flowing into the ocean (Standard Digital 2013). With the emerging oil and gas exploration activities coming up, there is no ready measures to match the capacity of anticipated disasters from potential incidences should industrial spillage or any form of high end disaster occur. The National Policy for Disaster Management in Kenya (2009) has quoted some of the Disaster Occurrences in Kenya between 1974- 2009, and in the list of about 85 major Incidences, no oil and gas related incidents were quoted. Considering the growing rush for the upstream

resources within, oil and gas related incidences require adequate consideration and planning. The national disaster response mechanism quoted in the policy takes a long channel of command before a disaster is declared for emergency attention, and has given a maximum of 14 days limit for declaration of a disaster from the moment of impact. In the oil and gas sector, this channel requires special consideration with capacity built instruments of response set up closer to the operation areas. Lokichar and Lodwar being the closest towns to the exploration areas have inadequate industry capacity disaster response facilities to contain such emergencies. Coordination between the national Government and the County Government requires adequate coordination mechanisms to enhance efficiency in control of oil and gas related emergencies.

Plate 31: A tanker involved in an accident leading to accidental spillage and dangers exposed to local community members

Communities are predisposed to disasters by a combination of factors such as poverty, aridity, settlement in areas with poor infrastructure and services such as informal urban settlements or even living in poorly constructed buildings. The country has experienced several downstream accidents and massive loss of lives both in urban and rural areas due to spillage from oil product pipelines and petrol tanker accidents. For example in January 2009, an oil spill ignition occurred near Molo, along the Nakuru-Kericho Highway and resulted in the death of at least 113 people and more than 200 critical injuries. Kenya's capacity to respond to emergencies and incidences is inadequate. However, OMC's through PIEA and the Oil Spill Mutual Aid Group (OSMAG) have equipment to handle mainly downstream oil spills and fire emergencies.

Case Studies:

Recent global incidents in the petroleum sector that include the Trans-Israel Pipeline oil spill in December 2014, the North Dakota train collision in 2014, the Lac-Mégantic rail disaster in July 2013, the Little Buffalo oil spill in April 2011, the Deep Water Horizon drilling rig spill in the Gulf of Mexico in 2010, the Californian San Bruno pipeline explosion in 2010, the Pemex pipeline explosion in 2012, refinery fires and shutdowns such as the ones at BP Cherry Point, Chevron Richmond, and Amuay in Venezuela in 2012 — are strong reminders of the importance of emergency preparedness and are constantly influencing the activity of national and international regulators.

In Kenya, several oil spill accidents and incidences have been recorded for instance an oil tanker which was involved in an accident in Molo – Sachang'wan area and an accidental release of unleaded petrol at the KPC petroleum deposit facility in Industrial

Area. Another Incident was in May 2015 when an accidental leakage occurred on Kenya Pipeline Company's Mombasa-Nairobi oil pipeline in Thange area, Kibwezi, Makueni County resulting in oil products seeping into River Thange and the adjacent areas.

Investigations conducted for the above accidents were attributed to poor/inadequate planning and miscommunication in transportation of the petroleum products both in rail and road transporting highly flammable petroleum products. In sufficient and inefficient early leak detection in pipeline transportation spills which leads to catastrophic events. Civic education on dangers of petroleum product are inadequateas members of the public/locals are always tempted to collect fuel after an accident despite the dangers.

Risk assessment and hazardous substance transportation planning prior to transportation of petroleum products ought to be implemented by the respective companies. As a result, this will minimize the incidences of the oil spills and accidents leading to loss of properties, lives and pollution to the environment. Continuous training ensures that the workers are put abreast to the safety aspects involved in the sector.

Laser diagnostic spill leakage technologies ought to be introduced to detect any leakages in pipeline transportation to ensure accidental spills are detected and supply cut to minimize the amount of accidental spills.

(ix) Encroachment of the Way Leave

The Increase in Kenya's Population has led to a shortage of cheap housing and contributed to overcrowding and mushrooming of slums. Due to inadequate housing, high unemployment rates and the ever-increasing rents, informal settlements have mushroomed to an extent that is not manageable. Most of them are located along railway lines, road reserves, adjacent to pipelines etc. It is the government's responsibility to ensure the safety and wellbeing of its citizens, by preventing encroachment of the way leaves. A strategic plan should be put in place to tackle this element of safety, starting with evictions from high risk areas, providing safer alternatives as the government works towards sustainable settlement solutions. The government should also invest in monitoring and enforcement of way leaves encroachment through financing and establishment of an authority that specifically addresses infrastructural way leaves.

(x) Safety Training and Education

Inadequate knowledge on safe working procedures can be catastrophic. The oil and gas industry needs employees who are competent. They should be well acquainted of permissible limits to industrial processes they undertake and when emergency response actions relating to the process should begin. Machine/Plant operators should undergo orientation examinations, with emphasis on the safety of operations as well as the respective emergency response procedures. Equipping staff with Occupational Safety and Health knowledge will enhance plant safety and capacity to prevent and respond to safety and health incidences.

There is a need to introduce and encourage civic education through media to inform the public on the dangers associated with highly flammable materials. Secondary repercussions of oil spills have been loss of human lives and properties through the associated fires. When

the public at large is well informed about the dangers associated with highly flammable materials, they will refrain from rushing to oil spill areas.

(xi) Fire Safety

Several oil and gas fire related incidences have been reported country wide for years. The remarkable incidence was the Sachangwan Oil Tanker Explosion in Molo that claimed the lives of more than 140 people and left at least 238 others injured (International Federation of Red Cross and Red Crescent Societies DREF Operation Final Report).

The fire legislation in Kenya is provided by the Factories and other places of Work (Fire Risk Reduction) Rules, 2007 and the Occupational Health and Safety Act 2007. The legislation covers all types of fire from different sources including electric, chemical and highly flammable materials among other normal combustible materials. Among the provisions in the Fire Risk Reductions include

(xii) Community Health and Safety

Activities such as drilling and construction, pipeline installation, seismic operations, and decommissioning may result in temporary impacts to other users within the area of operation. Impacts from downstream operations may also affect the nearby communities if proper measures are not put in place.

(xiii) Confined Spaces Hazards

Accumulation of natural gas in a confined space is a potentially fatal condition. Specific and unique areas for confined space entry may include excavation trenches during construction and regulating stations and vaults, both above and below ground, which may also contain equipment (e.g. safety valves, filters) that may emit fugitive emissions of gas and create a potential for oxygen deficient and explosive atmospheres.

(xiv) Severe Weather Facility Shutdown and Emergency Response Plans

In the event of extreme weather phenomenon such as el-nino, la-nina, hurricanes, heat strokes, sand storms and flash floods. Mitigation measures should be in place specific to the location of the petroleum facilities and oil fields. Pollution control, disaster mitigation and prevention measures for the aforementioned weather phenomenon should be provided.

Facility structures should be designed and constructed to withstand the expected weather conditions for the region and have an area designated for safe refuge, if appropriate. Standard Operating Procedures (SOPs) should be developed for project or process shut-down, including an evacuation plan. Drills to practice the procedure and plan should also be undertaken. Both onshore and offshore oil and gas industries need to have emergency response plans in place with respect to the different severe weather conditions.

(xv) Security

Access to oil and gas facilities by unauthorized parties should be avoided by means of gates. Means for detecting intrusion (for example, closed-circuit television) may be considered, allowing the control

room to verify the conditions of the facility. Additional active and passive security measures should be defined on the basis of a site-specific risk assessment.

(xvi) Machinery/Equipment Examination, Safety and Guarding

Part VII of the Occupational Safety and Health Act, 2007 provides for machinery safety in various sectors however it doesn't include all machinery utilized on the oil and gas upstream sector, it is recommended that this section of OSHA 2007, be revised to include safety guidelines for key machinery and equipment in the sector.

6.8.2 Offshore Occupational Safety and Health Concerns of the Oil and Gas Industry

Offshore oil and gas exploration and development involves a network of ships, offshore oil and gas exploration installations, offshore storage platforms and structures and people working in these platforms. These structures and platforms are meant to co-exist with the multiple use of the ocean involving marine parks, shipping lanes and routes, fishing routes, recreational activities among others. These activities will compound the rise to health, safety and security concerns such as increased chances of collisions between tankers, fishing vessels and offshore platforms.. Incidents in the offshore oil and gas industry could negatively affect the sustainable development of offshore oil and gas sector in the country. The Kenya Maritime Authority has been responsible for ensuring that the maritime fraternity has access to marine safety and security support services in the form of aids to navigation, responding to distress via a safety radio system, marine search and rescue, monitoring of pollution caused by ships, effective national oil-spill response, and ensuring ship and port security. Some of the offshore Occupational Safety and Health issues addressed by the authority relating to the Offshore Oil and Gas Industries are described hereunder.

(i) Oil Spills Response and Management

Offshore oil and gas development will increase the threats to oil pollution incidences as a result of the production process, offshore storage facilities, pipelines and increased tanker traffic for transportation of the products. This will necessitate a national and regional response framework under the International Convention on Oil Pollution Preparedness (OPRC, 1990) Backed By A National Law. The Shipping Operations (Marine Pollution) Bill, 2013, provides a comprehensive legislative framework for the Prevention, Preparedness and Response for Oil Spills, and compensation and liability arising from oil pollution damage. The National Oil Spill Response Contingency Plan gives a general guideline on the actions to be taken in the event an oil spill occurs. It will be necessary to acquire appropriate equipment and logistical support for marine oil spill response in Kenyan waters based on comprehensive risk assessments.

(ii) Maritime Safety and Security

The development of offshore oil and gas exploration and exploitation activities coupled with increasing maritime traffic could result in increased maritime user intensity in some areas. This would increase the likelihood of safety incidents such as collisions, oil spills, human errors, technological malfunctions, and natural hazards, cyber-attacks, increased likelihood of crimes committed at sea, issues such as piracy/armed robbery and increased likelihood of unauthorized activities in close proximity to installations (e.g. fishing within safety zones); presenting safety and security risks. Exploration and exploitation of oil and gas resources

conducted in protected areas particularly offshore like marine parks might have detrimental impacts on these ecosystems.

(iii) Navigation Safety and Aids to Navigation

Oil and gas exploration and development will result in increased shipping, fishing, tourism and other sea surface, water column and sea-bed exploitative activities in and around areas where oil and gas activity is also occurring giving rise to additional maritime safety responsibilities and increasing the risk of accidents and incidents. Kenya Maritime Authority is mandated by legislation to provide, approve or supervise the provision of aids to navigation in Kenyan waters in order to facilitate safe and effective movement of maritime traffic. This role is implemented in conjunction with the Kenya Ports Authority. All the offshore oil and gas terminals and installations will require aids to Navigation. Ship collision usually occurs when ships are not equipped with navigational aids that meet national and international requirements. Navigational aids include radar and lights on facility structures and, where appropriate and on support vessels.

(iv) Search and Rescue

The performance of distress monitoring, communication, coordination, and search and rescue functions, including evacuation is critical in the development of offshore oil and gas sector. Kenya Maritime Authority has established the Regional Maritime Rescue Coordination Centre (RMRCC) that covers search and rescue regions of Kenya, Tanzania, Seychelles and Somalia. It is acknowledged that SAR has a large marine element as well as from aviation and therefore the need for these two agencies to collaborate and coordinate in matters search and rescue. It is expected that the development of offshore oil and gas will lead to increased accidents and incidents that will require the services of Salvage, Search and Rescue.

(v) Capacity Building

The oil and gas sector in Kenya is at its infant stage and therefore important skills and knowledge to manage the challenges it may present may be lacking. Officers of all relevant key agencies including but not limited to KMA, KPA, NEMA, DOSH, ERC, KPC ought to be equipped with the necessary skills to manage offshore oil and gas development including standard setting, regulatory aspects, security and safety aspects and oil spills management.

The following set of capacity building areas will be useful:

- General course in Offshore Oil and Gas Operations;
- Bunkering operations and Management;
- Oil, Gas and Petrochemicals Shipping;
- Maritime Auditing;
- Search and Rescue;
- Offshore Installations, Port and Terminals Security;
- Ship Safety and Security;
- Marine Insurance;
- Oil Spill Management and Response;
- Marine Ecosystems Sensitivity Mapping;
- Offshore Oil and Gas Sector Waste Management;
- Maritime Safety and Security;
- Navigation Safety;
- Maritime Safety and Environmental Administration;

- Oil Pollution Damage Assessment;
- Maritime Education and Training;
- Spills, Accidents, Contingency and Risk Management;
- Marine Spatial Planning and Management;
- Marine Pollution Prevention and Management;
- Environmental Health and Safety Regulations, Compliance and Enforcement Skills

(vi) **Well blowouts**

A blowout (i.e., loss of well control) can be caused by the uncontrolled flow of reservoir fluids into the wellbore and may result in an uncontrolled release of formation fluids and gases into the environment. Blowout can occur during drilling and work-over phases (where it is of particular concern) or during production phases.

(vii) **Personnel transfer and vessels**

Personnel transfer to and from offshore facilities typically occurs by boat and helicopters. Safety procedures for these vessels during transport of personnel are required. Passengers should systematically receive a safety briefing and safety equipment as part of helicopter or vessel transport.

Additional occupational health and safety issues in oil and gas operations include the following:

(i) Financing

The financing of occupational safety and health services has largely been from the Government budgetary allocations, which have proven inadequate. With the enactment of the Occupational Safety and Health Act (OSHA), 2007 more responsibilities were added to Directorate of Occupational Safety and Health Services (DOSHS) without additional financial allocation. The responsibilities include research, training, awareness creation, advisory services to stakeholders, development of codes of practice and guidelines, provision of outreach services to the community at large and other OSH promotional activities.

The government has however established an Occupational Safety and Health Fund into which occupiers of workplaces will make contributions to enhance OSH awareness activities.

(ii) Information and Advisory Services on OSH

There is no reliable system of collecting, compiling and notifying of occupational accidents and diseases hence limited occupational safety and health information to enable necessary intervention. The country very has little comprehensive and synchronized research strategies to provide information and solutions on OSH problems.

6.8.2.1. National Legislation Gaps in Oil and Gas Operations

With the discovery in the oil and gas sector, laws should be in place to clearly spell out the governance of the resources. Some of these laws are not yet drafted. Moreover, the existing legal and regulatory framework has not been aligned to the Constitution. The country faces numerous challenges in the delivery of occupational safety and health services. Key among these are; Inadequate legal and institutional framework for streamlining service delivery and inadequate financial and human resource capacity to implement programme s. Others are low levels of awareness on occupational safety and health issues due to inadequate public

participation, inefficient safety and health culture, inadequate data management systems and, inadequate coverage of the informal sector, duplication of roles and conflicting laws for instance between NEMA and DOSHS. These challenges can impact negatively on the country's development. The draft National Energy Policy 2014 provides a framework to effectively address these pertinent issues and guidelines for implementing related programme s.

The draft policy points out that there is no framework for devolution of functions within the energy sector to ensure service continuity and standards to guide County governments on devolved responsibility. In the wake of the devolved system of government under the Constitution, minimum standards should be developed at national level to guide County governments on devolved responsibilities in the energy sector. This will help to avoid the scenarios where County governments make laws with glaring disparities over the same subject matter. There is need for a codified law governing the energy sector as a whole. We currently have outdated and fragmented sectoral laws governing the energy sector. These laws establish institutions whose roles and functions in the energy sector overlap. It calls for review of the institutional mandates of the various public institutions under the energy sector to streamline their respective mandates, businesses and operations. There is also need for clearly defined policies for revenue sharing and management of resources in the oil and gas sector. This will cushion the country from the adverse effects of the global market system.

Several guidelines have been developed to address the issues of Environment, Health and Safety (EHS) in the petroleum sector especially in the downstream sector. Petroleum Institute of East Africa (PIEA) developed the Guidelines for carrying out Environmental Impact Assessment and Environmental Audit in the petroleum sub-sector. The guideline highlights the Environment, Health and Safety (EHS) concerns that need to be addressed during an Environmental Audit in the Petroleum sector. The said section however asserts that the aspects given are not necessarily exhaustive. The guidelines inadequately address upstream and midstream concerns and developments emerging in the sector. They are also not aligned to the newly published amendments to the EIA regulations of 2003 especially on the categorisation of the sector into high, medium and low impact projects/ activities to make EIA licencing, monitoring and evaluation easy for law enforcement agencies and community participation. Currently, all petroleum development activities are lumped together as high risk in the NEMA EIA regulations. In addition, there is need to formulate the Environment Health and Safety guidelines/Regulations for the Liquefied Natural Gas (LNG). With the importation of the LNG from the regional countries including Tanzania and Mozambique, their transportation, storage and usage safety needs to be regulated.

Directorate of Occupational Safety and Health Services (DOSHS) developed the code of practice on occupational Safety and Health auditing with the aim of providing guidelines for use of health and safety advisers, occupiers and for all those who have responsibility for safety and health audits. In the aforementioned code, the guidelines for Occupational Safety and Health auditing are given as; Workplace information, Management of Occupational Safety and Health Policies and Workplace Safety, Health & Welfare Conditions. This is in addition to the established Occupational Safety and Health Act, 2007 and its subsidiary legislations which are enforced by DOSHS (DOSHS; 2005).

In June 2012, Energy Regulatory Commission (ERC) in conjunction with Kenya Maritime Authority (KMA) and National Environment Management Authority (NEMA) developed the Environment and Social Impact Assessment and Audit Guidelines for the downstream petroleum sector. The overall objective of developing these guidelines was to facilitate an orderly and effective administration of the EIA process in the downstream petroleum sector (ERC, 2012).

The Energy Act, 2006 Sec. 98 tags licensing of petroleum and gas facilities to compliance with Environmental, Health and Safety Standards. In June 2012, ERC in conjunction with NEMA and KMA developed draft General Guide to Pollution Preventions guidelines. The guidelines though in the draft stage, are aimed at providing good practices for the design, construction, commissioning, operation, and maintenance and decommissioning of petroleum sites and terminals that will eliminate or mitigate the risks of pollution (ERC, 2012).

6.6 Relevant Existing Problems

This section covers existing problems in view of stakeholder perceptions as well as industry practice in relation to the local Environmental Health and Safety management procedures.

6.10.1 Duplication of Roles by Local Statutory Institutions

There have been rampant accusations of duplication of roles among regulatory stakeholders. In that they both check the same aspects when carrying out their routine inspections, and there have been complications in compliance requirements, for example when one has to prepare reports for submission to different bodies. NEMA has been playing the role of DOSH due to their inadequate capacity in terms of representation of personnel on ground. The performance of NEMA in applying DOSH oriented laws is limiting with regard to OSHA (2007) requirements. The coordination framework of EMCA 1999 revision 2015 requires a coordinated approach with other lead institutions to avoid conflicts of application of policies. Energy Regulatory Commission (ERC) also noted that some of the roles of policies enshrined within EMCA (1999) Rev. 2015 are not in tandem with NEMA activities. This enhances technical avoidance of statutory responsibilities bestowed upon ERC and other institutions due to superiority of the EMCA statutes. There is need for harmonization between NEMA and ERC with emphases on technical implementation of Energy Standard Practices, some of which bear safety implications.

On the other hand, EIAs, EAs and other interventions notably concentrate on safety and environment, while public health issues are not well captured, particularly when considering receptor points. Ministry of Health advises on good coordination between NEMA, DOSH and themselves for inclusivity.

It could be of great importance if government enforcement and compliance agencies come together and organize their mandates in a way that does not impose a heavy cost on them or lead to conflicting regulatory functions. It was suggested that the government improves ERC's capacity to help curb fuel adulteration. Industry specific and most suitable guidelines should be adopted by various industries as opposed to the generic safety regulations, which cut across all industries.

6.10.2 Inadequate Personnel and Operation Capacity

There is inadequate operation capacity in NEMA Lamu, Turkana, Mombasa and other offices to monitor the oil exploration activities. According to Petroleum Institute, retaining costs of trained emergency respondents are not met, and during emergencies, logistics enhance delays of their availability resulting to heavy losses. Laboratories for alternative testing and probing need to be situated near operating points. The closest accredited water testing facility to Lokichar for example by Water Resources Management Authority is located at Kakamega town which is more than 200Kms away through earth road.

DOSHS presence is not felt especially in remote areas like Turkana, Isiolo, and Lamu where DOSH inspectors take 1-2 years before visiting the areas. A DOSHS officer could be in charge of two or more counties that are distant to each other e.g. a DOSHS officer who is based in Uasin Gishu (Eldoret Town) whose area of jurisdiction goes up to Turkana County (Lodwar Town) and yet the officer is not provided with the necessary facilitation to execute his duties such as a means of transport. This renders the officers redundant in terms of executing their roles as they are overwhelmed by the vastness of their areas of coverage.

6.10.3 Unclear Governing Standards in National and County Government on Devolved Responsibilities for the Energy Sector

There is need for incorporating County Governments in the planning of petrol stations and petroleum facilities in the entire value chain as they are key stakeholders. In the wake of the devolved system of government under the Constitution, minimum standards should be developed at national level to guide County governments on devolved responsibilities in the energy sector.

6.10.4 Disconnect of the Ministry of Health Services at the County Level

Concerns he about the devolution of the Health services from the National to the County levels creating disconnect and fragmentation of the way medical services are delivered have been raised. Most of the stakeholders are for the idea of medical services being managed by the national government. Despite the presence of the county hospitals, most patients or victims with major injuries from high casualty incidences are rushed to the national and referral hospitals due to inadequate hospital equipment and personnel in the County hospitals.

6.10.5 Inadequate Oil and Gas Handling Policies

Islands such as Lamu require special policies on handling of downstream fuel products. At the moment, storage has been prohibited within the island due to safety concerns. Petrol business persons have been forced to sell their products from boats to reduce the risk of burning down the town. Petroleum handling needs to be regulated on such environments, preventing and reducing the risks posed to both human and non-human populations from negligence and inadequate enforcement and compliance monitoring in these areas. Standards for selling petroleum products at retail level also need to be regulated.

6.10.6 Inadequate Policies and Support Infrastructure

There are gaps within associated regulations with regard to working hours which do not conform to oil and gas practice. Oil and Gas drilling is a continuous process that requires constant labour provision throughout the process. Laws pertaining flaring are not clear and need to be developed and reflect on nature of the industry. The OSHA 2007 regulations also do not apply well because issues upstream are peculiar and need specific guidelines. Current existing guidelines and regulations need to be specific to individual projects other than being generically compatible to all. There are inadequate of policies that should be enacted for petrol stations near residential areas, which should stipulate a safety buffer zone.

6.10.7 Buffer Zone/Safe Distance Regulations

Stakeholders from various parts of the country especially from the Western and Coast Regional Scoping Workshops complained of petrol stations mushrooming right in the middle of residential areas. During these workshops, concerns about petrol stations being built really close to areas of public gathering/assembly (churches, mosques, schools, hotels etc) were raised. The stations were claimed not to observe safety measures and best practices e.g. barricading the premises while offloading the tankers.

In some towns, there are no designated parking areas for the fuel tankers. They are driven and parked in town centres just like any other kind of vehicle, which is very dangerous. The nature of the goods carried by the tankers is highly flammable and any faults in fire safety could lead to massive destruction and loss of lives.

It was suggested that as the country moves to commercial oil production, every town should have well designed parking areas for the fuel tankers as well as bypass routes to ensure the tankers are not passing via town centres. The stakeholders suggested the establishment of buffer zones especially for petroleum stations to maintain in relation to settlements in their surround.

Furthermore, there should be a policy in place to guide processing the crude oil locally. The government should utilize the existing facility as it expands on others.

6.10.8 Disaster Risk Reduction and Emergency Response Management Plans

Oil Marketing Companies through Petroleum Institute of East Africa and the Oil Spill Mutual Aid Group (OSMAG) are some of institutions with equipment to handle mainly downstream oil spills and fire emergencies. Disaster management still remain to be poorly addressed at the National level as cases of spills and fires are still being reported.

The industry needs a well stand-alone emergency response plan on the national level. Statistics on spillage, pollution and fire incidents should be managed under the same plan. Bureaucratic cycles should be avoided, and should include field based solutions other than centralized solutions. The NDOC should be capacity built to be able to coordinate industry level disasters efficiently. Training should be integrated in institutions for safety upbringing purposes. Ethical values in the industry value chain require detailed attention to control curtails and regulators in terms of monitoring and implementation of the law.

There have been concerns on the poor response given to petroleum emergencies in the country. It was clearly highlighted that the country does not have a central command centre neither do we have the necessary equipment. OSMAG only responds to offshore spills and has lowcapacity to respond to onshore spills and accidents. The stakeholders were for the idea that there should be petroleum disaster response teams at county levels to enhance prompt responses.

6.10.9 Training and Education

Petroleum safety practices should be followed strictly to ensure safety. Some of the unsafe practices are happening as a result of ignorance and inadequate training/knowhow. The fuel tanker drivers are not specifically trained to handle petroleum goods; they are mere qualified drivers, which should not be the case. They should be well informed of the nature of the goods they transport. Proper planning prior to transportation of the petroleum products needs to be conducted. The plan will clearly guide the drivers on the nature of road to be used, accident-prone areas, and weather among other vital information. The transportation tankers should also be frequently inspected to ensure they are in proper working condition to prevent accidents.

Fuel adulteration is also an issue of concern to both the consumers and other key stakeholders as it compromises the quality of the fuel, leading to losses when the seller has to compensate their customers through paying for engine service. At times a customer may also not be able to point out where exactly they got the adulterated fuel and have to incur the cost of servicing themselves. The petrol stations every so often are not well monitored consequently giving room for mal practice such as draining untreated effluent into the environment. Currently we do not have adequate laws and regulations for petroleum sector e.g. lack of guidelines for gas flaring.

6.10.10 Public Awareness

There exists inadequate public awareness on the safety risks leading to accidents associated with petroleum products. In the event of fuel truck accidents, villagers including young children rush would rush to the scene to tap the spilled products due to little knowledge of the impending dangers. ERC should be tasked with running a national awareness campaign using social media print and television media. The dangers associated with approaching accident/spill sites should also be incorporated into the educational system right from early childhood education.

6.10.11 Human Resources/Capacity and Health Centres to Offer Health Emergencies from Petrol Related Incidents and Accidents

Most of the stakeholders were concerned that as a country we need to improve our health care capacity to respond to various incidents. From the past experiences, the victims of such accidents would have to be transported to distant hospitals reducing their chances of surviving and as a result succumb to their injuries. Most of the hospitals only have the capacity handle a limited number of patients hence in the event of such an incident; most patients end up unattended due to the overwhelming numbers in the hospital wards. The hospitals need to be increased in both their numbers and the human resource capacity complementing the anticipated patient population. In addition, the hospitals need to have adequate ambulances which can be availed whenever necessary.

6.10.12 Enforcement of KEBS Standards on Transportation and Storage of Petroleum Products in Premises and Ports Operating Offshore (Especially in Lamu)

The stakeholders consulted for instance in Lamu County felt that petroleum sellers were reckless in carrying out their businesses endangering the lives of the people in the town (see Plate 32). Thus far they store petroleum products in inappropriate containers. The concerned residents argued that had there been a KEBS staff stationed in the area to enforce implementation of the set standards, their lives would not be at risk.

Plate 32: Typical Examples of a Floating Petrol Station in Lamu with no safety provisions

6.10.13 Construction and Operation of Illegal Plants

There have been cases of unlawfully constructed and operated gas filling plants in the country. These facilities only come to light once they cause property damage or negatively impacted on the health and wellbeing of the surrounding public. Authorities governing the petroleum sector need to stay vigilant in enforcing respective laws. Non-compliance should be complemented with heavy fines and penalties. It is obvious that these facilities operate under the radar of our law and enforcement officers therefore calling for the need to invest in intelligence specific to the oil and gas industry.

6.10.14 Conflicts, Insecurity and Support Infrastructure

The stakeholders especially in Turkana region were concerned about conflict with the neighbouring Pokot community who might hinder the passage of oil tankers when the pilot scheme starts. As part of risk reduction and management the people advocates for countrywide awareness and training so that people know the oil is for the entire country and not a specific community, this may help to reduce conflicts and potential oil wars.

There were also concerns raised on the poor state of roads especially in Turkana County. It was strongly suggested that the government should improve the roads before commissioning the pilot scheme.

The country should also invest in equipments that can handle all the three tiers of disaster before commercial oil production begins. The equipment and manpower can be centrally commanded e.g. by the National Disaster Operation Centre.

6.10.15 Conclusion

From the foregoing, it is evident that the oil and gas industry will come along with numerous benefits. The exploration and operations involved in all the sectors (upstream, midstream and downstream) will come along with myriad impacts both positive and negative, which need to be mitigated. Similarly, there is need for a review of existing and/or additional of policies, plans and programme s to address the challenges listed in this chapter. The key recommendations include:

- Harmonization of the duplicated roles performed by NEMA, DOSH and ERC in relation to Occupational safety and health,
- Enhancement of educating the members of the public on the existing dangers during accidental spills,
- Formulation of policies to address clear buffer zones to be maintained by the oil industry sector both in upstream, midstream and downstream sectors.
- Capacity building in terms of human resource to conduct regular inspection to ensure compliance,
- Formulation of a comprehensive national legislation framework for oil spill prevention, preparedness, response, liability and compensation and agreements, memorandum of understanding for response between different parties that are consistent to the international and national provisions
- Establishing common, best practice approaches to offshore oil and gas safety and security regulation, to include industry engagement, this may include establishing regional government-industry cooperative agencies to provide advice and coordination
- Development of adequate disaster management structures or emergency preparedness plan in oil and gas sector through formulation of plans and policies that will provide sufficient guide to the relevant authorities,
- Maintenance of counter-terrorism capabilities, prevention strategies and operational responses to threats leading the management of maritime intelligence.
- Establishing of an elaborate search and rescue framework that incorporates all the agencies with a search and rescue functions.
- Establish an oil and gas industry Search and Rescue (SAR) requirement for offshore sites.
- Establishing a framework for marine environmental protection including pollution, dumping and decommissioning of offshore installations;
- Implement an integrated disaster risk management approach.

Detailed recommendations have been presented in the final chapter for implementation

7.0 CHAPTER SEVEN: ANALYSIS OF THE INSTITUTIONAL AND LEGAL FRAMEWORK OF THE PETROLEUM SECTOR IN KENYA

7.1 Introduction

This chapter outlines and analyses the institutional and legal framework of the Petroleum Sector in Kenya with emphasis on the following: petroleum institutional framework, policies, international legal framework and international best practices. This information was collected from existing development documents and interviews of the proponents/ developers/ investors in the petroleum sector during the study period. The SESA international experts using their international experience benchmarked these with international policies, programme s and plans. Some countries against whom benchmarking was studies, countries on the same continent/ similar stage like Mozambique (gas), Ghana and Angola (oil). This was also expected to those at advanced stages like Egypt, Libya, Nigeria, Malaysia, and Algeria among others to understand problems and best practices in managing environmental and social issues at policy levels.

The general objective of SESA was systematically examined and presented strategic recommendations for policies, plans, and programme s that will guide environmental and socio-economic planning and decision making in the country for the petroleum sector in Kenya. In terms of policy, the current legal and policy framework for oil and gas in Kenya includes both existing and proposed law and policy, divided between what existed before the discovery of oil in 2012, and that which has been drafted after the discovery.

7.2 Roles of Key Institutions in the Petroleum Sector

The Kenyan Government is run by Ministries. The ministries play key roles in policy formulation, enforcement of the existing legislation under their jurisdiction and ensuring strategic plans are implemented through various agencies and departments under the ministry. The following chapter presents a list of key stakeholders in the oil and gas industry and the role they play in the sector.

Table 221: Role of Key Institutions

S/N	Stakeholder	Key Role/ Legal Mandate	Why / how it was consulted
1)	Ministry of Environment, Natural Resources	▪ It manages, monitors, conserves and protects Kenya's environment and natural resources for sustainable development. Their inputs through NEMA in SESA were very crucial.	▪ Mandates NEMA to oversee all environmental management and protection throughout Kenya.
2)	Ministry of Energy and Petroleum (MoEP)	▪ Is in charge of formulating and enforcing policies to create an enabling environment for efficient operation and growth of the sector. It sets the strategic direction for the growth of the sector and provides a long-term vision for all sector players. ▪ Oversees upstream, midstream and downstream oil and gas sector ▪ Coordinates, facilitates the exploration and exploitation of petroleum products. ▪ Control of energy consumption, research, exploitation and supply. It sets the strategic direction for the growth of the sector and provides a long-term vision for all sector players	▪ Mandates ERC, KPC, NOCK and KPRL to oversee all petroleum exploration for government. All key agencies in (MoEP) were consulted based on their legal mandates.
3)	Ministry of Agriculture, Livestock and Fisheries	▪ It provides leadership in the management and development of crops, livestock and fishery resources.	▪ Was mainly consulted on issues regarding likely impacts on livestock/ pastoralism, fisheries and marine resources.
4)	Ministry of Labour & East Africa Affairs	▪ Concerned with the issues of labour, occupational health and safety and work injury benefit considerations and administrations.	▪ Was consulted on issues of Work Injury Benefit and Occupational Health and Safety through Directorate of Occupational Safety and Health Services
5)	Ministry of Devolution and	▪ It provides guidance and coordination of devolution and planning	▪ County governments were

	Planning	and public policy formulation	targeted in the study
6)	Ministry of Finance and National Treasury	▪ Responsible for developing and managing the macroeconomic policies of the country and are responsible for supervision and monitoring of the constitutional, legal and responsible management of the economy and public financial operations ▪ The ministry gives direction on the oil and gas sector in terms of public financial operations and revenue sharing ▪ Custodian of Production Sharing Contracts (PSCs).	▪ Was consulted of economic policies on oil and gas
7)	Ministry of Health	▪ Mandated to deal with health policy, health regulation, national referral health facilities, capacity building and technical assistance to counties ▪ A source of information on public health risk management issues	▪ Was involved at both National and county levels in SESA activities because health is a devolved function
8)	National Environment Management Authority (NEMA)	▪ Environmental management and protection. ▪ Monitoring of all project activities to safeguard and enhance the quality and protection of the environment in Kenya. ▪ Issuance of EIA licenses and SESA coordinating agency	▪ Was involved at both National and county levels in SESA activities because environmental management is both national and a devolved function
9)	Council of Governors	▪ Provides a supporting pillar for County Governments as a platform for consultation, information sharing, capacity building, performance management and dispute resolution.	▪ Over 50% counties were consulted
10)	County Governments (Ministries in charge of Energy, Environment, Industrialization, Natural Resources, Infrastructure, etc.)	▪ Notifications to County governments are required in licensing and their consent is required before any oil prospecting or mining activity begins. ▪ Community land falls under the mandate of county governments.	▪ Representatives of national government at county level and county officials participated in consultation workshops.
11)	Vision 2030 Secretariat	▪ Charged with the mandate of spearheading the implementation of Vision 2030 as the country's blueprint and strategy towards making Kenya a newly industrializing middle-income country ▪ Will advise on the Vision 2030 strategy in relation to Oil and gas activities.	▪ Invited to participate in National SESA forums
12)	Kenya Pipeline Company (KPC)	▪ Established in September 1973 under the Companies Act Cap 486, is 100% owned by the government which and its mandate is to provide effective, reliable, safe and cost effective means of	▪ Consulted at national and regional levels (Mombasa, Eldoret and Kisumu)

		transporting petroleum products from Mombasa to the hinterland.	
13)	LAPSSET Corridor Development Authority (LCDA)	▪ Tasked with establishing an integrated implementation plan and oversee the implementation of the proposed projects, especially the Crude Oil Pipeline, rail, highways, etc. ▪ Will have the inter-ministerial coordination committees comprised of relevant ministries.	▪ LAPSSET Corridor used as case study on impact of O&G on environment ▪ Participated in national forums
14)	National Oil Corporation Kenya (NOCK)	▪ National Oil Corporation of Kenya (NOCK) is 100% state-owned corporation. ▪ Its mandate is oil exploration, importation and sale of petroleum products in order to provide stability in the market. ▪ National Oil has a Data Centre for storage of seismic data, well logs, well reports, other oil exploration reports and aeromagnetic as well as gravity data which has been obtained in this country to date through petroleum exploration activities. In addition, National Oil has set up cores and drill cuttings storage facility in which the rock samples retrieved during petroleum exploration in this country from 1960 to date are stored for use by those carrying out exploration.	▪ Consulted at National level
15)	The Energy Regulatory Commission (ERC)	▪ Is an independent agency responsible for regulation of the energy sector agencies, oversight, coordination preparation of Least Cost Power Development Plans (LCPDP), monitoring and enforcement of sector regulations.	▪ Was consulted on EHS concerns at downstream
16)	Kenya Revenue Authority (KRA)	▪ Mandated by the government of Kenya to collect custom duty in Kenya as well as domestic taxes within Kenya.	▪ Consulted on the licensing issues and sustainability of tax systems in the O&G sector
17)	National Land Commission	▪ Manages public land on behalf of the national and county governments, initiates investigations into present or historical land injustices and recommend appropriate redress, and monitor and have oversight responsibilities over land use planning throughout the country	▪ Involved at all levels of SESA activities because of the concerns on pubic and community land.
18)	Kenya Petroleum Refineries Ltd (KPRL)	▪ Is the only refinery in East Africa. Until its closure in September 2014, it used to refine 40% of all petroleum products requirements in the country. ▪ Its name plate capacity is for 4 Million MT per annum but was	▪ Consulted on downstream EHS issues

		operating 1.6Million MT per year.	
19)	The National Museums of Kenya (NMK)	▪ Is a state corporation established by an Act of Parliament, the National Museums and Heritage Act, 2006 no. 6 of 2006. NMK is a multi-disciplinary institution whose role is to collect, preserve, study, document and present Kenya's past and present cultural and natural heritage. This is for the purposes of enhancing knowledge, appreciation, respect and sustainable utilization of these resources for the benefit of Kenya and the world, for now and posterity.	▪ Consulted at national and regional levels
20)	Kenya Marine and Fisheries Research Institute (KMFRI)	▪ Carries out biophysical and socio-economic research on fisheries, mangroves and marine. ▪ Source of aquatic research information, protection and management of aquatic resources, environmental patrols. Safeguarding sea lanes of communications, protection of offshore resources and aid to civil authorities	▪ Key in monitoring of offshore and onshore drilling activities
21)	Kenya Wildlife Service (KWS)	▪ It is a state corporation that was established with the mandate to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. ▪ Undertakes conservation and management of wildlife resources across all protected and unprotected areas systems in collaboration with stakeholders	▪ Consulted on protected areas including those under local counties, community and various sanctuaries where oil and gas exploration has taken place or planned in future
22)	Kenya Ports Authority (KPA)	▪ The Authority's mandate is to maintain, operate, improve and regulate all scheduled sea ports situated along Kenya's coastline. Other ports include Lamu, Malindi, Kilifi, Mtwapa, Kiunga, Shimoni, Funzi and Vanga. Its core business is to provide: Safe navigation, Pilotage, Berthing, Mooring, Pollution control, Stevedoring, Shore handling, Storage services.	▪ Was consulted on oil spillage and oil waste management
23)	Kenya Maritime Authority (KMA)	▪ Mandated to regulate, coordinate and oversee activities in the maritime industry for maximum socio- economic benefits in line with national standards and international conventions. ▪ Enforces safety of shipping compliance with construction regulations, maintenance of safety standards and safety navigation rules, as well as conducting regular inspection of ships to ensure maritime safety and prevention of marine pollution is adhered to. ▪ Co-ordinate and manage national oil spill contingency plan for both	▪ Consulted and involved on offshore activities and shipping compliances on oil waste management.

		coastal and inland waters	
24)	Universities and Research Organisations	▪ Training and capacity building ▪ Lead in research	▪ Were consulted during national and regional meetings
25)	Civil Society Organisations (CSOs)	▪ They are an aggregate of non-governmental organizations, community-based organisations and institutions that manifest interests and will of citizens/ community members	▪ Were consulted during national and regional meetings
26)	Private Sector Actors/ Investors/ Associations	▪ Have capital investigates in upstream, mid-stream and downstream ▪ Associations protect investors' interests	▪ Were consulted mainly at the national level
27)	Kenya Bureau of Standard (KEBS)	Provide standardization and conformity assessment services through:- ▪ Provision of testing and calibration facilities ▪ Product and system certification ▪ Undertaking educational work in standardization and practical application of standards ▪ Maintenance and dissemination of International System of Units (SI) of measurements	▪ Consulted for the standards set for the oil and gas sector

7.3 Institutional Assessment of Working Relationship between NEMA and relevant Lead Agencies in the Petroleum Sector

The National Environment Management Authority (NEMA) was established under the Environmental Management and Coordination (EMCA), 1999 (CAP, 387 of 2015). NEMA's mandate is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.

Some of the main functions of NEMA in accordance with EMCA, 1999 include;

- Co-ordination of various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programme s and projects with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya;

- Establishment and review of land use guidelines in consultation with the relevant lead agencies.

- Identification of projects and programme s or types of projects and programme s, plans and policies for which environmental audit or environmental monitoring must be conducted;

- Initiating and evolving procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur;

- Monitoring and assessing activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given.

NEMA's mandate in regulation and management of the petroleum sector in Kenya includes approval of Strategic Environmental and Social Assessment (SESA), Environmental and Social impact Assessment reports (EIA), Environmental Audit reports, licensing under different Environmental Management and coordination regulations which include Solid Waste management and water quality, Environmental Monitoring and Inspection for compliance. These functions should be executed in collaboration with the relevant Lead Agencies, which would include Directorate of Occupational Safety and Health Services, Kenya Maritime Authority, Energy Regulatory Commission, Ministry of Energy and Petroleum, National Museums of Kenya, Kenya Wildlife Service among others. It is very important therefore for NEMA to streamline its working relationship with the Lead Agencies. In terms of assessing the relationship between NEMA and the specific Lead Agencies, some key issues should be considered as outlined below;

7.3.1 Directorate of Occupational Safety and Health Services (DOSHS)

DOSHS draws its functions from the Occupational Safety and Health Act (OSHA), 2007 and the Work Injury Benefit Act, 2007. The role of Directorate of Occupational Safety and Health Services (DOSHS) is to inspect internal working environment and ensure the prevailing environmental conditions are favorable to human health within a facility. However, the workplace environment can be influenced by the external environment and as well, internal environmental conditions can influence external environmental conditions. This interrelationship necessitates a coordinated working relationship between DOSHS and NEMA.

Decision making for Environmental Impact assessment (EIA), environmental monitoring and inspection are some key areas where NEMA and DOSHS should work together within a well-structured mechanism in promoting occupational safety and health in the work place. NEMA consults DOSHS for technical opinion on occupational safety and health issues relating to a proposed project. Whereas, DOSHS opinion should be based on the occupational and safety concerns as presented and addressed in the EIA report, EIA consultants do not always provide adequate information hence making it difficult for DOSHS to give informed comments. In addition to this, after approval of EIA reports, one of the licence conditions requires proponents to comply with provisions of OSHA, 2007. However, NEMA does not share the copies of the licenses with DOSHS and there is no existing information system in NEMA where DOSHS can access data on facilities they are required to inspect to ensure compliance with the Act.

During environmental monitoring and inspection, NEMA would have similar concerns with DOSHS. Therefore, without coordinated or joint inspections, there would be conflicting interests, lack of consistency and duplication of efforts. There are major areas of conflict between EMCA, Cap 387 and OSHA, 2007. For example, section 83 (4) of OSHA, 2007 requires that, at every workplace where chemicals or other toxic substances are manipulated, the employer shall develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty containers of chemicals to avoid the risks to safety, health of employees and to the environment. EMCA section 93(1) prohibits discharge of any hazardous substance, chemical, oil or mixture containing oil into any waters or any other segments of the environment. At the end of every year, the environmental audit reports required by NEMA overlap in content with the Safety and Health Audit reports required by DOSH. Such provisions contained in different Acts require high level of coordination among respective organizations in order to enforce and to avoid conflict as well as duplicity.

EMCA provides for development of air quality standards as well as standards for noise, currently catered for in the Environmental Management and Coordination (Air Quality), Regulations, 2014 and also standards for Noise which are under the Environmental Management and Coordination (Noise Pollution Control), Regulations 2006 respectively. In view of these standards, the responsibility to measure noise levels and air quality rests within the Safety and Health Advisors registered by DOSHS. However, there is no clear mechanism on how these officers should share their findings with NEMA or how to incorporate the Safety and Health audit reports in the environmental audit reports and vice versa. For this reason, NEMA environmental inspectors and Occupational Safety and Health Officers end up duplicating efforts or demanding same legal requirements in a particular facility. The role of County governments in air pollution control in accordance with the constitution also poses an area of conflict although air quality regulation is yet to be devolved.

EMCA section 92(a) provides that NEMA should develop regulations prescribing the procedure and criteria for classification of toxic and hazardous chemicals and materials in accordance with their toxicity and the hazard they present to the human health and to the environment while OSHA section 83(1) provides that the DOSHS shall establish safety and health requirements based on risk assessments, technical standards and medical opinion, for the safe handling and transportation of chemicals and other hazardous substances. OSHA does not make reference to EMCA and vice versa. It is such conflicting provisions that make environmental monitoring in the petroleum sector a source of conflict between the two organizations hence a need to develop a multi stakeholder environmental monitoring and inspection plan.

DOSHS currently has inadequate technical and human resource capacity to enable effective monitoring and enforcement of OSH regulations in the upstream petroleum sector and more specifically in remote areas like Lamu and Turkana.

7.3.2 Kenya Maritime Authority

Kenya Maritime Authority (KMA) is a state corporation whose mandate is to regulate, coordinate and oversee maritime affairs guided by the Kenya Maritime Act, Cap 370 and the merchant Shipping Act, Cap 389.

Mission: To ensure sustainable, safe, secure, clean and efficient water transport for the benefit of stakeholders through effective regulation, coordination and oversight of maritime affairs.

Section 5 (j) of the Kenya Maritime Authority Act, 2006, provides that one of the functions of Kenya Maritime Authority (KMA) is to conduct regular inspection of ships to ensure maritime safety and prevention of marine pollution while section 5(o) states another function as ensuring, in collaboration with such other public agencies and institutions, the prevention of marine source pollution, protection of the marine environment and response to marine environment incidents.

EMCA section 6 provides that NEMA in consultation with the relevant lead Agency shall issue appropriate regulations to prevent, reduce and control pollution or other form of environmental damage in the coastal zone. Section 7 states that these regulations shall provide for the control and prevention of pollution of the marine environment from;

a. Land based sources including rivers, estuaries, pipelines and outfall structures;

b. Vessels, aircrafts and other engines used in the coastal zone;

c. Installations and devices used in the exploration or exploitation of the natural resources of the seabed and subsoil of the exclusive economic zone; and

d. The marine environment arising from or in connection with seabed activities and from artificial islands installations and other structures in the exclusive economic zone.

The two Acts have the spirit of collaboration between the two Organizations but there have been no mechanisms to promote this relationship. However, it is important to note that where there is conflict between legislations, section 148 of EMCA is clear that 'Any written law, in force immediately before the coming into force of this Act, relating to the management of the environment shall have effect subject to modifications as may be necessary to give effect to this Act, and where the provisions of any such law conflict with any provisions of this Act, the provisions of this Act shall prevail". In this regard, Kenya Maritime Authority Act ought to be streamlined with EMCA and recognize the role of NEMA to avoid any conflict in marine water pollution. There is need for KMA to undertake its functions and as a Lead Agency ensure NEMA receives all necessary data on marine environmental inspections and also for the two to develop a working relationship. This collaboration will also contribute towards marine environmental monitoring efficiency noting the limited capacity for the two organizations. Environmental pollution concerns of KMA are based on Marine Vessels sources but NEMA concerns are wider than that as reference earlier under section 7 of EMCA and KMA should work to add more impetus on NEMA efforts to control marine pollution on a wider perspective. This is based on understanding that marine environmental concerns for the petroleum sector are not only based on oil spills.

7.3.3 Energy Regulatory Commission

In accordance with the Energy Act 2006, one of the main functions of Energy Regulatory Commission (ERC) is to formulate, enforce and review environmental, health, safety and quality standards for the energy sector, in coordination with other statutory authorities. This function sets ERC in conflict with other organizations namely NEMA and DOSHS because it is too general. To correct this situation, it requires joint operations and coordination, failure to which there will be duplication of efforts. Conflict arises between NEMA and ERC during environmental monitoring in the downstream sector because ERC undertakes inspections independently focusing on compliance with NEMA Licensing regime and NEMA also visits these petroleum facilities for enforcement and checking on compliance. ERC also have interest on environmental audits undertaken by operators while this is an annual requirement by NEMA. ERC's Energy Audits are meant to be a chapter in the NEMA environmental reports if the two organizations were working together.

NEMA consults ERC for their professional opinion before making a decision on any proposed project in the energy sector. ERC can only provide adequate information if it refers to proposed project designs, which in most cases are not provided by NEMA to ERC. Even after NEMA makes a decision, copies of the EIA Licenses are not given to ERC though some of the conditions require ERCs attention to follow up on compliance. For example, proponents are directed to obtain construction permits from ERC before commencement of construction activities. The Energy Act, 2006 Section 30 (1b) provides that ERC shall issue such a license after the need to protect the environment and to conserve the natural resources in accordance with the EMCA 1999. This provision stamps the spirit of coordination between NEMA and ERC. In addition, section 32 (2a) provides that all licenses or permits issued by the Commission shall include a requirement that the licensee or permit holder shall comply with all applicable environmental, health and safety laws. This does not give ERC powers to enforce environmental, health and safety regulations but without a legalised and coordinated multi stakeholder enforcement approaches between NEMA, DOSHS and ERC, conflicts will always be witnessed. NEMA and DOSHS should undertake such functions noting that ERC permits and licenses are only issued after a developer has obtained EIA License from NEMA.

Section 90 (1) of the Energy Act 2006, provides that any person intending to construct a pipeline, refinery, bulk storage facility or retail dispensing site shall, before commencing such construction, apply in writing to the Commission for a permit and goes ahead to state that such applications should be accompanied by an environmental impact assessment report. It is not clear why the Act requires a developer to submit EIA report to ERC yet section 58 of EMCA, 1999 is clear that NEMA is the government organization that approves EIAs in Kenya. Although the common practice is that the developers submit an EIA License from NEMA, there are no means to verify authenticity of such licenses from NEMA because as stated earlier, NEMA does not share copies of the EIA licenses with Lead Agencies or there exists no public portal on NEMA licensed facilities or projects.

Section 98 (2) of the Energy Act 2006, states that in the event of a fire, explosion, oil spill, injury or fatality occurring in the course of operating a petroleum facility or transportation of petroleum, either by accident or through negligence, the operator or person transporting petroleum shall forthwith clean up the polluted or damaged environment, at his own expense, to the satisfaction of the Commission and other relevant authorities. This provision calls for adequate cooperation between NEMA, ERC, NDOC, DOSHS, and KMA in case of such undesirable event. There are also no operating EHS standards or guidelines on transportation of petroleum products.

7.3.4 National Land Commission

The 2010 Constitution provides that one of the functions of the National Land Commission (NLC) is to monitor and have oversight responsibilities over land use planning throughout the country. In the petroleum sector, all land where upstream petroleum development activities are on-going falls under the County Governments and the National Land Commission as public land. Unfortunately, the extent of involvement of NLC during licensing of oil blocks by the Ministry of Energy to international oil companies and by NEMA during approval of EIA reports for upstream petroleum activities is not adequate. There is no coordination and consultation during decision-making and whereas NEMA recommends development of Resettlement Action Plan (RAP)s and full execution, NLC is involved to ensure the displaced individuals are compensated but NEMA does not share the EIA reports and EIA Licenses with NLC for informed decision-making. Petroleum production at the upstream will necessitate development of heavy infrastructure and facilities and without proper land use planning; these activities may result in major land use changes with irreversible negative environmental impacts. It is important for NEMA to start considering NLC as a key Lead Agency in Upstream petroleum development decision-making and Ministry of Energy and Petroleum to prioritize consulting NLC at the earliest stages of petroleum development planning and designing. There is a need to develop domesticated guidelines for RAPs since currently, RAPs are conducted under the guidance of World Bank Involuntary Resettlement Policy and RAP guidelines.

7.3.5 Water Resources Management Authority

The Water Resources Management Authority (WRMA) was established as a corporate body through a gazette notice No. 8140 of 14th November 2003 pursuant to the Water Act (2002). The Authority is the lead agency in the management of water resources in the country and its overall development objective is to ensure rational, effective management of the water resources and equitable access for the various competing needs. WRMA operates in an environment where a number of stakeholders from other government institutions, the general public and private partners are directly or indirectly involved in activities which affect water resources. As the lead agency for water resources management, WRMA has to ensure that actions by all parties are well coordinated and contribute positively towards sustainable management of water resources. While WRMA is the lead agency in management of water resources, its roles may conflict with those of NEMA in enforcing laws on water conservation and pollution control. There are no laws or guidelines on working relationship between the two authorities; hence duplication of effort in enforcement is common in protection of water resources, shorelines, wetlands, etc.

7.3.6 National Museums of Kenya

The National Museums of Kenya (NMK) was established under section 3 of the National Museum and Heritage Act, 2006. Some of its main functions include identify, protect, conserve and transmit the cultural and natural heritage of Kenya and promote cultural resources in the context of social and economic development. Petroleum development can trigger environmental and social safeguards for protected areas and physical cultural resources. NMK has a mandate to gazette protected areas and hence restrict entry and undertaking of any activities in cultural and natural heritage sites. The Cabinet Secretary (CS) may, in respect of a protected area, from time to time by notice in the Gazette, prohibit or restrict access thereto or any development thereof, or the use thereof for agriculture or livestock, or activity thereon which in the CS' opinion is liable to damage a monument or object of archaeological or paleontological interest thereon. Any activity with potential to affect cultural and natural heritage should be implemented in consultation with National Museums of Kenya.

In Kenya, there are 63 Oil Blocks, of which there are upstream petroleum development activities on-going. Some of the protected areas may be falling within these oil blocks. In this scenario, the role of National Museums of Kenya in Petroleum development becomes very important. NMK should provide an updated map for all protected areas to guide sector regulatory decision makers. This calls for a close working relationship with NEMA during EIA process. Also, MoEP should consult NMK during demarcation and Licensing of oil blocks. It is necessary to assess the existing interrelationship between the three organizations and build capacity of NMK as a relevant lead agency for NEMA in the environmental and social management for the petroleum sector especially on EIA and Archaeological Impact Assessment (AIA).

7.3.7 Kenya Wildlife Service

Kenya Wildlife Service (KWS) is a state corporation that was established by an Act of Parliament (Cap 376), with the mandate to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. Section 26 (1) of the Kenya Wildlife Conservation and Management Act, 2013 (KWCMA, 2013), states that the provisions of the Act with respect to conservation, protection and management of the environment shall be in conformity with the provisions of the EMCA, 1999. Section 27 (1) of the KWCMA, 2013 provides that no user rights or other license or permit granted under the Act shall exempt a person from complying with any other written law concerning the conservation and protection of the environment. Section 27(2) states that a user or other related right shall not be granted under this Act where the requirement for a strategic environmental, cultural, economic and social impact assessment license under the EMCA, 1999 has not been complied with.

The importance of these provisions is to show how the KWCMA, 2013 recognizes the importance of coordination with other organizations in environmental management and regulation. Petroleum development can have negative impacts on wildlife due to destruction of habitats and encroachment on the wildlife and migratory routes. Some of the National Parks, migratory and dispersal routes would fall within the oil blocks hence the negative impacts would arise. It is therefore necessary to assess the relationship between NEMA and KWS on environmental decision making for the regulation and management of the petroleum sector. With the current situation, without updated national park boundaries, migratory and dispersal route maps to be developed by KWS, it is difficult to make informed decisions. As NEMA continues to benefit from KEPTAP on capacity development, it is important to consider involving KWS on training in fields like EIA for the oil and gas sector. It will also be important to develop guidelines on oil exploration and production in protected areas to avoid conflicts.

7.3.8 Kenya Forest Service

The Kenya Forest Service (KFS) is a corporate body that was established under the Forest Conservation and Management Act, 2016 with express mandate to enhance development, conservation and management of Kenya's forest resources base in all public forests, and assist County Governments to develop and manage forest resources on community and private lands for the equitable benefit of present and future generations. KFS is expected to work closely with NEMA in protection of forest resources especially in approving permits leading to clearance of forests for development projects. A few occasions have been witnessed where NEMA stops KFS from exercising their duties on some projects within protected forests prior to KFS obtaining NEMA approval. With the proposed crude oil pipeline passing through several forest areas, a collaboration procedure between the two institutions is lacking.

7.3.9 National Disaster Operation Centre

The role of National Disaster Operation Centre (NDOC) is to coordinate response efforts in case of emergency related oil spills. With partners and agencies within government, NDOC strengthens preparedness mechanisms such as contingency plans for dealing with oil spills and plans to dealing with potential community conflicts. A National Disaster Risk Management Policy is at advanced stage of formulation and public participation is required for its finalization. The Disaster Risk Management Bill will create an institutional framework for disaster preparedness, prevention response and mitigation is currently pending in parliament for discussion and enactment. However, it failed to capture oil spill hazards. There is need of recognizing emerging new hazards and technological threats. NDOC is also responsible for reviewing and supporting plans that have been prepared by specific agencies like ERC, KPA, KMA. The national oil spill contingency plan, oil pipeline spill prevention and communal contingency plan and a coordinated response plan are some of the existing policy gaps.

7.3.10 County Governments

The powers of the 47 County Governments in Kenya are provided in Articles 191 and 192, and in the fourth schedule of the Constitution of Kenya and the County Governments Act of 2012. In accordance with the constitution of Kenya, one of the environmental management functions of the County Governments is control of Air and Noise pollution. Air emissions and excessive noise levels are major environmental negative impacts that would arise from petroleum development activities across the supply value chain. The Environmental Management and Coordination (Air Quality), Regulations of 2014, are applied in enforcement of air quality standards in Kenya. However, these regulations do not provide petroleum sector air quality standards. In a situation where this regulation would be applied, conflict would arise between NEMA and County Government because the regulation is not yet devolved to County governments noting that the Constitution of Kenya provides that County government should implement specific national government policies on natural resources and environmental conservation.

While waste management is a devolved function of county governments, they lack capacity in terms of skill, equipment and facilities to handle hazardous waste from exploration, production and other petroleum facilities like retail stations, depots and oil fields. For example, due to lack of waste disposal facilities in Turkana County and surrounding regions, waste from oil fields is currently transported for over 650 Km by road to Nairobi for incineration/ treatment. This poses environmental, health and safety risks along the route in case of accidents or illegal disposals.

It is also clear that petroleum sector poses high risks in terms of fire and oil spill disasters. The Constitution of Kenya provides that fire-fighting and disaster management are functions of county governments. In this regard, the current situation is clear that the county governments may not have any capacity in terms of skills and equipment to carry out such functions in the petroleum sector. There is need to develop their capacity in this area and also put in place a cooperation mechanism between the county governments, NEMA and other lead agencies like national disaster operation units, and KMA which would also play a part in disaster response and management.

7.4 Analysis of the Environmental and Social Regulatory and Policy Framework governing Oil and Gas in Kenya

This section outlines an analysis of the environmental and social regulatory and policy framework governing Oil and Gas in Kenya. It identifies various gaps that exist in each of the legislation discussed and pertinent recommendations. This was achieved through a consultative process among key stakeholders and literature review of the existing and proposed policies and laws. The gaps identified have been listed in separate section in this chapter.

Table 222: General Policy Provisions

Policy	Major Provisions
The Vision 2030 Strategy	Kenya Vision 2030 is a comprehensive national development plan for period 2008 to 2030. The plan was developed following successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation, which ensured the country's economy, was back on the path for realization of rapid economic growth since 2002. The county's GDP growth rose from 0.6% to 7% in 2007, but declined to 1.7% and 1.8% in 2008 and 2009, respectively (GoK, 2007). The objective of the Vision 2030 is to transform Kenya into a middle income country with a consistent annual economic growth of 10 % by the year 2030. The footprint states that Kenya is dominated by Petroleum and Electricity as the Key movers. It identifies the commitment of the government to ensuring institutional reforms in the sector and strong regulatory framework, encouraging more private actors in the energy sector.
The National Land Policy, 2007	• The goal of the Policy is to guide the country towards efficient, sustainable and equitable use of land for prosperity and posterity. • This Policy framework defines the key measures required to address the critical issues of land administration, access to land, land use planning, restitution of historical injustices, environmental degradation, conflicts, unplanned proliferation of informal urban settlements, outdated legal framework, institutional framework and information management. It also addresses constitutional issues, such as compulsory acquisition and development control as well as tenure. It recognizes the need for security of tenure for all Kenyans (all socio-economic groups, women, pastoral communities, informal settlement residents and other marginalized groups). • Most significantly, the Policy recognizes and protects customary rights to land. It also recognizes and protects private land rights and provides for derivative rights from all categories of land rights holding. • Through the Policy the government will ensure that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation. It will encourage a multi-sectoral approach to land use, provide social, economic and other incentives and put in place an enabling environment for investment, agriculture, livestock development and the exploitation of natural resources. • The Policy recognizes the need to ensure sound and sustainable environmental management of land based resources, dealings in such land will be guided by conservation and sustainable utilization principles outlined

Policy	Major Provisions
	in national environmental laws and policies.
The National Forestry Policy, 2014	The National Forest Policy provides a framework for improved forest governance; resource allocation, partnerships and collaboration with the state and non-state actors to enable the sector contribute in meeting the country's growth and poverty alleviation goals within a sustainable environment. Among other objectives of the policy includes: • Mainstreaming of forest conservation and management into national land use systems, • Preparation of a national strategy to increase and maintain forest and tree cover to at least 10% of the total land area and for the rehabilitation and restoration of degraded forest ecosystems, and the establishment of a national forest resource monitoring system, • Adoption of an ecosystem approach for the management of forests, and recognition of customary rights and user rights to support sustainable forest management and conservation, • Establishment of national programme s to support community forest management and afforestation/reforestation on community and private land, Preparation of national standards for forest management and utilization, and the development of codes of conduct for professional forestry associations.
The National Wildlife Conservation and Management Policy, 2012	The wildlife poverty is aimed at promoting protection and conservation of wildlife in Kenya, both in protected and non-protected areas. The policy is implemented by the Kenya Wildlife Service (KWS).
The National Public Health Policy, 2014	• Key objectives of the Kenya Health Policy 2014–2030 - Eliminate communicable conditions - Halt and reverse the rising burden of non-communicable conditions - Reduce the burden of violence and injuries - Minimize exposure to health risk factors - Strengthen collaboration with private and other health-related sectors

Policy	Major Provisions
	• In the implementation of this policy, the health sector will embrace the following principles: Equity in distribution of health services and interventions; - Public participation, in which a people-centered approach and social accountability in planning and implementation shall be encouraged, in addition to the multi-sectoral approach in the overall development planning; - Efficiency in application of health technologies; and - Mutual consultation and cooperation between the national and county governments and among county governments.
The National Environmental Action Plan (NEAP), 1994	The National Environment Action Plan (NEAP) for Kenya was formulated in 1994 through a consultative process involving various stakeholders. The action plan was aimed at integrating environmental considerations into the country's socio-economic development. The integration process was to be realised through development of a comprehensive framework that ensures linkage of environmental management of natural resources to decision-making processes. The NEAP also established the process of identifying environmental problems and issues, awareness raising, building national consensus, defining policies, legislation and institutional needs, and planning environmental projects. An Environmental Action Plan for Arid and Semi-arid Lands (ASAL) and County-specific Environmental Action Plans for 24 ASAL districts were also formulated thus forming part of the building block to the NEAP.
The National Poverty Eradication Plan (NPEP), 1999	The National Poverty Eradication Plan (NPEP) was formulated with an objective of reducing the high levels of poverty in Kenya by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. The plan also aimed at reducing gender and geographical disparities in order to create a healthy, better-educated and more productive population. The formulation of the plan was guided by the goals and commitments agreed during the World Summit for Sustainable Development (WSSD) of 1995. The plan therefore focuses on the delivery of four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantaged people and creation of an enabling economic, political, and cultural environment through development of transport and communication sector. The plan is implemented by the Poverty Eradication Commission (PEC) that was established in collaboration with various Government Ministries, bilateral and multilateral donors, the private sector, Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOs).
The Poverty	The Poverty Reduction Strategy Paper (PRSP) for Kenya has the broad objective of reducing poverty and

Policy	Major Provisions
Reduction Strategy Paper, 2000	promoting economic growth. This policy articulates Kenya's commitment and approach to tackling endemic poverty through involvement of the poor communities in both rural and urban areas in various socio-economic development activities. The Petroleum Plans, Policies and Programme s, will offer various employment opportunities to Kenyans and will therefore contribute directly towards the realisation of the broad national goal of reducing poverty in the country. In addition, the project would stimulate economic development by creating an enabling environment for other key sectors of the economy to thrive.
Environment and Development (Sessional Paper No.6), 1999	The Kenya's policy paper on the Environment and Development was formulated in 1999. The policy defined approaches that will be pursued by the Government in mainstreaming environment into development. The policy harmonized environmental and developmental objectives with the broad goal of achieving sustainable development. The policy paper also provided guidelines and strategies for government action regarding environment and development. With regard to wildlife, the policy reemphasized government's commitment towards involving local communities and other stakeholders in wildlife conservation and management, as well as developing mechanisms that allow them to benefit from the natural resources occurring in their areas. The policy also advocated for the establishment of zones that allow for the multiple use and management of wildlife.
The National Biodiversity Strategy, 2000	The National Biodiversity Strategy and Action Plan (NBSAP) was formulated in order to enable Kenya address national and international commitments defined in Article 6 of the Convention on Biological Diversity (CBD). The strategy is a national framework of action for ensuring that the present rate of biodiversity loss is reversed and present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity; to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.
The National Climate Change Response Strategy, 2010	The National Climate Change Response Strategy was developed in 2010 with the following major action area as key recommendations: adaptation and mitigation measures in key sectors; necessary policy, legislative and institutional adjustments; enhancing climate change awareness, education and communication in the country; capacity building requirements; enhancing research and development as well as technology development and transfer in areas that respond to climate change, among many others.
The National Gender Policy, 2011	The purpose of the Gender Policy is to institutionalize The Kenya National Policy on Gender and Development (NPGD), with Gender, Children and Social Development. It articulates the policy approach of gender mainstreaming and empowerment of women at the ministry level. The policy seeks to have a society where

Policy	Major Provisions
	women, men, children and persons with disabilities enjoy equal rights, opportunities and a high quality of life.
HIV/ AIDS Strategic Plan 2014/15-2018/19	The Kenya AIDS Strategic Framework 2014/15-2018/19, is the Strategic guide for the country's response to HIV at both national and county levels. The framework addresses the drivers of the HIV epidemic and builds on achievements of the previous country strategic plans to achieve its goal of contributing to the country's Vision 2030 through universal access to comprehensive HIV prevention, treatment and care. The vision of this strategic plan is to have A Kenya free of HIV infections, stigma and AIDS related deaths. The goal of the plan is to Contribute to achieving Vision 2030 through universal access to comprehensive HIV prevention, treatment and care. The objectives of the plan are: 1. Reduce new HIV infections by 75% 2. Reduce AIDS related mortality by 25% 3. Reduce HIV related stigma and discrimination by 50% 4. Increase domestic financing of the HIV response to 50%.
HIV/AIDS Policy of 2009	The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The Pandemic heavily affects the Kenyan economy through loss of skilled and experienced manpower due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories, among others.

Table 223: Draft Pertinent National Policies

Policy	Major Provisions
The National Draft Energy and Petroleum Policy, 2015	**i. Provisions of Petroleum** • The policy states that the Government shall undertake upstream petroleum operations through petroleum agreements, which may include, production sharing contracts, concession agreements, and service contracts. • With the discovery of petroleum and coal deposits, the Policy gives the following provisions, the Government shall: - Establish a regulatory agency for the upstream petroleum operations;

- Substitute the National Fossil Fuels Advisory Committee (NAFFAC) with the National Upstream Petroleum Advisory Committee (NUPAC) responsible for upstream petroleum exploration and development matters
- Undertake the requisite process of ensuring transparency and accountability in extractive industries taking into account best industry practices and existing legal framework.

- Policy identifies need to develop adequate petroleum production capacity in the country, and also develop the petroleum supply infrastructure to meet the local and regional market demand, which would include setting up a new refinery at Lamu.
- Policy identifies need to ensure that there are strategic petroleum reserves in the country.
- Policy encourages an increased use of LPG with a view to eliminate the use of kerosene, charcoal and firewood in households.
- Policy states that the Government is also evaluating the possibility of using natural gas to support commercial and industrial activities including transportation.
- Policy identifies the need to ensure security of supply of petroleum products, with the Government facilitating construction of adequate import and off-loading, storage distribution and fuel dispensing facilities through Public Private Partnerships as appropriate.
- The quality of petroleum products will be constantly reviewed to conform to international standards through enhanced institutional capacity to enforce fuel quality specifications for both domestic and export market. The Government shall restructure NOCK to have midstream/downstream business separated from upstream business with a view to enhancing capacity of the upstream to fully conduct the activities therein.

ii. Energy Efficiency and Conservation

The policy identifies the importance of energy efficiency and conservation in Kenya and challenges to implementation being lack of awareness of the benefits and methods of conservation, apathy, limited technical capacity and inadequate data.

Policy	Major Provisions
	In implementing Energy Efficiency and Conservation, the government shall: - Develop and implement sustainable, awareness and sensitization programme s on energy efficiency and conservation; - Implement energy efficiency and conservation initiatives in all sectors; - Undertake research and development in energy efficiency and conservation; and - Collaborate with the private sector in energy efficiency and conservation. **iii. Land, Environment, Health and Safety** The policy identifies land as a critical resource and the competing interest in its utilization and hence a major impeding challenge; and prudent environmental management is key to ensuring sustainable development of the sector. The Government shall facilitate: Development of a National Resettlement Action Plan Framework for energy and petroleum related projects; including livelihood restoration in the event of physical displacement of communities; Access to land where exploration blocks fall on private land, community land and cultural heritage areas including game parks/reserves; Establish strategies and mechanisms to eliminate wood fuel, charcoal and kerosene as a household energy source by 2022 and Creation of disaster response units in each county and in relevant energy sector entities.
The Draft National Wetlands Policy, 2013	The Draft Policy sets the following governing policies: To enhance and maintain functions and values derived from wetlands; To establish an effective and efficient institutional and legal framework; To improve scientific information and knowledge base on Kenyan wetland ecosystems; To strengthen institutional capacity on conservation and management of wetlands; To promote innovative planning and integrated management approaches; To promote communication, education and public awareness and to promote partnership and cooperation at regional and international levels

Table 224: Pertinent Gazetted Local Legislation

Key Laws	Major Provisions
The Constitution of Kenya	The Constitution of Kenya has taken on board various issues that are related to environmental management. Article 42 of the Bill of Rights contained in the Constitution provides that '*every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures*'. Chapter 5 of the Constitution is dedicated to land and the environment. The constitution requires that land be used and managed in a manner that is equitable, efficient, productive and sustainable. Part 2 of Chapter 5 of the constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides that the state shall provide encourages efforts towards sustainable of natural resources, increasing of the national forest cover public participation in the management, protection and conservation of the environment, protection of genetic resources and biodiversity, environmental impact assessment, environmental audit and monitoring of the environment, etc.
The Land Laws (Amendment) Act, 2016	This Act of Parliament amended all the laws relating to land to align them with the Constitution, so as to give effect to Articles 68(c)(i) and 67(2)(e) of the Constitution, to provide for procedures on evictions from land, and for connected purposes
National Land Commission Act, 2012	Establishment for the National Land Commission NLC is provided for in the constitution. This act provides for the functions and powers of the NLC, qualifications and procedures for appointments to the Commission so as to give effect to the objects and principles of devolved government in land management and administration.
The Land Registration Act of 2012	The law provides for the registration of absolute proprietorship interests over land (exclusive rights) that has been adjudicated or any other leasehold ownership interest on the land.
The Land Act, 2012	The Act was enacted to provide for the sustainable administration and management of land and land based Resources, and for connected purposes. It also provides the manner for determination and the award for compulsory acquisition to be served on the persons determined to have interest in the affected land. According to Section 128 of the Act, any dispute arising out of any matter under the Act, which involves compulsory acquisition process, should be referred to the Land and Environmental Court for determination. Sections 107-133 of the Land Act specify the procedure to be followed in the process of compulsory land acquisition. Section 134 of the Act creates a Settlement Fund for land acquisition to provide shelter and livelihoods to people who are involuntarily displaced.

Key Laws	Major Provisions
	Part II section 8 provides guidelines on management of public land by the National Land Commission on behalf of both national and county government. This law, in section 8(b) stipulates that the Commission shall evaluate all parcels of public land based on land capability, classification, land resources mapping consideration, overall potential for the land use, and resource evaluation for land use planning. Section 8(d) stipulates that the Commission may require the land to be used for a specified purpose subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order. In managing public land the NLC is required in section 10(1) to prescribe guidelines for the management of public land by all public agencies, statutory bodies and state corporations in actual occupation or use. In these guidelines management priorities and operational principles for management of public land resources for identified uses shall be stated.
The Community Land Act, 2016	The Act provides for the recognition, protection and registration of community land rights; management and administration of community land; to provide for the establishment of and the powers of community land management committees; and county governments in relation to unregistered community land and for connected purposes. Part V to VIII of the Act are key to Oil and Gas Operations on Community Land. These parts give provisions on guidelines on: - Conversion of community land for public use; - Special rights and entitlements in the community land; - Environment and natural resources management (natural resources on community land, benefit sharing, rules bye-laws and regulation of community land use planning) - Settlement of disputes relating to community land such as dispute resolution mechanisms, Mediation and arbitration
The Petroleum (Exploration and Production) Act, 1986	The Act regulates the negotiation and conclusion by the Government of petroleum agreements relating to the exploration for, development, production and transportation of, petroleum and for connected purposes. Section 4 of the Act gives provisions on how petroleum operations should be conducted in Kenya, stating that no Petroleum operations are to be conducted without permit; all operation are to be undertaken as stipulated by the Act and regulations therein. Sections 5 to 8 give provisions on how Petroleum agreements shall be entered between the Government and an interested Contractor.

Key Laws	Major Provisions
The Climate Change Act, 2016	Establishes the National Climate Change Council whose main function is to advise the national and county governments on legislative and other measures necessary for mitigating and adapting to the effects of climate change Provides the legal and institutional framework for the mitigation and adaption to the effects of climate change; to facilitate and enhance response to climate change; to provide for the guidance and measures to achieve low carbon climate resilient development and for connected purposes
Environmental Management and Coordination Act (EMCA), 1999	The National Environment Management Authority (NEMA) was established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. Under the second schedule, oil and gas exploration and production and distribution infrastructure are listed as high-risk projects that require Environmental Impact Assessment and Audit. The Act prohibits discharge of hazardous substances, chemicals and materials or oil into the environment and outlines basic guidelines on the spiller's liability. Subsidiary EMCA Cap 387, related Regulations include: • Environmental (Impact Assessment / Audit), 2003 • Environmental Management and Coordination (Water Quality) Regulations, 2006 • Environmental Management and Coordination (Waste Management), Regulations 2006 • Environmental Management and Coordination (Noise and Excessive Vibration Control)Pollution, Regulations, 2009 • Environmental Management and Coordination (Ozone Depleting and Controlled Substances) Regulations, 2007 • The Environmental Management and Coordination (Conservation Of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2016 • Environmental Management and Coordination (Air Quality) Regulations, 2014 • Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009 • Waste Tyre Management Draft Regulations, 2013

Key Laws	Major Provisions
	• Deposit Bonds Draft Regulations, 2014 • E-Waste Management Draft Regulations, 2013
Occupational Safety and Health Act, 2007 (OSHA)	The purpose of this Act is to secure the safety, health and welfare of persons at work, and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. Subsidiary OSHA 2007, legislations include: - The Factories and Other Places of Work Act (Medical Examination) Rules, 2005 - The Factories and Other Places of Work (Noise Prevention and Control) Rules, L.N. No. 25/2005 - The Factories and Other Places of Work (Safety and Health Committees) Rules, L.N. No. 31/2004 - The Factories (First-Aid) Rules, 1977 - The Factories (Woodworking Machinery) Rules, L.N. No. 431/1959 - The Factories (Eye Protection) Rules, L.N. No. 44/1978 - The Factories (Electric Power Special) Rules, L.N. No. 340/1979 - The Factories (Building Operations and Works of Engineering Construction) Rules, L.N. No. 40/1984 - The Factories and Other Places of Work (Medical Examination) Rules, L.N. No. 24/2005 - The Factories and Other Places of Work (Fire Risk Reduction) Rules, L.N. No. 59/2007 - Factories and Other Places of Work (Hazardous Substances) Rules, L.N. No. 60/2007
Energy Act (2006)	The Energy Regulatory Commission (ERC) is the lead agency created under the Act and one of its powers is to formulate, enforce and review Environmental, Health and Safety (EHS) and quality standards for the energy sector, in coordination with other statutory authorities. Under the Energy Act, there are a number of regulations and draft regulations, which have provisions for environmental health and safety protection. These include: • Licensing of Petroleum Road Transportation Business • Licensing of Petroleum Logistics Business

Key Laws	Major Provisions
	• Draft Operation of Marine Jetties regulations The Energy Act itself requires compliance with EMCA 1999 and OSHA 2007 and has requirements for oil spill contingency planning.
The Water Act, 2016	This is an Act of Parliament purposed to provide for the regulation, management and development of water resources and water and sewerage services in line with the Constitution. Part III of the Act provides for the Regulation of the Management and use of water Resources through the Water Resource Authority. Section 23 provides for protection of catchment areas to conserve vulnerable water resource, Section 36 of the Act requires a permit to be obtained for: any use of water from a water resource, except as provided by section 37; the drainage of any swamp or other land; the discharge of a pollutant into any water resource. Application for such a permit shall be subject to public consultation as well as an environmental impact assessment as per the Environmental Management and Co-ordination Act, 1999. Section 63 of the Act entitles every person in Kenya the right to clean and safe water in adequate quantities and to reasonable standards of sanitation as stipulated in Article 43 of the Constitution.
The Forest Management and Conservation Act, 2016	The Act gives provisions for the establishment, development and sustainable management, including conservation and rational utilisation of all forest resources for the socio-economic development of the country. Part IX of the Act gives guidelines on disputes and offences and provisions on: prohibited activities in forests, counterfeiting or unlawful affixing of marks, offences relating to mining or quarrying and compensation for loss and damage.
The Wildlife Conservation and Management Act, 2013	The Wildlife and Conservation Act deals with the conservation and management of wildlife in Kenya. The Act provides that wildlife should be conserved so as to yield optimum returns in terms of cultural, aesthetic, scientific and economic benefits. The Act requires that full account be taken of the inter-relationship between wildlife conservation and land use. The Act controls activities within the national parks, which may lead to the disturbance of wild animals. Unauthorized entry, residence, burning, damage to objects of scientific interest, introduction of plants and animals and damage to structure are prohibited under this law. It requires that no person shall undertake oil or gas exploration and extraction without the consent of the Cabinet Secretary, and prior approval of the National Assembly.

Key Laws	Major Provisions
	It prohibits discharges of any hazardous substances or waste or oil into a designated wildlife area contrary to the provisions of this Act and any other written law
The Physical Planning Act, Chapter 286	Section 29 of the said Act empowers the County Authorities to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section allows for prohibition or control of the use and development of an area without proper cause. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective County Authority.
Prevention and Control of Marine Pollution Act, 2014	This Bill gives effect to the Constitution, international treaties and conventions on marine pollution, provide for the prevention, mitigation and control of pollution of the sea from ship transport operations, preparedness and response for pollution emergencies arising from ship transport operation, liability and compensation for pollution damage arising from shipping transport operations or pollution damage resulting from exploration and exploitation of seabed mineral resources and for connected purposes.
National Gender and Equality Commission Act, 2011.	The Commission was established through an Act of parliament and is mandated but not limited to perform the following functions: (a) promote gender equality and freedom from discrimination in accordance with Article 27 of the Constitution; (b) monitor, facilitate and advise on the integration of the principles of equality and freedom from discrimination in all national and county policies, laws, and administrative regulations in all public and private institutions; (c) co-ordinate and facilitate mainstreaming of issues of gender, persons with disability into the overall national development framework.

Table 225: Pertinent Proposed Legislation

Bill	Major Provisions
Petroleum Exploration, Development and Production Bill, 2015	Provides a framework for the contracting, exploration, development and production of petroleum; cessation of upstream petroleum operations; to give effect to relevant articles of the Constitution in so far as they apply to upstream petroleum operations; and for connected purposes. The Bill establishes the Upstream Petroleum Regulatory Authority which will also coordinate environment, Health and Safety issues in the upstream exploration and production of oil and gas
The Evictions and Resettlement Procedures Bill, 2012	Sets out appropriate procedures applicable to forced evictions; protection, prevention and redress against forced eviction for all persons occupying land including squatters and unlawful occupiers.
The Physical Planning Bill, 2015	The Bill provides for the planning, use, regulation and development of land and for connected purposes It proposes that the National Physical Development Plan should be for the basis of:- the promotion of social and economic growth; the optimal exploitation, allocation and conservation of national resources; the coordination of national, county, city and urban areas in physical development planning and development; promoting balanced country development for national integration and cohesion; and providing a framework for location of national investments and infrastructural developments
The National Sovereign Wealth Fund Bill, 2014	The Bill establishes Kenya's National Sovereign Wealth Fund to undertake diversified portfolio of medium and long-term local and foreign investment to build a savings base for purposes of national development, stabilization the economy at all times, enhance intergenerational equity in Kenya.
The Natural Resources (Benefit Sharing) Blll,2014	The Bill establishes a system of benefit sharing in resource exploitation between resource exploiters, the national government, county governments and local communities; to establish the Natural Resources Benefits Sharing Authority; and for connected purposes.
Marine Pollution Control Bill, 2014	The Bill gives provisions on prevention and mitigating Marine Pollution. Part VIII has on liability and compensation for pollution damage from Oil Spillage among other factors. The Bill recognizes Environmental Impact Assessment, Audit And Monitoring for Offshore Oil and Gas Exploitation

Bill	Major Provisions
	and Exploration Activities
The protection of Traditional Knowledge and Traditional Cultural Expressions Bill, 2015	The Bill provides a unified and comprehensive framework for the protection and promotion of traditional knowledge and traditional cultural expression
The Energy Bill, 2015	The Bill Establishes Institutions under the Energy sector mandated to oversee several activities within the sector. Such Institutions include: Energy Regulatory Authority (s.15), Energy and Petroleum Tribunal (s.31), Rural Electrification and Renewable Energy Corporation (s.47) and Energy and Petroleum Institute (s. 62).
The Natural resources (Classes of Transactions Subject to Ratification) Bill, 2015	The Bill establishes classes of transactions subject to ratification by Parliament pursuant to Article 71 of the Constitution. The following classes of transactions shall not be subject to ratification by Parliament — - the grant of a concession or right to exploit a natural resource through a permit, licence or other authorization issued in accordance with the requirements of national or county government legislation; - the grant of a concession or right by a private person to exploit a natural resource through an agreement or a contract; - the grant of a concession or- right to exploit a natural resource for scientific research, educational or other non-commercial purposes unless the exploitation involves taking the natural resource or an portion of it outside of the jurisdiction of Kenya; - the exploitation of a natural resource by a Kenyan national for subsistence purposes in circumstances in which the law does not require that a permit, license or other authorization be obtained; and - the exploitation of a natural resource in quantities falling below a threshold prescribed by the Cabinet Secretary by notice in the Gazette or below a threshold specified in the Schedule to the Act
National Marine Spills Contingency Plan	National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances
Oil Dispersant	KMA policy to control the use of Oil Dispersants

Bill	Major Provisions
Use Policy	

Table 226: International Policies and Guidelines

Key Policies	Major Provisions
World Bank Policies on Safeguards	World Bank Safeguard Policies are frameworks on best practices and approaches in protecting the society and environment in planning and implementation of projects financed by the Bank. Pertinent Policies in Kenya's Petroleum Sector include: ▪ *Environmental Assessment* ▪ *Forests* ▪ *Natural Habitats* ▪ *Pest Management* ▪ *Physical Cultural Resources* ▪ *Involuntary Resettlement* ▪ *Indigenous Peoples* ▪ *International Water Ways* ▪ *Disputed Areas* ▪ *Use of Country Systems*
World Bank/ IFC Environment, Health and Safety guidelines	These guidelines were developed to aid in implementation of Environment, Health and Safety mitigating strategies in specific programme s and plans. Under the Petroleum Sector, the following guidelines are pertinent: - ▪ *Environment, Health and Safety guidelines for Crude Oil and Petroleum Terminals;* ▪ *Environment, Health and Safety guidelines for Retail Petroleum Networks;* ▪ *Environment, Health and Safety guidelines for Liquefied Natural Gas (LNG)* ▪ *Environment, Health and Safety guidelines for Offshore Oil and Gas Development*

Key Policies	Major Provisions
	Environment, Health and Safety guidelines for Onshore Oil and Gas development
IFC Environmental and Social Performance Standards	These Standards provides a framework towards Environmental and Social Sustainability as part of risk management. These standards include: ▪ *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts* ▪ *Performance Standard 2: Labor and Working Conditions* ▪ *Performance Standard 3: Resource Efficiency and Pollution Prevention* ▪ *Performance Standard 4: Community Health, Safety, and Security* ▪ *Performance Standard 5: Land Acquisition and Involuntary Resettlement* ▪ *Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* ▪ *Performance Standard 7: Indigenous Peoples* ▪ *Performance Standard 8: Cultural Heritage*
Energy Sector Policy of the AFDB Group	The Policy provides a general framework for the Bank Group's energy sector operations. It has a dual objective: (i) to support Regional Member Countries (RMCs) in their efforts to provide all of their populations and productive sectors with access to modern, affordable and reliable energy services; and (ii) to help RMCs develop their energy sector in a socially, economically and environmentally sustainable manner. The policy document reiterates the banks commitment to (i) support the environmentally and socially sound production, processing, distribution and export of African hydrocarbons; (ii) support power generation from oil and gas; (iii) promote policies, principles, and practices that enhance transparency in the exploitation of the resource as well as in the use and distribution of the revenues; and (iv) support the optimal use of oil and gas resources to secure equitable and intergenerational long-term benefits.
African Development Bank Group's Policy on the Environment	The policy assesses environmental constraints and opportunities that affect medium and long-term development objectives across the continent. It also serves to guide policy and decision-making in those key sectors that depend upon the utilization of natural resources.
Equator	Financing mechanism for projects with an aim of ensuring that the projects financed are developed in a manner that is socially responsible and reflect sound environmental management practices. By doing so, negative impacts on

Key Policies	Major Provisions
Principles	project affected ecosystems and communities should be avoided where possible, and if these impacts are unavoidable, they should be reduced, mitigated and/or compensated for appropriately. It is believed that adoption of and adherence to these Principles offers significant benefits to financiers, borrowers and local stakeholders through borrowers' engagement with locally affected communities. It is therefore recognized that financiers affords the opportunities to promote responsible environmental stewardship and socially responsible development. The EPs address the following key areas: ▪ *Principle 1: Review and Categorization* ▪ *Principle 2: Social and Environmental Assessment* ▪ *Principle 3: Applicable Social and Environmental Standards* ▪ *Principle 4: Action Plan and Management System* ▪ *Principle 5: Consultation and Disclosure* ▪ *Principle 6: Grievance Mechanism* ▪ *Principle 7: Independent Review* ▪ *Principle 8: Covenants* ▪ *Principle 9: Independent Monitoring and Reporting* ▪ *Principle 10: EPFI Reporting*

Table 227: Multi-Lateral Agreements

Multi- Lateral Agreements	
Climate Change Newsroom for UNFCCC	The Climate Change Act, 2016, the EMCA, 1999 Air Quality Regulations, 2008 provides standards for air emissions from industries, vehicles and other sources.
Framework Convention for Climate Change (The Paris Agreement) (12th Dec 2015)	The Climate Change Act 2016, CAP 387, Air Quality Regulations 2008 provides standards for air emissions from industries, vehicles and other sources in an effort to reduce the carbon footprint due to emissions.
United Nations Convention to Combat Desertification	*GoK has enacted the* Environmental Management and Coordination Act, 1999 and came up with a National Action Programme (NAP) to Combat Desertification to fulfill the requirements of this convention
United Nations Convention on the Law of the Sea	The GoK has developed the Marine Pollution (Shipping Operations) Bill, 2014 for enactment by parliament.
Convention on Biological Diversity	domesticated through the EMCA, 1999, Conservation of Biodiversity Regulations, 2006
Stockholm Convention on Persistent Organic Pollutants	*GoK has enacted the* Controlled Substances Regulation, 2007 and the Water Quality Regulations, 2006 to fulfill the requirements of this convention
Convention on Wetlands of International Importance especially as Waterfowl Habitat *(Ramsar Convention*)	*GoK has enacted the* Wetlands, River Banks, Lake Shores and Sea Shore Management Regulation, 2009 and the Water Quality Regulations, 2006 to fulfill the requirements of this convention
International Convention on Oil Pollution Preparedness, Response	Kenya Maritime Authority (KMA) has also developed the National Marine Spills Contingency Plan and Oil Dispersant Use Policy to domesticate this international agreement.

and Cooperation	
International Convention for the Prevention of Pollution from Ships, *MARPOL 73/78*	This convention will be domesticated by the Prevention and Control of Marine Pollution Bill 2014 to be enacted by parliament.
International Convention on Civil Liability for Oil Pollution Damage for Oil Pollution Damage, 1992 *(CLC 92)*	This convention will be domesticated by the Prevention and Control of Marine Pollution Bill 2014 to be enacted by parliament.
International Convention on Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992*(IOPC Fund 92)*	This convention will be domesticated by the Prevention and Control of Marine Pollution Bill 2014 to be enacted by parliament.

7.5 Environmental and Social Considerations from the Benchmarking

As a result of the recent discovery of oil and gas in Kenya and its neighbouring countries, oil and gas producers will be forced to expand exploration and production activities into more remote, frontier, and often more fragile and technically challenging environments such as the Lake Victoria Basin and the offshore deep-water areas in the coastal parts. Not only will these activities be costly, they could also have significant environmental and social impacts if not managed properly. It is essential that governments of oil-producing nations enhance their capacity to protect the natural environment and ensure that sustainable benefits of oil and gas development accrue for their citizens today and into the future.

From our benchmarking exercise we evaluated environmental and social governance of oil producing nations against a benchmark standard of best management practices for minimizing environmental impacts of oil and gas development. From this exercise we have consolidated our findings into the following six (6) major focus areas that will influence the Kenyan environmental systems to be proposed in this next stage of the Master Plan:-

- Institutional and Legal Environmental Governance Structures
- Environmental Impact Assessment Process, Monitoring and Implementation
- Emergency Response Planning and Risk Management
- Public consultation and involvement
- Environmental Damage Liability and Decommissioning of Oil and Gas Facilities
- Private Sector Involvement in Good Environmental Practice

Details of the above are discussed below with relevant and specific case studies.

7.5.1 Institutional and Legal Environmental Governance Structures

In a majority of countries studied, a sufficiently appropriate, but largely theoretical, environmental policy and legal framework is in place. However, the effectiveness of this framework tends to be compromised by the lack of a sufficiently organized administrative structure that enables efficient regulatory compliance and enforcement. Additionally, the human and financial resources needed for effective environmental governance are generally lacking. Institutionally, most countries have a dedicated institution in place for managing the environmental and social impacts of the oil and gas industry; this is either a ministry of environment, or a similar institution.

In Australia, environmental approvals are usually subject to a range of conditions. These often require the development and approval of more specific management plans, the monitoring of performance and impacts, remedial action and investment in further environmental research or environment protection programme s. For major projects these programme s add tens of millions of dollars to already high project costs and significantly increase regulatory uncertainty. For example, it took more than three years and a 13,500-page Environmental Impact Statement for the Gladstone LNG Project to achieve commonwealth and state approval. These approvals imposed 1,200 strict conditions over the project's operations and requirements for further extensive scientific work to be undertaken as the project proceeds. The industry generally faces overlapping state and federal laws with duplicative, inconsistent, ambiguous and often arbitrary requirements. Paperwork and costs are significantly increased and projects are delayed without improving environmental outcomes.

In Kenya, the roles and responsibilities are not only disjointed in terms of focus, but they are also scattered across various government agencies / departments at National and County levels. Several laws require revision because they were enacted before discovery of oil and gas in the country. Clear environmental governance structures are lacking due to the on-going transition to a devolved system in the country.

Different countries have taken different directions and used different approaches in the development of their environmental policies and laws for the petroleum sector. Some have gone for either comprehensive policies or laws for the whole sector or pieces of legislation specific for upstream, mid-stream and downstream. For upstream, some countries have developed different laws and policies for the onshore and offshore. Different countries have also developed different forms of environmental institutions / organizational-set ups to manage the petroleum sector.

While developing countries like Nigeria have fairly well comprehensive policies and laws for the sector, enforcement and compliance has remained a major challenge to deal with illegal activities especially in mid-stream and downstream that have proved to be a major challenge to the Environment, Health and Safety of the people. The high levels of poverty in areas where the pipelines are passing led to illegal connections and linkages.

The Nigeria Petroleum Industry Bill (PIB) of 2012, which is to replace the Petroleum Act of 1969, outlines detailed environmental quality management requirements for upstream activities. Every activity upstream requires an EIA license and an Environmental Management Plan with input of conditions from both National agencies and the Federal Government as outlined in the EIA Act of 2007. The Environment Management Plan should contain the licensee's or lessees environmental policy, objectives and targets as well as their commitment to comply with the relevant laws, regulations, guidelines and standard as approved by the Upstream Petroleum Inspectorate. Every company is also required to have a comprehensive environmental awareness plan to reduce negative risks to workers and local communities. The PIB introduced the submission of environment management plan by all licensees and lessees engaged in petroleum upstream operations within a period of one year after commencement of the PIB or three months after the grant of the license or lease. All companies have environmental liability to environmental pollution by contributing to a fund to take care of any unforeseen environmental damage. The Bill further outlines the Health, Safety and Environment guidelines for downstream operations but lacks comprehensive guidelines for mid-stream activities.

7.5.2 Environmental Impact Assessment (EIA) Process, Monitoring and Implementation

Most countries have some form of Environmental Impact Assessment (EIA) process that has been incorporated within their legal and regulatory framework. However, much of the emphasis of the EIA process appears to be directed toward approval of oil and gas projects rather than reflecting a life-cycle management approach to environmental and social issues. Evidence of this effect is that most countries make use of insufficient— and sometimes totally absent—control and enforcement mechanisms during the post-EIA approval phase.

Environmental monitoring and restoration mechanisms are either weak or not enforced. Limited countries also have well-established and functional frameworks for Strategic Environmental Assessment (SEA) and Social Impact Assessment (SIA).

In some countries, the full extent of the EIA, SEA and SIA processes, as dictated by best practice, are yet to be implemented. Particularly lacking is systematic and sufficient involvement of the public and local stakeholders, access to baseline environmental and social information in the affected area, complete analysis of project alternatives, and consideration of cumulative effects and regional impacts beyond the project level. Environmental monitoring and project follow-up are considered part of the EIA regulatory framework enforced in the majority of countries studied. Nevertheless, in many cases, actual enforcement practices are inadequate, environmental monitoring is insufficient, and monitoring data are either not disclosed or are not made widely available to the public and affected stakeholders. Moreover, most countries have insufficient - sometimes totally absent—control and enforcement mechanisms during the post-EIA and SEA approval phases.

While many countries indicate that regulatory enforcement mechanisms and risk management procedures for oil and gas activities are incorporated into the regulatory framework, actual on-the-ground enforcement of EIA approval conditions and regulatory limits is not occurring in a systematic and effective manner. This is attributed to either lack of technical, human and financial capacity or general lack of political goodwill to environmental management efforts.

In Canada, Strategic Environmental Assessment (SEA) is a key analytical tool used by the federal government to support environmentally sustainable decision making. It evaluates the environmental effects of a proposed policy, plan, or programme and its alternatives, and informs strategic decision-making through a careful analysis of environmental risks and opportunities. SEA facilitates the integration of environmental considerations early in the policy development process in order to reduce adverse effects on the environment, including effects of such environmental changes on health and socioeconomic conditions. Key benefits of SEA include identifying measures to enhance positive environmental effects and mitigate negative ones. SEA also helps to streamline the environmental assessment of projects by eliminating the need to address certain issues at the project stage, and enables consideration of cumulative environmental effects. Federal departments and agencies, including Environment Canada, are obligated to conduct a SEA for any policy, plan, or programme submitted to an individual Minister or to Cabinet for approval where implementation of the proposal could result in important environmental effects, either positive or negative. However, the SIA process is carried together with EIA as part of the assessment process. This is exactly what happens in Kenya and this is the best practice for developing countries. However, in Kenya SIA process lacks basic guidelines.

7.5.3 Emergency Response Planning and Risk Management

There generally lack comprehensive, effective and functional emergency response systems in place in most countries. However, some of the sampled environmental assessment reports reviewed in some countries contain a description of emergency response plans and procedures in relation to an accident, natural event, or other emergency like oil spills and fire outbreaks. Most of the response plans are not integrated to the National Disaster Response Plans. The environmental agencies also do not display adequate competence in human, technical/ equipment and financial resources to manage national disasters that may occur in the oil and gas industry. There lacks on-going monitoring of the effectiveness of the emergency response plans by both the oil companies and responsible government institutions.

In 2008, an overturned fuel tanker, in the Ghanaian town of Techiman, exploded killing at least 22 people and over 50 had serious injuries. The explosion happened as people tried to scoop up fuel that had spilt around the vehicle. Such incidents are frequent in West Africa where poverty tempts many risk salvaging fuel from accident sites. Kenya has experienced similar scenarios. During the 2011 Nairobi pipeline fire which was caused by an explosion secondary to a fuel spill where approximately 100 people were killed in the fire and at least 116 others were hospitalized with varying degrees of burns. The incident was not the first such petrol accident in Kenya, with the Molo fire of 2009 resulting in at least 130 fatalities and hundreds more injured. Impacts are always high due to similar reasons from other countries. In developed Countries like Canada and Israel, an oil spill contingency plan is mandatory for any form of approval. While this is mandatory in Kenya, the monitoring compliance to EIA license conditions has been less than satisfactory.

7.5.4 Public Consultation and Involvement

Regarding public consultation and involvement, governments may consult about oil and gas activities during the EIA process, but they disclose little information to the public and affected stakeholders. Consultation is more about informing stakeholders about proposed oil and gas projects than involving them in project-related decisions. Additionally, there are significant barriers to the disclosure of information about oil and gas projects and the natural and social environments in which they occur. Most governments lack a commitment to establish and implement a centralized information system; electronic or otherwise.

The impact of the public consultation process on the ability to affect decisions regarding oil and gas projects is not clear. This lack of clarity can have a significant effect on the confidence of local stakeholders and communities that their specific concerns about oil and gas projects will be heard and considered by both regulators and proponents. Governments appear to recognize the need to consult early on in the oil and gas development phase. Most governments hold consultation activities in the directly affected project area to maximize local involvement. However, they give little consideration to covering the costs of participation in the consultation process, or to requesting contributions from industry to reimburse stakeholder costs. In many cases, consultation with local communities focuses

more on the amount to be negotiated as compensation than on establishing communication links for managing environmental impacts throughout the project cycle.

In Turkey, ten (10) best practices on public consultation include the following which are outlined in Stakeholder Engagement Plan for each project undergoing EIA:-

- Open and transparent
- Well communicated
- Informative and educative/ Provide enough information
- Inclusive and equitable
- EIA team should be cooperative
- Initiated early and sustained
- Well planned and focused on negotiable issues
- Supportive to participants
- Respect local values, norms, culture/ religion
- Accountability to the community

The existing Kenya environmental laws lack most of the attributes above.

7.5.5 Environmental Damage Liability and Decommissioning of Oil and Gas Facilities

In most of the countries studied, governments pay little or no attention to issues regarding liability and decommissioning of oil and gas facilities. Here again, more effort is directed at granting approval to proceed with oil and gas projects than to considering the long-term impacts and costs of these projects. Governments lack a policy and process for decommissioning and abandonment and do not routinely assess, determine, or assign the future liability costs of decommissioning and abandonment. It is not unusual for governments to devote more attention to economic benefits from short-term gains within their mandate than to consider these costs at a later date in some future administration. Most governments make no commitment to ensuring timely reclamation.

Nigeria is one of the countries that have faced a lot environmental damage from the petroleum sectorial activities. Pipeline sabotage from oil theft and poorly maintained, aging pipelines have caused oil spills. The oil spills have resulted in land, air, and water pollution, severely affecting surrounding villages by decreasing fish stocks and contaminating water supplies and arable land.

The Niger Delta region suffers from environmental damage caused by pipeline sabotage from oil theft and also spills from illegal refineries. Poorly maintained, aging pipelines are also a reason behind oil spills as this can result in pipeline ruptures as they corrode. The amount spilled because of oil theft versus aging infrastructure and/or operational failures is highly debated among oil companies and environmental and human rights groups.
The United Nations Environment Programme (UNEP) released a study in 2011 on Ogoniland and the extent of environmental damage from more than 50 years of oil production in the region. The study confirmed community concerns regarding oil contamination across land

and water resources, stating that that the damage is ongoing and estimating that it could take 25 to 30 years to repair. The report indicated that environmental restoration of Ogoniland in Nigeria could prove to be the world's most wide-ranging and long term oil clean-up exercise ever undertaken if contaminated drinking water, land, creeks and important ecosystems such as mangroves are to be brought back to full, productive health.

In brief, governments lack regulatory guidelines for defining residual contamination limits in soil and water. In the absence of such guidelines, it is impossible to define how contamination should be cleaned up and to determine how these future costs should be assigned. While governments do include the need for a conservation and reclamation plan as part of the EIA, there is little or no requirement for governments to approve those plans and have proponents implement them. Most governments lack procedures for dealing with the liabilities resulting from oil and gas facilities that have no owners or that have been abandoned (orphan wells). This is another issue of concern for developing countries as the costs of remediating these liabilities may entail many years of litigation in court instead of being dealt with in a timely manner.

7.5.6 Private Sector Involvement in Good Environmental Practices

The benchmarking study found that there is room for improvement in the involvement of the private sector toward the application of internationally accepted best environmental practices to minimize the impacts of oil and gas development. Most countries studied lack a mechanism requiring oil and gas companies to adhere to the regulatory framework for managing environmental and social impacts in their country of origin. This is particularly important for Kenya and other developing countries that do not have a well-developed national regulatory framework and are under pressure to develop oil and gas resources rapidly as a means of improving economic conditions and local development. Governments also are not engaged in a dialogue with industry, which would facilitate the incorporation of changes or updates in best environmental practice into national environmental regulations.

7.6 Gaps in the Existing Policy, Institutional and Legislative Framework

To identify the existing gaps, literature review and consultation of key stakeholders included ERC, Ministry of Environment, Water and Natural Resources, NEMA, Ministry of Energy and Petroleum, KPC, National Oil Corporation of Kenya (NOCK), Kenya Maritime Authority (KMA), National Disaster Operation Centre, private oil and gas companies and civil society organizations among others. Our review of the existing environmental legislative framework revealed the following policy and legal gaps.

- *General Strategic Environmental and Social Assessment (SESA) guidelines and comprehensive regulations:* The existing 2012 NEMA draft of guidelines require public and stakeholder participation in order to improve on SEA resource requirements (human, financial and technical), procedures, standards and timelines. SESA regulations that shall indicate SESA detailed procedures, fees to be paid by proponents, penalties, etc. are currently not ready.
- *Petroleum Sector EIA/ EA Technical Manual Guidelines*. ERC has developed EHS

guidelines for downstream petroleum sub-sector, which are awaiting publishing. The Draft guidelines produced through a consultative process by the Energy Regulatory Commission (ERC) in consultation with the National Environmental Management Authority (NEMA) have not been finalized. These guidelines need to be finalized and published after including the upstream and mid-stream activities, which are generally lacking in the existing draft. Since ERC will not be regulating EHS issues in the upstream, it may be necessary this process to be transferred and accomplished by NEMA with the support of various lead agencies.

The private sector through the Petroleum Institute of East Africa has made an effort of developing EIA guidelines for downstream activities. PIEA guidelines require major review to include upstream (onshore and offshore) and mid-stream activities of oil exploration and production activities. The guidelines need to be adopted and officially published by the GoK/ NEMA for them to be applied by all petroleum sector stakeholders and professionals in the Country.

- *Social Impact Assessment (SIA) Guidelines:* SIA involves the analysis, monitoring and managing the social consequences of development strategies/ policies, plans, programme s and projects. Social issues that need to be emphasized in the existing EIA/EA regulations include assessment of impacts on people's way of life, culture and traditions, community, political systems, health and wellbeing, property rights, fears and aspirations. Currently, there exists a policy gap on information required during the EIA process on potential, socio-cultural, gender-specific impacts and opportunities of the oil and gas sector – including how men, women, youths and children who may experience risks and benefits from the sector.

- *Petroleum Sector Environment, Health, Safety (EHS) Guidelines*: for upstream, mid-stream and downstream activities and operations. These guidelines do not exist to date leaving a major gap in the sector, which is associated with high risks associated with the oil, and gas facilities work environment.

- *Hazardous Waste Management and Gas Flaring & Venting Legal Procedures and Environmental Standards:* There are no specific legal guidelines or technical manual on disposal of upstream oilfield waste management from drilling activities, oil wells and offshore wastes and gas flaring. Such guidelines need development to understand responsibilities and enforcement procedures, waste characterization and classification, waste manifesting and tracking, standards of oilfield waste management facilities, waste storage and transfer, biodegradation, thermal treatment, use of oil by-products, management of oilfield landfills, importation and export of oilfield wastes, treatment and waste transport by pipelines. There is basically no oilfield waste user's guide. After devolution of waste management to County Governments, there are insufficient procedures on capacity building of the new institutions on matters related to environmental protection and conservation especially in establishing oil field waste disposal facilities. The law does not provide a monitoring guide for upstream oil field wastes discharge into the environment and deep wells by gas and oil production facilities.

- *Environmental Charges/ Fees:* Annual "Effluent Discharge License" (EDL) legal requirements for application and the high rates of fees charged by NEMA have also proved to be tedious, inconveniencing and expensive for most petroleum businesses. Charges should be reviewed and provide legal and economic/ financial incentives for investment and environmental conservation. Ideally, effluent discharge fee should be based on pollution load and not site operations.

- Exposures to hazards present in the oil and gas well drilling, servicing, and storage industry have not been addressed in specific subsidiary legislation under OSHA 2007. Standards for personal protective equipment to be utilized in various workplaces within the petroleum sector to be developed so as to ensure anchoring of use of appropriate PPE based on exposures at work, within the law. The fire risk reduction rules of 2007 should be amended to capture risks and management of potential oil field fires.

- *Decommissioning of Facilities and Restoration:* Section 93 of the EMCA 1999 prohibits discharge of hazardous substances, chemicals and materials or oil into the environment and outlines basic guidelines on the spiller's liability. However, there exists no specific legislation envisaged in this section to handle the oil and gas environmental pollution. The "*polluter-pays- principle"* hangs in law with no specific guidelines manual on assessment of environmental damages.

- *Eviction and Resettlement Legal Guidelines:* To deal with land acquisition and social impacts, there is need for finalizing the existing drafts to ensure high environmental and social performance standards for this sector in public, private and community land. The guidelines should outline grievance redressal mechanisms for the conflict resolution during resettlement action planning. There should be guidelines to ensure offshore community/ fishermen compensation for instance in Lamu, where the major source of livelihood for the locals is fishing. In the event that petroleum activities interfere with their access to the fishing grounds, there should be clear guidelines on how the fishermen should be compensated and their communities developed.

- *Environmental Quality Standards for Petroleum Sector:* There is lack of environmental standards and guidelines for upstream oil drilling and mid-stream processing activities to meet international environmental quality thresholds.

- *Air Quality Standards:* There is lack of environmental standards and guidelines for upstream oil drilling and mid-stream processing activities to meet international air quality thresholds.

- *Environment Liability Policy:* The Energy Bill, 2015 and the The Petroleum (Exploration, Development and Production) Bill of 2015 requires that all operators shall have environmental liability policy as shall be prescribed by the Cabinet Secretary in charge of energy. The two draft laws require that all upstream, mid-stream and downstream developments shall comply with the Environmental Management and Co-ordination Act, 2009 and the Occupational Safety and Health Act, 2007. It is also important to note that the model Production and Sharing contract provides for establishment of a Decommissioning Fund to take care of environmental liabilities from the oil and gas sector. NEMA has also not published and implemented the Deposit Bonds Draft Regulations, 2014 which are targeting the extractives sector.

- *Institutional and organizational Set-ups:* There is no specific department or section in Kenya's National Environmental Management Authority (NEMA) clearly designated to handle oil and gas environmental, health and safety issues and implementation of emergency response programme s for the oil and gas industry in case of an emergency. NEMA also has very limited staff specialized in petroleum and environmental engineering issues who are able to undertake technical review of EIA reports from the sector and provide the advice expected by the oil and gas exploration companies. The Prevention and Control of Marine Pollution Bill, 2014 conflicts with the roles of KMA and NEMA in the EIA process and environmental compliance and enforcement

procedures. There is need to create harmony between the various roles with NEMA coordinating. Some of the mandates of KMA found in the Marine Pollution Bill come from International Conventions ratified by Kenya, which may not be possible to change.

- *Development of an Environmental Management and Information System (EMIS):* NEMA has not developed this system to the expected levels due to limited resources. EMIS provides a complete, largely automatic, fully integrated, state-of-the-art ICT solution for the environmental management: planning, assessment, compliance monitoring and impact assessment as well as emergency management. This will provide NEMA and other lead agencies with an information technology solution for tracking environmental data for the emerging petroleum sector as part of their overall Environmental Management Systems (EMS).

- *National Environmental Monitoring Laboratory:* This facility needs to be established to take a leading role in a broad range of specialized and internationally accredited analytical laboratory services, including sample characterization, quality assurance, technical consulting on laboratory services to the private sector. This will not only support the petroleum sector, but also quality management in all GoK environmental monitoring, assessment and research programme s across the country.

- *Oil Spill Preparedness, Emergency Response and Crisis Management:* The oil spill preparedness, emergency response and crisis management is disjointed and ill-equipped in the country. There is dire need for collection of key information for development of a National Oil Spill Contingency Plan and actions to strengthen the GoK's capacities in these areas. National Oil Spill Contingency Plan needs to be harmonized with the National Disaster and Emergency Response Plan especially on chain of command in case of an emergency onshore and offshore. There is also need for consultation and harmonization on the GoK agency that should enforce the *"polluter pays principle"* in Upstream, Mid-Stream and Downstream when damage is caused by oil spillage and other forms of pollution. KMA has the responsibility to coordinate development and implementation of this critical national plan for the maritime industry.

- *Clean Production Technologies:* The existing energy regulations lack mechanisms of institutionalizing energy efficiency in the oil and gas sector. The main aim should be to reduce cost and enhance competitiveness and profitability while promoting a clean and healthy environment in the petroleum sector. ERC and NTSA and other stakeholders are currently collaborating on this aspect to promote cleaner vehicles, fuels and reduction of emissions to the environment.

- *Environmental Provisions in Upstream Exploration and Production Sharing Contracts:* The Model PSC in the existing Petroleum Act does not impose any explicit environmental standards on contractors, other than the obligation to generally carry out petroleum operations in accordance with good international petroleum industry practice. However, in all contracts/ agreements on upstream exploration under the Petroleum (Exploration, Development and Production) Bill, 2015 have clauses that require the contractor to comply to local environmental laws and also apply the best environmental, health and safety practices to protect and conserve the physical and ecological environment (fauna and flora), national parks and nature reserves, properties and infrastructure, water sources, agricultural areas, forests, fisheries and any other natural resources when carrying out upstream petroleum operations. The law requires that immediately an agreement is signed, the contactor should undertake strategic environmental and social impact assessment and obtain SEA and EIA licences from the National Environmental Management Authority. The contractor is expected to conserve

petroleum resources by preventing and minimizing wastage of petroleum, protection of correlative rights and maximization of ultimate economic recovery. The contractor is responsible for site restoration or environmental damage to the extent the same pertains solely and directly to upstream petroleum operations conducted pursuant to the contract. In case of pollution resulting directly from the gross negligence or wilful misconduct of the contractor, the contract provides that the cost of clean-up and repair activities shall be borne by the contractor and shall not be included as petroleum costs under the contract except decommissioning costs. The Bill further prohibits venting and flaring of oil and natural gas except with the authorisation of the Upstream Petroleum Regulatory Authority and NEMA during production testing or for emergency reasons.

It is proposed that contract clauses on environment shall be reviewed by highly experienced and competent legal environmental experts at the Attorney General's office and NEMA before final contracts/ agreements are signed and should be customised from block to block depending on its sensitivity. The Petroleum (Exploration and Production) Act requires some amendments for purposes of realignment to the national existing environmental laws. It contradicts the use of SEAs, SIAs and EIAs terminologies and this may cause different interpretations and confusion in applications. Environmental monitoring, compliance and enforcement are facing challenges due to limited financial, technical and human capacity of NEMA, County Governments and other relevant Government Agencies like DOSH, Kenya Forest Service (KFS), Kenya Maritime Authority (KMA), National Land Commission (NLC) Water Resource Management Authority (WARMA) and Kenya Wildlife Service (KWS).

- *Access to Land for Petroleum Exploration and Production:* The land tenure system in most of the potential oil and gas basins is communal. Thus, land is collectively owned by the residents and managed, on behalf of the community, by the County Governments. Land adjudication to various communities/ clans is yet to be undertaken in most areas, thus pasture and settlement lands have no legal land ownership documents. This has been the main cause of boundary-related conflicts and inter-tribal and inter-clan clashes.

  The Petroleum (Exploration and Production) Act (CAP 308), requires that whenever, in the course of carrying out petroleum operations, any disturbance of the rights of the owner or occupier of private land, or damage to the land, or to any crops, trees, buildings, stock or works therein or thereon is caused, the contractor (the person with whom the Government concludes a petroleum agreement with) shall be liable on demand to pay to the owner or occupier such compensation as is fair and reasonable having regard to the extent of the disturbance or damage and to the interest of the owner or occupier in the land. This Act does not give guidelines on access to public and community lands in terms of compensation to the Government or County Governments.

  The Energy Bill, 2015 requires that in the event of a fire, explosion, oil spill, injury or fatality occurring in the course of operating a petroleum logistics facility, transportation or sale of petroleum, either by accident or through negligence, the operator or person transporting or selling the petroleum shall forthwith clean up the polluted or damaged environment, at the operator's own expense, to the satisfaction of the licensing authority and any other relevant authority. Every business is also required to put in place an oil clean-up plan in case of an emergency.

- *Sharing of Petroleum Resources and Opportunities for Community Economic Empowerment:* The current draft petroleum law (Petroleum Exploration, Development and Production Bill, 2015) proposes that the Government share of revenue from oil and gas shall be apportioned between the National Government, the County Government and

the local community at a ratio of 75:20:5, respectively. The local community's share shall be equivalent to five per cent of the Government share and shall be payable through the County Government. While all public land and minerals belong to the people of Kenya collectively as a nation, this proposed sharing formula will require public consultation and final enactment into law. Each County Government shall legislate on the prudent utilisation of the funds received under this section for the benefit of present and future generations. Public consultations of the communities in Turkana County where commercial oil is already confirmed, reveals that they stakeholders are negotiating for a local formula where the county revenue obtained from petroleum activities be allocated 60% for County-wide development projects and 40% within the local community/ sub-county where revenue is generated. This conflict is due to lack of National Guidelines on Revenue sharing from natural and mineral resources. There are also conflicts in opportunity sharing, especially available skilled, semi-skilled and un-skilled job opportunities and relevant good and services (for example, transport, security, supply of goods, etc.).

The Community Land Act, 2016 requires that every investor on community land shall spend not less than forty percent (40%) of the net income in any or some of the following: (a) provision of services to the community; (b) laying infrastructure in the community; (c) education and capacity building; or (d) payment of royalties. This benefit sharing formula conflicts with the draft petroleum law (Petroleum Exploration, Development and Production Bill, 2015) and may have some constitutional loopholes that need to be sorted out before the law is enacted. There is also need to harmonise on the legal institution that should enter agreements on community land leases for oil and gas exploration.

- *Institutional and Organizational Set-ups:* There is no specific department or section in Kenya's National Environmental Management Authority (NEMA) clearly designated to handle oil and gas environmental, health and safety issues and implementation of emergency response programme s for the oil and gas industry in case of an emergency. NEMA also has very limited staff specialized in petroleum and environmental engineering issues who are able to undertake technical review of EIA reports from the sector and provide the advice expected by the oil and gas exploration companies. The Prevention and Control of Marine Pollution Bill, 2014 conflicts with the roles of KMA and NEMA in the EIA process and environmental compliance and enforcement procedures.

- *Environmental Due Diligence:* Environmental Due Diligence (EDD) is an increasingly international important part of the corporate due diligence process. Environmental liabilities can be large and hidden, and there are many examples of purchasers and funders being hit with unforeseen costs. The current laws do not mention this requirement and even sharing of the final report with NEAM for approval or advisory purposes.
- *Occupational Health and Safety Policy, Legal, Institutional Gaps*
    - There are no policy guidelines on: governing formulation of OSH Policies by players in the Upstream Petroleum Sector
    - There are no policy guidelines relating to needs analysis and capacity building in the institution bestowed with the responsibility of implementing the provisions of OSHA, 2007 (DOSHS)
    - There are no policy guidelines on budget allocation for the promotion of OSH activities in the upstream petroleum sector

- There are no policy guidelines in the relevant codes of practice for OSH Auditing and OSH performance monitoring in the upstream petroleum sector
- There are no policy guidelines on hazardous work operations associated with upstream petroleum sector, e.g. Rigging Safety, Flaring, Drilling chemicals storage, handling and disposal, etc.
- There are no policy guidelines on appropriate hazard control interventions including but not limited to appropriate PPEs to be used in the upstream petroleum sector.
- There are no policy guidelines on needs analysis and capacity building to the OSH experts and other stake holders obligated to give OSH advisory support to the upstream petroleum sector
- There are no policy guidelines on Emergency Response and Evacuation Plans in the upstream petroleum sector
- OSHA, 2007 and its subsidiary legislations does not adequately cover petroleum safety in the upstream sector
- OSHA, 2007 does not cover Community Health and Safety
- The Petroleum (Exploration, Development and Production) Bill, 2015 has established the National Upstream Petroleum Advisory Committee under Sec. 12. However, the Director, DOSHS, has been omitted in the advisory Committee
- The Factories (Fire Risk Reduction) Rules, 2007 in their formulation, envisages small workplace fires and have not adequately given legal guidelines on fires of the magnitude envisaged in the upstream petroleum sector
- The Factories (First Aid) Rules, 1977 are too general and do not adequately cover injuries of the magnitude envisaged in the upstream petroleum sector, considering the isolated nature of the upstream petroleum fields and facilities
- DOSHS has inadequate infrastructural, competence and operational capacity to implement and enforce OSHA, 2007 in the upstream petroleum sector.
- There are cross institutional mandates overlap. There are some mandates that put DOSHS, NEMA and Public Health in conflict, e.g., noise, medical examinations, pollution, etc. Furthermore, the proposed Upstream Petroleum Regulatory Authority will put into conflict some of the mandates bestowed upon the aforementioned institutions.
- There are no policy guidelines relating to Marine Safety in the offshore upstream petroleum sector
- OSHA, 2007 and its subsidiary legislations does not adequately cover Marine Safety in petroleum sector
- There are no policy guidelines relating to Marine Safety in the offshore upstream petroleum sector
- OSHA, 2007 and its subsidiary legislations does not adequately cover Marine Safety in petroleum sector
- There are no policy guidelines on Petroleum Transport Safety
- There are no policy guidelines in the safe establishment and management of the pipeline gas heating stations

- OSHA, 2007 and its subsidiary legislations do not adequately cover Transport Safety in petroleum sector.
- There are no policy safety guidelines on Retail Petroleum Sites and Gas filling plants
- There are no policy guidelines in the safe establishment and management of (marine) floating petroleum retail sites
- OSHA, 2007 and its subsidiary legislations does not adequately cover Safety at Retail petroleum sites and Gas filling plants in petroleum sector.
- There are no policy safety guidelines on Retail Petroleum Sites and Gas filling plants
- There are no policy guidelines in the safe establishment and management of (marine) floating petroleum retail sites
- OSHA, 2007 and its subsidiary legislations does not adequately cover Safety at Retail petroleum sites and Gas filling plants in petroleum sector.

- *Integrated EIA Approach:* All EIA reports reviewed had not taken into consideration an integrated approach to Environmental Impact Assessment. The Code of Practice and Professional Ethics for Integrated Environmental Assessment and Audit Experts in Kenya expects them to apply an integrated approach since this Code defines "Integrated Environmental Assessments" to include Environmental Impact Assessment, Archaeological Impact Assessment (AIA), Social Impact Assessment (SIA), Health Impact Assessment and Cultural Impact Assessments (CIA). However, most EIA experts ignore this because either they have no capacity or most project components find it expensive or due to land of legal requirement on the same. The HIA is a means of assessing the health impacts of policies, plans, programme s and projects in diverse economic sectors using quantitative, qualitative and participatory techniques. HIA helps decision-makers make choices about alternatives and improvements to prevent disease/injury and to actively promote health, which is one of the goals of sustainable development. The World Health Organisation (WHO) supports in the development of tools and initiatives in HIA to dynamically improve health and well-being across sectors. A well-executed HIA can prevent new project delays by anticipating, soliciting and appropriately incorporating stakeholder concerns and suggestions into the overall project design. Similarly, existing operations can also benefit by the timely assessment and evaluation of a broad range of impacts. One of the key benefits of the HIA process for stakeholders is the awareness that health is a relevant and significant cross-cutting issue.

- *Quality and Standard of Environmental Impact Assessment (EIA) and Audits:* More than 70 EIAs conducted in the fields of seismic, construction, exploration, drilling, installation and remodeling between the years of 2008 and 2016 (see annex) were quickly reviewed to understand their general content, and identify key weaknesses. Majority of these were undertaken by Tullow Kenya B.V; the rest being conducted by smaller companies such as Total Kenya Limited, National Oil Corporation of Kenya, Gulf Energy Kenya and Astrol Petroleum Company. The most active oil blocks have been 10A, 10BA, 10BB, 13T, 12A, 12B, L4, L16, 11B, L22, L14, L21, L23 and L24. The counties in which the EIAs were conducted are majorly the ones where exploration and seismic activity is being undertaken. These include; Marsabit, Turkana, West Pokot, Elgeyo Marakwet, Baringo, Samburu, Lamu, Tana River, Wajir, Garissa, Mandera, Mombasa and Kilifi. Other Counties such as Nairobi, Kisumu, Nakuru, Uasin Gishu, Mombasa and Kiambu recorded the highest number of EIAs for retail petrol stations and storage.

The general quality of Environmental Impact Assessment process and reports in Kenya by reviewing EIA reports and statements for offshore and onshore oil and gas projects was done at NEMA headquarters registries, websites of NEMA and investors in this sector. Experts were also consulted through SESA workshops. Reports for upstream, mid-stream and downstream projects were sampled and reviewed in Lamu, Nairobi NEMA head office and Turkana counties. The SESA study process identified deficiencies in the EIAs and EMPS which include:

- Lack of adequate training among most EIA experts in the country on petroleum sectorQuality of report is low and they have many gaps required by other government agencies like ERC, KFS, KWS, NMK, WARMA, and DOSH among others and also they do not meet international level standards, especially those of IFC/ World Bank.

- Inadequate technical skills and manpower at NEMA and lead agencies in reviewing EIA and audit reports.

- Disclosure of EIA and Audit reports and final decisions/ licence conditions to the directly affected persons/ local communities

- Limited public participation in the whole EIA and audit processes

- No clear guidelines on who project reports should be submitted to, reviewed and licenced. Currently, some are licenced at counties and NEMA head office. Due to the high impacts from petroleum activities, all are supposed to be handled by the head office due to limited capacities at the counties

- Counties have not established County Environment Committees. Hence, reports are approved by the County Director of Environment

- *Gaps in Local content policies/ laws:* Consultations with companies undertaking oil exploration in the country, registered the following as key challenges or limiting factors in local content development that need to be addressed: -

    - Un-competitiveness of local firms
    - Limited relevant experience and technical capabilities
    - Poor production quality and reliability,
    - Low compliance to international health, safety and environmental standards
    - Weak public sector regulation and inefficient bureaucracies
    - Defining the meaning of local content in the context of National and County Governments devolution governance structure in the Country
    - Cultural diversity, ethnicity and clannism which attempt to give a local meaning to 'local content' different from the international and Kenyan constitutional

- *Strategic Environmental and Social Assessment (SESA) for future new PPPs in the Petroleum:* The existing petroleum sectorial policies, programme s and plans had not undergone a Strategic Environmental and Social Assessment (SESA) process until the current study was undertaken to cover the whole sector. If new PPPs emerge in future, they should undergo individual SESA process to protect and conserve the environment and also protect the local communities at the policy level. Hence, the current SESA does not exempt new policies, programme s and plans by government and other lead agencies.

8.0 CHAPTER EIGHT: POLICIES, PLANS AND PROGRAMME S ALTERNATIVES ANALYSIS

8.1 Introduction

This chapter presents an in-depth evaluation of alternatives to Policies, Plans and Programme s assessed in the Petroleum Sector by looking into: (1) the alternatives/ options against the SESA objectives and baseline; (2) the alternatives, positive and negative environmental and sustainability effects; and (3) residual impacts of each alternative/ option evaluated or compared.

In light to this the SESA report the following alternatives were prioritized for analysis because most stakeholders had concerns on them: -

1. Alternatives to the Licensing Plan
2. Land Compensation Alternatives
3. Oil Transport Systems
4. Alternatives to Reduce Greenhouse Gas Emissions
5. Renewable Energy Alternative
6. Maritime Disputes Resolution Methods

8.2 Alternatives to the Exploration, Development and Production Licensing Plan

The following alternatives were identified and discussed below in consideration of the Petroleum Exploration, Development and Production bill of 2015 which states the proposed Plan on Licensing/petroleum agreement as exercised by the Cabinet Secretary:

a) No award of licenses
b) To proceed with the licensing programme as proposed (Unlimited award of licenses);
c) To restrict the area licensed temporally or spatially.

8.2.1 No Award of Licenses

This option proposes not to offer any blocks for licensing; an option that is incompatible with the main objectives of the Plan. In the absence of the award of licenses, all exploration and development activities would be undertaken by developers who had been awarded Petroleum Exploration and Development Licenses (PEDLs) previously and so some exploration and development activity would still take place but with a controlled or minimal ecological footprint due to minimized exploration and production activities.

8.2.2 Proceed with the Licensing Programme as Proposed

This option does not place restrictions on the number of licenses awarded or the area subsequently covered by licensing blocks, other than necessitated by the requirements of the as stipulated in the Petroleum Exploration, Development and Production bill of 2015. It supports the main objectives of the Draft Licensing Plan which includes: the comprehensive exploration and appraisal of Kenyan oil and gas resources and the economic development of

identified reserves. Ensuring that there is no upper limit to the number of applications received and the number of licenses subsequently awarded will maximize license take-up. Any activities under the license have to meet regulatory conditions including planning permission, environmental permitting and scrutiny by the EHS Personnel.

8.2.3 Restrictions on the Award of License

Restriction on the award of licenses can either be by;

i. Reflecting the Government's Climate Change Commitments;

Nationally the Government through the Climate Change Act of 2016 (section 3) seeks to enhance climate change resilience and low carbon development for the sustainable development of Kenya through:

i. mainstreaming climate change responses into development planning, decision making and implementation;
ii. building resilience and enhance adaptive capacity to the impacts of climate change;
iii. formulating programme s and plans to enhance the resilience and adaptive capacity of human and ecological systems to the impacts of climate change; Climate Change No. 11 of 2016 C17A - 7 [Issue 3]
iv. Mainstreaming and reinforcing climate change disaster risk reduction into strategies and actions of public and private entities; among others.

This option to restrict the award of licenses in light and consideration to the Government's climate change commitments to reduce Kenya carbon emissions over time. This option would support those main objectives of the Draft Licensing Plan that aim to protect the biodiversity, ecosystem functioning and the interests of nature and heritage conservation, and other material assets and users. However, proposals to restrict licenses are more difficult to reconcile with the other objectives of the Plan (the comprehensive exploration and appraisal of Kenya oil and gas resources and the economic development of identified reserves). Legislative targets for reducing Kenya's impacts on climate change should be considered to ensure a sustainable progress. That notwithstanding, licenses are offered for prospecting with no certainty that strata will contain oil and gas, or that if they do, that it would be recoverable. Restrictions based on an assessment of carbon intensity and quantity cannot then be applied before license award but only at the point of the extent of a reserve being determined. This degree of uncertainty would prove difficult to address adequately or equitably at license award. However, restrictions could be applied e.g. limit the amount of oil or gas extracted, or require carbon offsets proportional to the amount of oil or gas extracted.

Restricting licenses based on climate change obligations is of uncertain value due to the practical difficulties of implementation; therefore, it is not a reasonable alternative.

ii. Phasing License Awards

Enabling a number of pilot unconventional oil and gas sites first, so as to enable monitoring and assessment of the impacts before committing to a large scale roll-out;

This would enable monitoring and allow assessment of the exploration impacts before committing to a large scale roll-out. This option would support those main objectives of the

Draft Licensing Plan that aim to protect the biodiversity, ecosystem functioning and the interests of nature and heritage conservation, and other material assets and users. However, proposals to restrict licenses are more difficult to reconcile with the other objectives of the plan (the comprehensive exploration and appraisal of Kenya oil and gas resources and the economic development of identified reserves). This option could only be effective in the absence of other opportunities for oil and gas activity, so that only as a result of this licensing would oil and gas licensing begin. However, a significant number of licenses have been awarded and are still in force and development of some sites is at an advanced stage. The regulatory system which applies to these activities would also need to impose a series of additional requirements. Phasing of awards would also lead to concerns on discriminatory practices.

iii. Limiting the Area of Land Available to be Licensed

This is done by establishing a 'ceiling' figure for the total area of land. Petroleum exploration and development licenses (PEDLs) would then be awarded in merit order. This is assumed to lead to a reduction in the level of associated activity. This in-turn lessens the magnitude of both positive and negative effects, such that it is unlikely that they would be considered significant when compared to existing oil and sector activities. However, there remains the potential for effects from licensing to be clustered in certain areas, where geological conditions are more favorable, meaning that such effects could be locally significant for the communities that host licensed oil and gas activities.

The underlying intent of the option would be to reduce the amount of exploration activity. However, licensing (of the area available) does not necessarily affect the scale of exploration activity per se. This is ultimately determined by where the land is and the size of the hydrocarbon reserve, once ascertained, as well as the acceptability of these activities in the relevant areas. As a result, it is not possible to estimate in advance just what impact on activity any restriction of area may have. There is a further practical concern that the choice of a suitable 'ceiling' area of land appears essentially arbitrary and lacking in inherent justification.

Notwithstanding the uncertainties it does provide a means by which it is highly likely that the scale of overall activity and the effects resulting from this activity can be lessened. As such, it is an alternative that is realistic and can provide a means to reduce any significant adverse effects arising from the licensed activities.

iv. Limiting the Areas in which Licenses can be Awarded by Establishing and Applying Locational Criteria

The underlying intent of the option would be to ensure that licenses should not be issued in respect of areas where exploration or production activities might be undesirable because of its environmental (or other) impacts on that location. This option would support those main objectives of the draft Licensing Plan that avoid compromising the biodiversity, ecosystem functioning and the interests of nature and heritage conservation, and other material assets and users. However, proposals to restrict licenses are more difficult to reconcile with the other objectives of the plan.

Locational criteria could include a range of factors, which could be positive or negative or which could operate individually or collectively, for example:

- Avoidance of awarding licenses within close proximity to sensitive receptors (whether local communities, designated sites, surface water resources or ground water bodies). A precautionary distance of up to 15km could be used (depending on the receptor); and

- Preference for awarding licenses given to areas within Water Resource Zones in surplus, with good connectivity to the water mains, good connectivity to the gas network and with good transport links.

Excluding sensitive receptors and using a precautionary distance may have the unintended consequence of significantly reducing the area that is available for licensing, depending on the locational criteria used, which would make it difficult for the alternative to contribute towards the objectives of the licensing plan (to make comprehensive exploration and appraisal of Kenya oil and gas resources and the economic development of identified reserves). In addition, an approach based on broad criteria does not reflect the reasons for a specific site designation and the extent to which any licensing activity will have an effect. Locational criteria do however provide a means to mitigate effects. The material benefits of considering locational criteria will be addressed through inclusion in the mitigation measures section.

Considering the above discussed options, an alternative based on offering no areas for licensing under this ground will have no effects on the environment. However, and in common with all options for the Draft Licensing Plan, it should be borne in mind that licensed activities will still take place as developers have already been licensed.

The alternative that seeks to restrict the licensing area, provided that it does affect the scale of activity, could lead to a reduction in the magnitude of the environmental effects identified. As such, it does present advantages when considering the objectives of the draft Licensing Plan that seek to avoid compromising the biodiversity, ecosystem functioning and the interests of nature and heritage conservation, and other material assets and users.

However, given the importance of achieving the other objectives of the plan, and that the activities that follow licensing will need to meet a range of regulatory requirements (which, when applied and enforced, will ensure that effects at the project level will be identified, assessed and mitigated to an acceptable level), the unrestricted alternative (i.e. the draft Licensing Plan as proposed) may prove to be the preferable alternative.

The Licensing Plan as proposed, should be adopted, but with licensing conditions.

8.3 Land Compensation Alternatives

Compulsory acquisition is the most commonly used method of acquiring land for project development in Kenya. The compulsory acquisition of interests in land is provided for in the Land Act 2012 of Kenya. Whenever satisfied that it may be necessary to acquire a particular land, a request should be submitted to the National Lands Commission which in turn shall

prescribe criteria with guidelines to be adhered to, in the acquisition of the land. Upon approval of the request, the registrar publishes a public notice in the gazette after which the intended acquisition is registered.

With respect to this acquisition, once the compensation awards have been made, they represent a conclusive evidence of; (1) the size of the land to be acquired (2) the value, in the opinion of the land commission (3) the amount of the compensation payable

The challenge in the process is that the compensation award is not subject to invalidation in case of a discrepancy that may arise later between the area specified in the award and the actual area of land acquired. The Commission may also be inclined to reject the request to undertake an acquisition if the request falls short of the constitutional requirements (Article 40[3] of the constitution of Kenya).

The two widely applied modes of land compensation in Kenya are "land for land" and "cash for land". Despite their general acceptability, sustainability concerns continue to arise especially among the directly affected communities. The current Plans, Programme s and Policies do not adequately address the issues as gathered from stakeholder consultations that were undertaken during the development of this report. The alternatives discussed hereunder focus on 2 priority areas:

a. Options for land compensation
b. Compensation options for communities operating offshore

8.2.1 Options for Land Compensation

The three main options are cash compensation, leasing and no cash/in-kind compensation.

8.2.1.1 Cash compensation

Land losers (*Project Affected Persons*) receive cash instead of alternative land and the money is used to buy viable land elsewhere. The merits of cash compensation are 1) Land losers are able to choose viable land elsewhere and select locations of their preference and 2) Cash compensation could provide opportunities for opening family businesses. On the other hand, there are numerous demerits which include (1) In the long run cash compensation is least helpful particularly for rural and other marginal populations. Rural economies are in large part non-monetized, based on reciprocal exchange of goods and services; therefore, people are not well accustomed to managing cash. Some rural people have very little transaction experience with the outside world. The sudden cash in their hands gives many the false impression of being wealthy and they change their life style to a negative harmful way, (2) Finding relocation land is increasingly difficult. In addition, the costs for relocating, transporting, salvaging building materials, and so on can put financial strain on the displaced persons if not well accounted for in the cash compensation package. Furthermore, compensation for land acquisition should not be limited to monetary payments for individuals; there should be appropriate compensation to the community for people to re-establish their new communities, (3) Landless labourers are often the hardest hit group in the relocation processes due to their lack of ownership and entitlement to land. In many cultures, women are involved with land-based activities and

in herding animals; they are part of the productive work force and contribute substantially to the sustenance of the family. However, compensation monies always go to men, often leading to mistrust and division in the family. Governance for Extractive Industries Programme , a World Bank Institute's on 11th May, 2015 did an article that exposed deep abuses of women and children land rights related to the Hoima Oil Exploration with many reports of neglect by men who were the custodians of compensation monies and major land owners and (4) Cash compensation puts a huge burden on the government and is the reason why the Land Value Index Laws (Amendment) Bill, 2015 has been introduced in parliament to cap the rates and fraud cases of land peddlers that often put large infrastructural developments on hold.

According to Partridge (1989) three main issues of cash compensation are: (1) evaluating the worth of property to determine the amount of payment; (2) the timing of the payment; and (3) determining noncash compensation where cash alone is not appropriate.

8.2.1.2 Leasing by government

The government acquires land from owners and sells or leases out the whole or part of the acquired land to the company intending to acquire. The government receives the rent or fixed income from the acquired land since it is transferred to a company on lease on fixed rent yearly, while displaced persons get compensation. In such cases, part of regular income of the government from that project for which land is acquired would accrue to the relocated families as a part of compensation so as to guarantee annual percentage payments for the duration of the lease. There should be two types of compensation for leasing; the first being compensation for the surface while the second being the oil and gas royalty which is the percent of money generated by the oil. The Merits of leasing include (1) Land owners are not totally dispossessed of land but have the chance to regain it once the project is decommissioned, (2) The government or company does not have to totally own the land which is only needed for a short term as in the case of Safaricom Limited's approach of acquiring land for their network cables and transceiver stations and (3) The regular income may also be converted to pension to the displaced persons to become available in future and (4) future generations of the land loser will benefit from the annual income unlike when the compensation is done in lump sum and the land loser spends it all.

Issues with leasing are such as: (1) In most instances companies will offer payment per foot or per length of land required instead of per square foot which would also take care of the width of land required which reduces the rent values for the land, (2) Many land owners tend to forget that they are entitled to claim royalties from proceeds from the land they would have surrendered, (3) When only a portion of property is taken by a pipeline, this may result in decreased value for the remainder of the property that was not taken. These damages are referred to as "remainder damages". For example, if a pipeline company seeks a 50-foot easement, but that easement will cut off access from the property to a major roadway, there could certainly be remainder damages involved and (4) The amount of compensation is generally calculated on the basis of land area but does not take into account of land-loser's loss, for example, loss of livelihood or loss related to dislocation. Also, it is not only the land-owner who actually suffers loss because of the land acquisition, but there are many other landless people who lose their means of livelihood attached to the

land which is acquired, e.g. weavers, barbers, landless labour, potters, carpenters, etc. They face loss due to the acquisition of land as well as due to the breaking up of the community.

8.2.1.3 No cash/in-kind compensation

With careful and participatory planning, opportunities can be identified for the affected people to derive project-related benefits or to capitalize on opportunities to improve their incomes or productivity. Some impacts are secondary and do not occur directly as a result of loss of land but as a result of economic re-structuring. In-kind compensation is applicable especially where there is possibility of off-farm income or other benefits that accrue from the project especially for the community. Some forms of in-kind compensation may include setting up of community projects or social investment ventures. The demerit is possible time lags between the time land is acquired and the time benefits begin to accrue.

8.2.1.4 Issue of government bond or equity in a government owned entity

This compensation type has also been proposed by the Land Value Index Laws Amendment Bill, 2016. Land owners may be issued with shareholding capacity where they can own and share in part of the profits of bonds or equities. Alternatively, one part of the share of the company can be distributed among the displaced persons. In such cases, the displaced persons hold partial ownership rights and participate in the decision making process, and also receive part of profits of the company. This option lessens the burden of the government of having to pay high cash compensation rates to many people all at once but has demerits such as (1) Shareholding might be a complex thing especially for local communities who may not be well versed with transaction procedures and may not know the valuation criteria used to assign shares and (2) This mode is subject to economic shocks.

8.2.2 Compensation Options for Communities Operating Offshore

The most severely affected communities in terms of land utilization in this region are the fishermen. These can be compensated through cash or through other options as discussed below:

8.2.2.1 Access to Loans and other Credit Facilities to Start Alternative Livelihood Activities

Land losers can be enabled through access to loans and training to start other income-generating activities. The main challenge here is low of government capacity to monitor the use of monies acquired through loans. In the end communities might become impoverished. Establishment of SACCOs may help in the long-term.

8.2.2.2 Compensation through Capacity Building

Fishermen may be equipped to fish in other zones. LAPSSET has decided to empower fishermen to do deep sea fishing. In addition, fishing communities may be strengthened in terms of technical capacity through training so that they can find alternative income sources e.g. through employment in the oil and gas sector. Appropriate jobs can be offered to the skilled or semi-skilled livelihood-losers as an alternative choice of compensation. This model worked well in Tanzania offshore exploration activities where fishermen had their capacity

built and some were subsequently absorbed as workers in some of the project jobs including as cleaning and maintenance staff. The rig pass is an accredited workshop which meets the training requirements applicable to production and drilling. The programme prepares people for any operating environment, at any site, whether onshore or offshore. The rig pass programme is an independent audit and accreditation system. The programme ensures that personnel are equipped with the basic requirements defined by safety and training professionals in the drilling sector. The government can introduce a regulation that requires companies to provide this training to disenfranchised communities. The Merits of Capacity Building are (1) Local communities gain new skills which they did not have earlier and thus diversify their income sources and (2) With years of experience the locals can become key actors in the oil and gas sector.

The demerits of Capacity Building include (1) there are minimal training standards especially in rig access that have to be undertaken. Specific institutions that offer this training are very few and (2) Ethical considerations in cases where exploration companies ship in their own technical staff and tend to either exclude local communities or reserve for them the casual jobs. Regulations should be strengthened to ensure proper involvement of affected communities.

In conclusion, leasing is a best practice when it comes to compensation for land because owners do not have to completely lose their land and they get regular income which compensates for loss of land-based income generating activities.

8.4 Alternative Transportation Modes

Transport infrastructure exerts pivotal significance at the cost of doing business and the interaction between markets. According to African Research and Resource Forum, factors to consider when putting up infrastructure are:

- **Conception**: which transport infrastructure? Why?
- **Planning**: what trips are to be served? Which transport mode is most appropriate? Which is the optimal transport modal mix? Where will they go? How will they arrive? Which network?
- **Construction**: who will build the infrastructure? Which technology will they use? How do you build domestic capacity?
- **Management/service delivery**: who provides the transport service? How much do they charge for it? How do they provide? How do you regulate transport service delivery?

Factors to consider when selecting a suitable transportation mode are

- Cost-effective transportation with reduced mileage for road and rail transport
- Use of environmental friendly fuels in engines e.g. compressed natural gas and hydrogen
- Preference for pipeline transportation as opposed to road. Reduced heating e.g. heating technologies for heated pipeline can be adopted.

8.3.1 Road Transport

Road transport through trucks is currently the main artery of transport. Trucks are the most limited oil transportation method in terms of storage capacity but with prospects for increased activity in the oil and gas sector, mass transit solutions should be a prime objective of Kenya's road sector expansion policy and strategy. Along with this should be increased safety measures and enabling technology for greater efficiency and effectiveness. Improving the coverage and quality of roads in Kenya is therefore a key policy issue. Emphasis needs to be placed on efficient planning and construction for adequate connectivity to facilitate traffic flows, and adherence to well thought out and technically evaluated maintenance programme s in order to preserve the valuable road assets. The ongoing upgrading and rehabilitation of corridors will ensure improved mobility and connectivity. In Kenya the strengths of road transport are (1) Road coverage in the country is fairly good thus increasing flexibility in terms of potential destinations and (2) The country has good motorization level. Motorization level is an important measure in assessing the share of public transport available for public transit and commercial. However, the sector faces challenges such as:

- On its own, it renders costs of freight and speed of movement unfavourable to competitiveness of the region. This is majorly due to mechanical problems and limited carrying capacity. Trucks are the most limited oil transportation method in terms of storage capacity. Faster degradation of roads in Kenya and congestion externalities augment the huge losses in transit trade and productive working hours.
- Safety is an issue given the high road carnage rates in the region and the attendant high transaction costs. Road accidents and fatalities due to weak enforcement of policies and regulations and inadequate emergency preparedness are obvious.
- There is inadequate of harmonization of transport policies especially between potential partner countries which require redress.
- Vehicular gas emissions: This can be approached through a policy directive for all vehicles to have catalytic convertors installed.

8.3.2 Pipeline Transport

Pipeline can be used to transport crude oil from the wellhead to gathering and processing facilities or to move refined products to local distribution facilities. Pipeline transport offers a cheaper and safer means of transporting petroleum products in Kenya. Expansion of pipeline connections and increasing flow rates for the Mombasa–Nairobi pipeline is a good example of the practical interventions for improved performance in the transport sector. Kenya Pipeline Company Limited, a key player in the region through its long pipeline infrastructure from Mombasa to towns near Uganda. Extension of the pipeline infrastructure within and increasing flow rates hold the key to greater cost-effectiveness, environmental safety and road asset preservation when transporting petroleum products. The proposed LAPSSET will also be a significant contribution to the pipeline transport system in Kenya. Merits of pipeline transport include (1) Improved safety and security due to elimination/minimization of accidents, (2) Cost-effectiveness- it makes substantial contribution to reducing transport costs of petroleum products over long distances, (3) Helps reduce road deterioration and the high risks associated with heavy tankers in the case of road transport and (4) pipelines require significantly less energy to operate than trucks or rail and (5) they have a much lower carbon footprint.

The sector does not have major known challenges apart from the investment costs which are usually high. The huge financial implications of putting up pipelines have led to the government finding alternative financing methods by collaborating with the private sector (PPP) in a model of Design, Build, Finance and Operate ("DBFO") for such projects.

8.3.3 Railway Transport

Poor performance on rail transport calls for concerted railway transport infrastructure development to enhance goods freight in the country and offset the excessive burden on roads. Expanding, upgrading to standard gauge, and modernizing the railway infrastructure are critical steps to ensuring a more efficient and effective movement of passengers and goods. This will further strengthen connectivity between offshore and points of delivery further inland. Railway transport is key to efficient and effective movement of raw materials, and refined goods and services. It is believed that effective railway network gives more than 50% competitive advantage over trucks in East Africa. Key regional corridors are performing poorly but luckily with the ongoing construction of SGR this scenario is set to change.

The merits of rail transport are; (1) This mode is cost-effective. Channelling most of bulk freight to railway transport will result in cost savings that can then support other infrastructure developments, and in turn deliver on the funding needs for maintenance of the rail infrastructure itself, (2) Enhanced environmental gains such as reduced per capita emissions and enhanced space economy can be sustained by improving railway freight performance, (3) Rail can rapidly enter markets because the new facilities needed can be put up cheaply and quickly to handle expansion and (4) Railways often have shorter transit times between point-of-origin and final destination compared to road.

Some of the challenges of rail transport include:

- There is need for capacity building, improved design and workmanship of trains and wagons to increase efficiency. Utilization of technology will help.
- Substandard data and information especially regarding accidents and spillages lowers the attractiveness of railway transport.
- Huge investment burden yet corruption perception index and political instability reduce the chance of investment in the mode.
- Poor monitoring and evaluation practice and trans-boundary supervision issues which leads to poor reporting and oil siphoning

8.3.4 Maritime/Barge Transport

This is the best way of linking Kenyan oil to the world. The strengths of this mode of transportation for the Kenyan oil and gas sector are mainly; (1) Burden of custom procedures for Kenya is good, (2) The liner shipping connectivity of Kenya has been increasing gradually. Liner Shipping Connectivity Index (LSCI) is an indicator of connection to global shipping networks and is crucial in maritime transport sector performance and (3) they are much cheaper compared to pipeline or rail for example, a 30,000-barrel tank barge is equivalent to 45 rail tank cars at about one-third the cost.

There are however a few challenges with this mode of transportation which include;

(1) The cost of container transport is very high and (2) Congestion at the ports, inadequate container capacity and dismal transhipment performance. The Port of Mombasa can only be

Kenya's transhipment hub after major dredging. The prospects for export-led growth are dimmed under the current underperforming scenario. There is need to increase the number of ships and the vessel size for greater economies of scale, improve the quality of port infrastructure, establish more shipping companies that are efficient in their scheduled services and spatial coverage. Privatization of the port of Mombasa and establishment of a Free Trade Zone in Lamu are some possible solutions.

In conclusion, there have been earnest efforts towards harmonizing regional transport policies and regulations. Political will however, remains a central factor of success in the ongoing efforts to reform policy and regulatory frameworks. Pipeline and maritime transport are the best case scenarios for transportation and export of crude oil and finished products for Kenya.

8.5 Alternatives to Reduce Emissions of Methane and Other Greenhouse Gases in the Oil and Gas Sector

While the main impact of oil and gas on climate change comes from end-use combustion, the industry is coming under increasing pressure to measure and reduce the GHG emissions associated with its production, processing and distribution. Transportation of bulk crude oil and natural gas, petroleum refining, gas processing, petrochemical manufacturing and distribution of oil and natural gas products also emit large amounts of GHGs. The primary sources of oil and gas atmospheric pollution are

- **Production** (Flaring, venting and purging gases, Particulates from other burning sources such as well testing
- **Transportation** (Combustion processes such as diesel engines and gas turbines, Fugitive process from loading operations and tankage and losses from process equipment, airborne particulates from soil during construction and traffic
- **End Usage** (Ozone depleting substances are used in some fire protection systems and refrigerants, kerosene and other products for cooking and lighting)

8.5.1 Alternatives during Production

Flaring is the process of burning natural gas in an open flame while venting is the direct release of natural gas into the atmosphere. Gas flaring and venting occurs during the drilling and testing of oil and gas wells. According to Aregbe (2016), sustainable alternatives to flaring include gas injection or gas lift, stored Liquefied Natural Gas (LNG) or Compressed Natural Gas (CNG). It is economical to contain the gas and distribute as a commodity where possible other than flaring. Market provision for all products will reduce the need for flaring. In Alberta, solution gas flaring was reduced by more than 72 per cent between 1996 and 2005, while solution gas venting was reduced by 59 per cent between 2000 and 2005. According to Bott (2007), much of the solution gas that was formerly flared or vented is now pipelined to processing facilities and sold to customers or used in industry operations. Bott (2007) also outlines other ways of disposing off natural gas as being by using it to generate steam and electricity or burning it in incinerators.

The best alternative thereof, is ensuring that the flaring gas is put to use either through packaging for sale or encouraging industrial ecology approach in ensuring cleaner production through industrial symbiosis.

8.5.2 End-user Alternative

Promote penetration of LPG to control use of Kerosene. LPG has high energy density and clean-burning qualities. According to data from ERC (2014); about 1.2 billion litres of dual-purpose kerosene (DPK) are consumed in the country every year. More than 50 per cent of Kenyans use kerosene to light or cook as it is cheaper compared to other forms of energy such as electricity and liquefied petroleum gas (LPG). In 2014 92% of rural households relied on kerosene for lighting. Some of the strategies recommended by the consultant to increase access to LPG include:

- Relevant authorities should subsidize costs of purchasing propane tanks to enable access by more low income earners and the rural populations. Low costs especially for 6kg tanks can encourage uptake since they come with burners hence do not need purchase of cookers.
- Price discrimination mechanisms can also be employed to allow certain segments of the population e.g. rural households to access LPG tanks at lower prices while their counterparts living in high end regions continue to purchase the same at prevailing market prices.
- Strategies such as civic sensitization to increase uptake of innovations such as the PIMA gas initiative can be adopted. PIMA gas was launched in February 2012 by Premier Gas Company to facilitate access of LPG by low income earners. There are small tanks available from sizes such as 1kg and refilling is possible with as little as KES. 50.

8.6 Renewable Energy (RE) versus Oil and Gas

There are many forms of renewable energy most of which depend in one way or another on sunlight. Renewable energy sources are cleaner compared to oil and gas and their use should be prioritized. The relative price of these renewable energy sources (wind, solar, geothermal, hydropower and biomass) compared to oil and gas is a key determinant of the shift in use between these two fuel groups. Indeed, were oil and gas prices to rise due to increasing scarcity, markets for renewables (also for coal) would become more profitable to exploit without the need for government subsidies or other policy interventions. While renewable technologies have performed well on an absolute scale, their relative growth in penetrating markets has been quite small (Weaver, 2003). Thus, the impacts of changes in the regulation, technology and market structure of fossil fuels have been mostly favourable for electricity consumers; they have also been frustrating for the establishment of renewable technologies. RE is important in minimizing carbon footprints otherwise regarded as a major challenge with fossil fuels. However, currently each of these renewable energy forms is significantly more expensive than the preferred fossil fuels, which may lead to economic dislocations and hardships if they become the exclusive power sources for the future.

8.7 Maritime Row Resolution Alternative Methods in Oil Fields/ Blocks

There are two possible causes of maritime boundary disputes:

- Disputed Sovereignty over Land

- Overlapping Entitlements to Maritime Rights and Jurisdiction

8.7.1 Disputed Sovereignty over Land

Two countries can claim the same island (e.g.: arbitration case Eritrea v. Yemen) or the same area of mainland (e.g.: Bakassi peninsula in ICJ Cameroon v. Nigeria). To resolve this issue, the relevant rules of international law include those on the acquisition of sovereignty; they look to human activity (occupation and administration) of the territory. Disputes and differences about sovereignty will be resolved by examining which State has more activity on the disputed territory. New concepts of sovereignty are being explored in international law to overcome the basic sovereignty dilemma.

8.7.2 Overlapping Entitlements to Maritime Rights and Jurisdiction

There can be overlapping claims between adjacent or opposite States for 12 mile territorial seas, 200 mile EEZs, and continental shelves, which may extend beyond 200 miles. Given the extension of rights to a 200-mile limit, overlaps are now more common than they used to be. To resolve issues of overlapping claims, the relevant rules of international law are those on the delimitation of maritime boundaries. These rules can be found in the UN Convention on the Law of the Sea (UNCLOS), state practice and jurisprudence. CLCS requires states with shared maritime boundaries to agree on their territories, exclusive economic zones and continental shelves beyond 200 nautical miles. Methods of settling differences and disputes about overlapping entitlements include resolving any sovereignty differences, the establishment of a complete boundary, a partial boundary or a joint area, or combining some of those methods.

8.8 Alternative Trans-Boundary Conflict Resolution Methods

There are no models as such, but there are lessons to be drawn from disputes, especially the sovereignty dispute over the Bakassi peninsula. This dispute indicated that there must be space for involving international mediators: it was observed that Nigeria and Cameroon became more amenable to ICJ arbitration (ISS, 2015). The challenge here is mismatch between political priorities and goals as provided for in strategies and policy documents, and the institutional capacity, resources, time and political will required to determine cases in a legal, legitimate and acceptable manner. The preferred way of determining or adjusting maritime boundaries is to submit to a technical review (Chatham House, 2006). Technical issues pose significant but surmountable obstacle to determining undisputed maritime boundaries and establishing peaceful relations. Article 33 of the UN Charter provides for the peaceful settlement of disputes by means of the parties' own choice. These means always include negotiation. If negotiations are not successful, recourse may be hard to conciliation, good offices (e.g. of the UN Secretary General), arbitration (ad hoc or according to annex VII UNCLOS or judicial settlement (ICJ/ITLOS)).

Another option explored in both theory and practice is the implementation of alternatives that offer work-around concepts or, at best, transcend the boundary debate. These alternatives depend upon cooperation and a sharing or pooling of sovereignty. This method reduces conflict and creates mutual prosperity through the relevant parties pooling their sovereignty rather than disputing territory. Provisional means of overcoming disputes

include Joint Development Zones (JDZ). This kind of arrangement is anchored in the December 1982 United Nations Convention of 'the law of the Sea' (UNCLOS) which guides states faced with deadlocks over maritime boundaries to have 'provisional arrangements of a practical nature….' Otherwise, it stipulates that while states continue negotiating, a provisional framework for cooperation can be put in place. Forming Joint Development Zones is a sustainable way to manage resources in disputed areas. A good example of this is between São Tomé and Príncipe and Nigeria. This relatively novel concept has also found expression in 2050 AIMS as the Combined Exclusive Maritime Zone of Africa (CEMZA). Joint development of offshore hydrocarbons is the most important form of provisional arrangement and today there are at least 20 such agreements out of 180 boundary agreements.

There are different types of joint development agreement. Sometimes one State runs the oil and gas operations in the area under its law and simply pays an agreed proportion of the net revenues to its partner, as is the case in the Bahrain-Saudi agreement. More usually, both States will be actively involved either directly or through a management Commission with legal personality that holds licensing rounds. This will especially be the case if the joint development arrangement is made after the agreement on a boundary, but before an oil or gas discover is made. Some joint development zones operate by means of joint ventures between companies from the two parties. The key features of most Joint Areas are as follows:

- A treaty creating and defining the extent of the area. This is often but not always the area of the overlaps.
- A "without prejudice" clause, making clear that the arrangement is interim or provisional pending a final delimitation of the boundaries.
- Long duration (45 years in Nigeria/Sao Tome, with review after 30), because oil industry needs a long time span. The boundary can be agreed upon by negotiations during that time or at the end of the agreement.
- A system for exploitation and an agreed division of the production revenue (not always 50/50), e.g. Nigeria get 60% while Sao Tome Principe gets 40% of the offshore oil revenue

9 CHAPTER NINE: ENVIRONMENTAL AND SOCIAL FRAMEWORK AND RECOMMENDATIONS

This chapter outlines recommendations towards a general environmental and social management framework that will contribute to sustainability in the sector. While the majority of the proposed petroleum sector interventions are anticipated to have positive economic impacts and the livelihoods of local communities, some of the PPPs may have inherent environmental and social risks identified in this SESA report. This chapter groups key recommendations from the study into the following themes: -

- Institutional and Environmental Policy Recommendations
- Social and Economic Recommendations
- Occupational Safety and Health Recommendations
- Special Scientific and Socio-economic Studies Recommended

9.1 Institutional and Environmental Policy Recommendations

Application of an Integrated Environmental Assessment Approach: NEMA should demand EIA experts to use the integrated approach implied in the EMCA 1999 (Revised 2015, cap 387) in undertaking Environmental Assessments to include: Archaeological Impact Assessment (AIA), Social Impact Assessment (SIA), Health Impact Assessment and Cultural Impact Assessments (CIA). NEMA should work in collaboration with the Museums of Kenya, Ministry of Health and other lead agencies in development and implementation of these guidelines.

Development of Guidelines for Environmental and Social Impact Assessment for both the onshore and offshore petroleum development activities and procedures for Project Affected Persons Consultation and Stakeholder Participation: Kenya does not have a long history of upstream petroleum sector development. Capacity towards preparation of EIA reports at different levels of upstream development (Exploration, development and production) is lacking in the country. EIA Experts who develop these reports do not have enough knowledge to develop a report that is adequate enough to guide informed decision making. There is a lack of consistency and uniformity in the quality of EIAs submitted for oil and gas projects. There should be different EIA Reports for different upstream activities at different levels and also for facilities involved. For example; Seismic survey, exploration wells, production wells, Central processing facilities, Private pipelines, camps and Crude oil testing and storage facilities like tanks. These guidelines will be very useful to reviewers/ decision makers and EIA consultants. The EIA guidelines will also help relevant Lead Agencies understand the kind of information that is expected from them by the NEMA during the stakeholder consultation process.

Develop an environmental management and coordination regulation for the petroleum sector: Implementation of an overarching legal and regulatory framework for the oil industry is of prime importance to the successful development of domestic hydrocarbon resources, while not compromising the integrity of the natural, social and cultural environments. There do exist some environmental regulations in Kenya but they do not cover Petroleum sector especially upstream sector. These regulations that focus on solid and hazardous waste, air quality, chemicals, water quality should be reviewed and enhance applicability in the petroleum sector. In addition, there is no regulation on Oil Spills Management. NEMA in consultation with KMA should issue appropriate regulations to prevent, reduce and control pollution or other form of environmental damage in the coastal

zone. These regulations shall also provide for the control and prevention of pollution of the marine environment from petroleum activities in the upstream, midstream and downstream.

Development and implemention of a Public Participation and Consultation National Manual for Oil and Gas Sector: this will guide the development of the proposed *Community User Guide for Environmental and Social Impact Assessment* to strengthen public consultation and involvement.

Community user Guide for Environmental and Social Impact Assessment: At the present time, the need for consultation for oil and gas projects is included in environmental Assessment legislation, but consultation is not necessarily undertaken in all cases. Environmental assessment reports should not be approved without inclusion of the public consultation process and its results. Consultation regarding oil and gas operations should be undertaken in a culturally appropriate manner, taking into account local customs, ethnic background, approach to business interactions, knowledge of extractive industries and their effects. During the study, it was discovered that communities lack information on their role and involvement in EIA process hence making public consultation inadequate. This guide will help create awareness among the Local Communities and shape their participation. Past EIA reports show inadequate participation because the locals do not understand the process. This guide can be incorporated in the EIA Guidelines and KEPTAP support to NEMA to create awareness among local communities through available information systems including hand to hand distribution. This Guide shall include matters related to free, prior, informed consent (FPIC). Consider this as a key empowerment element for community engagement and participation. Based on international best practices and the national public participation policy framework and laws, each county should develop community-to-community consultation / engagement standard guidelines because all the 43 communities in the country have diverse cultural and traditional leadership and engagement practices.

NEMA should develop Oilfield Waste Management guidelines for the upstream petroleum industry: which include; responsibilities and enforcement procedures; waste characterization and classification; waste manifesting and tracking; oilfield waste management facilities (waste storage areas/facilities and waste transfer stations, surface facilities associated with disposal wells, waste processing facilities, oilfield landfills, bio-degradation and thermal treatment); Application requirements for oilfield waste management facilities; and other waste management and disposal options.

Develop oilfield waste user's guide on hazardous waste management, gas flaring and venting, legal procedures and environmental standards: A guide that covers all the potential hazardous waste from oil and gas exploration and all possible management strategies should be developed for the relevant agencies and companies. NEMA, DOSH and MOEP should take lead. The guide should propose the most sustainable and cost-effective methods and procedures of dealing with oilfield waste. The guide should also incorporate the best technologies for activities such as gas flaring and venting as well as minimum acceptable standards and legal procedures for managing hazardous waste.

Development of the EHS Inspection and Monitoring Procedures: NEMA does not undertake regular monitoring of the upstream petroleum sector development activities though there are some efforts to monitor the downstream sector. The major reasons for this are inadequate staff and technical understanding on areas to focus on in the upstream sector operations where there is potential for sources of environmental and social impacts. There are no written coordination procedures to ensure no overlaps and duplication of effort and roles. These procedures for both onshore and offshore operations would be a basic tool to

guide monitoring and inspection. However, there is still need to build capacity for the National and County-based Environmental Inspectors in NEMA and other relevant Lead Agencies on use and application of this procedural manual.

Establish a one stop Petroleum Sector Environmental Management Information System: During consultation, it was discovered that information on the Petroleum sector in NEMA is scattered and this is one of the contributing factors to poor monitoring. IOCs do not have guidance on where to obtain various requirements or approvals required. In this case though not avoiding compliance, there is no compliance assistance by various government agencies. It is important to have a one stop source of information relating to petroleum sector with easier accessibility. The system should be able to provide for number of EIA reports on petroleum sector received, lead agencies consulted and their comments, records of decision, monitoring records, incidents reported and response, environmental audit reports received and locations of ongoing projects. It is necessary to benchmark such systems so that an adequate infrastructure for the system is established. The system will also help in storage and disclosure of all regulatory submissions such as EIAs, public disclosure of blocks in operation by various oil companies and information about their activities. The system will also help improve the public consultation and review process. The system should put together all necessary licences, approvals, permits required for petroleum development upstream, midstream and downstream. This system should be developed in phases where Phase one would involve studying all the information relevant for the petroleum sector in NEMA including operations involved, undertake comparative studies on other similar system models in countries involved in petroleum sector development where such system exists and recommend the most applicable system design. Phase two would involve finalization of the proposed design and establishment and capacity building on use of the system. This should also act as a national and county reference point for all information on legal provisions and requirements in the country.

This will need an Inter-ministerial/Agency Coordinating Committee, since the Petroleum sector development is too complex and should be developed in an environmentally sound and socially acceptable manner. The committee should be made up of government representatives to ensure coordination and information dissemination. This committee should be made up of Government institutions involved in petroleum sector development like MEP, NOCK, ERC, KPC, and Environmental, Safety and Health Regulatory Agencies like NEMA and DOSHS.

Establishment of a Petroleum Unit at NEMA to handle all environmental matters for upstream, midstream and downstream sector: NEMA lacks capacity on handling environmental, health and safety issues of the petroleum sector, especially in the upstream and mid-stream sub-sectors. To bridge this gap, it is recommended to have a petroleum sector dedicated unit/ directorate that acts as a one-stop-centre that coordinates all other government agencies (especially DOSH, ERC, Kenya Police among others) as per EMCA, 1999. This will promote efficiency in EIA projects reports review, EIA Site verification visits, EIA follow-up and monitoring, inspection and prosecutions. Capacity building efforts on regulating the petroleum sector will then be focused on the officers deployed in the unit.

Whereas Lead Agencies have responsibilities meant to give effect to EMCA, there appears to be either a misunderstanding of how other statutes should give effect to EMCA, Cap 387 or this is interpreted to mean there is overlap in mandates. To avoid this scenario in the petroleum sector which is very sensitive, there is need to study the mandates and responsibilities of the different organizations involved in addressing environmental concerns

in reference to their relationship with NEMA and draw the interrelationship structure. A policy and legal framework on the same should be developed to support their operations.

Establishment of a special department for wayleave acquisition, record keeping, monitoring and enforcement of wayleaves encroachment: The National Land Commission should dedicate resources to this function. There is a high rate of encroachment of wayleaves throughout the country which contributes to higher resettlemt costs and local conflicts/grievances during project implementation. There should be guidelines to discourage settlement on wayleaves and establish clear demarcations between public and private land. Any acquisition of land in the interest of expanding wayleaves should be guided by policies and plans to protect land owners. Technology such as GPS and GIS-based information should be fully utilized in keeping inventory and in monitoring. Clear regulations should also be set on how to deal with encroachment of wayleaves.

Establishment of National Environmental Analytical Laboratory: In relation to proposal on environmental inspections, there is need for laboratory analysis of pollutants. To achieve this, NEMA should establish a state of the art laboratory, a mobile soil, air, water and effluent quality monitoring laboratory and train the officers on how to use these equipment and apparatus to prosecute the increasing number of environmental cases in court.

Lead Agencies Capacity Building and Inter-Agency Coordination including Streamlining Environmental Roles and Responsibility: There is need of development of a capacity building programme for NEMA, key public sector institutions and County Governments. This will help in strengthening institutional capacity in environmental management of the oil and gas industry both at National and County levels and improve and build capacity on EIA follow-up, monitoring mechanisms and information dissemination to ensure enforcement and compliance to laws.

It is recommended that the Government of Kenya take steps to more clearly define the institutional structure for environmental management, whereby NEMA is the competent authority responsible for establishing the national environmental policy, while sectoral Environmental Departments within other ministries are responsible for the policy's implementation and sectoral regulation. An inter-Agency Environmental Monitoring Committee should be established to ensure effective follow-up, monitoring and compliance with established government policy and legal instruments. Since NEMA consults other relevant Lead Agencies for opinions towards decision making on EIA reports, if the Lead Agencies do not have any background understanding or basic information on the petroleum sector, their sectoral based opinions on EIAs will be inadequate also noting that these Lead Agencies play a key role in monitoring. It is therefore important to put in place a capacity building programme for Lead Agencies in line with KEPTAP Objectives. Horizontal communication pathways should be maintained because they are critical in reporting and development of information sharing of protocols.

Develop Health Impact Assessment (HIA) guidelines: Whereas there is no evidence of illnesses arising from upstream sector development, HIA should be incorporated in EIA to assess the potential of oil and gas development to result to human health impacts. As a good practice and legal requirement, an HIA report can be annexed to an EIA report. Such report should cover analysis of activities (within planned development) to determine potential health impacts, determination of baseline of health status and assessment/estimation of potential health impacts, generate recommendations on intervention options, framework for monitoring and evaluation and outline process and platform for systematically engaging all stakeholders in decision-making process on health matters. These guidelines will help MOH, County Governments, DOSH and NEMA and consultants on decision making.

Health is a critical issue to both the project workforce and the surrounding communities in the oil and gas industry. The oil and gas industry faces a complex agenda that increasingly requires an evaluation of health, social and environmental impacts throughout all of its operations. Kenya should use international guidelines for undertaking Health Impact Assessments in the oil and gas industry (especially those of the International Petroleum Industry Environmental Conservation Association- IPIECA) (IPIECA, 2005). Such assessment should be taken alongside environmental and social impact assessment to avoid unnecessary duplication of information, community meetings and stakeholder sessions.

Development of Petroleum Transportation Safety System: a standard management system should be in place that covers commitment and awareness of Road Transport Safety Policies; Data, Information and Regulations; Risk Assessment and Reduction; Selection and Monitoring of Transporters; Driver Recruitment, Selection, Training and Certification; Specification and Maintenance of Equipment; Standard Operating Procedures; Reporting and Evaluation of Accidents and Incidents; Emergency Response; Management of Change, Processing of documents and auditing. ERC should be mandated to formulate and implement the transportation safety system.

Conservation of habitats: Support mapping of indigenous forest, wildlife migratory and dispersal routes and breeding zones and development of updated maps: This would mainly cover protected forests, wildlife, fish breeding sites and areas with potential for onshore upstream activities based on the current oil blocks map. KWS, KFS, KEMFRI and NEMA shall take the lead in this recommendation. All sensitive habitats, animal migratory routes and fish breeding grounds may be Gazetted to control human developments and for preservation of these ecological sites for future generations. Relevant government lead agencies should develop technical guidelines for oil and gas exploration in protected forests, Important Bird Areas (IBAs) and wildlife areas (onshore and offshore for marine parks). Ecologically sensitive areas with irreversible negative impacts should be avoided in major oil and gas developments unless scientific studies and public participation have adequately been done before final decisions are made by NEMA and the MoEP.

Ensure Linkages to Wise Use of Water and Protection of Water Bodies and Wetlands: The upstream petroleum development activities in Kenya potentially take place in arid and semi-arid regions with scarce water resources. There is need for a comprehensive water needs assessment for the petroleum sector and put in place a strategy to promote wise use of water resources. With particular reference to onshore operations, the oil and gas companies should develop water management plans. The overall strategy should aim to commit the oil and gas sector to protect water resources and conserve usage in its activities, to develop strategies for water sourcing and to minimize the use of potable water sources, protect underground aquifers, ensure that there are no conflicts with other water users and to promote use of recycled water. In addition, upstream and midstream operations have potential to pollute ground water aquifers and water bodies like wetlands, lakes and rivers. It is necessary to map all existing water bodies against designated oil blocks for focused management. This should be mandatory for all ESIA reports on oil exploration and development projects before licensing. Pollution level assessments should be done before and after exploratory activities for continuous monitoring of any impacts to water bodies. NEMA in collaboration with WARMA should develop technical guidelines for oil and gas exploration in inland waters and wetlands. The same guidelines should cover groundwater resources.

Integrating Biodiversity into Environmental Impact Assessment Process: Based on an appropriate risk assessment, biodiversity should be integrated into each

relevant stage of the EIA process by expanding the scope of analysis to include biodiversity characteristics, evaluating impacts holistically using a wider ecosystem approach as recommended in the Convention on Biological Diversity (CBD), and considering long-term and cumulative secondary impacts in addition to more immediate, primary impacts. Integration of biodiversity should occur in all key stages of the EIA process in upstream oil and gas operation lifecycle from pre-bid/ contracting to decommissioning, i.e. through *identification of alternatives, screening, scoping, baseline establishment, evaluation (impact analysis), development of mitigation options and implementation, and during monitoring and adaptation*. The MOEP must also ensure that O&G companies shall address biodiversity issues at end point divestiture in their operational plans, especially when contracts are terminated by either party or divesting by transferring legal business interest to another operator.

Environmental Conservation Plans: This is important for all the oil blocks in the country. For example, there is urgent need to finalise, gazette and implement the Lamu Environmental Conservation Plan- being a UNESCO heritage site, the conservation plan should be implemented before the commencement of the oil exploration, production and infrastructure development; Develop and Implement Conservation Plans for all Marine Parks-As a way of conservation of biological diversity and promotion of sustainable development, conservation plans need to be put in place during exploration of oil to ensure possible threats to marine parks are addressed; There is need to Map/ zone and protect the fish breeding grounds in offshore oil exploration to prevent pollution of water as well as zone/ map important bird areas

Build capacity on Heritage Impact Assessment and develop guidelines for undertakingsuch assessment: In Kenya, there are protected areas like heritage sites with archaeological and cultural importance while others are designated as protected areas/national monuments under the National Museums and Heritage Act, 2006. To avoid interference with these areas, the importance of Heritage Impact Assessment before approval of extractive sector projects should be recognized hence it should be made a requirement under Environmental (Impact Assessment/Audit) Regulations, 2003. The National Museum of Kenya should advice NEMA on this part of the report and make recommendations before issuance of EIA Licences. This will require a comprehensive capacity development for NEMA and NMK. Guidelines for preservation of cultural properties and resources which include sites having archaeological, historical, traditional, religious and unique natural values should be developed. Social-cultural surveys need to be undertaken to document such sites for preservation and utilisation for tourism and eco-tourism purposes. The county governments should adopt a leading role in this activity because of their strategic position, whereas GoK through NMK shall assist with technical support.

Review and revision of institutional and legal frameworks and laws: Some existing institutional frameworks and laws that were enacted before discovery of oil and gas in the country and before the 2010 constitution and devolution process require revision. Streamlining, reviewing and updating environmental policies, legal and regulatory status to ensure that the country achieves sound oil and gas policy sufficiently is important at this stage. For example, the development of national SESA/ SEA, EIA and Audit guidelines for the petroleum sector by ERC through the support of NEMA and other government agencies is critical. This also applies to formulation of EHS guidelines for the upstream and mid-stream sectors. The development of land leasing regulations/ guidelines for private and community land types for mining, oil and gas exploration and production is also urgently needed, just to mention a few.

In the quest to create a dynamic oil and gas industry, institutional transparency and accountability must be promoted. Transparency is essential in building and maintaining public dialogue and increasing public awareness about the GoK's development role and mission in the petroleum sector. It is also critical for enhancing good governance, accountability, and development effectiveness. The harmonization of political leadership with civil society, media and other opinion shapers, as well as the private sector to pursue ethical leadership and robust public management models will contribute significantly to achieving these best practices. Empowering existing institutions tasked with providing checks and balances (for example the National Assembly, the Senate and the Judiciary), should contribute to the creation of a good fiscal decentralisation with accountability and community driven development.

All stakeholders should have a moral and constitutional duty to apply best practices in public consultation and involvement, building of sustainable partnerships and the integration of social concerns into oil and gas project planning and design, appraisal, construction, operation and decommissioning processes. All key stakeholders of the sector must undertake management of social issues through public participation and partnerships. It is important for future investments in the upstream and midstream sub-sectors to have community support, acceptance and informed consent as part of their foundation. The development and continuous review of existing environmental, regulatory and monitoring frameworks with determination of liability costs during decommissioning, closure, and abandonment processes, will support the sector in the long term by protecting future generations.

Capacity building for EIA Experts/Consultants on Petroleum sector: The EIA course approved by NEMA and being offered by various training agencies should be revised to include sectors with high impacts (especially the petroleum sector) and mentorship programme on EIA. Professional societies like the Petroleum Institute of East Africa (PIEA) should develop a short-term EIA curriculum targeting policy makers in the petroleum sector. All experts that had been registered without an EIA professional training may be required to undertake the same for improvement of their technical skill. The course should also cover the Archaeological Impact Assessment (AIA), Social Impact Assessment (SIA), Health Impact Assessment (HIA) and Cultural/Heritage Impact Assessments (CIA). The course should be undertaken for a longer period of about 3-6 months to cover the expanded content. NEMA may also consider other sector-based training curriculum to address concerns on EIA process and quality of reports for high-impact sectors, where petroleum sector investments fall under. The capacity of the Environmental Institute of Kenya (EIK) (association of EIA Experts) should be strengthened further by having representation in key government environmental committees and agencies to ensure environmental and social issues are integrated in various sectors of the economy.

SESA for Exploration and Development of Oil Blocks: From a regional perspective, the government may consider as a best practice for undertaking SESA, a study for each of the 63 oil blocks before licencing of exploration and development projects on oil and gas. This will be a better precaution to protect and conserve the regional environment and deal with local trans- boundary issues. Individual Exploration and Development projects shall undergo integrated EIAs as usual to deal with site specific impacts.

Implementation of cleaner technologies for the oil and gas sector: the MOEP should engage the Kenya National Cleaner Production Centre (KNCPC), which is a registered Trust within the Government's Ministry of Industrialization and Enterprise Development to develop and support implementation of cleaner technologies for the oil and gas sector in the country. KNCPC should develop petroleum industry good practice code to address

downstream environmental issues and promote technological and management solutions to reduce GHGs across the production, refining and transportation of oil and gas. The KNCPC in collaboration with PIEA and KOGA should build national capacity for resource efficient and cleaner production in the petroleum sector to be applied in enterprises through awareness creation, training, project implementation, and policy advice for increased enterprise productivity and sound environmental management. All IOCs should also embrace and implement cleaner technologies for the oil and gas sector.

Best Available and Safest Technology*;* adopt the best available and safest technologies for oil and gas operations (upstream to downstream). The PPPs should encapsulate the proponents' intent to adopt economically feasible and environmentally sound technologies at present and the near future. This entails the use of effective methods to realize expected targets, preventing pollution, reducing emissions from industrial activities and their impact on the environment.

Reduction of timelines for approvals for the recommended levels of the SEA process: To improve the quality of the reports, there is need for continuous capacity building of EIA Experts, development of the sector guidelines, data collection and reporting standards. The period of obtaining a NEMA SEA/ EIAs approvals and permits should be reviewed and shorted to avoid frustration of investors to this sector but at the same time taking necessary precautionary environmental conservation and protection measures. Full automation of the EIA and environmental audit processes by allowing the public to access to online reports and their annexes, on-line payments and licences issued are some of the areas that need improvement. The current fee (based on project risks) for EIA license applications is still high, especially given the economic risk inherent in oil and gas exploration activities. The economic risk inherent in exploration activities should be considered in reviewing EIA licence application fees. The MOEP should also seek amendments in EMCA 1999 (section 125 and Part XII) on operations of the National Tribunal Environment to ensure that oil and gas exploration and production activities are not stopped by court orders without preliminary hearings and rulings to determine the substance of the case. Stop orders from the Tribunal automatically issued by this court may have high economic losses for the country when final profits and losses are being calculated.

The law should also be reviewed to reduce the SEA process to a standard period of 6-12 months.

The following is the recommended levels of EIA for onshore and offshore upstream activities:

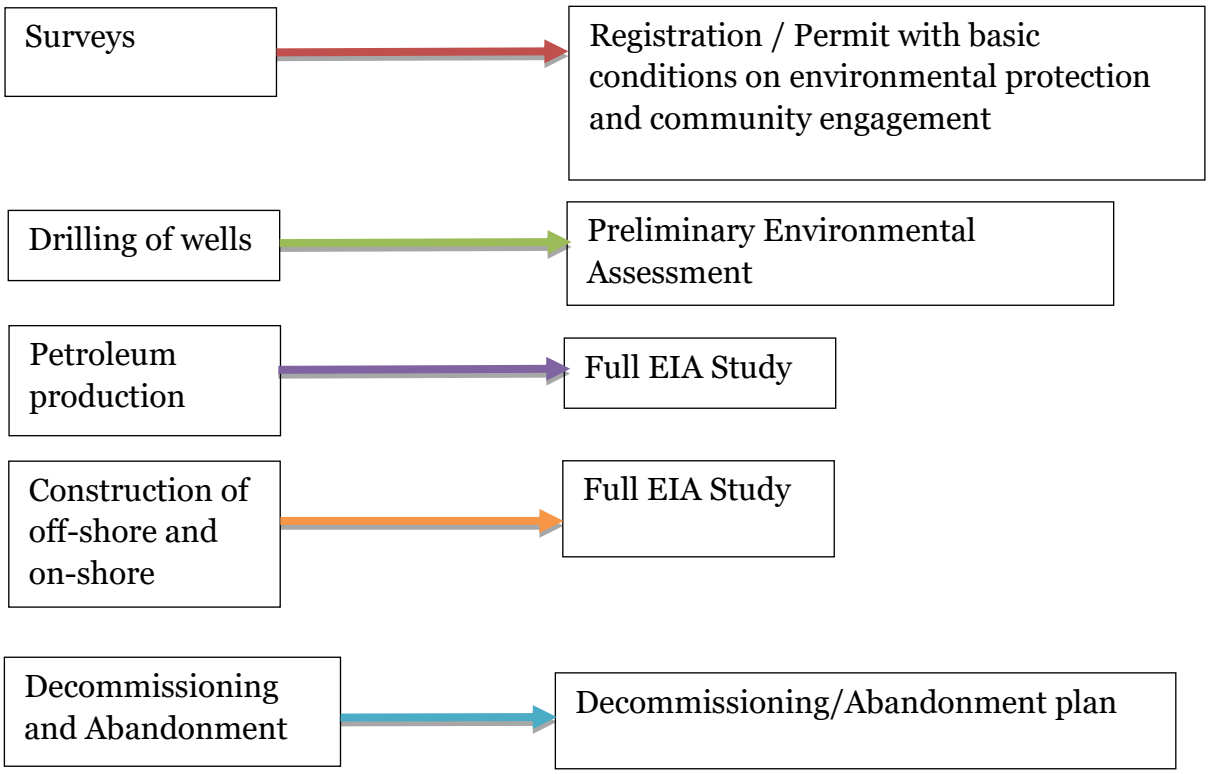


Figure 31: Recommended levels of assessment for onshore and offshore upstream activities

Environmental provisions in production sharing contracts: The following recommendations are made regarding environmental considerations in various provisions in production sharing contracts:

- We recommend the flaring of natural gas should be generally prohibited except in prescribed circumstances—when approved by GoK or when necessary for testing of facilities or for safety or emergency reasons (an approach used in a range of countries including Ghana and Mozambique). It is recommended that development plans be required to account for associated gas utilization. NEMA should also develop standards and procedure for gas flaring.

- We recommend that regulations be developed with regards to the required water quality where water is to be disposed of; imposing an obligation on oil and gas Contractors to process water to an agreed standard prior to disposal.

- We recommend a 'Spill Response Plan' or equivalent document should be demanded for each oil or gas well / development. We recommend that further research be performed into such a document and international examples of such response plans so that the country may ensure it has an appropriate set of requirements in place to ensure the environment and the people are protected.

- We recommend that international regulations on blowout prevention equipment should be researched and legalised in the Kenyan petroleum upstream environment to prevent oil spills.

- The impact on local communities, including their health and safety when in proximity of petroleum exploration and production operations must be considered. We recommend such matters should be explicitly subject to existing environmental, health, safety, and land legislation. Air quality and noise control regulations should be strictly implemented and should mirror international standards to reduce impacts.

- The GoK should also include laws that deal with protection of human rights and social protection as part of such agreements.

Public-Private Initiatives: Without conflict of interest, GoK should facilitate, support and engage with private sector initiatives/organisations. For example, the Oil Spill Mutual Aid Group (OSMAG), Kenya Oil and Gas Association (KOGA).

Land Use Planning and Integrated Infrastructural Development: Most of the areas targeted for oil and gas infrastructural development have markets with limited facilities and services. Oil and gas activities have already witnessed social impacts like immigration, social equity/ parity, local food security, housing, land use and values, unplanned urbanisation and growth of market centres, and increased demand for education. Current development plans are based on newly developed physical plans at the county level using Integrated Infrastructural Development (IID) approach. This approach through public-private partnerships and stakeholders engagement, shall provide oil and gas exploration and production sites (potential future growth centres) with well-planned infrastructural facilities like power distribution networks, water, health and sanitation, education, telecommunication, drainage and pollution control facilities, roads, financial services, raw materials supply, storage and marketing outlets, transport, security systems, land use planning, natural resources management, common service facilities and technological back up services. Communities need to be involved in planning of all forms of developments due to land issues (for example, in the case of the way leave required for crude oil pipelines). Both National and county governments must work closely in augmenting each other in infrastructural development. This will create opportunities for the private sector to make profitable investments.

Undertake a coordinated Spatial Planning to avoid Land and Resource Conflicts with the Oil and Gas Industry: Planning and administrative measures are recommended in order to promote coordination of oil and gas activities with other land uses. Adoption of these measures should use cumulative effects assessments to identify potential conflicts with other resource development, and present a coordinated zoning process amongst affected parties. The county governments should be supported by National Government to integrated national master plans (e.g. LAPPSET Master Plan) into their local plans. Access to common information platforms will reduce the current technical deficiencies in planning at Counties.

Improved Working Mechanism and cooperation between National and County Governments: The National and County Governments should work with oil and gas operators in improving the consultation and community engagement process for oil and gas projects, since upstream sector development activities are new in Kenya and IOCs are transferring into the country international best practices. The local regulatory Authorities should promote cooperation with the IOCs so that there can be mutual learning. Relevant government agencies at both national and county levels should integrate/ harmonise poverty

and infrastructural development policies, plans and programmes with those in the oil and gas sector.

Integration of Climate Change into the Oil and Gas Sector: Environmental decision-making, planning and investment needs to respond to the challenges posed by climate change. Approaches adopted can be through integrating climate change into all levels of decision making including policies, plans and programmes and strategies (PPPS); and use mainstreaming as the functional integration of climate change mitigation and adaptation policy priorities into everyday planning and management. Strategic Environmental Assessment (SEA) is now recognized as perhaps the most flexible and capable instrument of climate policy integration available internationally and nationally. Provision of a coherent framework for assessing and managing a broad range of environmental risks which contribute to the integration of climate change should be considered into the PPPS.

9.2 Social and Economic Recommendations

Existing and possible negative socio-economic outcomes of resource extraction are not inevitable in the oil and gas sector. However, they can be tackled and mitigated through effective strategies, international social performance standards and best practices, review of legal frameworks and policies in the following areas:

Legal and social agreements: Legal and social agreements on responsibilities and commitments of parties, compensation, local content, security, standards, sharing and use of revenues, applicability of National and County laws, development of national and county-level infrastructure, employment and sharing of business opportunities should be formulated, negotiated and implemented for the prosperity of the country and all its people. Lessons learned from Nigeria and other countries indicate that goals of sustainable development cannot be achieved where damages to environment adversely affect local livelihoods. Due to the close relationship between management of environmental and social impacts and the gross national income, it will be important to prioritise the former to ensure sustainability of the sector and general economy of the country.

***Guidelines for Public consultation and information disclosure*:** This should be guided by international guidelines in areas of land acquisition, resettlement, compensation, SEA/ EIA and Environmental Audit processes. The extent and level of information disclosure should be agreed upon to protect the government/ national interests, investors and community interests.

Early consultations and clear policy definitions on the roles of each of these stakeholders in the oil and gas exploration and production projects cycle is of critical importance. This should be through various environmental and social planning and development tools and approaches like EIA, Environmental Audits and CSR or social investments programmes. Consultations on standards and practices of each of these stakeholders should generally be guided by IFC, EPs and other international standard guidelines and practices.

***Public Consultations and Stakeholder Engagement*:** Engagement between investors, government, local leaders and employees should be continuous and undertaken at regular intervals to ensure smooth operation of activities and faster development of the sector. Transparency and responsiveness to requests for information and concerns from the local community and environmental civil society groups will be important to combat misinformation. For projects with medium and high impact risks, NEMA should ensure investors demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with affected communities and, where

relevant, other stakeholders. For projects with potentially significant adverse impacts on affected communities, the investor should conduct an informed consultation and participation process as per the national and county guidelines in stakeholder engagement. It is recommended that County Governments should be supported by the national government to develop guidelines and regulations on community engagement during the EIA process. These guidelines should be tailored to local traditional systems on community consultations and international best practices, especially those developed by IFC (*Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*) (IFC, 2007). The proposed Community Stakeholder Engagement guidelines should be from community to community and for some special interest groups like women, youths, disabled, etc.

The proposed guidelines should have general key components encompassing a range of activities and interactions over the life of every project. These can be divided into eight (8) key components: Stakeholder Identification/ Mapping and Analysis, Information Disclosure, Stakeholder Consultation, Negotiation and Partnerships, Grievance Management, Stakeholder Involvement in Project Monitoring, Reporting to Stakeholders, and Stakeholder Management Functions. Based on the above IFC Handbook guidelines, companies should take a systematic (rather than ad-hoc) approach that is grounded in internal day-to-day business operations, create systems and internal capacities to track and manage stakeholder issues and risks more effectively. Implementation of this recommendation will make it easier for O&G companies to easily obtain the Social Licence to Operate (SLO) which refers to the level of acceptance or approval of the activities of an organization by its stakeholders, especially local impacted communities. It is recommended that the guidelines must provide guidance on Free, Prior and Informed Consent (FPIC) as a procedural mechanism developed to assist in ensuring the right of Indigenous peoples to self-determination without obstructing national development interests as enshrined in the Kenya constitution of 2010.

Awareness creation on safety among communities living along crude oil transport corridors: MOEP should empower local communities with information and knowledge on risks of oil spillage, fire, air, water and soil pollution impacts, health impacts and management of disasters. This will enhance safety precautions and disaster preparedness and enable locals to respond quickly and effectively when disasters strike.

Preparation of a Resettlement Policy Framework (RPF): Resettlement of indigenous and vulnerable populations will be required both in upstream and mid-stream projects that will require land for long-term investments and infrastructure, temporary use or as provision for way leaves, for example for power transmission lines and pipelines. Systematic and step-by-step identification of project impacts and affected populations through mapping, census of project affected people (PAPs), inventory of affected assets, socioeconomic studies of PAPs, analysis of surveys and studies, consultation with affected people concerning assistance benefits and development opportunities should be undertaken. Legal frameworks guiding compensation and relevant for the petroleum sector should be developed based on constitutional and land legal guidelines. The guidelines should take into consideration resettlement assistance and livelihood, budget and implementation schedules, organisational responsibilities, consultation and participation procedures, grievance redress mechanisms, and monitoring and evaluation systems. In principle, the international IFC Environmental and Social Performance Standards provide a yardstick for the national framework for the sector.

The MOEP should prepare a Resettlement Policy Framework (RPF) for the petroleum sector to guide the selection and implementation of projects that will require precautionary measures related to involuntary resettlement. The RPF shall be complied with where involuntary resettlement, impacts on livelihoods, acquisition of land or restrictions to access natural resources and proceeds occur. The RPF should provide project stakeholders with

procedures to address the risks that may arise from implementation of oil and gas projects leading to economic and physical resettlement of populations. It should provide guidelines on how the projects should avoid, minimize, manage or mitigate and even compensate all project related displacement risk. The RPF shall provide guidelines on preparation of resettlement plans of the affected people. As stated above, it should include a grievance redress mechanism to provide affected people with avenues for making a complaint or resolving dispute that may arise and appropriate and mutually acceptable redress actions are taken as well as providing a transparent and accountable implementation process.

Whereas resettlement should be minimized to the lowest possible level, the country lacks reference points on how to implement resettlement action plans and there is also limited capacity on development of RAPs and monitoring of implementation. There has been a problem with determination of eligibility, resource or asset valuation and restoration of livelihoods. NEMA in collaboration with National Lands Commission should take the lead in RAP approvals and implementation. This needs a legal framework to make approvals of RAP reports and implementation framework to be mandatory for projects before commencement to reduce social and economic impacts to Project Affected Persons (PAPs). The government should consider prioritization of more sustainable compensation models and better than the lump sum cash payments to PAPs who end up misusing it in a short period. The most sustainable methods to consider will be cash+land compensation and payment through instalments structured to cover longer periods depending on the lifespan of the projects.

It is recommended that the Government should formulate a single legal framework that streamlines land acquisition for public investments and infrastructural projects. This will save the government from numerous hiccups emanating rom land acquisition challenges and ownership conflicts. The projects are further delayed when land disputes end up in court where injunctions are imposed, blocking commencement of the projects even when contractors had moved to site, hired workers and procured perishable items like cement, and leased machinery that attract fees as they lay idle. The government and the people of Kenya loose from such cases especially in the petroleum exploration and development sector where daily costs are very high. This is the case during the implementation of other petroleum transportation infrastructure like roads and railways. Also cited by stakeholders in this study as a major drawback is the lack of a standard compensation procedure from public project to project and from one government agency to the other creating a loophole for litigation. There is need for preparation of a valuation roll to enable all Kenyans know the market value of land across the country in order to end haphazard increase in land prices and speculation. Regular update of the land registry on way leaves to provide credible information on landowners is also recommended.

***Facilitate the implementation of local content plans*:** The MOEP should develop a policy framework on how to work with the National Cohesion and Integration Commission (NCIC) in implementation of local content strategy and plans in order to limit conflicts especially during the implementation of upstream and midstream sectors. The NCIC is a statutory body established under the National Cohesion and Integration Act (Act No.12 of 2008) and its mandate is to facilitate and promote equality of opportunity, good relations, harmony and peaceful coexistence between persons of different ethnic and racial communities of Kenya and to advise the Government on all aspects thereof. This must be accompanied with cohesion and integration education to the local communities and all Kenyans in general.

Dvelopment of guidelines for access to land for Petroleum Exploration and Production: There is need for clear guidelines on how companies and the government should acquire land to be used for petroleum exploration and production. Kenya has many

tenure systems which are not clearly separable, which sometimes leads to communities losing their land. This report has already discussed the best practices in land compensation; but this should not occur in isolation. Communities must be fully informed of their land rights and given a chance to participate in the negotiation process. Plans and policies must also ensure the conservation of land and its resources during and after the project.

Develop monitoring programmes to ensure application of human rights: In reference to the provisions of the Constitution of Kenya, 2010, the draft petroleum law (Petroleum Exploration, Development and Production Bill, 2015) recognises the following fundamental community rights:

- Be informed prior to carrying out of any upstream petroleum operations within their county and sub-county;
- Put forward any inquiries, interrogate planned activities which directly or indirectly affect their interaction with the ecosystem during the preliminary phase of awarding of petroleum licences for consideration;
- Adequate compensation for land taken over for upstream petroleum operations in accordance with relevant land laws and the constitution;
- Be compensated by any contractor who causes environmental damage and/or pollution;
- Be compensated for any injury and/or illness directly or indirectly related to the petroleum operations if the contractor was in a position to take measures to prevent the occurrence of the same;
- Compensation for damage to property and lost source of revenue or livelihood as a result of upstream petroleum operations taking place in their immediate surroundings;
- Be educated and sensitized on upstream petroleum operations within their county and sub-county; and
- Participate in planning for corporate social responsibility (CSR) projects that are to be implemented within the community by the contractor in consultation with the national and county governments.

Monitoring programmes to ensure the application of the international principle of Free, Prior and Informed Consent (FPIC) in oil and gas exploration and development should be instituted by the MOEP through support of other partners.
A human rights-based approach refers to a conceptual and procedural framework directed towards ensuring the promotion and protection of human rights in policies, programmes, plans and projects. It is the basis of all human rights relevant instruments and actions and has been applied in a wide range of contexts (notably in health and development cooperation). It seeks to: (1) position human rights and its principles as the core element of actions; (2) demand accountability and transparency by duty-bearers towards rights-holders; (3) foster empowerment and capacity building of rights-holders to, inter alia, hold duty-bearers to account; (4) ensure that the meaningful participation of rights-holders in development processes and planned interventions is recognised as an intrinsic right, not simply as best practice; and (5) ensure the non-discriminatory engagement of rights-holders and the prioritization of especially-vulnerable or marginalized individuals or groups (e.g. women, elderly, children and youth, minorities and Indigenous peoples).

Mainstreaming Gender issues and Vulnerability in the Petroleum Sector: Kenya is a signatory to various international and regional protocols such as the Convention for the Elimination of Discrimination against Women (CEDAW) and the Africa Protocol on Women's Rights. As a result of the discovery of oil and gas in Kenya, a number of legal and institutional frameworks have been developed for the exploration, production and

management of the industry, but there is no clear demonstration or commitment to gender responsiveness in these legal and institutional considerations. An analysis of the oil and gas value chain in Kenya shows a focus more on the scientific, technical and economic aspects. Often, men have better access to benefits via employment and supplies, while the costs such as family/social disruption fall most heavily on women.

The Kenyan constitution provides fundamental policy guidelines to protect male and female citizens from gender imbalance. Gender imbalance experienced elsewhere on the African continent has exacerbated inequality. It has resulted in costly social conflicts and entrenchment of poverty in oil producing areas and widened gaps between the rich and the poor, who are mostly women, children and the youth.

These historical lessons from some African countries should serve as guidelines to strengthen citizen participation, including women's rights and gender oriented organizations in policy dialogues in the sector. Strong citizens' participation will contribute to better management of the industry and ensure livelihood diversification and sustainability. Access to jobs and opportunities should be enhanced for all gender groups, people living with disabilities, marginalised, and minority communities. The MOEP should undertake a study on how to mainstream gender issues in petroleum sector policies in order to ensure ample regulation to address gender issues in the growing petroleum sector. This must also be extended to the proposed local content strategy.

There should be commitment to the implementation of gender provisions in the Kenya Constitution and legal provisions in the National Gender Equality Commission (NGEC) Act (Cap. 15) of 2011. The objective of this recommendation is to promote gender equality, and social responsiveness and freedom from discrimination in the oil and gas sector.

Preparation and implementation of the Vulnerable and Marginalized Groups Framework (VMGF): as part of proposed gender study, the MOEP should develop the VMGF as one of its outputs. The objective of the VMGF is to ensure the development process associated with oil and gas fully respects the dignity, human rights, economies and culture of vulnerable and marginalized people and the sector projects have broad community support from the affected vulnerable and marginalized people. The VMGF should recognize that this support can only be attained through free, prior and informed consultation. To that end, VMGF should provide guidelines which will avert any potentially adverse effects on the vulnerable and marginalized groups; or if avoidance proves not feasible, minimize, mitigate or compensate for such negative impacts. The VGMA should also ensure vulnerable and marginalized groups receive social and economic benefits that are culturally appropriate and inclusive in both gender and intergeneration terms.

Development of a National Communication Strategy for Oil and Gas Sector and implementation of a Public Education Awareness Programme : The MOEP should develop and implement a communication strategy on the process and timelines associated with exploration and development of the petroleum sector to manage expectations of local communities/leaders and Kenyan people in general.

During the study, it was noted that local communities have high expectations on benefits to be accrued through upstream petroleum sector development. Majority expect employment, opportunities for supply of goods and services failure to which, they will not support utilization of the petroleum resources in their areas. This necessitates a communication

strategy to disseminate factual information to the communities to manage their expectations. This will also ensure that petroleum sector development coexists with the traditional economic activities so that the affected communities do not put too much emphasis on petroleum development benefits and abandon their economic activities for example pastoralism.

There is also need for upstream players and government (both National and County-level) to manage expectations of local communities and their leaders and invest in communication about the process and timelines associated with exploration and development. Implementation of a public communication strategy, along with transparency will be the primary tools for controlling misinformation by explaining the importance of petroleum exploration and development for the Kenyan people, especially those in rural areas. This strategy will also be a key tool in achieving local community 'buy-in' (social licence) for further exploration and development, and consequently pre-empt disruptions to upstream operations. GoK should ensure transparency and access to information regarding its vision, strategies, decision-making processes, revenue realisation and utilisation, and development priorities. Basic information on the outlook of the sector needs to be clear and accessible, for example, how many and what type of job/business opportunities will be created over the next year and beyond, and what are the factors that would alter this/ put this at risk.

The communication strategy should also cover national awareness programmes for mid-stream and downstream sectors to reduce the adverse impacts associated with new developments, emergency response and disaster management strategies. This should be integrated to the school/ college curriculum for sustainability purposes. All forms of communication channels including but not limited to community/ village/ county forums, print, digital and social media should be targeted.

Promotion of Community Development Programmes: The oil and gas companies should work closely with local provincial administration, community leaders, civil society organisations and National and county governments to initiate short, medium and long-term interventions that can improve the communities' socioeconomic well-being. GoK should develop a mechanism to facilitate such engagement. This in effect will make the host communities identify with and appreciate the exploration and production projects and 'own' them, thus leading to 'social licence', increased prosperity and participation in critical initiatives.

***Development and Enhancement of GoK security strategy/ master plan of the petroleum sector*:** GoK needs to enhance its security strategy to ensure adequate security personnel; modern technology and equipment, ICT and financial resources are assigned to oil and gas installations for sustainability of the petroleum sector. This should cover all major highways, ports, railways, pipelines, depots and storage facilities and other related infrastructure country-wide. The Kenyan government must advance political devolution to insecure counties, while working to contain Al-Shabaab using a political strategy. With this approach, then there is a strong likelihood that, with regional and international support, the National Government will be able to curb the militant group's activities, allowing the oil industry to operate in a relatively secure environment. If Kenya is to become the transit hub for East Africa's oil boom, and fend off competition from Tanzania, then relative stability and security on the coast, major cities and LAPPSET corridor must be achieved. The GoK should improve the ability of Kenya's Defence Forces, National Intelligence Service, and National Police Service to protect critical infrastructure in the petroleum and energy sector by having institutional units covering security measures and issues that would foster information sharing. Security concerns will entail extra insurance premiums for the financing of a

possible Crude oil pipeline, pushing its cost to the higher end. This means that any consortium of companies to build the pipeline will need to bury it underground for security and environmental reasons, following international best practice in the industry. This would increase construction time, but in the long run, a buried pipeline would help avoid the oil bunkering witnessed in Nigeria and have a smaller footprint on pastoral livelihoods in northern Kenya.

The LAPSSET Corridor Development Authority together with all Security Agencies of Government must fully implement the Security Master Plan for the Corridor to comprehensively address all security concerns of Oil Companies on pipeline security along the Northern Corridor. A continuous monitoring and evaluation of the implementation process should be carried to fill any emerging insecurity gaps and issues.

Operationalization of the Petroleum Training Fund: The responsibility of operating the petroleum training fund is vested in the Cabinet Secretary in charge of the petroleum sector. There is need for more detailed policy and legal mechanisms to guide the operation of the fund. The amounts contributed should be a percentage of the licence fee and accrued revenues thereafter in order to strengthen programmes of human capital development among Kenyans. All the training funds should be channeled to relevant government institutions to support capacity building programmes though academic and development research and technical innovations.

There is need to harmonize all the training programmes and needs in the private and public sector as outlined in The Petroleum (Exploration, Development and Production) Bill, 2015 to ensure quality standards through a curriculum accreditation process. This could be managed through a partnership with the Commission for University Education, The Technical and Vocational Education and Training Authority (TVETA) and with input from existing private institutions, middle-level institutions of learning and Universities (private and public).

It should be appreciated that it is not only NEMA that needs capacity building, Oil and Gasbeing a new and fast developing industry in the country. All lead agencies require institutional capacity building to handle the new challenges. Full grasp of environmental and social issues and the capacity to effectively supervise, control and measure potential environmental and social effects will enable NEMA to put in place efficient oil and gas sector governance system. No less important is that the benefits of an extensive training programme will also positively extend to other sectors of Kenyan institutions and civil society that are not necessarily linked to oil industry development. Besides the need of setting the appropriate training objectives and the identification of the major technical and organizational gaps within the institutions involved, the following areas are recommended for training:

- General petroleum technical training
- Environmental pollution and monitoring for petroleum sector;
- Environmental sampling, monitoring, inspection and auditing of oil and gas infrastructure and facilities;
- Environmental and social impact assessment training for oil and gas;
- Oil spills management and response;
- Environmental and social monitoring methods and practice;
- Waste (Oilfield, Waste Oil, etc) management in petroleum sector;
- Assessment of Environmental damages, risks and liabilities
- Cumulative effects assessment;
- Environmental management and management systems;

- Environmental data management, GIS and remote sensing;
- Environmental regulations, compliance and enforcement skills;
- General oilfield environmental management;
- Air emissions modeling and management;
- Surface and groundwater management in Oil Fields;
- Soils and reclamation/ rehabilitation issues;
- Spills, accidents, contingency and risk management;
- Well closure, decommissioning and abandonment;
- Environmental and social issues by development phase (seismic, drilling, production offshore and onshore);
- Public consultation and involvement / engagement;
- Environmental, Health and safety inspection/ Oilfield safety, security and first aid;
- Conflict resolution, grievance redress mechanisms and mediation;
- Resettlement, Land Acquisition and Compensation.
- Oil emergencies response

Environmental due diligence training

There is need for counties to understand the forward and backward linkages between counties and sectors. This will help understand the definition of local content and for communities to see the interdependence in the sector. It is also important for a comprehensive employment skills assessment of the petroleum sector to be conducted, especially at the upstream and midstream to ensure maximum employment is created and expectations are met.

Of concern is the reality that the upstream capacity building endeavour is being promoted and concentrated at the petroleum engineering undergraduate and degree levels undertaken abroad whilst the critical and immediate need is for tertiary and craft skills capacity development that can be advanced through local technical middle level colleges and village polytechnics. This requires greater focus on expertise development at the craft and technician level in all oil and gas industry sub-sectors and specifically for the nascent upstream segment.

Training in occupations relevant to the sector is a key component of capacity building. This includes personnel such as drivers of light and heavy vehicles, electrical and communication engineers, remediation and laboratory technologists, welders, security guards, legal experts, human resource management experts, business development officers, Environment, Health and Safety (EHS) experts, accountants, public relations professionals, community and social services officers, , international and multi-cultural caterers, petroleum engineers, machine operators, store and record keepers, carpenters, masons, painters/blasters, technicians in heating, ventilation and air conditioning technologies, medics, material and chemical engineers, helicopter pilots, gardeners and landscaping experts, riggers, tool pushers, roughnecks, trainers, salespeople, shipyard repair crews, railway train drivers, mud loggers, etc.

Training is important because it will provide the oil companies with the requisite labour force that meets international standards, lead to well-paying and long term jobs for Kenyans and local community members, and facilitate advancement for individuals, companies and communities. By enabling such outcomes, training also leads to increased 'ownership' of the country's natural resources, increased engagement in the oil and gas industry, and enhances the level of transferable skills which benefits other sectors in the economy. To promote training programmes for the sector, increased investment in facilities and curriculum development for polytechnics and technical colleges will be required.

The Energy Bill (2014) proposes the establishment of the National Energy and Petroleum Institute. The role of the Institute is to carry out research, development and dissemination activities in the energy and petroleum sector and in particular promote local, regional and international participation in research activities, particularly in technology-oriented research. The Petroleum (Exploration and Production) Act (CAP 308) will also establish a training fund for the purpose of training Kenyan nationals in petroleum operations. All monies raised from the contractors (the persons with whom the Government concludes a petroleum agreement with) as a training contribution shall be paid into the training fund. The training contribution amount will be as specified in the PSCs. The establishment of the Institute and training fund needs to be managed concurrently to ensure timely operationalization, and sustainability of financing human capacity development in the country.

Kenya Pipeline Company (KPC) has already been designated as the Centre of Excellence for Oil and Gas Pipelines human capacity building for the region by the Summit of the Heads of State for Kenya, Uganda, Rwanda and South Sudan. With this, KPC is strategically planning to use its vast experienced staff in the Company to train experts for the region in order to prepare for the emerging oil and gas sector. This strategy should be harmonised with the KPRL Training School based in Mombasa.

Equitable distribution and allocation of revenue and other benefits from the oil and gas sector : Firstly, there is need to map the energy sector to be in line with the responsibilities of both the central and county governments as enshrined in the new constitution. There is also the need to address any conflict that may arise between laws especially on revenue sharing formulas as can be seen in the Mining Act and the Petroleum Exploration and Production Act and the revenue sharing responsibility as given in the Commission for Revenue Allocation Act and any other bill/Act on revenue sharing. A comprehensive local content Act needs to be passed to ensure boundaries are well defined with regards to employment and resource distribution in counties. Acceptable definition of who the local community consists of will also help in prevention of conflict that may arise as a result of revenue distribution because economic costs and benefits resulting from this resource cuts across borders and communities/ clans in the oil exploration blocks.

A portion of the government's revenues from oil and gas activities should be allocated by Commission on Revenue Allocation (CRA) to the counties and communities directly affected by such operations as per approved law and international best practices. This could help address development of rural livelihoods and economies as well as provide funding to mitigate any potential adverse environmental and social impacts, particularly considering that majority of Kenya's oil and gas as well as mineral exploration activity is carried out in marginal, relatively under-developed areas. In principle, Petroleum revenues could be gathered into a consolidated fund prior to allocation as this would appear to facilitate accountability. These funds would then be allocated in accordance with the principles set forth in the Constitution on a formal basis once an appropriate use of the funds has been approved. Counties will be expected to enact laws on how to invest and distribute funds from oil and gas and other extractives.

Developing good governance on environmental and social investment principles in government, communities and private sector in terms of opportunities sharing, will support protection of the environment and ensure sustainable growth of the sector. In determining revenue and opportunity sharing mechanisms there is need to develop workable formulae. While formulae cascaded down to the sub-county level may benefit host communities in the short term, if exploration and production develops in other regions, mobility and career

progression for workers may be hampered, while investors will face significant training and efficiency related costs at new sites. This can be solved by modelling plans on successful opportunities sharing formulas and schemes implemented by international oil companies operating locally based on international best practices.

Strengthen policies and other incentives that encourage livelihood diversification and discourage over reliance on oil benefits: At the national level, we can adopt a policy where no debt can be securitized based on future oil revenues with a petroleum fund investment advisory committee is established to offer prudent advice of management of the petroleum fund that should be held in foreign currency. There is also need to develop a framework on how the fund can be managed to support other economic livelihoods and one that will be used to arbitrate conflict between national and county government and the local community. For instance, county governments can receive funds from the fund to a maximum of the collections from other economic activities in their counties. This will encourage them to promote the growth of other sectors. Planning is of essence for prudent spending of resources. Counties should therefore invest in efficient economic planning departments to advise them on areas to invest in order to achieve maximum benefits. It is recommended to establish sustainable livelihood diversification and development programmes by various government ministries related to agriculture, livestock and industrialization as a long term strategy to mitigate any adverse impacts of the *Dutch Disease* if at all it occurs. Such programmes should be extended to the fishermen operating off-shore.

Harmonize systems for efficient revenue collection: In order to decrease multiple registration and revenue collecting agencies, and decrease the cost of doing business, there is need to centralize revenue collection and create an e-registry of all tax laws and regulations to be followed by investors in the sector. Because the relevant government parastatals and departments that collect fees are dependent on treasury to supplement their budgets, the Kenya Revenue Authority (KRA) should take a leading role to collect fees on behalf of government and accounting for the same to treasury.

Government control fuel pricing: There is need for a cohesive licensing regime for fuel stations to ensure locations, pricing and quality of fuel is as standardized. ERC should be supported to ensure they have more monitoring agents country wide who ensure that only the published fuel prices are charged to consumers. Further, the ERC published list of towns should be increased to ensure fairness and openness in the pricing. Another recommendation is self-regulation in the sector, with markers being allowed to import own products and compete for customers in the open market.

Conduct Economic feasibility study of transport systems for crude and refined oil to ensure optimum returns: Due to Crude and Refined Fuel transport challenges**,**there is need to conduct a full economic feasibility study with various scenarios explored to ensure the best investment decision is undertaken. Considering the short duration this early oil is expected to last, one will need to find out if such investment is sufficient for the short period this mode is expected to be utilized before pipeline completion. For disclosure purposes, it is advisable that economic feasibility study findings, recommendation and justifications are officially disclosed to the public especially if public funds will be used.

Control of Adulteration of Fuel: The adulterant that is mixed with petrol and diesel generally is kerosene. The reason why kerosene is chosen as an adulterant is its low cost. Since most adulteration of fuel is between kerosene and diesel, mainly because kerosene taxes are low, there is need to standardize the fuel taxes as this will discourage unscrupulous

traders from the act. Because of the huge losses the country is incurring as a result of this, a special a multi-agency/ one-stop unit within ERC or NEMA should be formed to monitor using modern ICT/ satellite technology and apprehend the perpetrators.

On the other hand, the emissions from automobiles result in increase of greenhouse gases like carbon dioxide. One of the major reasons for increased emissions is adulteration of automotive fuel. This adulteration results in reduced performance and lifetime of engine and other components of an automobile. Diversion of large amounts of kerosene for the purpose of adulteration reduces its availability to the poor people. So this has forced them to use wood as an alternative to kerosene for their household purposes. This indirectly leads to increase in global warming by increasing air pollution and cutting down of trees. So to prevent all these ill effects, an approach to automatic fuel adulteration detection and reporting system is proposed. The government should make available adulteration detection techniques in the Kenya Market which are cost effective and can be fitted in any automobile with little modifications. This is important because adulteration is one of the major causes for engine failures. Hence, this approach helps in reducing adulteration, thereby increasing engine lifetime with a good performance and finally to attain a clean and healthy environment.

Development and Implementation of Local Content Strategy*:* It is recommended that the sector stakeholders within the country should seek to maximise the benefits of oil and gas wealth generation through a comprehensive strategy that includes: -

- The use of local expertise, goods and services, labour (including skilled and semi-skilled) and financing in the oil and gas industry value chain. Efforts to encourage local value addition on a no-subsidy basis should also be encouraged.

- Develop local capability in the oil and gas value chain through education, technical skills and relevant expertise development, transfer of technology and know-how, and active research and development.

- Target an agreed level of local participation and investment in all aspects of the oil and gas industry value chain. GoK and all stakeholders should work to enhance the participation of the local private sector, civil society, academia, local communities, women's organisations, and other affected groups in the decision-making processes to ensure effective governance of the oil and gas sector. The National Government should design and implement a framework for working with the private sector to achieve local content regulations and integrate their corporate social responsibility/ social investment objectives with Kenya's national and county development plans.

Local content on oil and gas and other extractives legislation should be harmonised and stand on its own as a separate Act of Parliament to avoid unnecessary conflict with the Kenya Constitution, other relevant and existing local content policies and proposed legislation within the MoEP and other GoK agencies. The legislation also needs to set a realistic path to achieve the targets set out. While the focus should be on 'National Content' because all natural resources belong to all the people of Kenya, the local communities (hosting sector operations) should be empowered to competitively access the opportunities in the sector. Expectations of local communities who are defining local content as community specific input should be managed through nationhood sensitisation programme s. Consultations and outreach programme s to build trust among the industry, governments, civil society organisations and local communities through the creation/ implementation of regional livelihood development programme s will also supplement the process. Development and implementation of a communication strategy is of critical need; this along with the implementation and continuous

monitoring of the local content strategy is important in managing expectations and building trust among stakeholders.

Through a participatory process, GoK needs to fast-track the development of a local content sessional policy paper and strategy for the oil and gas sector in Kenya. The context of local content under a devolved government system, workforce and supplier capacity development, regulatory requirements, business drivers of the sector, and management of stakeholder expectations should all inform development of this strategy. Expedited implementation of a Local Content Strategy will enable GoK to invest in capacity building, ahead of the development stage where most of the job and business opportunities are likely to occur. It is important to note that increasingly, upstream investors consider well implemented local content to have a positive financial and social impact on their businesses when compared with internationally sourced goods and services. Therefore, in developing a local content strategy, as well as the legislation to support its achievement, GoK should work with upstream investors, and other stakeholders to gain insight on the opportunities, challenges and areas requiring joint investment in capacity building.

Local communities argue that the International Oil Companies (IOCs) do not employ them. However, the situation on the ground is that the local communities lack relevant skills that can enable their absorption to the industry. In view of this, the need to support the growth of indigenous (in-country) technical and professional skills, local industries development and to develop training institutions (polytechnic, college and university levels) for development of programme s focused on technical skills development for the oil and gas industry. The National Government State Departments in charge of education, science and technology, investment, industry and cooperatives development may take a lead in this recommendation. Harmonization of all policy and legal Local Content initiatives and existing policy and legal drafts by developing them into one comprehensive National Local Content Strategy and Bill for the whole petroleum sector through a wide participatory process is recommended.

9.3 Occupational Safety and Health Recommendations

9.3.1 General Recommendations

There are many occupational safety and health issues that need to be overcome in the areas of awareness, education, training, corporate commitment and compliance. These challenges can be overcome by employing a combination of appropriate Proactive as well as Reactive strategies. With reference to the issues raised in the stakeholders' meetings, the following strategic recommendations are feasible;

- There should be a clear set of guidelines and regulations provided with regards to safe distances/buffer zones for developing petrol stations, oil fields, depots (offshore and onshore) among other petroleum facilities. Safe distances should be provided with reference to risk assessment, ensuring 100% safety of persons/organisms who do not directly interact within the petroleum development. Where in the case of the occurrence of a fire that may also trigger an explosion depending on the character of what has been ignited, how realistic is the surrounding population assured of their safety in regard to the safety distance provided. KEBs should set up an independent task force to harmonize all HSE standards of the petroleum sector. For example, safety distances from boundary line of the petroleum service stations to any

residential buildings and places of public assembly are within the international standards. For example, in Singapore it is between 50-90m. Such public places that need standards include: places of worship, schools, hospitals, shopping centres / malls, hotels, offices, town centres, neighbourhood centres, cinemas / theatres, bus interchanges/ stations, community club / centres, railway stations, airports, convention centres, exposition / exhibition centres, hawker centres / restaurants / fast food centres / discotheques / night clubs, galleries / museum, stadiums, swimming complexes, custom check points, amusement centres, recreational premises, public places of assembly for persons admitted thereto by ticket (e.g. zoo, bird park, amusement parks, etc.) among others.

- Mitigation against safety risks posed by petroleum tankers passing through congested streets in major towns (e.g. Eldoret, Nakuru, etc) by planning and construction of bypasses and town zoning.
- A standard impact assessment study should involve risk assessment. It is evident that EIAs have been approved without a complement of risk assessment. A very good example is EIAs for road infrastructure where multi-criteria decision analysis should be used to assess the sustainable safety performance of road projects at the design stage. This criterion ought to be used in all road projects. There is also need to develop a Multi Criteria Decision Analysis framework for risk management of the oil and gas industry in Kenya.
- Development of policy guidelines in the relevant codes of practice for OSH Auditing and OSH Performance Monitoring in the upstream petroleum sector. Issues of training, PPE and quality controls on workplace hazards should be properly instituted to allow full compliance or consequences for non-compliance.
- Harmonization of duplicated roles performed by NEMA, DOSH, ERC, and KEBS in administering the petroleum sector. The lead agencies can conduct joint inspections, investigations, enforcement and monitoring of oil and gas facilities in compliance with the accepted risk management plan and compliance with the broader legislative framework. Inspections to be carried out using a risk-based methodology that considers relevant risk factors, performance and compliance history, current industry incident trends, and any relevant findings from previous inspections. Upon completion of an inspection, the authority's inspectors should issue the company a detailed report of the inspections findings, conclusions and any recommendations for improvement. If necessary, inspectors may also request a company to provide them with their proposed actions to address issues highlighted in the inspection report.
- There is need to enhance the DOSHS human resource and technical capacity. Hiring more inspectors to manage remote areas in particular for sustainable and equitable enforcement of OHS laws and regulations in all the 47 counties and sub-counties.
- Enhancing public awareness and encourage their participation in monitoring EHS activities of the petroleum sector. Enlightening them on roles they have to play in ensuring their own safety through EHS advocacy programme s. Medias used to disseminate information can be achieved through; seminars held on communal or public spaces, learning and religious institutions. Promoting EHS awareness on petroleum based risks through media houses such as television, radio stations (for English, Swahili and Vernacular).
- Petroleum Fuel Tankers drivers should be trained and educated on safe transportation and handling of petroleum products. There is need to formulate clear guidelines for training fuel tanker drivers so as to ensure competence as well as safety of the public at large due to risks accompanied by duties executed by fuel tanker drivers. The drivers should be trained to meet the Petroleum Fuel Tanker Driver: Industry Training Standard. The drivers should also undergo a terminal specific induction. The Industry Training Standard to cover all the knowledge and skills that a petroleum tanker driver should have to perform the job to a high and consistent

standard. Annual refresher training not immediately required as drivers should already have the required knowledge, but immediate practical assessment may be necessary in these instances.

- Formulation and Implementation of the National Disaster Risk Reduction and Emergency Response Management Plan: Develop adequate disaster management structures through formulation of plans and policies that will provide sufficient guide to the relevant authorities who implement and enforce. Emergency service provisions should be in place for response and assistance in the occurrence of accidental spills and fires. The disruption caused by disasters can be prevented and minimized by putting mitigation structures in place mainly through enhancing government responsibilities as follows;
- Establishing a framework for managing disasters in Kenya that takes into account the difference between rapid onset and slow onset of disasters.
- Building the capacity of institutions to act appropriately in the face of disasters.
- Building a wellmanaged disaster response system.
- Ensure that disaster policy intersect with development policy and poverty-reduction. It must be multisectoral and applicable at all levels.
- Ensure that disaster management is coordinated and focuses on both risk reduction and maintaining an efficient disaster response capacity.
- Promoting linkages between disaster management and development.
- Promoting programme s and strategies that aim to reduce the vulnerability of Kenyans to the recurrent hazards they face, preparing communities at all levels by strengthening their capacities, preparedness and resilience.
- Providing clear financial provisions for disaster management.
- Providing adequate and sufficient resources to ensure the effective implementation of the policy and subsequent strategies and programme s.
- Promoting disaster management training and community awareness.
- Integrating Disaster Risk Reduction and Disaster Management into National development planning at all levels.
- Integrating Environmental Safety and Health and Disaster Management into National Education Curriculum, so as to become part of National Education System. This would aid in mitigating health and safety risks in the downstream petroleum sector.
- Systematically monitoring and evaluating the trends and status of climate change and its impacts on the various types of disasters and development issues.
- Counties to develop their responsive disaster management plans using national frameworks.
- Strengthening of Enforcement of fuel adulteration laws/ Compliance/ Monitoring.
- The responsible oil and gas authority to provide clear and sustainable guidelines on flaring and venting activities with reference to the best available and safest practices.
- Enhance EHS technical capacity in managing oil Waste from Onshore and Offshore petroleum developments through specific trainings tailored towards enhancing waste oil treatment and spill management skills.

- Emphasize on enforcement and implementation of the following specific regulations to enhance air quality management practices;

    a) Point Source Air Emissions Prevention and Control Technologies to be adopted by the industry, I.e. on Particulate Matter, SO_2, NOx, Ozone depleting substances and Green House Gases.

    b) Implementation of carbon capture and storage technologies, or installation of protection and enhancement sinks and reservoirs to cut down greenhouse gas emissions.

- Ensure implementation of licensing regulations of gas testing facilities, which have been growing in number within the country.
- Incorporate laser diagnostic spill leakage technologies to enhance detection of any leakages in pipeline transportation, reducing and preventing risk of high volume accidental spills through timely detection, cutting supply.

There is need to emphasize on enforcement and implementation of the following specific regulations to enhance air quality management practices;

1. Each petroleum sector (upstream, mid-stream and downstream) should have an air quality monitoring programme in place.

2. Stack Emission Testing for CO_2, SO_2, NOx and PM gases to be done at intervals to be determined by the regulating authorities.

3. Point Source Air Emissions Prevention and Control Technologies to be adopted by the industry, I.e. on Particulate Matter, SO_2, NOx, Ozone depleting substances and Green House Gases.

4. Implementation of carbon capture and storage technologies, or installation of protection and enhancement sinks and reservoirs to cut down greenhouse gas emissions.

5. Strict implementation and maintenance of a buffer zone of petroleum facility to residential dwellings and storage of highly flammable products based on the current regulations.

Adopting international standards and reviewing our own local regulations to enhance our capacity to protect the environment and natural resources from negative impacts associated with the industry.

9.3.2 EHS Policy Recommendations for the Maritime and Offshore Oil and Gas Industry

- Development of a more robust national marine pollution response strategy;
- Formulation of a comprehensive national legislation framework for oil spill prevention, preparedness, response, liability and compensation and agreements, memorandum of understanding for response between different parties that are consistent to the international and national provisions. GoK to create a National Oil Spillage and Pollution Compensation Fund and/or Kenya to be an active member of The International Oil Pollution Compensation Funds (IOPC Funds) to ensure victims (both onshore and offshore) like those of the case study of Thanke Village in Makueni

County are compensated in time. The National fund can be benchmarked with that of KWS on damages caused by wildlife to local communities and other similar funds.

- Coordinated approach/framework for oil pollution prevention and response between government agencies and the private sectors such as the Oil Spill Mutual Aid Group (OSMAG).
- Comprehensive assessment of the offshore oil and gas safety and security risk profile in the offshore oil blocks.
- Establishing common, best practice approaches to offshore oil and gas safety and security regulation, to include industry engagement, this may include establishing regional government-industry cooperative agencies to provide advice and coordination.
- Offshore installations and mobile offshore drilling units must have Ship Security Plans on location
- Maintenance of counter-terrorism capabilities, prevention strategies and operational responses to threats leading the management of maritime intelligence.
- Comprehensive assessment of the status of the existing aids to navigation along the Kenyan coast
- Establishment of safety zones and safety of navigation around offshore installations and structures
- Establishing maritime safety and security arrangements to include incidents at sea protocols;
- Strengthening of the Maritime Search and Rescue Centre (MRCC) to monitor maritime traffic along the Kenyan coast and provision of maritime safety information.
- Establishing of an elaborate search and rescue framework that incorporates all the agencies with a search and rescue functions.
- Strengthen the capacity of the Mombasa Search and Rescue Coordination Centre and adequately equip the center.
- Establish an oil and gas industry Search and Rescue (SAR) requirement for offshore sites.
- Establishing a framework for marine environmental protection including pollution, dumping and decommissioning of offshore installations;
- Develop individual state and collective offshore arrangements and capabilities for disaster management to include: offshore oil and gas incidents prevention, recovery and response; and shared scientific information to include: marine science, oceanographic, hydrographic, seismic, coastal and meteorology data in order to better understand and deal with the environmental impacts of incidents;
- KMA to ensure compliance and enforcement of national safety standards/ guidelines on vessels selling petrol in all marine waters in Kenya.
- Implement an integrated disaster risk management approach;
- Conduct joint and comprehensive risk assessments of the environmental, social and economic impacts of major activities;
- Harmonize methodologies, tools and procedures for risk assessment of maritime infrastructures and operations;

- Spatial planning to protect and preserve rare and fragile ecosystems and migratory routes;
- Incorporate the principles of 'Polluter Pays', 'Precautionary Principles', and 'Best Available Techniques and Best Environmental Practice' within national legislation along with ratified international treaties and all international rules, standards and recommended practices and procedures in offshore oil and gas development.

9.4 Special Scientific and Socio-economic Studies Recommended

Capacity building on economic valuation of all onshore and marine resources: Using an environmental economics/ ecosystem services approaches, there is need for economic valuation of all onshore and marine resources within each offshore oil blocks in Kenya. For onshore inventories, NEMA and the Department of Resource Surveys and Remote Sensing (DRSRS) based at Ministry of Mining can lead the process.

For offshore blocks, the study should cover all marine waters in the territorial sea and exclusive economic zone if possible before licencing of international oil companies to commence production. This condition should exclude exploration stages. The capacity of Kenya Marine and Fisheries Institute (KMFRI) should be improved to lead in this process by establishing a special scientist programme within the Institute with financial and technical support from both the Kenya Government petroleum fund and the country's development partners. It will also be important for such studies be repeated over a period of time (every ten years may be appropriate) and keep a database for the same for national economic planning and petroleum licencing purposes. National Treasury will be required to facilitate these studies through appropriate budget allocation and prioritization of oil blocks with commercial interests. This inventories will be used for wise resource conservation and decision making processes. These inventory studies can be done every 10 years.

Develop guidelines for health and safety audit of oil exploration activities: Environmental, health and safety audit of all areas drilled since exploration started in the country to determine how and where the oil wastes were disposed, environmental quality (water, air, soil, animal, and vegetation) status and health of the local communities, violations of international best practices and laws, any human rights violations and any positive or negative impacts to local communities. A multidisciplinary team is recommended to undertake the study pre and post the establishment of NEMA in the country. The study should find out lessons to learn for future oil and gas exploration and production activities, environmental management plan and health innervations required. Companies involved in oil and gas exploration should prepare standard Annual Sustainability Reports to support the audit and monitoring process. The reports should contain common EHS metrics that are designed to ensure that the companies are accountable to their EHS policies.

Carry out health and safety audit of petroleum transportation modes: The is need for independent, comprehensive and mandatory environmental, health and safety audits of all petroleum infrastructure to identify risk area. This will include major urban roads and highways, railways, ports, way leaves, depots and oil pipelines in terms of compliance to EHS laws and other safety requirements. The study should also find out the level of public awareness on risk associated with storage and transportation of petroleum products. The audits should develop budgets for implementation of findings by various agencies like KENHA, KURA, KRC, KPC and other relevant government agencies. The agencies must allocate financial and human resources to implement the findings from audit audits annually.

Carry out Periodical Baseline Studies including studies on local content: The National Government in collaboration with the county Governments and upstream investors should undertake periodical baseline studies in oil and gas potential areas to determine the skills and supplies available in the market both nationally and at the county level. This will help determine what can be sourced locally and where international suppliers can partner with Kenyan firms to ensure local capacity is built over time. This will provide a framework for various government agencies, and public and private educational institutions to develop and implement capacity building investment programmes in an informed manner. Upstream players will also benefit from the information from such studies in planning their corporate social responsibility or community social investment projects.

A baseline Study on Local Content identifying the need for skills and supplies in the sector, as well as the current availability of these skills and supplies locally (nationally and at county levels) for the purposes of formulating a National Content Strategy Implementation Plan.

9.5 IMPLEMENTATION PLAN FOR STRATEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT FOR THE PETROLEUM SECTOR IN KENYA

Below is the proposed SESA implementation plan to be adopted and implemented by various stakeholders and government agencies in the short, medium and long terms.

This implementation plan is based on the recommendations provided in the SESA report. The recommendations are referred to as the activities in the implementation matrix. The colour coding implies that red is first priority activities which should be urgently implemented, Blue is second priority with activities that should be implemented with KEPTAP funding and they are not very urgent while yellow is for activities which are not urgent and they do not require KEPTAP funding.

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
1.	Mapping and conservation of onshore and offshore biodiversity hotspots in Kenya	NEMA/KFS	350							
2.	Mapping and conservation of wildlife migratory/ dispersal routes and breeding zones on land	KWS	450							
3.	Mapping and conservation of fish breeding zones in Kenyan waters with oil and gas potential	Fisheries Department/ KEMFRI		√						
4.	Mapping out and conservation of areas of archaeological and heritage	NEMA/NMK	250							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
	value in all oil blocks									
5.	Development of Environmental Conservation Plans for different ecosystems like marine, forests, Game reserves in areas with oil blocks	NEMA/KWS/ KFS	450							
6.	Develop guidelines for oil and gas exploration in natural forests, protected areas (on shore and offshore) and biodiversity hotspots	NEMA	250							
7.	Ensure Linkages to Wise Use of Water and Protection of water bodies and wetlands	NEMA, WRMA								
8.	Development of guidelines for Integrated Environmental and Social Assessment for both the onshore and offshore petroleum development activities	NEMA	250							
9.	Development of inspection and	NEMA	350							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
	monitoring procedures for the oil and gas sector									
10.	Undertake Gender Assessment for the Petroleum Sector	NEMA	200							
11.	Establishment of a Petroleum Unit at NEMA to handle all environmental matters for upstream, midstream and downstream sector	NEMA		√						
12.	Establishment of a special department for wayleave acquisition, record keeping, monitoring and enforcement of way leaves encroachment	NLC		√						
13.	Establishment of an equipped national environmental analytical and mobile laboratories	NEMA	1,200							
14.	Development of an environmental information management system for Petroleum Sector	NEMA, MOEP, NOCK, ERC, KPC, DOSH	350							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
15.	Development of a comprehensive oil spill prevention, preparedness, response and management plan for onshore and offshore oil spills	NEMA/KMA, DOSH	350							
16.	Capacity building for ESIA experts /consultants, relevant NEMA staff and lead agencies' contact persons on Integrated Environmental and Social Assessment for the petroleum sector projects	NEMA/EIK, PIEA	150							
17.	Development of resettlement policy framework and practice standards	NEMA/NLC	300							
18.	Development of guidelines for Access to Land for Petroleum Exploration and Production:	NLC	300							
19.	Develop Land Use Plan and Integrated Infrastructural Development for counties with potential for oil exploration and	Min of Devolution		√						

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
	production									
20.	Development and implementation of a comprehensive local content policy and regulations to facilitate participation of Kenyans in the petroleum sector	MoEP	450							
21.	Development and implementation of a National Communication Strategy for Oil and Gas Sector Awareness Programme	MoEP	250							
22.	Development and implementation of a national security master plan for oil and gas sector	MoEP		√						
23.	Build capacity on Heritage Impact Assessment (HIA) and develop guidelines for undertaking HIA	NEMA/NMK	250							
24.	Review and revision of environmental regulations to incorporate petroleum sector frameworks and laws that	NEMA, KMA	350							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
	especially apply to upstream and mid-stream sectors									
25.	Development of occupational safety and health regulations and related standard guidelines	DOSHS	350							
26.	Development of policy guidelines in the relevant codes of practice for OSH Auditing and OSH performance monitoring in the upstream petroleum sector	DOSHS	250							
27.	Development of Oil spill Regulation covering onshore and upstream across upstream, midstream and downstream	NEMA/KMA	350							
28.	Formulation of a comprehensive national legislation framework for oil spill prevention, preparedness, response, liability and compensation and agreements	NEMA in association with KMA	300							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
29.	Creation of disaster response units in each county and in relevant energy sector entities	NDOC		√						
30.	Promotion of Institutional Transparency and Environmental Accountability	MoEP		√						
31.	Develop a framework for pro-active and sustained engagement between the two levels of government, investors and communities in energy and petroleum resource areas	MoEP		√						
32.	Awareness creation on safety among communities living along crude oil transport corridors	NDOC	200							
33.	Establishment of upstream solid waste management systems (storage, collection, transportation, treatment and disposal)	NEMA/County Governments		√						

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
34.	Develop oilfield waste user's guide: Hazardous Waste Management and Gas Flaring & Venting Legal Procedures and Environmental Standards	NEMA	200							
35.	Development of guidelines for Health Impact Assessment (HIA) and establish procedures for entrenchment in the ESIA process	MOH, NEMA, DOSH, IPIECA	350							
36.	Development of petroleum transportation safety system	ERC		√						
37.	Enhance Environmental, Safety and Health monitoring and inspections in the upstream petroleum sector in line with international best practices	DOSHS/ NEMA	600							
38.	Undertake regular community health assessment in areas with ongoing upstream and midstream activities	MOH		√						

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
39.	Development of policy and technical guidelines relating to Marine Safety in the offshore upstream and midstream petroleum sector	KMA	200							
40.	Develop/ update/ revise regulations on location, operation and safety distances for construction of petrol fueling stations and LPG filling stations and depots including marine floating petroleum retail sites	ERC	350							
41.	Incorporate Environmental Provisions in Upstream Exploration and Production Sharing Contracts	MoEP, NEMA		√						
42.	Establish a national programme for elimination of fuel adulteration	ERC	100	√						
43.	Capacity building for Petroleum Fuel Tankers drivers on safe transportation and handling of petroleum products	ERC	100	√						

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
44.	Integrating Environmental Safety and Health and Disaster Management into national education curriculum, so as to become part of national education system	MoEST	200	√						
45.	Development and implementation of a public participation and consultation national manual for oil and gas sector	NEMA	250							
46.	Development of guidelines for SEA, ESIA, Audit and other environmental information disclosure	NEMA								
47.	Community user Guide for Environmental and Social Impact Assessment	NEMA	100							
48.	Lead Agencies Capacity Building and Inter-Agency Coordination including Streamlining Environmental Roles and Responsibility	NEMA		√						

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
49.	Ensure SESA for Exploration and Development of Oil Blocks is undertaken	NEMA		√						
50.	Reduction of timelines for approvals for the recommended levels of the SEA process	NEMA								
51.	Promote adoption of Implementation of cleaner technologies for the oil and gas sector	, NEMA, KOGA, KNCPC		√						
52.	Promote use of Best Available and Safest sustainable Technologies in oil and gas sector	MOEP, NEMA		√						
53.	Initiate Public-Private Initiatives and capacity building onCSR	MoEPKOGA, OSMAG	350							
54.	Undertake a coordinated Spatial Planning to avoid Land and Resource Conflicts with the Oil and Gas Industry	NLC KMA	650							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
55.	Build capacity of GOK on development of Legal and social agreements	NEMA	100							
56.	Facilitate the implementation of local content plans	NCIC								
57.	Preparation and implementation of the Vulnerable and Marginalized Groups Framework (VMGF):	NGEC		√						
58.	Develop monitoring programmes to ensure application of human rights	MOEP								
59.	Promotion of Community Development Programmes	MOEP, NEMA								
60.	Operationalization of the Petroleum Training Fund	MOEP, NEMA								
61.	Equitable distribution and allocation of revenue and other benefits from the oil and gas sector	MOEP								

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
62.	Strengthen policies and other incentives that encourage livelihood diversification and discourage over reliance on oil benefits	MOEP, PIEA								
63.	Harmonize systems for efficient revenue collection	ERC, KRA								
64.	Conduct Economic feasibility study of transport systems for crude and refined oil to ensure optimum returns	MOEP								
65.	Capacity building on economic valuation of onshore and marine resources	NEMA, DRSRS, KMFRI, treasury								
66.	Develop guidelines for health and safety audit of oil exploration activities	DOSH, NEMA/ lead agencies	250							
67.	Carry out health and safety audit of petroleum transportation modes	DOSH, NEMA	100							

SN	Activity	Responsible Implementing Agency	Estimated Budget cost/Source of funding ('000)		Financial Year					
			KEPTAP	GOK	2017	2018	2019	2020	2021	2022
68.	Carry out Baseline Studies including baseline Study on Local Content	MoITC	350							

Total Estimated KEPTAP funding Cost is **$12,200,000.** This is not inclusive of cost of trainings proposed in the table below and the cost to be incurred during implementation of activities proposed for GOK funding.

9.6 Human Capital Capacity Building and Development

The following set of capacity building areas will be useful:

	Area of training	**Beneficiary**	**Timing**		**Funding**	
			Immediate	**Later**	**KEPTAP**	**GOK**
1	General course in Offshore Oil and Gas Operations	KMA/NEMA/DOSHS/ERC/MOH	√		√	
2	Oil Spill Management and Response	KMA/NEMA/MoEP/KPC/NDOC	√		√	
3	Marine Ecosystems Sensitivity Mapping	KMA/NEMA		√		√
4	Offshore Oil and Gas Sector Waste Management	KMA/NEMA/MOH	√		√	
5	Maritime Safety and Environmental Administration	NEMA/DOSHS/KMA/MOH	√		√	
6	Marine Spatial Planning and Management	KMA	√			√
7	Environmental Health and Safety Regulations, Compliance and Enforcement Skills	DOSHS	√		√	
8	Environmental pollution and monitoring for petroleum sector	NEMA/KMA/ERC/MoEP	√		√	
9	Environmental sampling, monitoring,	NEMA	√			√

	inspection and auditing of oil and gas infrastructure and facilities					
10	Environmental and social impact assessment training for oil and gas	NEMA/ Lead Agencies	√		√	
11	Environmental and social monitoring methods and practice	NEMA	√		√	
12	Waste (Oilfield, Waste Oil, etc) management in petroleum sector	NEMA	√		√	
13	Assessment of Environmental damages, risks and liabilities	NEMA/KMA		√		√
14	Environmental regulations, compliance and enforcement skills	NEMA	√		√	
15	General oilfield environmental management	NEMA	√			
16	Surface and groundwater management in Oil Fields	NEMA		√		√
17	Soils and reclamation/ rehabilitation issues	NEMA		√		√
18	Well closure, decommissioning and abandonment	NEMA	√		√	

19	Resettlement, Land Acquisition and Compensation	NEMA/NLC	√		√	
20	Environmental due diligence training	NEMA/MoEP	√			√
21	Environmental, Health and safety inspection/ Oilfield safety, security and first aid	DOSHS/NEMA/ERC/KMA/MOH	√		√	
22	Economic valuation of onshore and marine resources	KMA/NEMA		√	√	

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