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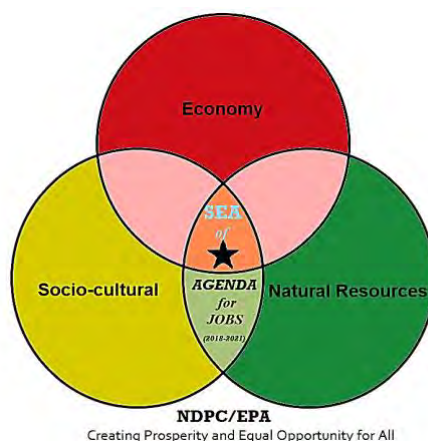
Strategic Environment Assessment (SEA)

ON OPENING UP THE ONSHORE VOLTAIAN BASIN AND THE KETA
DELTA BLOCK FOR OIL AND GAS EXPLORATION AND PRODUCTION

EXECUTIVE SUMMARY
VOLUME I



AUGUST 2021



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The comments and opinions contained in this Executive Summary are those of the Environmental Protection Agency (EPA), the Ministry of Environment, Science, Technology and Innovation (MESTI), National Development Planning Commission (NDPC), Ministry of Energy, Ghana National Petroleum Corporation (GNPC), Petroleum Commission (PC), and Ghana Geological Survey Authority (GGSA) and may not reflect the opinions of other Ministries, Departments and Agencies (MDAs) or other external bodies. The EPA has carried out the Strategic Environmental Assessment (SEA) on opening up the onshore Voltaian Basin and Keta Delta Block for oil and gas exploration and production in good faith, exercising all due care and attention. The EPA does not accept responsibility for any inaccurate or incomplete information supplied by third parties. No representation is made about the accuracy, completeness or suitability of the information in this publication for any purpose. The EPA shall not be liable for any damage which may occur to any person or organisation acting or not based on this publication. An effort has been made to ensure facts and data are correct and up to date where possible at the time of writing and editing. However, it is acknowledged that many of the topics covered in this Report are dynamic. Therefore, some information may not reflect the current situation. The use of information provided in this Report as reference material should be combined with a contact of the appropriate agencies to ensure the information herein continue to be accurate and relevant.

Foreword

We are pleased to endorse this report which summarises the entire process, findings and recommendations of the Strategic Environmental Assessment (SEA) on opening up the onshore Voltaian Basin and the Keta Delta Block for oil and gas exploration and production.

In addition to the offshore basins that are currently producing petroleum resources, Ghana has a large sedimentary basin onshore, which could be opened up soon for oil and gas exploration. There are serious policy choices and environmental considerations that need to be addressed to ensure that oil and gas contribute to sustainable broad-based development. It is therefore important to quickly understand and respond to the risks and opportunities related to petroleum activities in the study areas.

The SEA demonstrates that environmental sustainability is critical to ensuring the long-term viability of the oil and gas industry. The concept of environmental sustainability is related to the balance between natural resources as well as socio-cultural, economic and institutional issues. Current global concerns such as climate change, safety and emergency response in petroleum operations have been considered in the SEA. The SEA process engaged a wide range of stakeholders including public and private sectors, civil society, NGOs, academia, traditional authorities, fishing communities and international agencies. The involvement of these stakeholders and capacity building throughout the SEA process has helped all participants to understand the wider impacts of oil and gas development on the environment and economic growth.

The general expectations of oil revenue supporting growth and prosperity cannot be achieved without factoring in environmental considerations to achieve sustainable development of petroleum resources. Through engaging a wide range of stakeholders, the SEA provides a basis for transparent and accountable decision-making which will enhance the smooth development of the oil and gas sector in the areas considered. It is expected that the Ministry of Energy and the Ministry of Environment, Science, Technology and Innovation together with the National Development Planning Commission will coordinate and facilitate the integration of the findings and recommendations into the relevant sector policies, plans and programmes.

We extend our appreciation to the SEA Core Team, Consultants and collaborating agencies, both local and international, for their efforts in completing this noble task.

**MINISTRY OF ENVIRONMENT, SCIENCE,
TECHNOLOGY AND INNOVATION**

MINISTRY OF ENERGY

Statement by Collaborating Agencies

The discovery of oil in commercial quantities in Ghana in 2007 and subsequent commencement of production in 2010 has generated high expectations of rapid economic growth and prosperity among the population. However, the long-term viability of oil and gas production raises significant opportunities and risks for environmental sustainability that must be addressed to ensure that the expected benefits can be achieved.

The Strategic Environmental Assessment (SEA) on opening up the onshore Voltaian Basin and the Keta Delta Block for oil and gas exploration and production is a means to ensure that the petroleum resources, both offshore and onshore, are managed in an environmentally sustainable manner. The SEA is the result of collaboration between the Ministry of Energy, the Ministry of Environment, Science, Technology and Innovation, the National Development Planning Commission and the Environmental Protection Agency (EPA) along with technical support from the Petroleum Commission, the Geological Survey Authority and Ghana National Petroleum Corporation. The heads of these organizations formed the Steering Committee that provided oversight for the SEA.

The wide-ranging process of the SEA covered the period from 2015 – 2019. The process involved a broad range of stakeholders including public and private sectors, Civil Society Organizations, NGOs, Academia, Traditional Authorities and international agencies.

The SEA has produced three (3) main reports covering this Executive Summary, Content Report and Process Report that highlights the main aspects of the SEA including the findings and recommendations. This Report is intended to meet the expectations of a wide range of stakeholders including the Government, Civil Society, Academia and International agencies among others. Those who require more detailed information are advised to refer to the Content Report which is available on the Ministry of Energy's website i.e.: www.energymin.gov.gh and the Environmental Protection Agency's websites: www.epa.gov.gh and www.epaoilandgas.org.

Acknowledgements

The SEA report was prepared by the Strategic Environmental Assessment (SEA) Core Team and the Consultants under the direction and support of the Inter-ministerial Steering Committee. The Agency is grateful to all stakeholders who participated in the processes that have led to the successful completion of this report.

The names of all the participating stakeholder institutions and individuals are published and annexed to the SEA of the onshore Voltaian Basin and the Keta Delta Block Process Report. The Agency also acknowledges the contributions and support received from the Oil for Development Programme (OfD) of Norway, Netherlands Commission on Environmental Assessment and other Development Partners.

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Table of Contents

1.0	Introduction.....	7
2.0	Baseline Information.....	11
3.0	The SEA Process.....	13
4.0	Preparatory Phase.....	17
5.0	Scoping.....	19
6.0	Assessment and Recommendations	27
7.0	Implementation and Monitoring	43

List of Abbreviations

2D	Two-dimensional
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
EC	Economic
EPA	Environmental Protection Agency
GCPF	Gas Central Processing Facility
GIS	Geographic Information System
GNPC	Ghana National Petroleum Corporation
GoG	Government of Ghana
Ha	Hectare
HSE	Health Safety Environment
ICSU	International Council for Science
IMP	Integrated Management Plan
INS	Institutional
KPI	Key Performance Indicator
MDAs	Ministries, Departments and Agencies
MESTI	Ministry of Environment, Science, Technology and Innovation
MMDAs	Metropolitan, Municipal and District Assemblies
MoU	Memorandum of Understanding
NCEA	Netherlands Commission for Environmental Assessment
NDP	National Development Planning
NDPC	National Development Planning Commission
NDPF	National Development Planning Framework
NEMA	National Environment Management Authority (Uganda)
NGO	Non-Governmental Organization
NR	Natural Resources
OCPF	Oil Central Processing Facility
OfD	Oil for development program (Norway)
PET	Petroleum
PPP	Policies, Plans and Programs
SC	Socio-cultural
SDG	Sustainable Development Goal
SE	South East
SEA	Strategic Environmental Assessment
TA	Traditional Authorities
ToR	Terms of Reference
UN	United Nations

Cover page pictures:

1. The Yeji-Makango ferry
2. Elephants at the Mole Park in the Northern Region
3. Docked boats on the banks of Lake Volta

1.0 Introduction

Ghana's oil and gas development

Ghana is endowed with four sedimentary basins with significant hydrocarbon accumulation. These basins are the offshore Western Basin, Central Basin, Eastern Basin, the onshore Voltaian Basin and the Keta Delta Block. Hydrocarbon exploration in Ghana started in 1896, however, commercial production began in 1970 from the Saltpond discoveries in the Central basin. The promulgation of PNDCL 64 (1983) establishing the GNPC resulted in increased offshore activities. First oil was produced from the Jubilee field in December 2010 and since then offshore oil production has been progressing steadily. A Strategic Environmental Assessment (SEA) was undertaken from 2009-2012 to address the various sustainability issues related to the offshore oil and gas sector.

In the Onshore areas, the British Geological Survey Department and other researchers conducted some initial studies in the Basin over 100 years ago. The Soviet Geological Team drilled 10 hydrogeological boreholes down to 150-750 m in the 1960s. Shell acquired wide grid aeromagnetic data (18,000-line km) and 2D seismic data (208-line km) between 1971 and 1977. Figure 1 illustrates the shows of hydrocarbons based on the investigations to date.

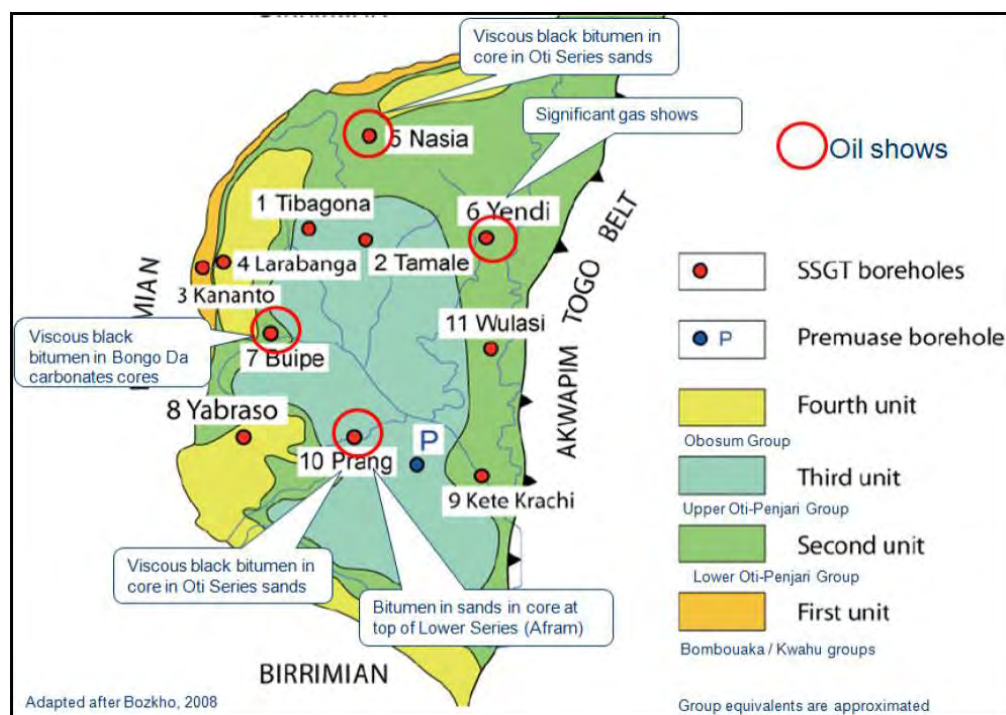


Figure 1: Hydrocarbon shows in the Voltaian Basin

To further investigate the hydrocarbon potentials in the Voltaian Basin, GNPC has carried out 2D seismic surveys covering a grid system in the Basin as shown in Figure 2. These surveys will be used to decide on and eventually locate deep wells to be drilled to ascertain the presence of rock sources.

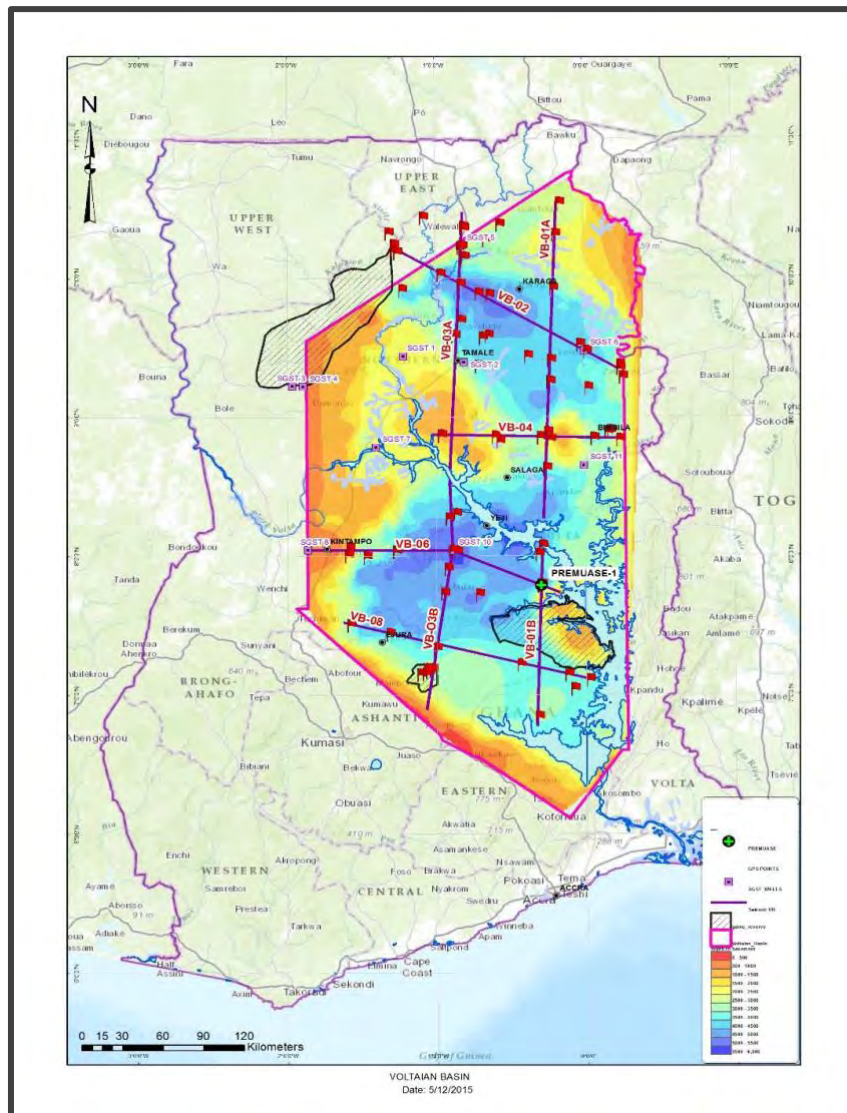


Figure 2: 2D seismic line structure in the Voltaian Basin

The Government has already awarded an exploration and production license for the Keta Delta block in the Volta region to Swiss Africa Oil Company, PET Volta Investments and GNPC. The Government is now considering opening up the Voltaian Basin and the Keta Delta Block for further petroleum exploration and production (see map on the back page of this Executive Summary).

Purpose and Objectives of the SEA

The SEA is being undertaken to guide policy choices and transparent decision-making to ensure sustainable development by the GoG. The main focus of the SEA on Opening up the Voltaian Basin and the Keta Delta Block for Oil and Gas Exploration and Production is to guide how to integrate environmental concerns into existing and new Policies, Plans and Programs (PPPs) and into laws and regulations relevant for the development of the oil and gas sector in the study area. The term “environment”, as used in the SEA does not only embrace the biophysical environment but also the social, cultural, economic and institutional aspects that constitute the human habitat. SEA is most effective if applied at the point where PPP’s, laws and regulations are being developed and different approaches or alternatives are proposed and discussed.

It helps to identify obscure or hidden effects including their cumulative, induced and transboundary effects and focuses on sustainability principles. The purpose of this SEA is therefore to ensure that environmental issues are considered in major decisions concerning the development of oil and gas in the Voltaian basin and the Keta Delta Block at the earliest stage to achieve the following;

- Protecting and enhancing the natural resources (e.g., Flora and fauna, wetlands, etc.) on which people depend for their livelihoods,
- Improving health and well-being by eliminating pollution and reducing accidents,
- Reducing risks associated with the industry, including user conflicts
- Enhancing opportunities for the vulnerable and excluded, and,
- Creating institutional systems that allow transparent processes and broad participation in decision making.

The SEA should feed into the key elements of proactive planning (phasing of oil and gas development, land use and spatial planning, infrastructure development, waste management, utility and social service needs etc.). In particular, it is expected that the findings of the SEA shall feed into the Medium-Term National Development Policy Framework prepared by NDPC. Furthermore, the SEA would also address issues related to the Sustainable Development Goals (SDGs) and the African Union Agenda 2063.

The specific objectives of the SEA are to:

1. Integrate environmental and social considerations in the development of the onshore oil and gas fields and related activities to ensure sustainable development,
2. Ensure that environmental issues are addressed at the earliest stage of decision-making,
3. Ensure wider stakeholder participation in decisions making,
4. Identify and present relevant baseline information on the natural resources, socio-cultural, economic and institutional conditions of the communities that are likely to be affected,
5. Develop relevant scenarios for the future oil and gas activities in the Voltaian Basin and the Keta Delta Block,
6. Identify potential sensitive environmental areas and provide guidance for protecting such areas whilst at the same time exploiting petroleum resources,
7. Identify environmental opportunities and risks associated with various stages of the onshore oil and gas development (the scenarios) and present necessary guidelines to enhance opportunities and to minimize risks,
8. Establish thresholds for acceptable development to provide a benchmark for cumulative environmental effects assessment,
9. Outline mitigation and monitoring requirements and objectives that establish best practices and ensure effective management for future oil and gas development,
10. Provide recommendations for the sustainable development of oil and gas activities in the study area and present plans for implementation and monitoring of the recommendations decided to be implemented.

Policy, Legal and Regulatory Framework

The SEA is conducted in conformity with the Environmental Assessment Regulations, 1999 (LI1652), and also the Guidelines for SEA contained in the report on the “Review of the Strategic Environmental Assessment (SEA) in Ghana”, issued in May 2009. Furthermore, the National Development Planning System Regulations 2016, (LI 2232) gives legal backing to planning systems provided by NDPC, which include the use of SEA at all levels. The SEA Guidelines provide for stakeholder analysis, scoping, assessment and monitoring and evaluation which have all been applied in this SEA. The SEA has considered a wide range of policies, plans, programs as well as laws and regulations covering all aspects of the emerging onshore oil and gas sector.

Capacity Building

The development of SEA in Ghana has always involved a conscious effort to build the capacity of participating stakeholders through participatory processes. The aim is to encourage stakeholders to consider environmental considerations at the earliest stages of decision-making and thereby promote sound environmental stewardship in developing the petroleum sector. During this SEA, all stakeholders involved got a basic understanding of the petroleum industry, for example through the development, evaluation and communication of development scenarios. The broad range of participants drawn from public and private sectors, traditional authorities, religious groups, fishing communities, transport operators, artisans, civil society organisations, women’s groups etc., were exposed to the application of basic SEA tools, such as opportunity/risk matrices, and identification and assessment of issues related to the petroleum sector. Several capacity-building opportunities have been provided to the SEA Core Team. Not only through the daily execution of the SEA, but also by exposing the Team to international perspectives of the oil and gas sector. Study tours to the basins and Uganda have contributed to this training.

2.0 Baseline Information

Baseline information for the SEA is presented in the SEA Content Report. Fact Box 1 is a summary of the baseline information with a focus on the four pillars of the SEA. Fact Box 2 explains some typical challenges related to the relations between oil and gas development and the protection of environmentally protected and sensitive areas.

Fact Box 1: Existing Environment

General

Ghana is bordered on the East by the Republic of Togo, the West by Cote d'Ivoire, the North by Burkina Faso and the South by the Gulf of Guinea. The total land area of Ghana is 238,533 km² with an Exclusive Economic Zone of 110,000 km² of the sea, forming the territorial area of Ghana. Ghana has a coastline of 550 km. Oil and gas prospects span the entire coastline as well as onshore in the Voltaian Basin. The Volta river basin is located in six countries (43% in Burkina Faso, 42% in Ghana, and 15% in Togo, Benin, Cote d'Ivoire and Mali) and drains 400,000 km² of the semi-arid and sub-humid savanna area. A dominating feature of the basin is the man-made Lake Volta created to produce hydropower at Akosombo and Kpong. The Keta basin lies at the extreme SE corner of Ghana adjoining Togo. The use of water resources and the influence of climate change on nature and people are major challenges to manage in the study area.

Natural Resources

Ghana is rich in biodiversity. The country boasts a wide variety of birds, reptiles and animals with unique habitats and a wide range of rare plants and flowers. The coastline of Keta is characterized by an exceptional and environmentally sensitive lagoon system. There are several nature reserves within the study area such as Digya National Park, Bomfobiri Wildlife Sanctuary, Kogyae Strict Nature Reserve and Keta Lagoon Complex Ramsar Site.

Socio-Cultural

The SEA covers eight (8) administrative regions: Northern, North East, Savannah, Bono East, Ashanti, Eastern, Volta and Greater Accra. 33 districts are involved of which 4 are located in the Keta basin. All 33 districts have basic education and health infrastructure. More than half of the districts have satisfactory secondary health services and educational infrastructure. The population in the study area is around 3.45 million which is a smaller part of the total population of approximately 25 million in Ghana.

Economic

The main economic activity in the study area is agriculture, especially in the Volta river basin, while in the Keta area it is predominantly fishing. Commercial activities come second to agriculture in these areas. In addition to potential oil and gas resources, the study area contains other economic valuable resources such as gold, timber, industrial diamonds, bauxite, manganese, rubber, salt and limestone. It is expected that the potential oil and gas resources in the Voltaian Basin will fuel substantial economic growth. This is also why the Government is accelerating the exploration and potential development of petroleum resources in the study area.

Institutional

Ghana is a unitary state divided into 16 administrative units or regions, each headed by a regional minister appointed by the President. The principal units of the regions are the Metropolitan, Municipal and District Assemblies (MMDAs), which constitute the Local Government. The Constitution empowers the President to create Ministries and appoint Ministers for various sectors. The Ministry of Energy is the lead agency responsible for the oil and gas sector. Other relevant agencies are the Ministry of Environment, Science, Technology and Innovation, NDPC, the Petroleum Commission, GNPC and EPA.

Fact Box 2: Protected and Environmentally Sensitive Areas

The Government of Ghana is formally responsible for designating areas for ecosystem protection and biodiversity conservation and to avoid activities that compromise their ecological integrity. The Government also regulates activities in environmentally sensitive areas in general to secure their biological value. It is the responsibility of the petroleum companies to develop appropriate responses and systems to manage their business activities in areas of high environmental value according to regulations, international best practices and company standards. If the Government decides to open up for petroleum activities in highly sensitive areas, both parties have a clear responsibility of doing whatever possible to minimize the adverse impacts on the environment.

Petroleum activities in the Voltaian Basin and Keta Delta Block may result in some adverse primary and secondary impacts on environmentally sensitive and protected areas. Primary impacts are normally directly connected to the area of influence of a project/activity and can often be mitigated when projects incorporate sound operational management and biodiversity conservation practices from the earliest stages of project development. Secondary impacts usually do not result directly from project activities but are the result of the project presence and high-level decisions and the actions of nearby communities in response to a project's presence. It is therefore often difficult to identify the origin of such impacts. Secondary impacts are often caused by human population changes in an area and new/additional activities resulting from project development such as roads, settlements, harbours and power generation. Petroleum development in the Voltaian Basin and Keta Delta Block will attract people who hope to get jobs or to use the business opportunities created by the increased demand for goods and services. Due to the character of the secondary impacts, the petroleum industry is not always in a position to control or influence these.

Typical significant impacts in onshore environmentally sensitive and protected areas are related to seismic activities, land take and presence in general, construction of roads and pipelines, traffic, produced water, oil spills and secondary impacts related to in-migration. Primary and secondary impacts from operations in water bodies are mainly related to seismic surveys, drilling operations, installation of platforms/artificial islands, pipeline laying, operations and supply activities. Typical aspects and possible impacts are acoustic disturbances of marine organisms, damage and fragmentation to habitats from vessels activities and damage on ecosystems from waste, produced water and spilt oil.

Although avoiding, minimizing and mitigating the negative impacts should be the priorities when environmentally sensitive and protected areas are influenced by petroleum activities, companies might take the opportunity to benefit biodiversity in and around project sites. Offsetting residual impacts is also an alternative action.

The condition of the environmentally sensitive and protected areas has a direct influence on the tourism industry. Petroleum activities in such areas will therefore directly influence the success of developing Ghana as an eco-tourism destination in West Africa. This sensitive co-existence between two major sectors demands strong leadership from both sectors supported by governmental pro-active management. The infrastructure associated with petroleum activities may have various negative impacts on tourism if not well managed. Such impacts could, for example, be an increase in the number of roads and vehicles in the area, which could lead to increased road kills of wildlife, the infrastructure at the drilling sites and the associated lights may scare away wildlife while at the same time reducing the aesthetic value of the protected area. The construction of petroleum associated infrastructure also often increases fragmentation of the landscape, which may cause animals to move away from the known good viewing sights. A combination of such impacts may contribute to a reduction in revenue derived from tourism.

3.0 The SEA Process

The SEA had two dimensions:

- **Process**

The SEA was a participatory process involving relevant stakeholders. The focus was to ensure understanding, involvement and ownership of the SEA amongst stakeholders. The process of the SEA is covered by the SEA Process Report.

- **Content**

The SEA identifies and documents sustainable actions and institutional arrangements for effective management of the oil and gas development in the Voltaian Basin and the Keta Delta Block. The content of the SEA is covered by the SEA Content Report.

Figure 3 illustrates the four phases of the process followed.



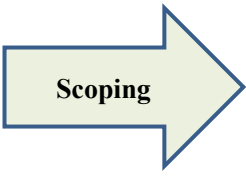
Figure 3: Stepwise SEA process

Figure 4 summarizes the main activities of the SEA and the related deliverables. These are the most important meetings and workshops which took place:

- The SEA on opening up the Voltaian Basin and the Keta Delta Block for oil and gas exploration was launched by the Hon. Minister of MESTI on 29th February 2016 in Accra. The launch was followed by a National Stakeholder Consultative workshop which ended on March 1st. Over seventy (70) participants drawn from the various Ministries, Departments and Agencies (MDAs), Civil Society Organizations, Private Sector and Academia took part in the workshop. In addition, twenty-seven (27) media practitioners attended to ensure that the process received wide publicity. The participants validated the scenario analysis by the SEA Core Team and gave their input and comments.
- Consultations on the regional level were carried out during June 22nd – 25th 2016 in the Northern, Brong Ahafo, Ashanti and Eastern regions. The workshops were held in the regional capitals and attended by participants from Ministries, MDAs, Civil Society, Private Sector and Academia. In all, a total of a hundred and seventy-three (173) persons participated in the consultations. Based on the scenarios, they identified risks and opportunities within each of the four pillars.
- The consultations in the area of the Keta Delta Block took place on June 27th. In all, a total of fifty-one (51) persons took part in the process and added their proposals for risks and opportunities through group-work sessions as at the other venues.

- The Integration and Response Matrix which was the result of the Scoping Process was discussed in a National Consultation workshop held on April 11th 2017 in Accra. The goal of this workshop was to receive feedback from the stakeholders as input into the process of developing recommendations based on the Key Issues. A wide range of participants from various parts of the country including members of the National House of Chiefs, representatives of MMDAs, Civil Society and Academia attended the workshop. The participants worked in groups and in plenary to validate the input from the SEA Core Team and to make additional input. The role of Traditional Authorities in the entire consultation process was deemed to be crucial in helping to resolve issues related to land acquisition, compensation and overall conflicts that could arise from the co-existence of the oil and gas developments with communities.
- The SEA Team meeting in July 2017 concluded on the SEA Recommendations and prepared the Response matrix for further integration into the PPPs and laws/regulations.
- The meeting with the MMDAs (Metropolitan, Municipal and District Assemblies) was held from 15-18 January 2019 in Sunyani in the Brong Ahafo Region. During this meeting, the MMDAs got a good insight into all aspects of the SEA process and they delivered valuable input on how to integrate the SEA Recommendations into their medium-term Development Plans.
- The meeting with the Sector Agencies in Accra on January 22nd 2019 resulted in comprehensive capacity building on the SEA process and the main outcome of the meeting were plans for how to integrate the SEA Recommendations into the sector plans. All plans would be submitted to EPA and NDPC for review and approval.

 Preparatory Phase	Period	Activity	Participants	Deliverable
	Nov 2015	SEA Kick-off meeting, Accra	EPA, MESTI, MoE, Norwegian Partners, NCEA	Final ToR
	Dec 2015	Formation of Core Team and meetings	Relevant ministries and SEA Core Team	SEA organization and capacity building

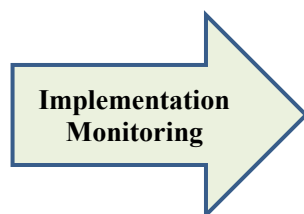
 Scoping	Period	Activity	Participants	Deliverables
	Jan 2016	Project development	Consultants and Support Team	Scenario development and analysis
	Feb 2016	SEA Core Team retreat, Sogakope	SEA Core Team and consultants	Scenario development and analysis

Period	Activity	Participants	Deliverables
Feb/March 2016	SEA launch and stakeholder workshop, Accra	Team, consultants, national stakeholders, NCEA and Norwegian Government representatives	Launch report and scenario development/analysis
March – June 2016	SEA Core Team meetings	Team and consultants	Draft Issues Register
June 2016	Regional consultations	Northern, Brong Ahafo, Ashanti, Eastern and Keta	Validation of draft and additional issues to be addressed
June 2016	Desktop review of GNPC EIA	Team, consultants, EPA and GNPC	Additional issues to be addressed
June 2016	SEA Core Team, Akosombo	Team and consultants	Issues Register and Key Issues selection
Aug 2016	SEA Core Team, Sogakope	Team and consultants	Scoping Report

Period	Activity	Participants	Deliverables
Aug 2016 – March 2017	Team meetings	Team, consultants	Data gathering and prep. for assessments
April 2017	National Consultation Workshop	Relevant stakeholders	Input to Recommendations and Response Matrix
April 2017	Team meeting, Accra	Team and consultants	- Framework for assessments - Draft Recommendations and Response Matrix
May 2017	Study tour to the Voltaian Basin and the Keta Delta Block, and to Uganda	Team, consultants, Norwegian partners	Input to finalization of the assessment phase
July 2017	Team meeting, Accra	Team, consultants	Final Recommendations and Response Matrix



Period	Activity	Participants	Deliverables
Oct 2018	Revitalization meeting, Accra	Team, consultants	Review status of the SEA, add issues since the last meeting and plan ahead



Period	Activity	Participants	Deliverables
Nov 2018	Audit of plans for Districts and Sectors, Accra (meeting 1)	Team, local consultant	Inventories of coverage of oil and gas-related aspects in DMTDPs and SMTDPs
Nov 2018	Audit of plans for Districts and Sectors Accra (meeting 2)	Team, local consultant	Inventories of coverage of oil and gas-related aspects in DMTDPs and SMTDPs
January 2019	Meeting with the MMDAs in Sunyani, Brong Ahafo region	Team, local consultant and representatives from the region	Capacity building on SEA activities so far and plans for integration of the SEA recommendations into the Medium-Term plans for all regions
January 2019	Meeting with the Sector Agencies in Accra	Team, local consultant and representatives from the sectors	Capacity building on SEA activities so far and plans for integration of the SEA recommendations into the Medium-Term plans for all sectors
April 2019	Team meeting, Accra	Team and consultants	Review of the Executive Summary, the SEA process report and the SEA Content Report. Plans for completion of the SEA process
2019	High-Level Meeting	Team, Ministries etc.	Presentation of the SEA Conclusions

Figure 4: SEA Process and Deliverables

4.0 Preparatory Phase

The preparatory phase for the SEA began with developing the Terms of Reference (ToR), for engaging consultants to participate in the undertaking of the SEA which defined the mandate and objectives of the SEA. According to Ghanaian practice, EPA coordinated the practical undertaking of the SEA and they developed a Scope of Work for the SEA following the stepwise process already mentioned.

The organization of the SEA undertaking was decided as part of the ToR, see figure 5 below.

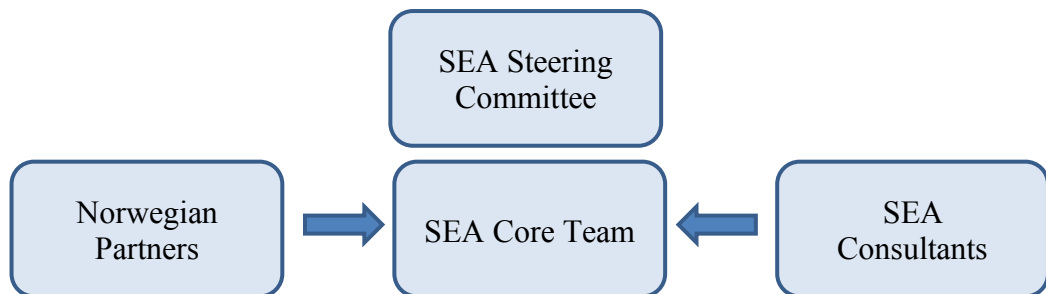


Figure 5: Organization of the SEA work

The Steering Committee was co-chaired by the Deputy Ministers from the Ministry of Energy and MESTI. The members were from ministries and government agencies, representatives from local governments and others. As being responsible for the overall quality of the SEA, it adopted the work plans and budgets and oversaw and guided the work on the SEA. The Committee was responsible for submitting for decision and implementation the recommendations from the SEA Core Team.

The SEA Core Team was responsible for the technical work on the SEA. It reported to the Steering Committee and maintained the day-to-day contact with the SEA Consultants.

The SEA consultant team which was led by an International SEA Consultant also entailed a Local Consultant from Ghana and a support team of international experts. The Netherlands Commission for Environmental Assessment was consulted regularly during the SEA process. The consultants supported the SEA Core Team as needed and took part in the Core Team meetings and other meetings and workshops.

The SEA approach and detailed methodology of carrying out the SEA focused on the following aspects:

- The SEA shall be based on the defined ToR and shall refer to the review of SEA experiences in Ghana, in particular lessons learnt from the offshore SEA.
- Identification of main risks and opportunities related to the potential oil and gas development in the Voltaian Basin and the Keta Delta Block as the foundation for the SEA assessments shall be based on a systematic approach by progressing from all relevant Issues to the most significant Key Issues.

- Development and discussion of relevant oil and gas scenarios shall be used as a major tool to build knowledge and understanding on typical and relevant oil and gas activities for all involved and to agree on Key Issues.
- Identification and involvement of relevant stakeholders at all stages of the SEA process is regarded as a necessity to assure a SEA process according to international standards.
- Budgets, timelines and consultations shall be agreed upon during the screening process and shall be adapted to the ongoing process when needed.

Stakeholder engagement has been a prerequisite to a successful SEA process and aimed to mobilize the involvement of the relevant institutions, individuals and communities in good discussions and feedback. The specific objectives of the stakeholder engagement were as follows:

- Ensure public participation in the SEA process
- Inform, collect views and build ownership of the different stakeholders as their specific concerns about the oil and gas development in the basins of interest are collected and considered during the SEA process

5.0 Scoping

Scoping is the process to define the geographical and thematic boundaries of the SEA. The final deliverable of this stage was the Key Issues to be further assessed as the basis for the SEA recommendations. The stakeholder meetings and workshops started at an early stage during the pre-scoping phase.

Figure 6 illustrates a summary of the process and conclusions for each step (for more information it is referred to the SEA Scoping Report):

1. The scenario methodology is used to describe possible developments of oil and gas activities in the Voltaian Basin and the Keta Delta Block. The scenarios describe a range of images of the future based on the most realistic available information. Each scenario, therefore, represents a uniquely visualized picture of specific directions of oil and gas activities. Scenario planning involves two steps: scenario development and analysis. The first is to compile all data which can be used by experts to establish the best possible understanding of the oil and gas resources in the area of interest. For the Voltaian Basin, this data includes all former investigations mentioned in section 1.1. Figure 7 is an indication of the potential oil and gas provinces identified in the Voltaian Basin. Within each of these provinces, specific scenarios for petroleum activities are developed to a rather detailed level. As can be seen from the examples in Fact Box 3, the scenarios include exploration drilling, field development, processing/treatment and transportation of products, terminals, local use of products, support services such as camps for employees, supply bases etc. Seven scenarios were developed for further discussions with the SEA Core Team.
2. The scenarios were analyzed by experts by the deployment of an aspect-impact matrix which provided possible risks and opportunities.
3. To keep the input from scenarios relevant and graspable, and to ensure feedback from a wide variety of possible future conditions, the SEA Core Team decided to keep three scenarios for further development and discussions. These scenarios are presented in Fact Box 4. Scenario 1 represents a positive outcome of the 2D seismic surveys done by GNPC and comprises follow up 3D seismic surveys and limited exploration drilling. However, it is assumed that no commercial discoveries are made. In scenarios 2 and 3 it is envisaged that the seismic surveys and exploration drilling resulted in commercial discoveries of gas (and condensate) and oil (and associated gas) in the northern and southern sectors respectively. The potential time horizon illustrated in Fact Box 3 indicates that a potential commercial discovery can be developed at the earliest from 2026 onwards.

The risks and opportunities developed by the experts for the three scenarios were evaluated by the SEA Core Team. The aspects considered for each of the activities which were described in the three scenarios comprised: physical presence, emissions to air, discharges, waste, accidental events and decommissioning. The characteristics of the aspects were defined and discussed in detail and the related issues were identified and linked to the four SEA planning pillars. The total number of issues identified for the three scenarios by the SEA Core Team during this stage was 329. Table 1 shows the format of the aspect-impact matrixes (example in cursive).

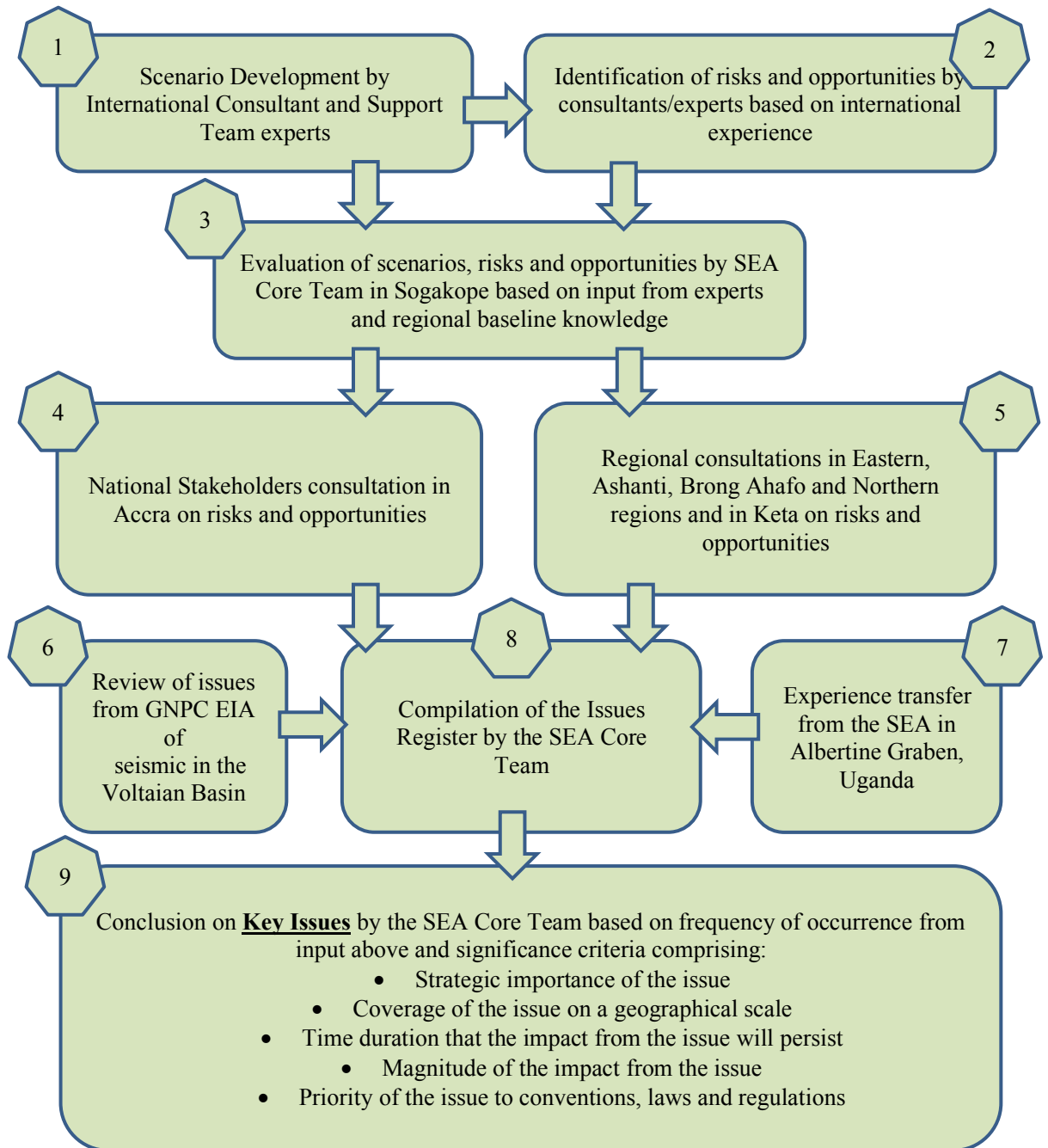


Figure 6: Process of identifying Key Issues for the assessment

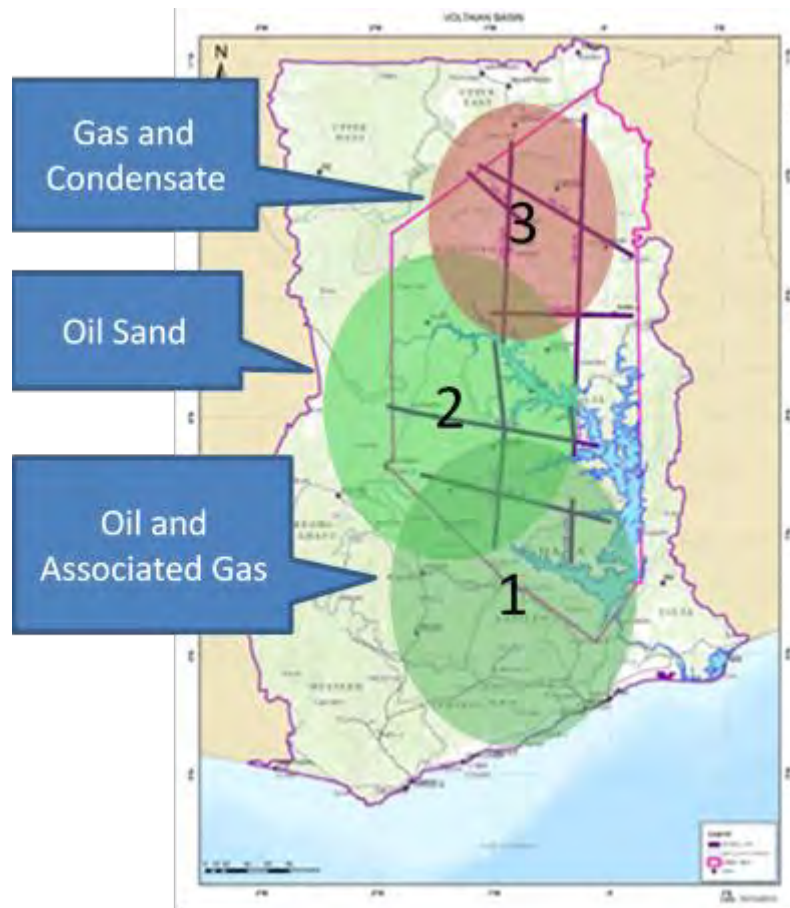


Table 1: Format of the aspect-impact matrixes

Aspect	Description/ characteristics of the aspects	Issues divided by: NR (Natural Resources), SC (Social-cultural), EC (Economic), INS (Institutional)
		Opportunity: Green colour. Risk: Red Color
Physical presence	Construct a central supply base	NR: Disruption of land migratory corridors of wildlife SC: Disturbance of unknown archaeological sites EC: Job creation, increase in revenue and income, opportunities for supply chain INS: Technology transfer, human capacity development

4. The National Stakeholder Consultative workshop added input, comments and suggestions to the scenario analysis made by the SEA Core Team.
5. The Regional Stakeholder workshops took place in all regions: Eastern, Ashanti, Brong Ahafo and Northern regions and in Keta.
6. GNPC had developed and delivered an EIA for 2D seismic surveys in the Voltaian Basin. The desktop review covered a thorough study of the results of the district-level consultations for the EIA in the affected communities covering 24 Metropolitan, Municipal and District Assemblies (MMDAs) in the basin.

The consultations were carried out during July 22-25, 2015 and covered a hundred and sixty-eight communities. The relevant risks and opportunities identified were incorporated in the Issues Register for the SEA. The consultations focused on these thematic areas: land use and compensation, corporate social responsibility, community and education, local content and employment, environment and pollution, religion and culture, health and safety and general issues.

7. The SEA for the petroleum sector in the Albertine Graben region in Uganda (completed in 2013 and followed up by implementation programs until 2017) represents a unique international opportunity to learn from onshore/lake development of petroleum resources. The SEA Core Team through EPA managed to arrange a study visit to Uganda hosted by NEMA (National Environment Management Authority) Uganda, during May 6-13, 2017 and got an excellent opportunity to exchange views and experience on possible challenges related to a SEA for petroleum developments in similar geographical areas and conditions. The SEA Core Team reviewed the draft list of risks and opportunities as a result of the study visit (ex-post) and used the knowledge gained as input to the recommendations at the later stage.
8. All input on risks and opportunities were compiled in an Issues Register.
9. Based on the criteria outlined in Figure 6, the SEA Core Team recorded scores on each of the issues in the Issues Register and listed **level of significance** on three grades: High marked with red colour, Medium marked with yellow and Low marked with green colour. All issues of High significance were selected as Key Issues. Table 2 is an example of the matrix used to identify the Key Issues in the basins and Table 3 shows the summary of issue significance.

Table 2: Example of the matrix to identify Key Issues (example Natural Resources)

Issue	Source of issue - experts (e) - GNPC (g) - Team and national consultation (c) - regions (r)	Frequenc y	Relevanc e	Geographic	Duration	Impa ct	Priorit y	Significan ce
Pollutio n of surface water	e, g, c and r (5)	8	h	national/ district	h	h	h	High (h)
Pollutio n of groundw ater	e, g, c and r (3)	6	l	district	h	l	h	Medium (m)
Air pollutio n	e, g, c and r (5)	8	l	district	h	l	l	Low (l)

Table 3: Summary of issue significance

Pillar	Total issues	Low	Medium	High
Natural Resources	15	4	3	8
Socio-cultural	23	2	1	20
Economic	25	3	1	21
Institutional	30	0	0	30
	93	9	5	79

To prepare for a systematic assessment of the Key Issues and to present a structured and plausible inventory of recommendations, the Key Issues were clustered into 17 groups. An assessment of why the specific Key Issue is relevant was undertaken by the Team. The total number of Key Issues is higher than shown in Table 3 due to some repetitions of similar Key Issues in the different groups:

1. Petroleum related Activities in Protected and Environmentally Sensitive Areas
 - 3 Key Issues
 - Example: Interference with environmentally sensitive areas
2. Co-existence with Local Communities/Archaeology and Cultural Heritage
 - 27 Key Issues
 - Example: Change in population dynamics such as urbanization
3. Co-existence with Agriculture, Industry and Services
 - 19 Key Issues
 - Example: Restrictions on land use
4. Co-existence with Tourism
 - 12 Key Issues
 - Promotion of tourism
5. Co-existence with Fisheries
 - 8 Key Issues
 - Example: Risk to fisheries in the Keta lagoon
6. Petroleum Revenue Management
 - 13 Key Issues
 - Example: Development of local economy
7. Discharges and Emissions from the Petroleum Industry
 - 2 Key Issues
 - Example: Pollution of surface and groundwater
8. Waste Management
 - 3 Key Issues
 - Example: Setting up waste disposal company by locals
9. Water Management
 - 3 Key Issues
 - Example: Freshwater management
10. Emergency Preparedness and Response
 - 4 Key Issues
 - Example: Accidental events
11. Transportation Infrastructure (roads, rail, water, pipelines)
 - 8 Key Issues
 - Example: Impacts on existing infrastructure
12. Institutional Capacity Building at all Levels (structure, functions, data management)
 - 17 Key Issues
 - Example: Job creation and skills development
13. Development of Legislation, Regulations and Standards
 - 9 Key Issues
 - Example: Monitoring and enforcement of decommissioning commitments
14. Land Use and Spatial Planning
 - 9 Key Issues
 - Example: Resettlement, livelihood and compensation

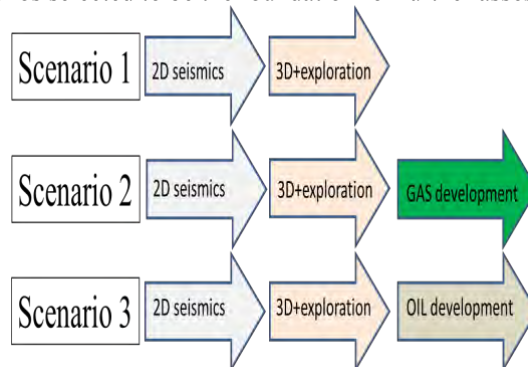
15. Transboundary and International Issues
 - 3 Key Issues
 - Example: Security concerns
16. Climate Change
 - 2 Key Issues
 - Example: Influence from land-use management
17. Decommissioning
 - 6 Key Issues
 - Example: Site restoration and reclamation

Fact Box 3: Scenario Development

Seven scenarios were developed for the Voltaian Basin:

- High Case “Full speed Oil, Oil Sand and Gas” – Licensing and exploration in province 1, 2 and 3. Discoveries and development in all three.
- Medium 1 “Oil and Gas – Licensing and exploration in province 1, 2 and 3. Discoveries and development in 1 and 3.
- Medium 2 “Oil” – Licensing and exploration in province 1, 2 and 3. Discoveries and development in 1.
- Medium 3 “Oil Sand” – Licensing and exploration in province 1, 2 and 3. Discoveries and development in 2.
- Medium 4 “Gas” – Licensing and exploration in province 1, 2 and 3. Discoveries and development in 3.
- Low Case “Not commercial” – Licensing and exploration in province 1, 2 and 3. No commercial discoveries in any of them.
- Zero Case “Uninteresting” – Only 2D seismic surveys. No interesting potential and full stop.

These are the three scenarios selected to be the foundation for further assessments:



Scenario 1: Not commercial 2D, 3D and exploration drilling

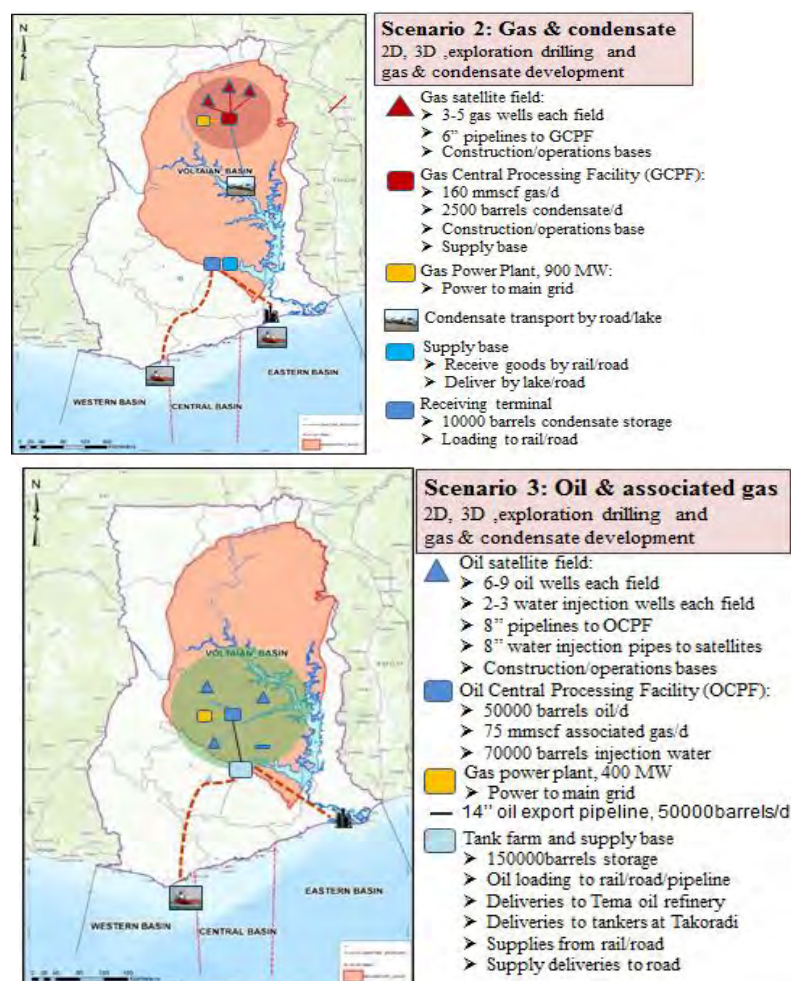
All three oil/gas regions:

- Infill 2D and 3D seismics
- 1-3 exploration wells each site
- Drilling camp at each site
- Transport of personnel to drill site by road, sea and helicopter

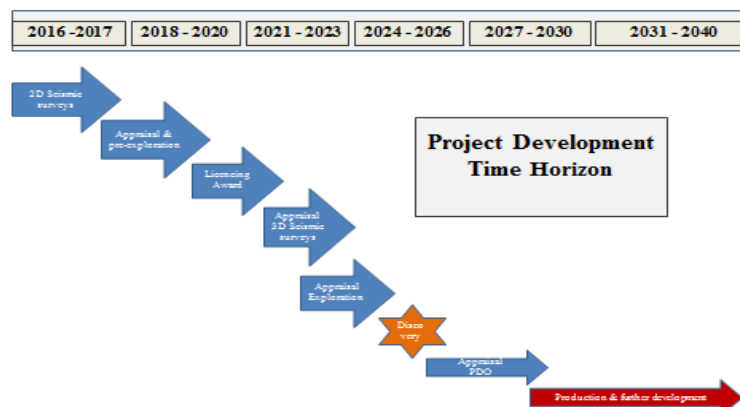
Supply base:

- Drilling rig and supplies by sea/road to supply base
- Drilling rig and supplies by lake/road to exploration sites

Fact Box 3: Scenario Development – Cont'd



The potential time horizon for the development of projects according to scenario 2 and 3 is as follows:



6.0 Assessment and Recommendations

The main objectives of the assessment phase were to analyze the Key Issues and to identify and present the Recommendations of the SEA process. The Implementation of the Recommendations is discussed in section 7.

Before further discussions with stakeholders, the Team needed to get a deeper understanding of the Key Issues. All the 93 Key Issues represent complex aspects that needed to be understood and carefully analyzed. To indicate the complexity of the aspects identified, Fact Boxes 4 and 5 illustrates two of the most significant Key Issues connected to Social Risks related to the development of oil and gas resources.

Fact Box 4: Social Risk – Community Conflicts

How and when does this risk materialise?

While communities generally have well-defined boundaries, they are mostly only demarcated in areas used for agriculture and along roads, footpaths etc. and claims from various communities may overlap in remote areas without creating many concerns. Therefore, the multiple layers of land and resource rights (state, traditional authorities, communities, households, individuals) and conflicts between them largely remain unnoticed until one of them claims exclusive ownership/rights and tries to market these without sharing benefits. This commonly changes overnight with the advent of oil and gas exploration. Areas that were previously considered to have limited or no value become or at least are perceived suddenly as high-value land, just because it is needed for seismic tests etc. While the associated expectations are often unrealistic as land needed for explorations is in most cases, not the land needed for development and operations. In some countries claims of exclusive ownership over such non-viable lands have generated massive and sometimes violent conflicts between and within communities, between communities and the state, between communities and traditional authorities, between communities and households/individuals. It is often fuelled by the unrealistic expectations to become rich by selling/leasing out these lands and their associated resources and assets to the companies involved in the exploration without realising that unrealistic expectations with a view on potential compensations might convince the companies to access different land and the expected high yields from useless land secured at high social costs don't materialise at all.

Why is the risk important?

Ghana's complex land rights and the low level of cadastre development are a potential breeding ground for such conflicts and it can be expected that conflicting claims of ownership control at the very least significantly delay exploration if not cause open conflicts between communities in ethnic boundary areas or between original owners and settlers.

How to deal with the risk?

Best practice suggests that the Government with support from the oil/gas companies establishes - in anticipation of the completion of the national cadastre - an easy and hands-on guide to identifying the rightsholders and users of land and assets in a rather comprehensive manner that doesn't limit itself to legal and/or legalizable rights, but includes all forms of permanent and temporary use, even if it is not recognised within the legal framework of Ghana such as informal grazing, harvesting, fishing and/or passage. Experience shows that such rapid community-based property demarcation can cover at reasonable costs thousands of hectares of rural land in a rather short time and give – when backed by relevant legal provisions – certainty and security to the rightful landowners and users, speeds up the land access for exploration and prepares the ground for the real cadastre under preparation. Experience has shown that on average such preliminary registration costs for each 1,000 ha are around USD 5,000 and can be conducted by a team of 5 within a week with some additional time needed to validate and update the data through public displays etc.

Fact Box 5: Social Risk – Management of Unrealistic Expectations

How and when does this risk/issue materialise?

Many studies show that despite all preparations and information campaigns, rumours, news, announcements and finally the commencement of oil and gas explorations give rise to unrealistic expectations among community members. This happened for example along the Ghanaian coast long before oil and gas deposits were discovered in 2007, in the Ashanti Region of Ghana long before any serious finds of gold were made etc. It is a global phenomenon and there seems to be no antidote or cure

These unrealistic expectations consist of hopes for imminent and widespread economic development, employment, provision of significant and lasting compensation for land access, recognition as customary owners of land with access to royalties and decision-making powers etc. These unrealistic expectations rarely/never materialise and are soon replaced by disappointment and frustration that undermine the ability of local communities to find their place in the development and production phase and therefore their ability to realise tangible benefits.

Why is this risk/issue important?

It is important to manage this risk, as unrealistic expectations will occur in the onshore Voltaian Basin and Keta Delta Block in preparation for the potential exploration phase. While the change in mindsets might be unavoidable, the associated social risks such as terminating traditional ways of sustainable resource management in anticipation of new income sources i.e. fishing with poison and/or explosives as this is perceived as the last season for fishing, cutting perennial crops and selling the associated timber to create space for imaginary factories and office buildings, speculating in land and asset development to prepare for larger compensations, selling land and productive resources for short term gains etc. can be managed and mitigated, if considered and carefully addressed as experience from other countries show. Similarly, operational risks associated with sudden and unsubstantiated increases in land values, labour costs, prices for commodities etc. can be mitigated when anticipated and addressed in advance.

How to deal with this risk/issue?

Best practice suggests that unrealistic expectations can best be mitigated when rights, roles and responsibilities of all parties involved are clarified among all stakeholders (local communities, traditional leaders, government and companies) and realistic development scenarios developed; thus, a quality SEA as the one presently conducted for the Onshore Voltaian Basin and Keta Delta Block is a good starting point but would need to be broken down further for the various sections of society. Key elements to be clarified in this process are the following:

- Who owns underground resources?
- Do companies have access to compulsory land acquisition if land prices requested by owners are unrealistic?
- What benefits are to be provided by oil/gas companies to local communities?
- How many people for what period are normally involved in oil/gas explorations?
- What are the chances that explorations result in the development of fields?
- What is done during explorations and what material/resources might be purchased at local levels?

Experience shows that comprehensive and constant information campaigns around this key information are still not able to avoid the appearance of unrealistic expectations, but it helps local communities to prepare a realistic Plan B for the time they realise that they will not get rich overnight without tailoring their desires around the opportunities at hand.

Several activities were undertaken during the assessment phase to gather relevant information that would inform the process of evaluating the Key Issues and proposing Recommendations. The first step was to develop an Integration and Response Matrix which for each Key Issue identified the connected potential PPPs and laws/regulations which could be influenced by the Key Issue and the possible “owners” of each Key Issue.

This matrix was the platform for a National Consultation Workshop in April 2017 as described in section 4. The participants validated the input from the SEA Core Team and presented their proposals on Recommendations for how to deal with the Key Issues.

Before deriving appropriate Recommendations, a framework was developed for the assessment process. It was agreed that the most effective option for the implementation of the Recommendations is to integrate them into the ongoing National Development Planning Process (NDPP). NDPC facilitated the process of reviewing the sections on oil and gas in the draft Medium-Term National Development Policy Framework (MTNDPF) known as “*An Agenda for Jobs: Creating Prosperity and Equal Opportunity for All, 2018-2021*”, which was under preparation at that same time. This created a very significant opportunity for the medium-term recommendations of the SEA to be incorporated into the MTNDPF. The MTNDPF is the basis for the preparation of Sector and District Medium-Term Development Plans. It was further agreed by the team that all the long-term recommendations would be added to the draft Long-Term National Development Plan so that they would be integrated into National development plans beyond 2021 as shown in Figure 8.

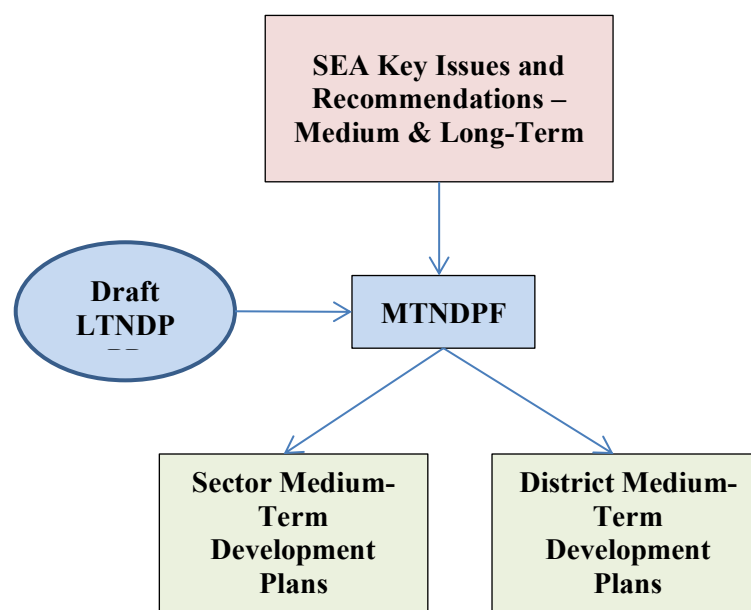


Figure 8: Integration of the SEA Recommendations into the MTNDPF

The SEA Core Team concluded on the final Recommendations after these activities and adjustments:

- A field visit to the Voltaian Basin and the Keta Delta Block area, May 1-5, 2017 (report attached to the SEA Process Report).
The visit was to enable the Team to have an overview of conditions within the basin including the human settlements, flora and fauna, road and water transport infrastructure,

levels of economic activities etc. which would further inform the relevance of the Recommendations being proposed and discussed.

- A study tour to Uganda, May 6-13, 2017 (report attached to the SEA Process Report). The objectives were to exchange views on environmental management in the two countries, to promote cooperation between the countries and to learn from Uganda's experience with the SEA for the Albertine Graben oil and gas development.
- Restructuring of Key Issues groups.
A number of the seventeen (17) Key Issues groups had similar characteristics and as such duplicated some of the Recommendations. To avoid this, the Team reviewed, eliminated duplications and further consolidated the Recommendations into a final matrix which included references to the relevant sustainability pillars and the timing of the National Development Planning process as indicated in Tables 4-8.
- Consolidation of Recommendations (July 2017).
The Recommendations were reviewed to eliminate duplications and further consolidate them into a final matrix which included references to the relevant sustainability pillars and the timing of the National Development Planning

Table 4: Thematic Group A - Overarching (cross-cutting) Recommendations

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
1.	Zero oil and gas activity on the Volta Lake and its 200m buffer as per EPA Onshore oil and gas Guidelines	x	x	x	NR, INS
2.	Water management in onshore oil and gas activities	x	x	x	NR, INS
3.	Draw on lessons learnt from the extractive industry such as mining to enhance onshore oil and gas developments	x	x	x	INS
4.	Ensure broad consultations with all stakeholders to secure commitments based on mutually beneficial outcomes	x	x	x	INS, SC

Table 5: Thematic Group B – Enabling Framework Recommendations

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
5.	Allocate financial resources for the sustainable management of the Voltaian Basin and Keta Delta Block			x	INS, EC
6.	Enhance Petroleum Revenue Management through a transparent and flexible revenue utilization mechanism for onshore oil and gas activities taking into account the impact of oil and gas activities on the affected districts			x	INS, EC
7.	Develop monitoring and evaluation mechanism for utilization of oil and gas revenue			x	INS
8.	Allocate resources from the sustainable management fund to strengthen the relevant public sector institutions			x	INS, EC
9.	Develop a comprehensive communication strategy for oil and gas activities in the basins	x	x	x	INS
10.	Develop a comprehensive educational and training curriculum for skill-based training	x	x	x	INS
11.	Develop Capacity building programs for regulatory institutions at all levels, CSO, Academia, Traditional Authorities (TAs), etc. to monitor the oil and gas industry	x	x	x	INS
12.	Ensure access to standardized, harmonized and timely geospatial data and information for national development planning including oil and gas	x	x	x	INS
13.	Ensure strict adherence to the commitments made in EIAs and other permits involving both industry and regulators	x	x	x	INS
14.	Ensure strict adherence to the provisions of the local content regulation	x	x	x	INS

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
15.	Ensure that stakeholder engagement is based on consultative, collaborative and participatory approaches to achieve adequate community engagement	x	x	x	INS
16.	Establish a Grievance Redress Mechanism to resolve potential community conflicts before their escalation	x		x	INS
17.	Strengthen security provisions for oil and gas infrastructure into the national security system			x	INS
18.	Broaden participation of governance processes to ensure checks and balances	x	x	x	INS
19.	Formulate and implement guidelines to ensure zero tolerance for political interference in oil and gas decision-making to avoid circumvention of systems			x	INS
20.	Review existing laws on land acquisition, compensation, local content and amend to address gaps where they exist	x	x	x	INS
21.	Strengthen the enforcement regimes on procurement and cost management			x	INS
22.	Complete the local plans of high growth and development areas particularly in the Voltaian Basin and Keta Delta Block	x	x	x	INS
23.	Complete the structure plans of districts within the Voltaian Basin and Keta Delta Block	x	x	x	INS
24.	Create special development Areas for the oil and gas basins (as in the context of LI 2232)			x	INS
25.	Develop a land acquisition and resettlement framework for oil and gas activities	x	x	x	INS, SC
26.	Ensure strict compliance to land use plans	x	x	x	INS

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
27.	Prioritize the demarcation of all lands within the Voltaian Basin and Keta Delta Block by involving the traditional authorities	x	x	x	INS
28.	Publish the current land use and land cover classes of the Voltaian basin and develop same for the Keta Delta Block	x	x		INS
29.	Ensure continuous transboundary dialogue to prevent any potential security threats	x	x	x	INS
30.	Formalize transboundary demarcations	x	x	x	INS

* Refer to Fact Box 6 regarding challenges connected to this recommendation

Table 6: Thematic Group C – Technical Issues Recommendations

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
31.	Ensure strict adherence to EPA guidelines and standards on emissions and discharges	x	x	x	INS
32.	Establish accredited laboratory facilities to monitor and analyse emissions and discharges from the petroleum industry			x	INS
33.	Implement zero flaring philosophy			x	INS, NR
34.	Establish appropriate waste management systems within the basins in accordance with a framework for zero impact philosophy and maximizing local content	x	x	x	INS, NR, EC
35.	Explore the possibility of utilizing the treated produced water in the process and for other purposes			x	INS, NR, EC
36.	Review existing water policies, regulations and guidelines to address the requirements of the oil and gas sector	x	x	x	INS, NR
37.	Update the Integrated Water Resource Management Plans to cover petroleum activities	x	x	x	INS, NR, SC, EC

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
38.	Establish a system that allows for determination and monitoring the volumes of water available for petroleum related activities		x	x	INS, NR, SC, EC
39.	Build in-country capabilities for emergency response (e.g. funding, human resource development, technology, and equipment)	x	x	x	INS
40.	Build necessary infrastructure to support emergency response (roads, harbours, water supply systems, landing strips, etc.	x	x	x	INS
41.	Develop a National Oil Spill Contingency Plan for onshore oil and gas activities			x	INS
42.	Develop the national emergency preparedness response plan for upstream petroleum activities excluding oil spill and natural disaster		x	x	INS
43.	Monitor and evaluate compliance with applicable Health, Safety and Environment (HSE) regulations in the petroleum sector		x	x	INS
44.	Establish Risk reduction measures		x	x	INS
45.	Develop a comprehensive inter-modal transport plan for the basins to support oil and gas activities			x	INS
46.	Develop an infrastructure plan for the Basins			x	INS
47.	Educate and create awareness to enhance co-existence and avoid conflicts and manage unrealistic expectations		x	x	INS, SC
48.	Implement a rapid infrastructure and service development to support the increase in population due to in-migration	x	x	x	INS, SC
49.	Develop a framework for decommissioning oil and gas infrastructure in the Voltaian Basin and Keta Delta Block			x	INS

Table 7: Thematic Group D – Local and Global Natural Environment

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
50.	Ensure no petroleum activities in protected areas except for non-intrusive reconnaissance where non-intrusive reconnaissance identifies petroleum resources in protected areas, appropriate technology which allows access to the resource from outside the protected area should be used	x	x	x	NR, INS
51.	Strictly enforce existing policies, regulations and guidelines that relate to environmentally sensitive and protected areas e.g., Forest and wildlife policy, etc.	x	x	x	NR, INS
52.	Adopt an integrated management approach in decision making with respect to potential petroleum activities in environmentally sensitive and protected areas.		x	x	NR, INS
53.	Petroleum companies engaged in petroleum activities in sensitive areas should employ appropriate technology that contributes to the sustainable management of ecosystems and biodiversity.			x	NR, INS
54.	Adopt a low carbon growth model for oil and gas activities at all levels			x	NR, EC, INS
55.	Mainstream climate change issues into all activities in the oil and gas sector	x	x	x	INS, SC, NR, EC
56.	Ensure the implementation of a gas-to-power policy in line with the Gas Master Plan			x	INS, EC, SC
57.	Ensure strict compliance to land use plans	x	x	x	INS

* Refer to Fact Box 7 regarding challenges connected to this recommendation

** Refer to Fact Box 8 regarding challenges connected to this recommendation

Table 8: Thematic Group E – Co-existence

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
50.	Adopt an integrated approach for the implementation of the National Corporate Social Responsibility policy with the involvement of key stakeholders in the oil and gas industry			x	INS, SC
51.	Alternative/restoration livelihood programmes should be rolled out to compensate for affected individuals and communities			x	SC, INS
52.	Create job opportunities to increase employment particularly for women and the youth			x	EC, SC
53.	Educate and create awareness on local traditions, and cultural practices to enhance co-existence and avoid conflicts and manage unrealistic expectations			x	SC, INS
54.	Ensure rapid infrastructure development and provision of goods and services to support the increase in population due to in-migration and demand for goods and services			x	INS, EC, SC
55.	Ensure strict preservation of cultural, archaeological and heritage sites to protect the integrity of the ecosystem		x	x	SC, INS
56.	Formulate and implement a framework for adequate compensation that promotes beneficial co-existence and discourage speculative “land-grab”	x	x	x	INS, SC, EC
57.	Implement alternative/restoration livelihood programmes to compensate for affected individuals and communities			x	SC, EC

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
58.	Mainstream participation of women and youth in all aspects of oil and gas activities			x	SC, INS
59.	Update land use and spatial plans for the basins	x	x	x	INS
60.	Develop a policy to promote and enhance existing and other potential tourist sites within the Basins	x	x	x	INS, EC
61.	Develop a policy to promote industrialization within the Basins			x	INS, EC
62.	Develop a programme to build the capacity of local companies to participate in oil and gas activities			x	INS, EC
63.	Develop other sectors of the economy alongside the oil and gas sector to create a balance in employment			x	EC
64.	Develop regulations on maximum disturbance levels of oil and gas activities taking the tourism use into consideration		x	x	INS
65.	Develop and enact regulations to implement the integrated coastal zone management plan	x	x		INS
66.	Ensure strict adherence to the Fisheries Regulations 2015, LI 2217	x	x	x	INS
67.	Ensure strict compliance with regulations relating to the management of ecosystems for tourism	x	x	x	INS, NR
68.	Ensure strict compliance with the Public Health Act 2012, ACT 851		x	x	INS
69.	Ensure that activities in areas designated for biodiversity conservation are in accordance with the official protection status		x	x	INS, NR

No.	Recommendation	Immediate Term (2018-2021)	Medium Term (2022-2025)	Long-Term (2025 & beyond)	Sustainability Pillar
70.	Ensure that the oil and gas industry offer capacity building programmes for existing and potential new businesses to prepare them for delivering goods and services to the industry			x	INS
71.	Develop other sectors of the economy alongside the oil and gas sector to create a balance in employment			x	INS, EC
72.	Promote and enhance appropriate technology with respect to sustainable fisheries including aquaculture development	x	x	x	INS, EC
73.	Use oil and gas industry to drive developments in fisheries sectors			x	SC, EC, INS
74.	Use oil and gas industry to drive developments in other related sectors			x	SC, EC, INS

Due to various budgetary and administrative challenges, the SEA of the Onshore Oil Gas Development in the Voltaian Basin and Keta Delta Block of Ghana was put on hold from July 2017. After a series of meetings and discussions between EPA, MESTI, the Royal Norwegian Embassy, the Ministry of Environment of Norway and the Oil for Development Program, funds were made available and it was determined that the SEA should restart in October 2018. Consequently, a Revitalization Meeting was held for the SEA Team and Consultants from 3-5 October 2018 to plan the remaining activities for the SEA. The most significant conclusions from the revitalization meeting were:

- The SEA Team was informed that the Seismic activities had commenced in the Northern sector of the Voltaian basin. The Petroleum Department of EPA presented observations made during monitoring visits by EPA to the project sites. They showed pictures and videos of the campsites and project sites. They also briefed the team about the various community interactions and compensation procedures.
- The Team was also informed about some challenges faced by the oil company working in the Keta delta Block area. The project was put on hold due to negative reactions from some communities as a result of misinformation by some unscrupulous persons. The Petroleum Department indicated that EPA had subsequently held public hearings to facilitate a better understanding of the proposed seismic activities.

- The team members from the NDPC presented sections of the new national medium-term development policy framework published and titled: ***An agenda for jobs: creating prosperity and equal opportunity for all 2018-2021***. This is the main document to be used by all Sectors and Districts to plan for development from 2018. They showed the various sections where the SEA recommendations had been incorporated into the document. The most significant input is in the ***Policy Matrix*** on Energy where it is stated clearly that:
“**12.9.3 - Implement recommendations of strategic environmental assessment of onshore and offshore oil and gas sector** (SDG Targets 14.2, 14.3)”. This would help to facilitate the process of implementing the SEA Recommendations as proposed by the SEA Team.
- It was stated that there is a need to develop a framework for addressing the cumulative impacts of the oil and gas activities due to the drive by the Government to expand exploratory activities both onshore and offshore.
- The Team agreed that the first step of the implementation should be an audit/review of the plans already prepared by the Sectors and Districts for 2018-2021 to assess the extent to which the SEA Recommendations have been incorporated. The Consultants prepared a set of Guidelines to be used for the exercise.
- The Team agreed on the way forward for completing the SEA process.

Fact Box 6: Land access and compensation

How and when does this risk/issue materialise?

Land acquisition and transfer procedures are tailored around private transactions between citizens and compulsory acquisitions for public development projects (roads, etc.). Before oil/gas explorations most countries do not have any specific legislation or provision to cater for the specific land access needs during exploration i.e., temporary access for international companies to many small parcels of land in rural areas. This means that companies aiming to explore vast areas of land face:

- a. an absence of relevant legislation and provisions,
- b. unrealistic expectations from land owners,
- c. multiple claims of ownership for the same plot due to the absence of a functional cadastre;
- d. public procedures that often offer very low compensation rates to enable societal development;
- e. requirements for detailed legal documentation to avoid exposure for corruption charges from the oil/gas companies.

To bring all parties together despite these challenges requires significant time, energy and funds and increases the costs of exploration significantly even though all parties involved (companies, state and population) want the same.

Why is this risk/issue important?

While the constitution of Ghana enables a variety of traditional authorities to control land, documentation and recognition of these ownership and user rights are poorly developed. In turn, compulsory land acquisition under the State's Land Act 1962 has been used extensively since colonial times to obtain access to land and easement not only for public projects such as roads, schools etc. but also for private investments. The underlying principle of eminent domain to obtain land for public and private developments that aim to benefit the overall population has resulted in a situation where compensation rates do not always meet replacement value standards. Other areas allow room for improvements as quite often the rather lengthy acquisition process is not adhered to, compensation is paid late or in some cases never and has resulted in a situation where people largely try to resist all attempts to access their land and/or affect their assets.

This has significant operational risks for the exploration phase when temporary access is required at short notice. This challenge is further exaggerated by the lack of clarity of land ownership and user rights and triggers multiple claims to one piece of land that makes it difficult and, in some cases, impossible to conduct exploratory surveys and test drills on the preferred parcel of land and/or within a reasonable schedule.

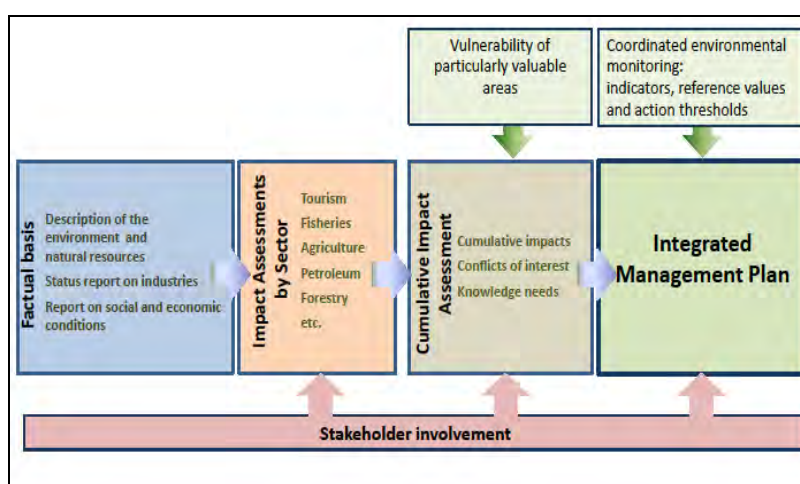
How to deal with this risk/issue?

Best practice suggests that in preparation for the exploration phase, the companies involved and the government develop a Land Access and Compensation Framework in line with international standards. The main difference between these and national compensation standards is that it considers the affected land and resources not only as assets that are compensated at market rates but as productive assets that generate livelihoods for the people owning/controlling and/or using these lands and assets. This can be best illustrated with a view on perennial crops such as orchards etc. as under national legislation often only the timber value of the trees is compensated or in the best case, the effort needed to regenerate the crop to the production stage, while international standards also require that the harvests not realised during this period are compensated.

Fact Box 7 - What is an Integrated Management Approach (Plan)?

The basis of the Integrated Management Plan is defined by the 12 principles of the UN Convention on Biological Diversity (1992). As shown in the figure below it requires a phased approach with the following activities:

- Proper understanding of the biological baseline conditions at species, community and habitat/ecosystem level as well as ecosystem structure and functions (the factual basis).
- Assessment of impacts upon these baseline conditions from developments by industry sector including identification of mitigation measures as a basis for spatial planning.
- Assessment of cumulative impacts of all industry sectors considering the vulnerability of particularly valuable areas.
- Stakeholder engagement during all phases



The term “Environment” includes the physical and biological environment as well as social, socio-economic and cultural dimensions to ensure that all relevant aspects are considered. Such a holistic view will support the development of sound ecosystem protection and biodiversity conservation practices most suitable for a particular case.

The geographical scope of the IMP, as well as its deliverables regarding factual and spatial information deliverables (e.g., GIS, constraint mapping), shall be well defined in the beginning. The IMP content includes:

- Description of baseline conditions incl. ecosystem values and sensitivities as well as factors that influence the state of the environment such as anthropogenic factors.
- The zero alternative - assessment of the potential future conditions without further industrial interference.
- Sector-specific impact assessment (economic value, locations, scale, socio-economic aspects, expansion planning, etc.) as well as potential future economic interests.
- Cumulative impact assessment based on sector-specific and ecosystem assessments incl. identification of conflicts of interest, synergy and co-existence issues plus vulnerability assessment.
- Knowledge-based management: management objectives for a specific area, institutional oversight and indicator-specific monitoring. Consideration of climate change, pollution aspects and risk of accidental events as well as assessment of existing legal framework and institutional capacity incl. recommendations for improvement.
- Sustainable management recommendations to protect sensitive species and ecosystems and establishment of a framework for economic activities, incl. no-go areas, restricted access, timing restrictions, sequencing of activities, etc.

Fact Box 8: Sustainability and Climate Change

The SEA is exploring the potentials and pitfalls of onshore oil and gas exploration and production in Ghana whilst aiming for a more sustainable, resilient, fair and prosperous place for all.

Sustainable development is described in Ghana in terms of four pillars, i.e. the environment, the economy, society-culture and institutions. Without an assessment of the four pillars, the risks for the government, business, citizens and the land will be unknown. Onshore oil and gas development requires this dynamic system thinking as applied through the SEA.

The Sustainable Development Goals

In September 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development as a charter for global sustainability. The 17 Sustainable Development Goals (SDGs), underpinned by 167 targets, address the world's pressing economic, institutional, social and environmental challenges.

Oil and gas exploration and development have positive and negative impacts on areas covered by the SDGs including **climate change**, freshwater resources, local communities, biodiversity, and socio-economic/cultural impacts. If prepared wisely, the sector may contribute to sustainable development by generating direct and indirect jobs; supplying access to energy and petroleum resources; contributing tax and other revenues to the government; advancing technologies, infrastructure and products; long-term investment in communities in which they operate, and managing the impacts of its operations by emphasizing environmental protection, health and safety, and human rights. On the flip side, oil and gas exploration and development can have a serious adverse effect on the ability of Ghana to work towards meeting the SDGs. Among the challenges is the industry's environmental footprint on climate change, water, and biodiversity, and its associated impacts on communities.

Onshore oil and gas exploration and development that is part of enabling Ghana to meet its international and national sustainability objectives are contingent on working wisely with the four pillars of sustainable development where good governance through well-functioning institutions is the key enabler.

Enabling framework

The International Council for Science (ICSU) have developed "A Guide to SDG Interactions: from Science to Implementation." The ICSU provides a conceptual roadmap for understanding how the SDGs and their targets are linked. A sustainable development approach is usually a more challenging planning exercise than just building a road, a boring tower or establishing an industrial plant. But the sustainable approach brings multiple benefits such as adaptation to effects of climate change, more secure livelihoods for people, and healthier ecosystems that support nature as well as tourism and other economic activities. The difference between simply building an expedient road or other structure, and pursuing a more synergistic, sustainable approach comes down to who is deciding and how the resources are allocated. This is about good governance (SDG16) and forming partnerships and securing the financial and technical means to implement the other goals (SDG17).

For onshore oil and gas exploration and production, systems thinking may support in identifying:

- internal contradictions between different key issues and recommendations
- hidden opportunities locally and nationally
- untapped strategic and policy leverages

7. Implementation and Monitoring

Advisory Notes

Consistent with the methodology adopted for the SEA of the offshore oil and gas developments, the SEA team proceeded to develop advisory notes for a number of the recommendations to provide further clarity to guide those who would be responsible for implementation. The Advisory Notes cover the significant recommendations that are critical to ensure long-term sustainable development of oil and gas in the onshore areas. Table 9 shows which recommendations were further investigated.

Table 9: Recommendations & Advisory Notes

No.	Recommendations & Advisory Notes
1	Allocate financial resources for the sustainable management of the Voltaian Basin and Keta Delta Block
2	Develop a land acquisition and resettlement framework for oil and gas activities in the Voltaian Basin and Keta Delta Block
3	Enhance Petroleum Revenue Management through a transparent and flexible revenue utilization mechanism for onshore oil and gas activities taking into account the impact of oil and gas activities on the affected districts
4	Ensure no petroleum activities in protected areas except for non-intrusive reconnaissance where non-intrusive reconnaissance identifies petroleum resources in protected areas, appropriate technology which allows access to the resource from outside the protected area should be used
5	Adopt an integrated management approach in decision making for potential petroleum activities in environmentally sensitive and protected areas
6	Update the Integrated Water Resource Management Plans to cover petroleum activities
7	Establish a Grievance Redress Mechanism to resolve potential community conflicts before their escalation
8	Ensure access to standardized, harmonized and timely geospatial data and information for national development planning including oil and gas

Implementation

As already mentioned in section 6 and shown in Figure 8, the Recommendations are incorporated into the MTNDPF, which is coordinated by the NDPC. One of the strategies of the MTNDPF under Energy and Petroleum is to implement the Recommendations of the SEA of the onshore and offshore oil and gas sector to deal with the impact of the oil and gas industry. The challenge was how to monitor the implementation through the Sector and District medium-term plans.

To follow up this decision, the SEA Core Team arranged to hold stakeholder consultations in the form of workshops with the Districts in the Voltaian Basin and the Keta Delta Block area and the relevant Sector Agencies (MDAs) at the National level. These workshops are intended to facilitate the districts and relevant Sector Agencies to incorporate the Recommendations of the SEA into their respective development plans. While these arrangements were being planned, it was noted that the Districts and Sectors had already submitted their draft plans to NDPC for review and the NDPC

members could make some of the plans available to the SEA Team. It was therefore decided that before meeting with the Districts and Sector Agencies, the SEA Team would carry out an Audit (Review) of some of the available plans to determine the extent to which the plans have addressed the findings/recommendations of the SEA.

The first meeting of the SEA Team was held in Accra from 21-24 November 2018. A second meeting was held on 27th November 2018. Apart from the audit/review exercise, the meetings were used to build understanding among the Team and to identify entry points for discussions during the stakeholder consultation meetings with the Metropolitan, Municipal and District Assemblies (MMDAs) and MDAs.

It was found generally that apart from the 4 Coastal Districts and 2 Districts in the inland areas, none of the other Districts had considered Oil and Gas Development in their plans. A similar observation was made for the Sector Agencies. These observations informed the SEA Team on the approach to be adopted during the stakeholder consultation workshops to ensure that the recommendations of the SEA would be effectively integrated into the District and Sector plans.

The meeting for the MMDAs (Metropolitan, Municipal and District Assemblies) was held from 15-18 January 2019 in Sunyani in the Brong Ahafo Region. Representatives from 30 out of 32 affected MMDAs were in attendance. Other participants included EPA Regional Directors and Regional Economic Planning Officers from the relevant administrative Regions.

The main objective of the meeting was to engage the MMDAs within the Voltaian and Keta basin on the incorporation of the SEA recommendations into their respective District Medium Term Development Plans (DMTDP). This was to ensure those district assemblies located within the Voltaian Basin and Keta Delta Block have appropriate oil and gas plans and budgets in place to deal with issues arising from the ongoing seismic studies and possible future developments.

The first session of the meeting covered a series of presentations to update the participants on the SEA process and discuss the key issues and recommendations and how to relate them to the planning process using the NDPC guidelines. After the presentations, participants were tasked to work on their respective plans to integrate the oil and gas recommendations in the appropriate sections.

The consultation meeting with the Sector Agencies was a one-day event held in Accra on 22nd January 2019. More than 70 participants attended the meeting. The meeting followed a similar format to that used for the MMDAs. The main objective of the meeting was to engage the Sector agencies (MDAs) whose mandate is relevant to the SEA of the Voltaian Basin and the Keta Delta Block area on the need to incorporate the SEA recommendations into their respective Sector Medium Term Development Plans (SMTDP). This was to ensure that these agencies have appropriate policies and oil and gas plans and budgets in place to deal with issues arising from possible future developments.

After the presentations, participants were tasked to work on their respective plans to integrate the oil and gas recommendations in the appropriate sections. It became clear that within the medium-term period of 2018-2021 the onshore oil and gas activities would be mainly those related to seismic studies. Accordingly, the MDAs planned to cover issues related to capacity building, land use, governance and compensation, which would be more relevant to them.

As with the Districts, the Sector agencies were tasked to prepare draft plans at the meeting and requested to work further on the plans after the workshop. All completed plans would be submitted to EPA and NDPC for review and approval. As mentioned before, the challenge was how to monitor the implementation through the Sector and District Medium-Term Plans.

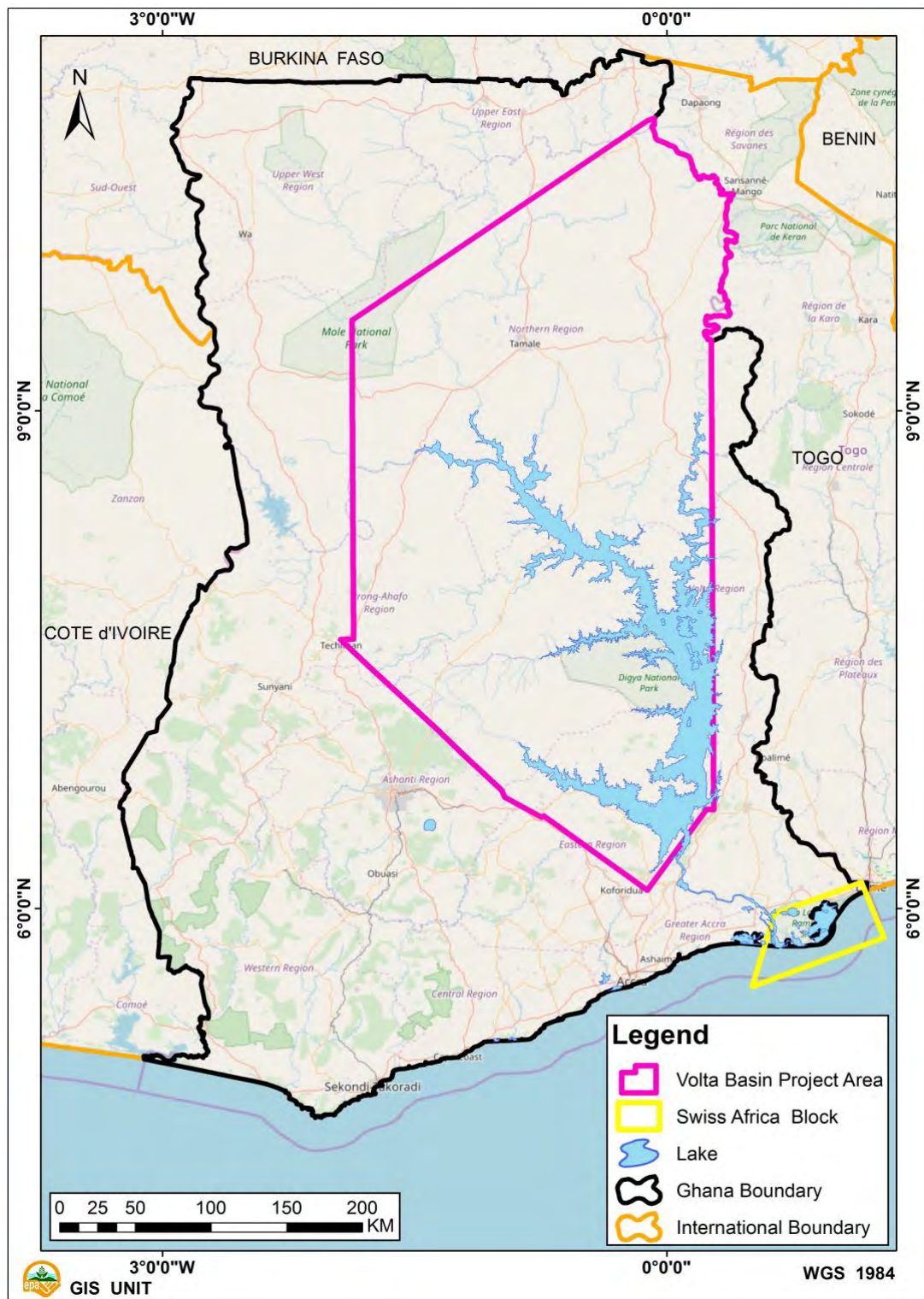
Monitoring

Two (2) options for monitoring the process were proposed and discussed as follows:

- Option 1 – the SEA Core Team would deliver the Recommendations to the Plan Coordination Division and Monitoring and Evaluation Division of NDPC respectively, which would be responsible for implementation and monitoring using the existing planning, monitoring and reporting processes including the Annual Progress Reports.
- Option 2 – the SEA Core Team would set up an implementation and monitoring committee that would act independently to oversee the incorporation of the recommendations in both the sector and district plans. The committee would also monitor the implementation and produce monitoring reports.

The SEA Core Team agreed to adopt option 2 with EPA and NDPC forming the committee with the support of consultants.

Map of the Voltaian Basin and the Keta Delta Block Area





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