Delivery of the National Training on Upstream Oil and Gas Operations in Environmentally Sensitive Areas
Polana Serena Hotel, Maputo, Mozambique via Zoom Online Training Platform
With Individual Pre-Training Preparation Requirements
26-28 October 2021
Training Summary and Documentation

Contents

Background

As oil and gas operations move into more challenging and remote locations, we are seeing an increasing level of potential environmental impacts, including biodiversity loss in sensitive habitats.

Under the Oil for Development Programme, the Government of Norway and UN Environment Programme have a collaboration to enhance national capacities for improved environmental management in OfD-supported countries, including Mozambique. It is in this regard, UNEP organized a National Training Course on Upstream Oil and Gas Operations and Biodiversity Considerations in collaboration with Mozambique's Ministry of Land, Environment and Rural Development (MITADER), the Norwegian Environment Agency, and UNEP-World Conservation Monitoring Centre (UNEP-WCMC).


Due to the current global COVID-19 pandemic which have led to travel restrictions, and with the safety and well-being of participants as the highest priority, the training was delivered online to participants convened in a training venue who met the pre-training preparation requirements. Presentations in the training were recorded and a link has been shared with

participants who attended to enable other participants who could not join to access the training when feasible.

This training report summarizes key points from the discussions and participants' feedback from the training evaluations.

Training Course

The 3-day training course aimed to achieve the following objectives:

- Increase awareness of the need to manage the impacts of oil and gas development in areas of biodiversity value (including protected, conserved and environmentally sensitive areas) to ensure their values are maintained or enhanced
- Learn about industry best practices on project-level impact mitigation, drawing on case study examples and guidance materials from leading organisations; and
- Establish how to integrate biodiversity management best practice approaches into Mozambique's environmental (and social) impact assessment processes.

Pre-Training Preparations: As a prerequisite to participate in the training, participants were required to complete a baseline knowledge assessment , the training needs assessment and to watch a lecture video that provided an initial overview of environmental issues related to biodiversity management in upstream oil and gas. This was to ensure all attendees had acquired at least a minimum level of understanding of the topic before the training.

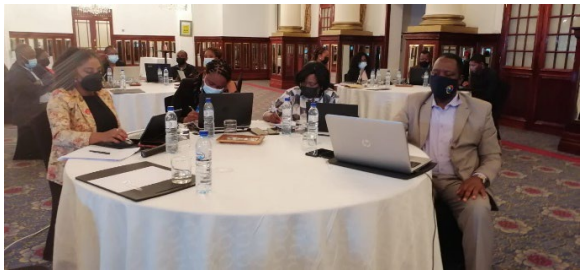
A total of 35 participants (13 women, 22 men) attended the training, consisting mainly of national and provincial government representatives from the

- **Ministry of Land and Environment (MITADER)**- National Directorate of Environment (DINAB), National Administration of Conservation Areas (ANAC), National Agency for Environmental Quality Control (AQUA), ITA;
- **Ministry of Mineral Resources and Energy (MIREME)** - National Hydrocarbon Company (Empresa Nacional de Hidrocarbonetos), National Petroleum Institute (INP), Instituto Nacional de Gestao de Desastres (INGD);
- **Ministry of Transport and Communication (MTC)** - Mozambique Maritime Authority (INAMAR), National Institute for Hydrography and Navigation (INAHINA); and
- **Ministry of the Sea, Inland Waters and Fisheries (MMAIP)**- Instituto de Investigacao Pesqueira (IIP).

Also represented were participants from environmental authorities - Servico Provincial do Ambiente of the following provinces: Cabo Delgad, Nampula, Zambezia, Sofala, Inhambane, Gaza and Maputo; as well as from Academia and private sector- Universidade Eduardo Mondlane (UEM), Consultec LDA and RMS Consultores.

The online training also included Q & A sessions with contributions from several participants (see Annex 1). Presentations and other training materials were shared with participants prior to, during, and after the training. The training also included group work activities focused on Environmental Impact Assessment and Sensitivity mapping that

required participants to apply knowledge gained from training through identifying biodiversity considerations, environmental risks, key impacts, and potential mitigation measures as well as calculating sensitivity rankings of assets to oil spills using the susceptibility ranking provided. (see Annex 5).




Discussion Highlights

Throughout the training, participants raised questions/comments relating to the different modules, which have been captured through an online shared google doc (captured in Annex 1 for questions, comments and answers). Some of the key issues can be summarized as follows:

a. **Inadequate capacity for mapping and monitoring activities in sensitive areas to support the prevention and/or mitigation of impacts on biodiversity from upstream oil and gas activities**
   - Participants highlighted the need for more capacity building to support the development of sensitivity maps especially in contingency planning for oil spills as well as monitoring oil and gas activities in environmental sensitive areas. These will support in area-based planning, identification of potential priority areas including through sensitivity and susceptibility rankings and development of approaches to mitigate biodiversity and ecosystem services impacts.
   - Currently, several development partners are working with Mozambique to ensure sound management of its key biodiversity areas. Some of which include UNEP-WCMC, WCS and Norad. In this regard, it was highlighted that an interactive mapping system for key biodiversity areas – SIBMOZ was being developed, with the support from various partners, which will help regulators make better informed decisions especially as relates mitigation measures
   - They also highlighted that a monitoring protocol for selected aspects for oil and gas activities management and planning will be developed under a current ongoing project with INP. In terms of environmental monitoring, it was emphasized that the SMART criteria should generally be applied.

b. **Data sourcing and management to support sensitivity maps**
   - Throughout the training, the need for a database with easy access and proper data management – sourcing, storage and updating to support sensitivity maps, was highlighted. Participants highlighted the challenges in sourcing and/or retrieving data relating to biodiversity and ecosystem services in the country. They will need to identify entities and develop collaborations for managing and updating data. In this regard, the experience from Norway was shared as an example, where it was highlighted that a national team updates data in the different seasons of the year

and this data is easily accessible online. Also, Mozambican government may need to create a budget to cater for data management as well as collaborate with relevant organizations for data sourcing.
- Participants also highlighted an ongoing project by INP that includes database creation of environmental and social attributes (onshore and offshore) that may be impacted by oil and gas activities. However, this database will be restricted to relevant institutions due to the limited budget available for the project

c. **Coordination between relevant government institutions, private sector and relevant stakeholders for better impact analysis**
   - The need for development of collaboration and consultation between relevant government institutions, private sector and relevant stakeholders, such as academia and research institutions, was emphasized. This collaboration can support the gathering and management of relevant data for sensitivity maps and area-based planning.
   - Working with different sectors will also support in identifying, analyzing and classifying various impacts – direct, indirect, cumulative, as it will be reviewed from different perspectives

d. **Evaluation of priorities and Implementation of mitigation hierarchy**
   - Participants showed great interest in understanding how to evaluate priorities and apply mitigation hierarchy. The importance of sensitivity maps with updated accessible data was emphasized as it supports regulators in getting a full picture to enable the identification of prioritized areas e.g. areas to avoid, no-go areas, areas that can be restored etc. as well as make informed decisions in terms of application of mitigation hierarchy
   - The importance of scoping was also emphasized as there is no single or particular matrix for the application of mitigation hierarchy for biodiversity. Certain steps such as retrieving the right data, right definition of habitat with specific thresholds to help define offset measures and setting targets based on the biodiversity on the site were indicated as important.
   - There are best practices guidelines developed by Cross Sector Initiative and IPEICA to help in applying the mitigation hierarchy. The International Finance Group also provided criteria regarding critical habitats and how it could be defined. It is usually based on a project-by-project approach to determine the available options available to support restoration, minimization and offsets, etc.
   - Application of the mitigation hierarchy is also governed by countries' legislations. For example, some countries have already determined areas that cannot be offset in their legislations. Thus, it is important for national legislation to provide for this – identify areas that are assets, to enable regulators implement and hold companies to account for their actions.
   - Also highlighted was the use of EIA in preventing conflicts of interests and adoption of a strategic planning process to help provide an overall framework to guide and identify the no-go areas and the mitigation measures that can be taken.

Modules – Main Highlights

Day 1.

Module 1: Impacts and business case for mitigation

Scope and Summary

This module aimed to increase awareness of the need to manage the impacts of oil & gas development in biodiversity areas to ensure their values are maintained or enhanced. It helped participants understand spatial planning approaches to avoid or mitigate impacts from oil & gas development as well as how to establish and integrate biodiversity management best practice approaches into Mozambique's environmental (and social) impact assessment processes.

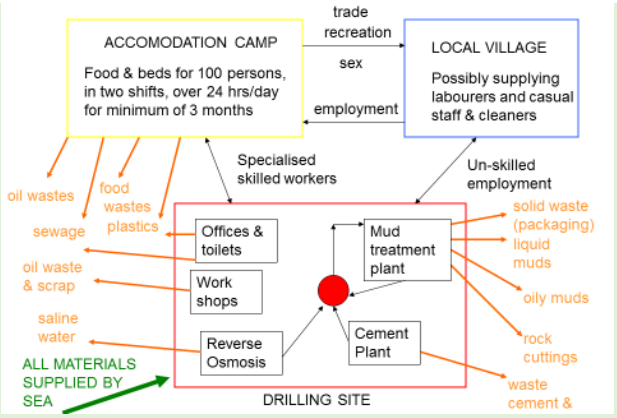
It discussed industry best practices on project-level impact mitigation, drawing on case study examples and guidance materials from leading organisations, including IPIECA.

Presenters :
Matthew Richmond, UNEP
Joe Turner, UNEP-WCMC
Artemis Kostareli, IPIECA
Madeleine Gray, IPIECA

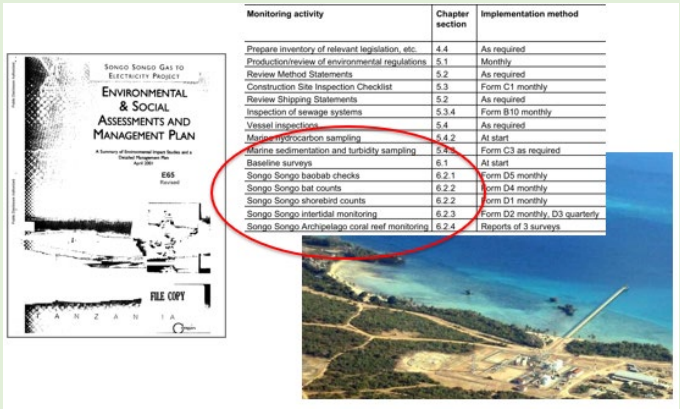
1.1. Making the case for biodiversity and ecosystem services in the context of oil & gas

Using the Tanzania's Songo Songo Island gas exploration project as case study, this module highlighted the following points:

- The first natural gas development, financed by the World Bank, in early 2000s, had due consideration for biodiversity and ecosystem services. However, the second gas project, in 2015, unfortunately did not prioritize the environment.

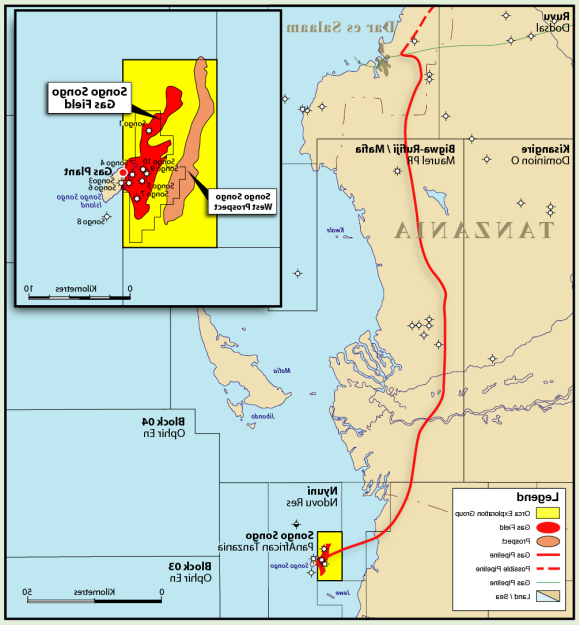


A. Challenges with gas exploration on Songo



B. Songas project's ESMP for construction

c. New SSI Gas Plant on Songo Songo Island



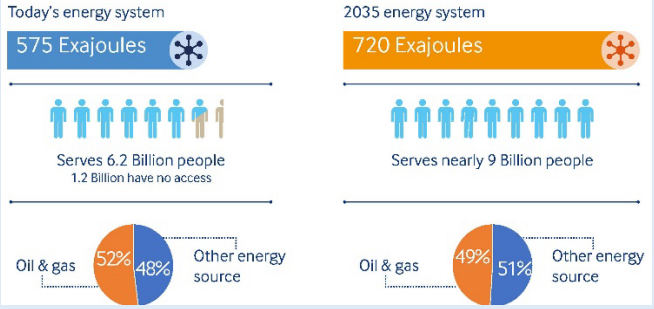
d. Songo Songo Island gas fields

- Songo Songo Island is part of the Rufiji-Mafia-Kilwa Ramsar site, designated in 2006. Ramsar sites are wetlands designated to be of international importance under the Ramsar Convention due to their biodiversity composition. Wetlands included in the List acquire a new status at the national level and are recognized by the international community as being of significant value not only for the county/countries, in which they are located, but for humanity as a whole.
- The project provided economic opportunities for the locals e.g. employment, trade, etc. as well as some challenges including management of waste (oil, food, plastic), sexually transmitted diseases, etc.
- Biodiversity forms the basis of ecosystems and underpins ecosystem services
- Protected areas are one of the cornerstones of in situ conservation – but significant biodiversity values exist outside protected areas; Key Biodiversity Areas are always identified based on known biodiversity values – of which many are not protected

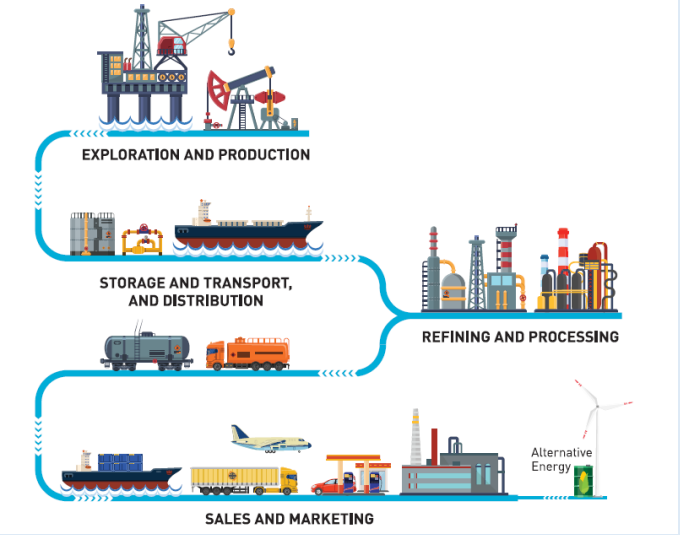
- The ecosystem approach can enable sustainable development that conserves biodiversity through integrated management of land, water and living resources
- ESIAs/SEAs need to consider biodiversity and are key components of an integrated management approach

1.2. Industry overview of the upstream oil and gas sector

Under this module the following points were highlighted:



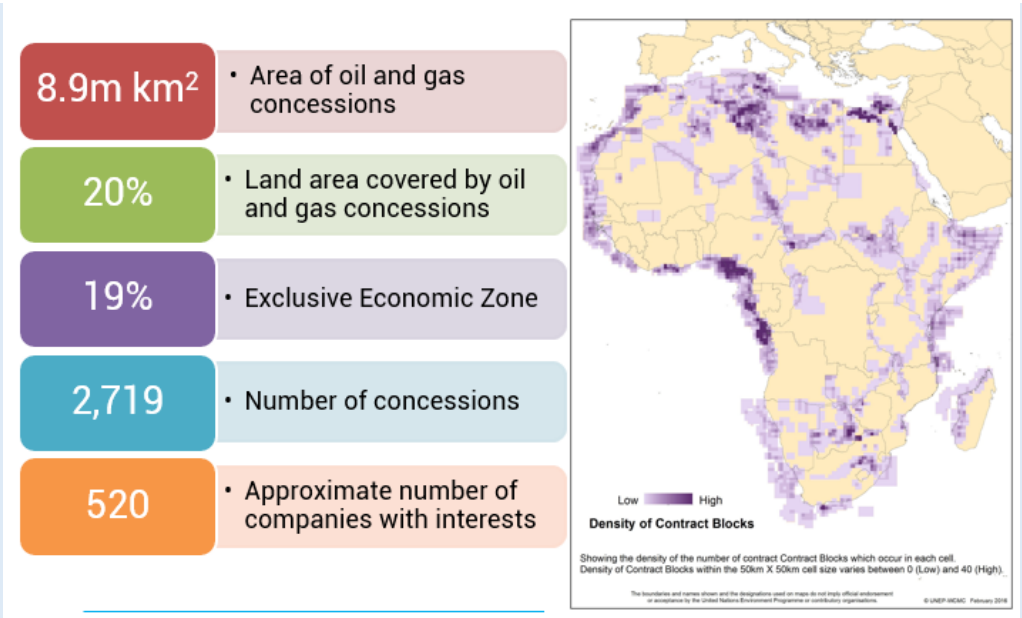
c. Mapping the oil and gas industry to the Sustainable Development Goals: An Atlas, IPIECA 2017



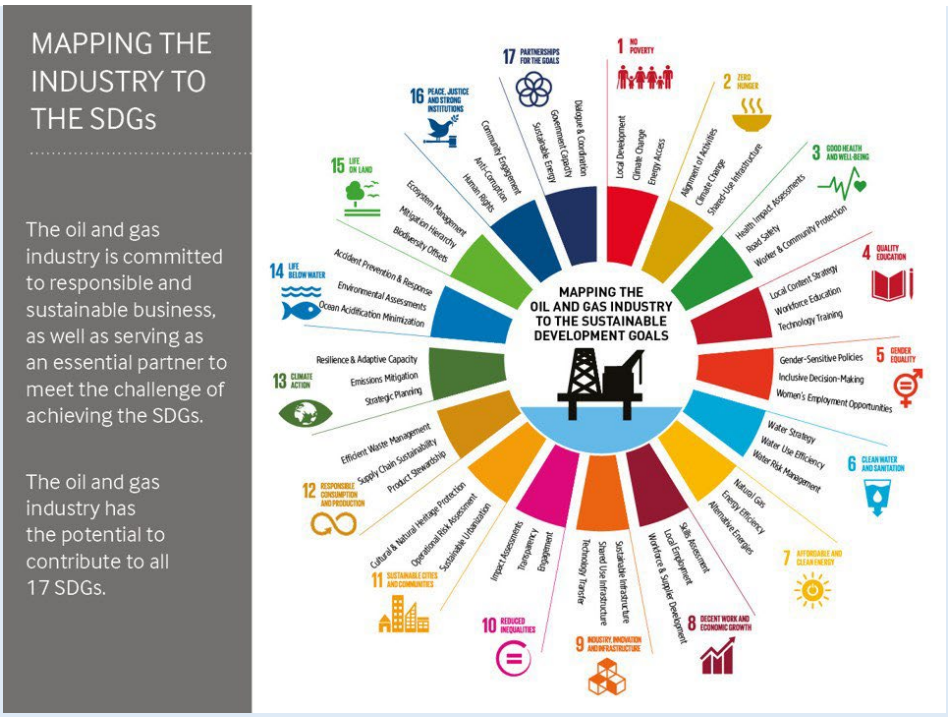
d. Oil and gas value chain

- The upstream oil and gas life cycle consists of exploration, development, production and decommissioning. These stages present a number of potential risks for biodiversity and ecosystem services, which all need to be managed.
- IPIECA aims to advance the oil and gas industry's environmental and social performance and contribution to the energy transition in the context of sustainable development.
- Cross-sector Biodiversity Initiative provides a forum for cross-industry collaboration and learning on biodiversity best practice amongst the oil and gas mining and finance sectors
- Biodiversity risk management frameworks for the industry – including those set by finance institutions – exist and can be used to mitigate impacts
- Significant oil and gas projects exist in Mozambique and the application of these industry best practices will be important to safeguard the countries biodiversity
- Operators are typically responsible for returning the site to as close to original state as possible according to regulations/ standards/ original agreements. Long-term environmental monitoring may be required.
- One significant project that is being planned is the LNG project in the Cabo Delgado region in Northern Mozambique which comprises deep water gas field and an onshore LNG facility – first of its kind in Mozambique. This project is intended to deliver a net gain of critical habitats and no net loss of natural habitats over the life of the project

- IFC Performance Standard 6 is the most widely applied financial standard for the protection and conservation of biodiversity (over 108 financial institutions applying it as signatories of the Equator Principles)



e. Africa's oil and gas potential, UNEP-WCMC 2016



f. Oil and gas supporting sustainable development goals

1.3. Potential impacts on biodiversity and ecosystem services from oil and gas development through the project lifecycle

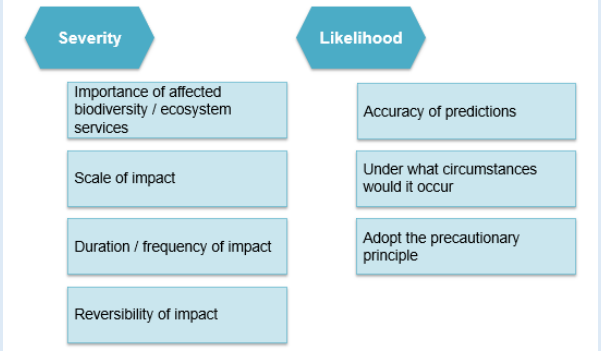
Highlighting the potential impacts (Table 1) of oil and gas operations can have on biodiversity and ecosystem services throughout the project lifecycle, the following key messages were discussed:

- Impacts from oil and gas activities can be direct, indirect/induced, and cumulative
- Direct impacts include direct species mortality and disturbance e.g. seismic impacts on whales, migration or breeding, Introduction of invasive alien species e.g. through transportation, and re-vegetation programs
- Indirect impacts include changes to local economic conditions e.g. deforestation and agricultural expansion, changes to local environment e.g. soil erosion following habitat conversion, sedimentation of waterways
- Cumulative impacts include impacts from several sources like bioaccumulation of chemicals and heavy metals, over-exploitation of water from multiple operations
- An environmental risk matrix assesses impacts based on their severity and likelihood. Evaluate the ***Importance*** (e.g. IUCN threat status, dependence on basic service such as water supply), ***Scale*** (e.g. species population affected, extent of water contamination), ***Duration*** (short or long term) and ***Reversibility*** (is it permanent? will the area regenerate in the long term, or is the impact sustained)
- Impacts vary during the project lifecycle and may include physical disturbance, noise and light pollution, and waste generation

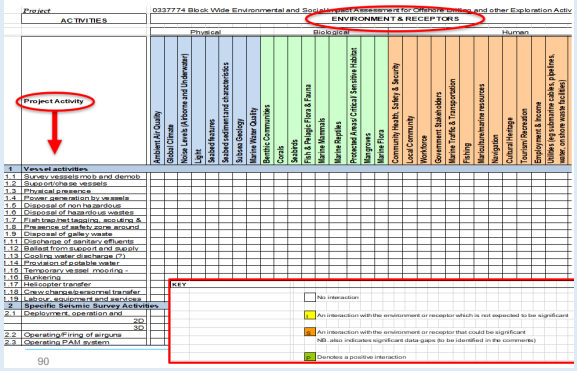
Table 1. examples of potential impacts of oil and gas operations through project lifecycle

Oil and gas lifecycle	Issue	Possible outcome	Potential impacts
Seismic surveys	Physical disturbance	Damage to habitats and species from survey equipment	• Entanglement with marine wildlife • Coral reef physical damage
Drilling	Waste	Generation of drill cuttings and fluids, of chemical waste from machinery, and of workforce waste	• Cuttings smother benthic biota • Change in seafloor conditions • Bioaccumulation of chemicals in local fisheries • Contamination of soils or water sources
Gas plant construction	Dredging	Removal of benthic habitat	• Smothering of communities • Reduced productivity from sediment suspension and loss of light

			• Destruction of nursery habitat for local fisheries
Oil and gas production	Atmospheric emissions	Emission of pollutants (GHG and non-GHG)	• Worsening of air quality • Change in environmental conditions
Decommissioning	Physical disturbance	Removal of infrastructure	Alteration to benthic structures and established communities



g. Establishing potential impacts and dependencies



h. Impact identification with an ENVID matrix, IPIECA 2020

Impact		Likelihood				
		1	2	3	4	5
Severity	Score	A (Very unlikely)	B (Unlikely)	C (Possible)	D (Likely)	E (Very likely)
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1 to 4 **Low**		5 to 12 **Medium**		15 to 25 **High**

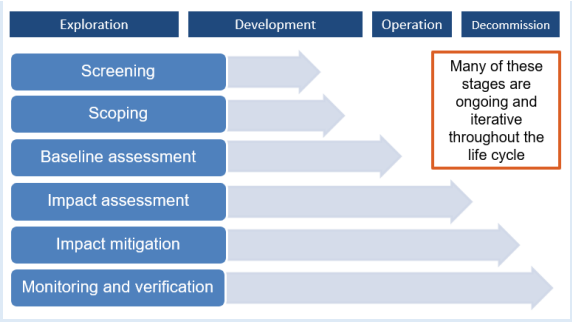
i. Typical environmental risk matrix

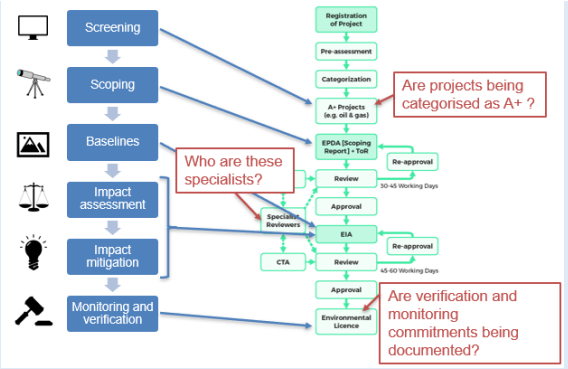
1.4. An overview of the ESIA process and introduction to the mitigation hierarchy

Some of the discussion points highlighted in this module are below.

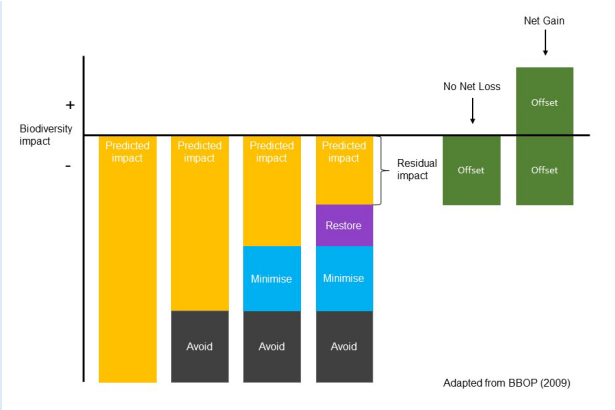
- The ESIA process is the key legal tool for project-level impact assessment and mitigation
- The mitigation hierarchy is a best practice tool to limit negative impacts that should be considered at all stages of a project

- The mitigation hierarchy follows an order of preference: ***avoid*** as far as possible, then ***minimize*** remaining impacts, then plan to ***restore***, and as a last resort ***offset*** any residual impacts
- The mitigation hierarchy is iterative and should be used throughout the design and implementation of a project
- Biodiversity Action Plans (BAPs) are developed to accompany mitigation programmes as part of project implementation and are inspired from National Biodiversity Strategies and Action Plans (NBSAPs) which are required by the Convention on Biological Diversity (CBD) for parties to protect and restore their biodiversity and ecosystems
- Principal elements of BAPs typically include:
    - Preparing inventories of biological information for selected species/habitats
    - Assessing the conservation status of species within specified ecosystems
    - Creation of targets for conservation and restoration
    - Forming budgets, timelines, and institutional partnerships for implementation





j. biodiversity management throughout upstream project lifecycle



k. Application of mitigation hierarchy

Impact Type	Impact Source	Mitigation Measures	
Physical loss and disturbance of mangrove habitats	Temporary and permanent disturbance and loss of mangrove and species from construction and operational activities	**Avoidance**	• Load Out Facility (jetty) located away from areas of dense and mature growth
		Minimisation	• Minimisation of disturbance during construction in areas outside of the direct construction footprint
		Restoration	• Restore areas temporarily affected by physical impacts. • Approaches to be established through the development of a biodiversity action plan (BAP) and/or reinstatement plan (RP) to define approach to manage reinstatement.

l. Mitigation of physical loss of mangroves

Day 2

Module 2. Biodiversity considerations at the project-level

Scope and Summary

This module provided in-depth information on the importance of conducting screening, scoping and development of baselines as part of an ESIA process. It highlighted the role of spatial data in baseline assessments, and various biodiversity assessment tools and data platforms, including the SIBMOZ platform being developed in Mozambique.
It also discussed impact mitigation focusing on the application of the mitigation hierarchy as well as monitoring and verification.

The Norwegian experience on managing biodiversity in the oil and gas sector was presented, including its EIA process, institutional and legal framework. Practical experience on biodiversity management in Mozambique was also presented which focused on the EIA process, verification checklists and biodiversity regulatory framework, as well as challenges faced in country and ongoing projects related to the biodiversity management.

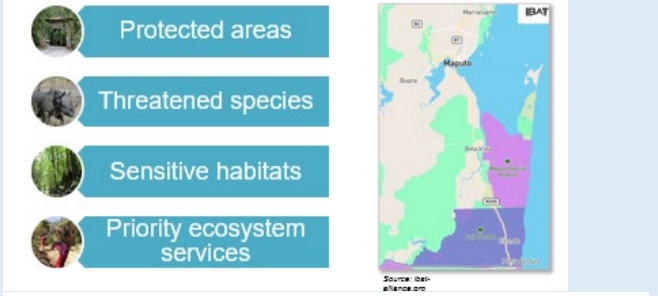
Presenters:
Sharon Brooks, UNEP-WCMC
Luca Koerner, UNEP-WCMC
Mathilde Juel Lind, NEA
Rosana Francisco, DINAB

2.1. Screening, scoping and biodiversity baselines

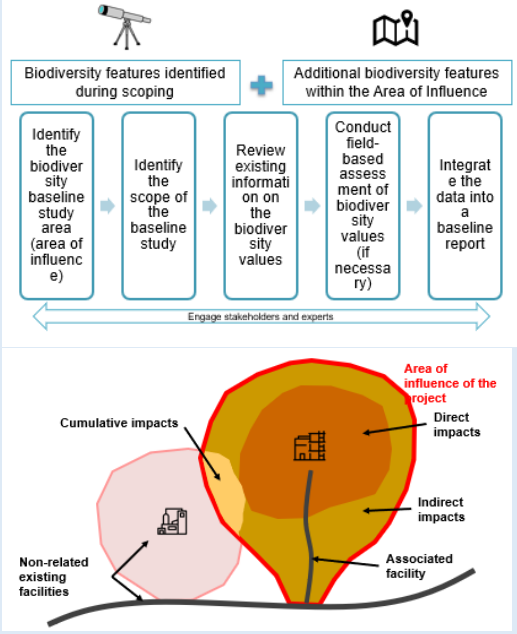
- Screening should take place prior to the selection of the preferred project option to eliminate alternatives with the greatest potential impacts. For regulators, this process determines if an ESIA is required and the level of detail needed. By performing screening, companies can evaluate which options would have significant negative impacts on biodiversity and ecosystem services, and hence identify the option(s), with the least potential negative impacts.
- Scoping determines the priority issues to be considered in the ESIA, and good scoping saves time, money, and effort. The screening and scoping should influence and determine what information is needed when undertaking a baseline assessment for an impact assessment.
- Baseline assessments characterize the existing conditions to establish the biodiversity and ecosystem service status before operations begin. Consideration of different areas and timeframes within a species life cycle makes marine baselines very complex as collecting data at one point in time can miss important life cycle stages of a species
- Baseline assessments inform impact assessment and management planning, monitoring and adaptive management over the life of the project
- Some biodiversity data platform includes Protected Planet, IBAT (assessment tool for decision-making and provides global KBA dataset), Ocean data viewer

Table 2. Tools and data platforms to support biodiversity management

Name	Description	URL
BirdLife Data Zone	Data on bird species and IBAs with country profiles and case studies	http://datazone.birdlife.org/home
GBIF (Global Biodiversity Information Facility)	Compiled species-level data with global coverage	https://www.gbif.org/
IBAT (Integrated Biodiversity Assessment Tool)	Database compiling information about global biodiversity in an online decision support tool	https://ibat-alliance.org/
InVEST (Integrated Valuation of Ecosystem Services and Trade-offs)	Open-source software models to map and value ecosystem services and assess trade-offs	https://naturalcapitalproject.stanford.edu/invest/
IUCN Red List	Online information on global conservation status of species	https://www.iucnredlist.org/
Ocean+	Platform providing access to marine and coastal biodiversity datasets	https://www.oceanplus.org/
Protected Planet	Web-tool providing access to the World Database on Protected Areas	https://protectedplanet.net/
UN Biodiversity Lab and the Environmental Situation Room	Online platform giving access to global data layers	https://www.unbiodiversitylab.org/ https://environmentlive.unep.org/media/html/situation/situation_room.html
Biodiversity Network of Mozambique	Research-grade primary biodiversity data from leading national universities, research centres, and conservation areas.	https://maps.openscidata.org/index.php/view/map/?repository=bionomo&project=Bionomo



m. **Significant areas to note during screening**



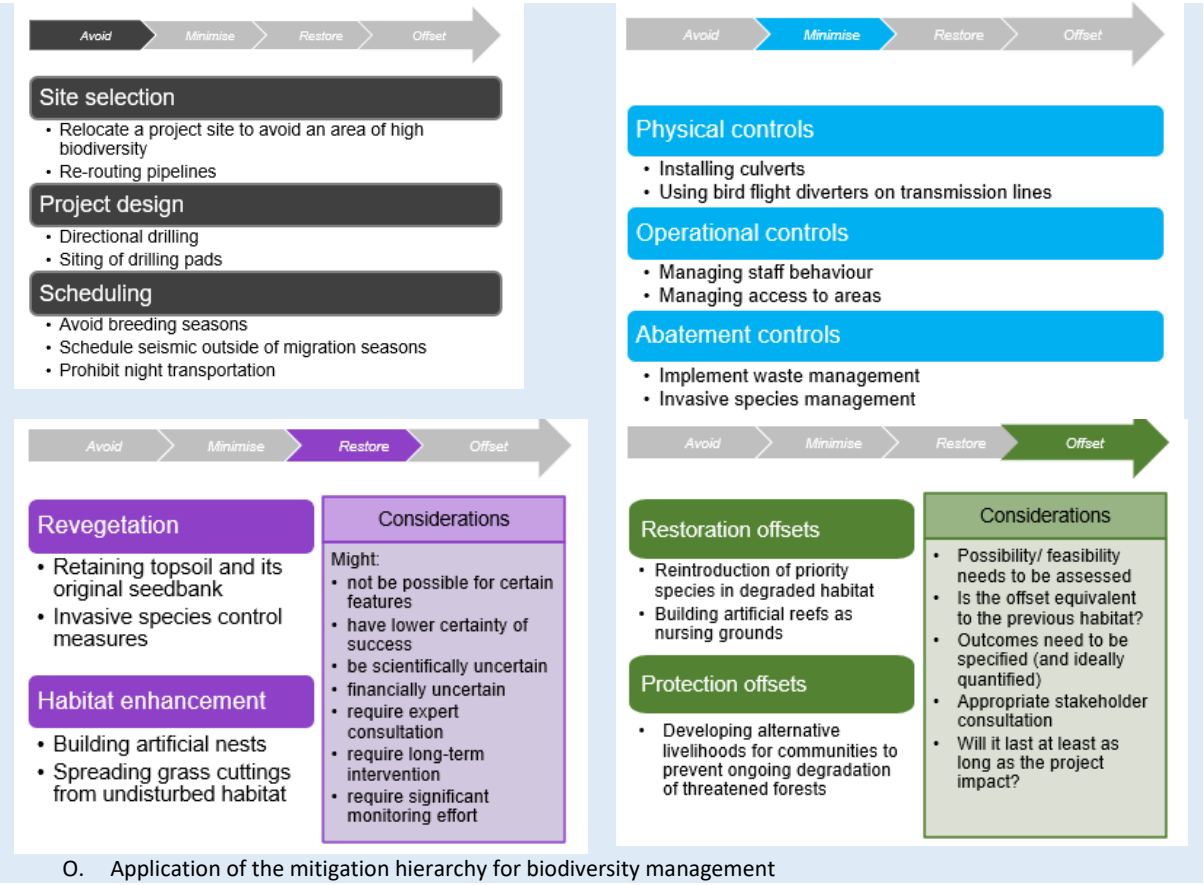
n. **Developing baselines and defining the area of influence**

2.2. Mitigation Hierarchy, Monitoring and Verification

The following points were highlighted in this module:

- The mitigation hierarchy is crucial for oil and gas development projects that aim to achieve no overall negative impact on biodiversity (No Net Loss) or even a Net Gain of biodiversity.
- It is based on a series of essential, sequential steps that must be taken throughout the project's life cycle to limit any negative impacts on biodiversity.
- The first step of the mitigation hierarchy includes measures taken to **avoid** creating impacts in the first place. A lot of avoidance has happened at screening, where potential project sites may be screened out in order to avoid areas of high biodiversity. To avoid, different measures can be applied and many of these will have to be integrated right from the beginning, at the project design phase (e.g. planning low-impact construction on site)
- Where impacts can't be completely avoided, they should be **minimized** and this will happen at the beginning and throughout the project. Typical examples are measures to reduce noise and pollution.
- For impacts that can't be avoided or minimized, **restoration** can then be applied. These measures can be taken to improve degraded or removed ecosystems following impacts that cannot be completely avoided or minimized. Restoration tries to return an area to the original ecosystem that occurred before impacts.
- While restoration is possible during operations, it is mostly needed towards the end of a projects' life cycle, where most of the impacts have already occurred. However, that it might not be successful or possible for all biodiversity features and it requires more time and monitoring efforts

- Lastly, **Offsets** - measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the mitigation hierarchy. They are often complex and expensive, so attention to earlier steps in the mitigation hierarchy is usually preferable

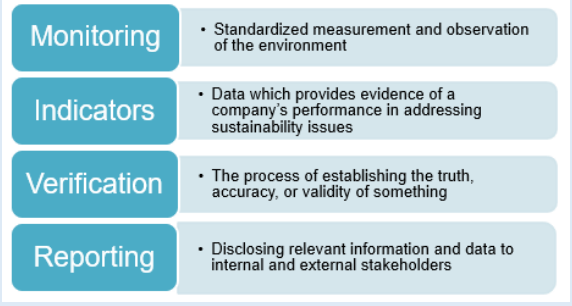


O. Application of the mitigation hierarchy for biodiversity management

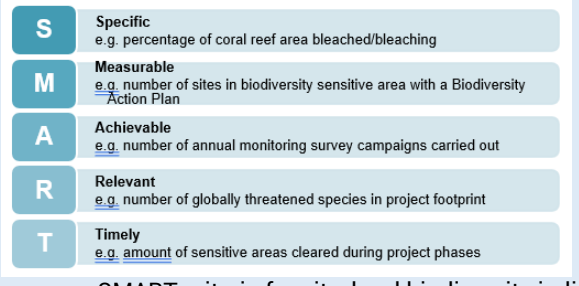
On Monitoring and Verification:

- The Mitigation Hierarchy (avoidance and minimization, restoration and offsetting) is an effective tool to guide environmental impact however, monitoring should support active management by the company, so that results are fed back into mitigation actions
- Monitoring supports accountability and transparency, helps to ensure success of mitigation measures, and informs adaptive management
- Monitoring is also carried out by regulators, in addition to the renewal of the environmental license and potential environmental audits
- Verification is important to ensure the credibility of the data and transparency of a company's biodiversity management approach. This is then usually done by independent third-party regulators
- Spatial data is a very useful tool during monitoring. Spatial monitoring data can verify the effectiveness of impact mitigation across landscapes and at specific sites. For example, at Landscape level, Remote sensing data can monitor broad-scale changes over large areas and at Site-level, High resolution data can establish whether specific objectives of impact mitigation strategies are being met

- Some fundamental criteria to keep in mind when designing your indicators:
    - Follow a "SMART" philosophy: being specific, measurable, achievable, relevant and timely.
    - Offer sufficient SENSITIVTIY: Biodiversity indicators must also be sufficiently sensitive to provide a warning of change before any irreversible damage occurs – effectively they must serve to indicate where no significant change is occurring, and also where the threshold between insignificant and significant change lies.
    - biodiversity indicators should also be simple and relate to something that people can understand and use
    - They should be able to address a need (e.g., be established through stakeholder dialogue or respond to a predicted significant impact).
    - Sensitive to anthropogenic impacts – able to measure changes caused specifically by humans (i.e. able to differentiate between long-term background changes and those changes arising from the presence of oil and gas operations).
    - Spatially and historically relevant across the required geographical (i.e. local, regional, global) and time (year/years/decade) scales.



o. Monitoring and Verification Terminologies



p. SMART criteria for site-level biodiversity indicators

2.3. Biodiversity in the oil and gas sector – Norwegian experience

The following points were highlighted during the discussion:

- It is important to ensure that the environmental aspect is managed in all the different phases of the oil and gas life cycle
- The Ministry of Petroleum and Energy is the authority responsible for regulation. However, the Ministry of Climate and Environment is responsible for developing cross-sectoral environmental policy
- Some Principles laid down in the environmental legislation of Norway to ensure good environmental practice include polluter pays, precautionary principle, best available techniques, risk reduction, etc.
- Authorities and oil companies have mutual dialogue and openness for transparency. Meetings are conducted with operators and the Norwegian Oil and Gas as well as Environmental NGOs
- Annual seminars are arranged which are open for stakeholders and media. For example, there is a seminar on oil spill response preparedness (together with PSA)

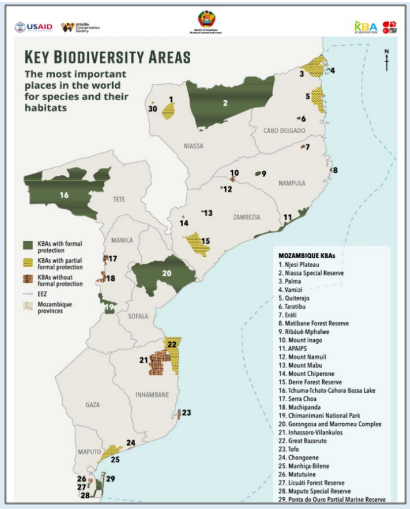
and another where the results from previous years' environmental monitoring offshore are presented and commented. Yearly feedback is provided to all operators on their annual reports and Summary of the findings and trends (in operators yearly reports) are published.

- The applications for discharge permits are always published on the website as part of the consultation procedures. Key stakeholders are notified directly by email
- Best practices from an environmental perspective include Mapping of the whole area (biological recourses/biodiversity), establishing framework based on mapping, and specific restrictions in sensitive areas/ areas of specific concern

2.4. EIAs in practice in Mozambique

The following points were highlighted during the discussion:

- Protected areas make up about 26% of the national territory with 29 Key Biodiversity Areas (KBAs) mapped in Mozambique. ANAC is the principal authority to manage these areas in collaboration with conservation partners.
- Mozambique has legislations and institutional framework that supports the conservation and sustainability of biodiversity e.g. the Law on the Protection, Conservation and Sustainable use of Biodiversity (Law 5/2017) – its chapter IV provides for special measures to be applied for the protection of biodiversity; Regulation on the Environmental Impact Assessment Process Decree no 54/2015.
- The EIA regulation requests for qualitative assessment of ecosystem services and identification of vulnerability to the effects of climate change including direct, indirect, residual and cumulative impacts as well as mitigation measures and development of Offset management plan
- A checklist has been developed to guide the proper implementation of the mitigation hierarchy in accordance with the EIA legislation. A platform has also been developed for Environmental Licensing Management System in Mozambique as a result of the CONNET project
- One of the challenges faced in biodiversity conservation is human activities, as about 70% of the population depend directly on ecosystem goods and services



q. Key biodiversity areas in Mozambique

r. Art.11 of Decree No. 54/2015 Environmental Impact Study

Day 3

Module 3. Planning for oil and gas development

Scope and Summary

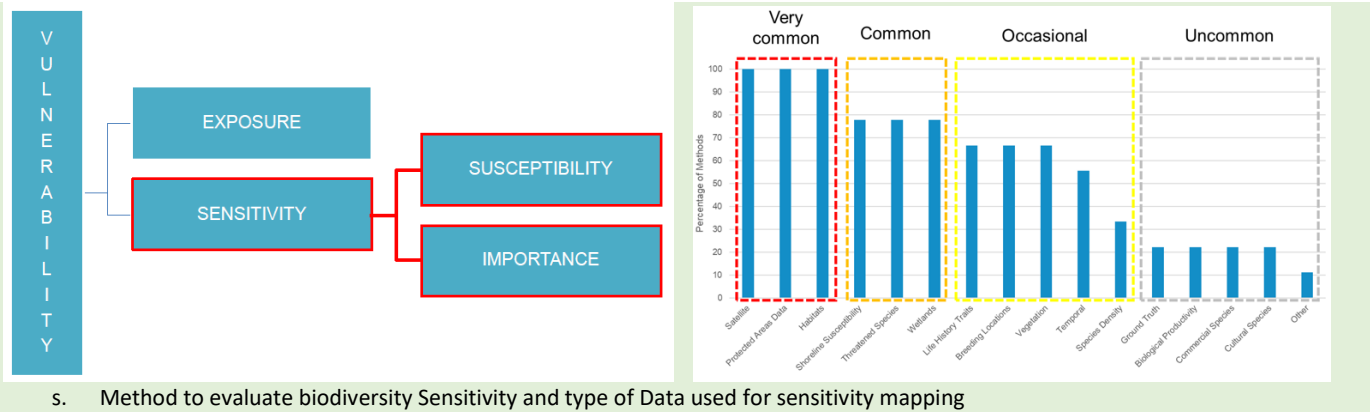
This module discussed environmental sensitivity mapping for area-based planning, including meaning and importance of area-based and marine spatial planning, the methods and data used for sensitivity mapping and how it is used in relation to oil spill preparedness and response. In this regard, the MESA tool, marine spatial planning and ongoing project related to mapping for biodiversity management (for oil and gas operations) in Mozambique were presented.

Presenters :
Joe Turner, UNEP-WCMC
Luca Koerner, UNEP-WCMC
Milton Zibane, INP

3.1. Environmental sensitivity mapping in the context of area-based planning

- Area-based planning is a proactive approach that offers an opportunity to develop a spatial plan for a sustainable future. It aims to balance conservation and sustainable development opportunities, so they are implemented in a way that maximizes benefits and reduces trade-offs. Area-based planning allows stakeholders review different scenarios of outcomes related to impacts on different groups within society, as well as biodiversity.
- From a sectoral perspective, area-based planning can help to determine the best location for oil- and gas-related activities, helping to award concessions, locate oil- and gas-related infrastructure, roads, associated housing developments, and to minimize impacts such as habitat loss, fragmentation, and pollution.
- Area-based planning links to marine spatial planning. The main purpose of marine spatial planning is to identify the utilization of marine space for different sea uses in accordance with national policies and legislation, while taking into consideration the preservation, protection and improvement of marine environment.
- Marine spatial planning in Mozambique is led by the Ministry of Sea, Inland Waters and Fisheries with the key tasks to map the ocean use, coordinate different activities and interests in the marine and coastal space (one of which is environmental protection and conservation) and decrease the potential for conflict
- Strategic Environmental Assessment is an important part of area-based planning and should take place at the early stages before decisions are made. It integrates social, environmental and economic considerations into policies and plans decision making and therefore provides that legal framework for area-based planning. It also assesses the direct, indirect and cumulative impacts of the oil and gas sector as a whole and on all levels.

- Area-based planning also links to SEAs which integrates social, environmental and economic considerations into decision making and provides a legal framework for area-based planning.
- Environmental sensitivity mapping can form one component of a larger, integrated area-based planning process. Sensitivity mapping highlights sensitivity of ecological and socio-economic assets to specific pressures
- Stakeholder engagement (Government institutions involved in environmental protection and management, NGOs, Universities and other research institutions, private sector, etc.) and a participatory process are key to capture all asset values and their contextual importance
- Availability and maintenance of relevant data are key for sensitivity mapping and other area-based planning efforts; Improved data collation and management processes are needed in Mozambique
- MESA is a hybrid tool for sensitivity mapping, developed based on the commonalities identified among other methods. It focuses on oil and gas but is also relevant for a range of other sectors. It has been applied in Ghana to update their 2004 assessment of coastal sensitivity to oil spills.
- Key issues relating to biodiversity data in Mozambique include: Data scattered across institutions and lack of capacity to manage and use data. Potential solutions include
    - A metadata inventory to understand what data exist and where
    - Data sharing mechanisms between institutions
    - Capacity and training on managing and using data
    - Collating priority datasets for sensitivity assessment
- Data management systems will support the visibility and accessibility of data for their inclusion in sensitivity maps.



s. Method to evaluate biodiversity Sensitivity and type of Data used for sensitivity mapping

3.2.1. Environmental Sensitivity Mapping in Practice

The different steps to developing an environmental sensitivity atlas include:

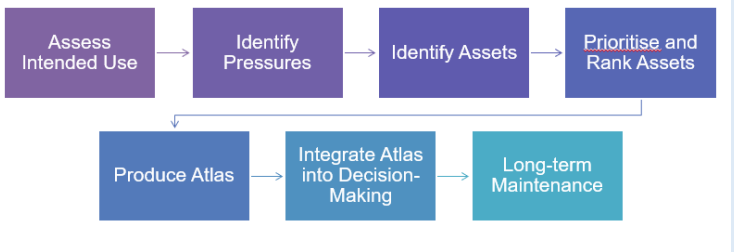
- ***Identify its intended use(s)*** – objectives, realm and scale, audience. Once intended use is established, then an appropriate stakeholder group should be convened from:
    - Government institutions – to oversee the process and provide input on regulations regarding acceptable impacts
    - NGOs – to provide contextual conservation implications

- Academics – to provide scientific assessment of the assets
- Industry Experts – to provide technical details on the likely impacts on asset

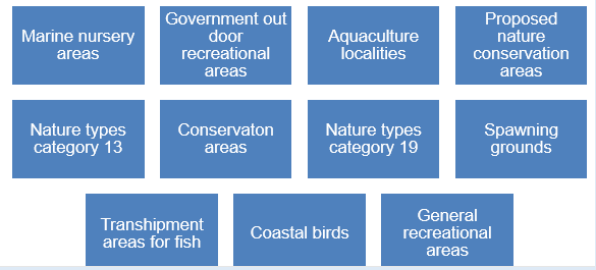
- ***Identify the source of pressures that will be reviewed.*** The pressures are directly related to the intended use of the atlas and will vary between realms. Expert consultation and supporting literature will be needed to understand what pressures to incorporate given the intended use.
- ***Identify Assets to be safeguarded.*** Regarding environmental sensitivity mapping, environmental asset is a collective term for both ecological and socio-economic assets.
- ***Prioritizing and Ranking Assets.*** The importance of an asset may be valued differently at a global vs a national or local level. For example, although a certain habitat type may not be globally important, it may provide a key ecosystem service in a specific area and therefore be highly important at that scale
- ***Produce Atlas.*** Sensitivity atlases can be generated using spatial software such as ArcGIS or QGIS. Currently, the methodology relies on two software: FME from Safe Software, for which licenses were kindly provided to OfD partner countries; and QGIS which is an open source software. Environmental asset datasets are run through FME for 'STAGING', and the importance and susceptibility rankings are then added in for 'PROCESSING
- ***Integrating into decision-making processes.*** While dissemination of the final product inevitably occurs at the end of the development process, the identification and engagement with appropriate audience should be considered from the very beginning to ensure uptake of the map. To integrate properly, identify who are the intended users and the format they require the atlas.
- ***Long-term maintenance.*** A sensitivity atlas should be a living entity, constantly able to update as new data becomes available.

On Sensitivity mapping in Norway, the following were highlighted:

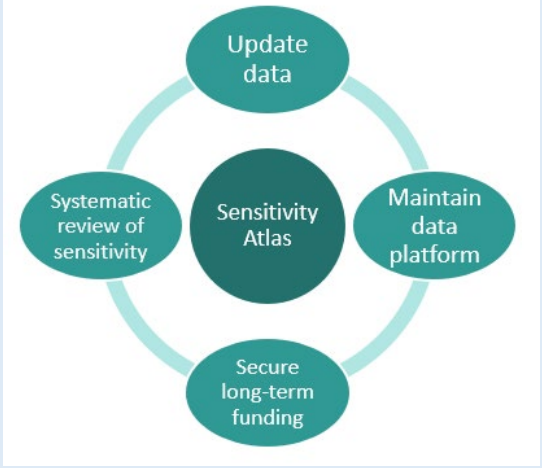
- Sensitivity maps are tools used to prioritize (activity) at acute pollution events as the maps show vulnerable, threatened, and prioritized resources in the coastal areas.
- Three resource categories are relied on including Nature-based industry and activity, biological components, and geographical areas, with 65 asset categories in the three data sets
- A full analysis is carried out each month based on new data



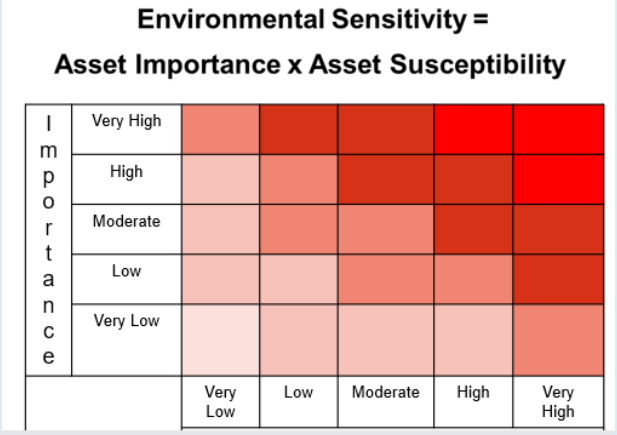
t. Process for developing a sensitivity atlas



u. 11 data sets used in sentivity atlas in Norway



v. Breakdown of the flow of resources and data to produce sensitivity atlas and ensure long-term maintenance



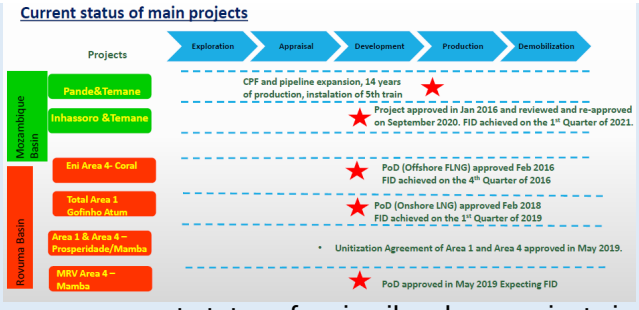
w. Priotizing and ranking assets

3.2.2. Development of Environmental and Social Vulnerability Mapping for Oil and Gas Exploration and Production Areas in Mozambique

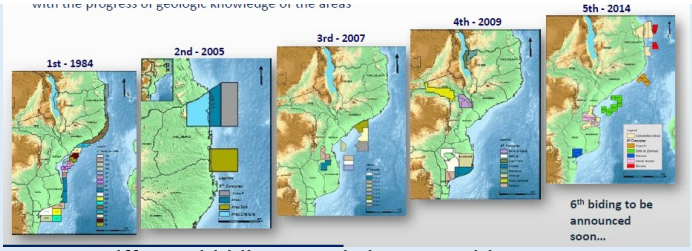
Under this Module, the following points were highlighted during the discussion:

- The Petroleum Law of 2014 forms the legal and regulatory basis for granting rights to commercial entities allowing petroleum operations and establishing the governance structure clarifying roles and interests.
- Insituto Nacional de Petroleo (INP) is the regulatory authority for petroleum operations in Mozambique.
- Five bidding rounds have been undertaken since 1984 and a sixth one is to be announced soon. Natural gas production from Pande/Temane fields began in 2004
- The Government of Mozambique through the Ministry of Mineral Resources and Energy has received World Bank financing for the "Mining and Gas Technical Assistance Project (MAGTAP) A SESA (Strategic Environmental and Social Assessment) was included as key component of MAGTAP for Oil and Gas and Mining Sectors.
- SESA included an institutional and policy matrix to address the recommendations to be implemented at short, medium and long term. Regarding the third policy issue related to gas exploitation and protected areas, it was recommended to conduct an exploratory study and definition of 'no go' areas because biodiversity can't be replenished.
- The project was divided into four main phases: Background review, Vulnerability indicator identification, compilation and reporting and "No-go" areas. The project is expected to develop
    - a data base of environmental and social attributes (onshore and offshore) that may be impacted by oil and gas activities
    - an interactive map showing current pressured areas and environmental and socially vulnerable aspects for decision-making and

- a monitoring protocol of selected aspects for oil and gas exploration and production management and planning



x. current status of main oil and gas projects in Mozambique



y. Different bidding rounds in Mozambique

Group Exercises[1]

Scope and Summary

Day 2: EIA Exercise - Group Work 1(GW1)
The objectives of the GW1 exercise included:

- Understand the context of operations to eliminate potential locations to avoid impacts
- Understand the potential impacts as a consequence of going ahead with the project
- Develop approaches to mitigate biodiversity and ecosystem services impacts

Based information on ecological and socio-economic features provided and using the table below, participants were required to

a. Identify one location for a drilling platform to focus on.
b. For the drilling platform location chosen:
   - Identify the biodiversity components or ecosystem services that may be affected by the operations
   - Describe how the operations may impact the respective biodiversity components or ecosystem services (in addition to the drilling platform and processing plant themselves, also consider the pipeline from the platform to the plant and access roads)
   - Outline what example mitigation measures could be applied for each of the identified impacts

Day 3: Sensitivity mapping exercise (GW2)
The objectives of GW2 included:

- Assess the importance of different ecological assets.
- Map out the sensitivity of ecological assets to oil spills.
- Identify potential priority areas within potential concession blocks.

[1] This training included two group work exercises - GW1 was held on Day 2 of the training while the GW2 took place on Day 3 of the training.

Using the sample tables below and based on the information provided, participants were required to

a. Rank the importance of each of the ecological assets between 1 (Very low) and 5 (Very high) in the table below. More than one asset can have the same importance rank.
b. Using the susceptibility rankings provided and the importance rankings established in Part 1, calculate the sensitivity ranking of each asset to oil spills (see table 2) Sensitivity is calculated by: Susceptibility x Importance (see table 1) Sensitivity ranking go from 1 (Low) – 25 (Very high)
    - Fill out the sensitivity map accordingly. Each grid cell should include the sensitivity rank based on the ecological assets it overlaps with.
    - For each challenge, discuss current efforts and additional priority actions which could be taken to address these specific challenges.
c. Identify which concession blocks may have high environmental risks with it. Discuss which blocks may need to be identified as priority areas for further environmental studies, and why

At the end, these exercises[2] aimed to help participants to better understand how oil and gas operations may impact the respective biodiversity components or ecosystem services, the possible mitigation measures and apply knowledge gained during the training in calculating and ranking sensitivities.

Presenters :
Joe Turner, UNEP-WCMC
Chidinma Zik-Ikeorha, UNEP

Table 3. EIA GW1 exercise

Selected location	**Biodiversity component or ecosystem service**	**Description of key impacts**	**Potential mitigation options**
Drilling platform			
	e.g. local subsistence fisheries	*e.g. Restricted access to fisheries and/or wild foods for local people*	*(consider solutions that avoid, minimise, restore, and offset impacts and dependencies)*

[2] Participants were divided into 7 groups consisting of representatives from each institution represented. See Annex 5 for each team's output of the group work exercise.

Table 4: Sensitivity Exercise GW2- Importance ranking

Asset	Importance ranking	Reason
(A) Coral Reef		
(B) Mangrove		
(C) Sand Beach (turtle nesting)		
(D) Forest (National Park)		

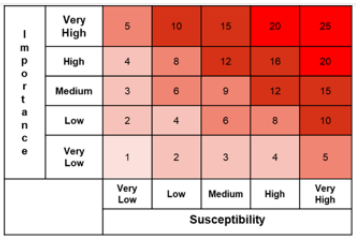


Table 1: Sensitivity matrix

Asset	Susceptibility ranking	Importance ranking (from Part 1)	Sensitivity ranking
Coral Reef	2 (Low)		
Mangrove	5 (Very High)		
Sand Beach (turtle nesting)	3 (Medium)		
Forest (National Park)	4 (High)		

Table 2: Susceptibility ranking per ecological asset

Results of Participant Assessments

Prior to and after the training, UNEP carried out a baseline and final knowledge assessment[3] using a set of "exam" questions (30 questions in total translated to Portuguese), which was one way of evaluating the improvements in knowledge attained as a result of the online training. The set of questions (multiple choice or true/false responses) was primarily based on the technical presentations delivered during the online training session. It should be noted that this type of written assessment only provides a partial assessment of the knowledge of individual participants to help in the evaluation of additional knowledge gained during the training, through group work discussions and direct interactions with their peers and training experts. Hence, it is important to view these assessments together with participants' own evaluation of the training, and whether it met their learning needs (discussed further below).

Of the total number of participants (35), 25 were able to complete both the baseline and final assessments, while others were unable due to previous engagements. Participants who took both the baseline and final assessments registered a 15% average improvement in their knowledge of chemicals and hazardous waste management in the oil and gas sector. Of the 32 people who completed the baseline assessment, the average score was 71%. Of the 25 people who completed the final assessment, the average score was 86%.

[3] Due to the time constraints, as the training was delivered online, participants were required to take the baseline knowledge assessment before the training as a prerequisite to attending the training. Participants were given a week to complete the final knowledge assessment online after the training was completed.

Results of the Training Evaluations

UNEP provided the opportunity for participants to evaluate the training based on their own expectations and learning needs. 26 participants in total completed the evaluation.

The majority of participants gave scores of 4/5 or 5/5 for meeting the set of learning objectives outlined by the training. Participants were also asked to rate the extent to which individual modules (1-3) met their individual learning needs (score range of 1= not met to 5=fully met). Most participants scored each Module 4/5 or 5/5.

When asked to rate their experience of having the training delivered online in an in-classroom setting, 16% of participants rated the training as 'excellent', while 84% rated the training as 'satisfactory'. When asked to rate their overall satisfaction with the training, 20% of participants rated the training as 'excellent', 36% rated the training as 'highly satisfactory' while 40% as 'satisfactory' and 4% indicated 'needs improvement'.

Participants appreciated the participatory/interactive training approach although it was delivered by experts online. Some participants wished to have a more extended training to have more time for discussions, team activities as well as preferred in-person training with field visits included. Participants also gave feedback to be considered for future improvement of online trainings. Some of the feedback comments included in-person training to apply knowledge acquired, extended training period, inclusion of field visits and more case studies and experiences in application of mitigation hierarchy, as well as need for early dissemination of translated training materials and better internet connectivity (see Table 5).

Future considerations for improvement include:

- greater time allocation for Q&A/comment session or possibility of having hybrid training or extending duration of training, to provide more time for discussions and clarification from presentations
- early dissemination of translated presentations and training documents. However, this will require the receipt of list of participants and presentations well in advance
- need to have at least one team member physically present at the training venue to support coordination of logistics (DSA, accommodation, facilitation, etc.)

For further details of evaluation results, consult Annex 2.

Annex I. Participants' Questions/Contributions and Experts' Responses

Participant Name/Institution	Questions/Comments	Responses from Experts
Rafael Morais (AQUA)	1- Which mitigation measures were implemented to reduce the impact on traditional fishing in the area as it took place near coral reefs and mangroves (In the case of Songo Songo case study)? 2- The number of endangered species have increased in Mozambique, which criteria are used to establish the number of threatened species? 3- Elaborate on Human interaction?	1- Comprehensive EIA was conducted by the funding agency and consultants from Canada executed it in 2002 before legislations in Tanzania were finalized and it was a comprehensive study which took many months and several mitigation measures were defined. One of their mitigation rules was Zero Waste and no waste was to stay on the Island and had to be removed. It was because the island has a very shallow water table and any waste that would be buried could penetrate to the table which was 25 meters below the land, therefore waste had to be distributed between recycling centers or any process necessary. Another important measure taken was as relates sexually transmitted disease as 40,000 people were living in the island due to the inflow of workers and people for the job. The village insisted they had HIV training every week and distribution of free condoms. The project was to support the health center and built a new building in the village to keep vaccines and medications. In terms of monitoring, random and unannounced visits from World Bank environmental managers took place every 6 months to check the waste management in the island. 2) One of the factors that contributed to the decrease in the number of species is the population growth and related activities such as cutting forests and farming, these factors are squeezing biodiversity into smaller areas.

Julieta Jutemaine	Protection of mangroves was highlighted during the presentation. How can this be done?	It's difficult to protect a mangrove and you need to think about the river basin as it can affect different components and is linked to the system. You have to think about the catchment
Paulino Changuda	What were the mitigation measures taken in while constructing the pipelines?	The impact on the fisheries wasn't significant as most activities were on land so fisheries were not an issue while constructing the gas processing plant, but the issues occurred while carrying out seismic surveys. To avoid the issue they pulled streamers over the sea and they were informed that fishing net should not be left in the sea on the days of the survey. There were many coral reefs in the area and the pipeline routes were selected to avoid coral reefs, and when the pipeline reached the mainland it was trenched so they excavated the channel and buried the pipeline and there were no issues in that matter. They made sure but the challenge was with the anchors and barges but it was expected and identified early on. So risk assessment and measures were taken.
Natercia Cuna	What was the impact of the explosion of one of the 12 wells mentioned in the presentation and what mitigation measures were taken	The accident happened when they were finishing one of the wells and the gas caught fire and it lasted for days. It happened in the mid 70's but the population of the area was about 200 people and it was very different from today and no casualties happened.

Julieta Jetimane	Do you have any experience you want to share on recovering the areas after the cycle of mining and exploration in Mozambique.	IPEICA doesn't focus on decommissioning but our sister organization IOGP has a strong focus on this field but I can get back to you with material on the matter later on and Marisol can forward our response. In regard to restoration in certain areas, we can discuss the restoration options around exploration sites at the end of the decommissioning phase and the impact mitigation in terms of biodiversity later on.
Gastao Carlos (environmental Service of the province of Zambie)	I want to know information regarding archeological activities while conducting environmental assessments in the sites in such large scale projects when it comes to historical artifacts found and mitigation of impacts on cultural heritage.	Many companies signed up to the No-Go Commitment which means no oil and gas activities near archaeological and world heritage sites. All companies should implement mitigation hierarchy to avoid and find a way around archeological sites to avoid impacts that could come up. Mat: In addition to the best practices followed by the industry that companies may have signed up to, we must not forget the national legislations that include such sites that are considered as natural assets, so other sectors should be involved to guide as you might be working with operators who have different standards and it is important for other authorities to be involved.
Ligia Chamo (ministry of road development)	I want some clarification regarding measures implemented to achieve neutral emissions while working on oil and gas projects.	In regards to explorations and production and emissions from operations such as drilling the company's main focus to do the Zero Routine Flaring should be limited to safety issues, reduce and fugitive methane emissions and vents, incorporating solar panels and wind energy to provide electricity, energy efficiency design should be incorporated as well. Any resudial GHG can be offsetted with natural climate solutions. Mat: Some companies like Statoil have mitigation processes to reduce emissions while oil drilling and one of them is to make sure

		engines used are up to standards and regularly maintained and it a high priority. Chi: It's important for regulators to implement national legislation which is a basis to hold companies to account for their actions.
Alexander	Comment: The KBA COMBO project: outcomes of these projects should not be isolated but disseminated. Use the outcomes for decision-making and try to find similar projects that have the same goals. During the implementation of the CONNECT project coordinated by WCMC, the terms of reference (TOR) for biodiversity portal were established and developed within the scope of this project. The TORs were used by the project so the portal can be updated - SIBMOZ. Regarding regulation, a new regulation for EIAs provided guidelines on how to develop and implement mitigation measures. The need to develop standard templates that should be used by reviewers of development projects and companies developing EIA reports. It helps to ensure the projects are fully complying with the guidelines of the EIA. New feature, creation of interaction platform between the bidders, department of environmental ministry and participation of provincial level department- to promote the use of digital platforms to grant environmental licenses and permits. This platform will allow them meet deadlines and have a real time view of the status of the project	
Rosana Francisco	Who does the cumulative impacts assessment ?	It is the regulator's responsibility to help build the picture assessing the cumulative impacts and with the help of the contractors they can establish baseline measures. There should be an environmental study to evaluate the impacts on society, green life, agriculture and so on, carried out by the government with the help of operators.

Fransisco	Regarding environmental mitigation, do you have specific criteria to establish the hierarchy of impacts in the oil and gas industry.	There are best practices guidelines developed by Cross Sector Initiative and IPEICA to help in applying the mitigation hierarchy. It has a project by project approach to determine the available options around to help in applying mitigation hierarchy- restoration, minimization and offsets. It is also governed by countries' legislation and some countries have determined areas that cannot be offset. The International Finance Group also provided criteria regarding critical habitats and how it could be defined. There are a lot of guidelines available and we will share it with you at the end.
Elji adrian	I'm seeking clarification on the influence area of the project in the diagram you represented where you had the operation and an unrelated facility. I see we have direct and indirect and cumulative impact. Do you have any specific criteria to establish the type of the impact or it is usually related to the area	Sharon: There will be land clearance that needs to happen because of the project and there will be disturbance to the species because of the noise and mortality could be. There will be direct impacts which are within the direct control of that operation associated depending on the type of operation. There will be indirect impacts associated with the infrastructure that's associated with your project. That could be associated with having an access near the habitat. Mat: The impact itself can happen directly or indirectly and comes down to how you manage it. Essentially because to deal with cumulative impacts, that requires collaboration with other actors to deal with those indirect impacts that need you to look beyond the project fence. Chi: I remember we also pointed out in the previous presentations you need to work with different sectors and authorities to analyze and get a better picture of all potential impacts.

	How can we protect threatened species within area which is influenced with the project	It depends on the species and the threat it faces, so if the species is threatened with the loss of the habitat you need to look at the design of the project. Sometimes it might be a disturbance and sometimes it's related to the time and the season for example, so you need to make sure when you are conducting the project. If that species is endemic and cannot live in a different area you need to consider that. So you need to figure out the type of species and identify the danger and then find the right approach.
Josimar Biosse - AQUA	We have discussed the smart criteria, is there any specific difference between the environmental monitoring carried out by the operator and the regulator?	The SMART criteria are universal and is applied to ensure the right biodiversity and it should be followed by the agency or the regulator. Sharon: I think there's an agreement how the monitoring plan should be implemented - by the regulators or the operators but I believe it depends on the country. In Norway, regulators don't do the monitoring, it's the operator. Integrated planning is required and is not only related to the petroleum sector. Marisol: Regulators and operators should agree on the terms of monitoring Mat: On a project in Tanzania, the monitoring can't be defined unless it is after the construction, and it depends on logistics. The consultant speaks with the contractors and defines the requirements. Academia can be involved in the monitoring. The World bank has sent specialists to conduct the monitoring.

		The agency should provide numbers to follow with the knowledge base.
Heles Francisco Adriano (environmental services agency from Nampola)	In the presentations you discussed the integrated plans. Which are the key conflicts raised by the concerned parties between the government, communities, and companies, any examples ?	Mat: The golden rule is to avoid any conflict with the local communities because it can get out of hand. To minimize the conflict with the community you need to collect all the right info. In Tanzania, there was a government pipeline and the people didn't see the benefit of the project and there were protests. Fishnets sometimes can be damaged. Marisol: EIA can prevent these conflicts of interests and also adopt a strategic planning process to provide an overall framework to guide and identify the no-go areas and which mitigation measures can be taken. The message: Offsets are at final steps of options, unlike what some regulators think if you applied the mitigation hierarchy, we could reach the offset as a final step. Sharon: The mitigation hierarchy provides examples of avoidance in designing projects and options like using helicopters instead of the roadways. http://www.csbi.org.uk/our-work/mitigation-hierarchy-guide/ How to apply concepts of the mitigation hierarchy: Matilde: You have to see the scoping, there are some measurements that can be done depending on the affected components to limit some of the procedures. You need to look at the picture early on.

	I would like to see how we can implement offsetting plans on the ground. I wonder if we can have info on what matrix that we can use.	Sharon: The challenge in biodiversity is that we don't have a single matrix and it depends on the element of the biodiversity. That's why the scoping to identify priorities is so important so you can collect the information and you set your target around that, so it is based on the biodiversity on the site. Here is another resource published by the industry which describes the potential environmental impact from upstream oil and gas industry, and the potential measures to prevent/mitigate these impacts: https://www.iogp.org/bookstore/product/environmental-management-in-the-upstream-oil-and-gas-industry/
Gastao Carlosos	According to the explanation of the categories, the category A+ is not applied yet in Mozambique, I want to know why and what efforts are made to implement this category.	Rosanna: A+ is not applied because of the defect. We need to engage independent experts and reviewers to provide a scientific opinion on the project and environmental impact assessment, so the government decides. The ministry needs the support of the external independent experts. For the time being we don't have regulations, but it is being drafted and the A+ category will be applied once we have the right regulations. Regarding A and A+, we will be facing residual impacts that will require offsetting measures. We, the managers of the process, are still acquiring the required skills. I've asked the question regarding the matrix because all the stakeholders and technical staff should have a deep understanding of the matrix, because if we needed to implement offsetting measures, we will be submitting suggestions and if we don't know what are we talking about, probably we will accept or reject a project without specific grounds, so this is also a learning process for managers.

	Chi: Can you share your view as a regulator on the mitigation methods chosen by operators. Mozambique is working on developing sensitivity mapping and it is important to identify the no go areas.	Matilde: Companies should provide the location, mitigation methods and alternatives. As authorities we should make sure that mangroves are not affected, and if not, we ask them to provide a good argument
	If you are drilling a well and it's under the mangrove like 2 km away you can do directional drilling so you don't harm the mangroves, it's done in different parts of the world.	
	Day 3	
Jamie Timoteo	1. As there is complication in gathering info in Mozambique, how can these techniques help us? 2. How can you create groups that finance these projects?	Joe: There are difficulties in developing these measures all over the world, so you need to talk with the authorities. Mat: I can't tell what happens in the different regions in Mozambique, but the take home for the meeting I did in the north of Mozambique there is a lot of data available either in academia or EIA's but there's a gap in the middle for sure. Alexander: The recent mapping conducted highlighted the project, and the project had 5 international mapping areas such biodiversity. We also had a lot of data from the university and institution where these studies were carried out. Regarding the environmental strategic assessments, the report of the coastal area was done by an impact company along with another company, there was a team from the government and another team. We did a consultation on national, and provisional scale

		For the funds, it was from the corporation's and the government also contributed. Matilde: To manage the data is very important as we struggled in Norway, so it is important to be managed sufficiently
Julieta Jetimane	I want to know a practical example when assessing the environmental sensitivity, What strategies can be implemented for exploration, as biodiversity can be affected.	Sensitivity mapping is a tool that can be used by regulators and developers to get the picture. It can be used as an additional resource for information. Afterwards you can apply the mitigation hierarchy, and you can avoid the area, if not you can apply the mitigation methods. If you are developing a pipeline for example you need to know what elements could be impacted. Sometimes there could be a disturbance but it can be restored, but if you destroy mangroves, that takes longer to restore. You need to consider susceptibility as well. Sensitivity mapping can help you make the decision, and you need to weigh in all the different components, mitigation measures and so on.
Mat:	We developed sensitivity mapping, should we incorporate socio-economic data	Joe: Yes, as it was mentioned in the presentation.
Josimar Biosse	What would be the best ways to start the process, and who updates the data in the maps. Can we integrate AI in sensitivity mapping? I still have question on the entity which is responsible to update	Norway's experience To manage data we need to integrate the operations, conducted every month in Norway, and the process is done in collaboration between different institutions. To update data, we have a national team that works on updating data in summer and other seasons. Protected areas are updated regularly. For AI, we use it in monitoring data in nature for example, it can be used onshore, in Norway for example we use predictive modes, we can do more in that field though and we are proposing to use it in different aspects and we are working on it.

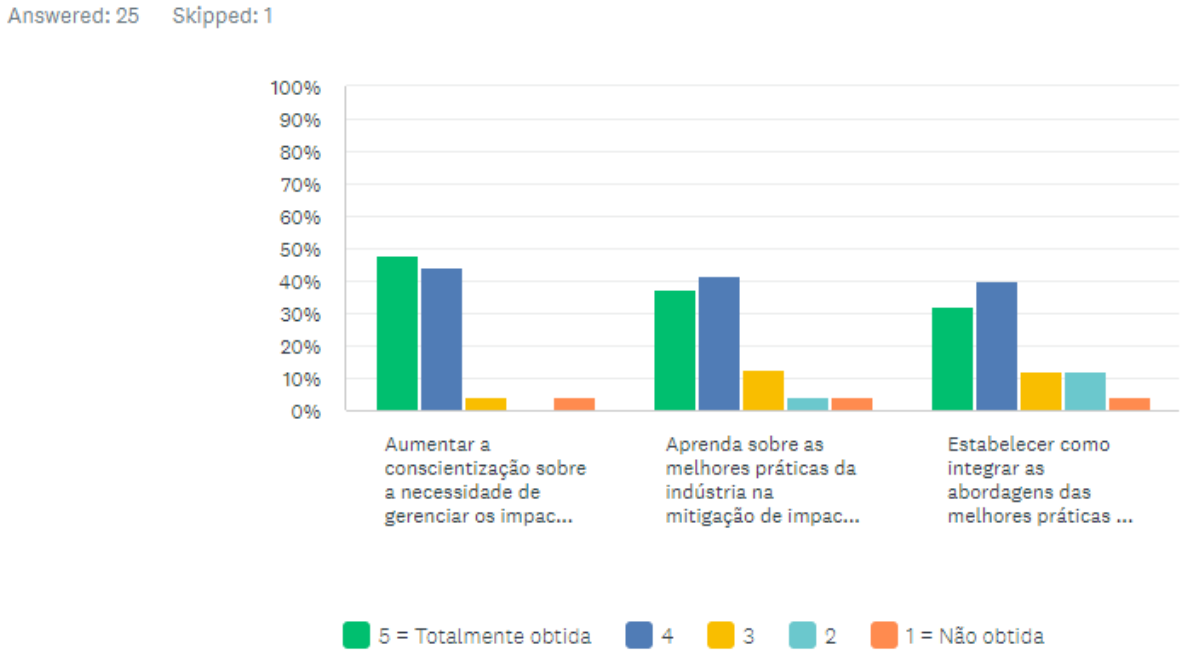
		We have research entities and environmental agencies and we have a budget to conduct the mapping, so we stick to the basic data and afterwards we process it. So, it is a collaboration between our organization and these organizations. Matilde: Can we say that the entity which owns the data is responsible for updating it? Lars: Yes, we expect them to update the data, but it can be difficult to do the processing. Lars: In Norway the data is owned by the country. So having open systems to exchange the info is very important, but it can be challenging in other countries.
Carlota	The project will be delayed, but I want to know will we be having the sensitivity map by the end of next year.	It's an exercise of the project, but it is not the objective to be used in oil and gas. The tool can be used in decision making and it can help in designing and for different environmental aspects.
	Regarding the data flow, we are doing a continuous process because nature changes as well, so we are still concluding the next steps.	The next step has not been planned because the current project has a limited budget. There are issues that require consultation and we need financing. We will be thinking about the tenders and we will take into consideration the spatial planning. We need to consider additional needs with the governmental institutions regarding financing and other aspects.

	Will the licensing data for the database be open for everyone?	It will be data based and we will have various subjects in that regard. The info will be available strictly for oil and gas and environmental entities. It will be restricted in the beginning for the oil and gas sector. We still haven't decided and the governmental authorities can provide it. So, we will try to share the info with the maximum number of users. And the plan for spatial administration will be for area of marines and fishing areas,
	How to evaluate the priorities and values of assets and what's more or less important based on the process of developing sensitivity mapping. Priorities should be made while setting up the project, and you need to consider that while working with the consultants.	We are still in the phase of background review, to key areas of biodiversity and ecosystems and we are still gathering information for various sectors, and afterwards we will identify the elements and indicators. The process is done by consultants and we are accompanying them.
Marisol	Can you comment on the coral reef area, are they less sensitive to oil spills as the groups mentioned?	Mat: It's true because oil floats, and from my experience in the gulf war oil spill the oil floats and moves to shores, but when there's a wind and movement and sand is mixed with oil it sinks and affects the coral reef. So it is less vulnerable to oil spills.
	It's important to distinguish between susceptibility and importance when you are classifying the different elements in mapping. It's not just about the data, but you need to know what to do and how you can use the data. For example, you can use it in contingency planning for oil spill, or the cleanup process and you can inform the responsible parties.	

Annex 2. Detailed results of Participants' Training Evaluations

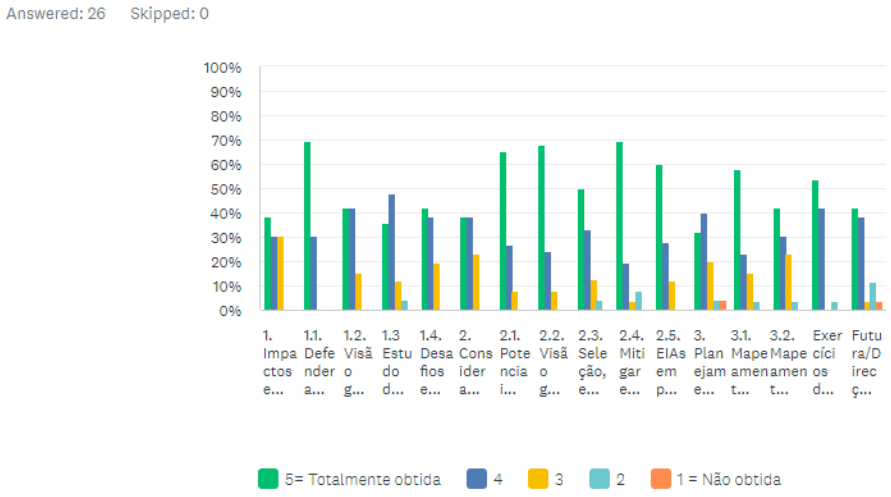
The majority of participants gave scores of 4/5 or 5/5 for meeting the set of learning objectives outlined by the training.

Fig 1. Participant Rating of Learning Objectives Met (score range of 1= not met to 5=fully met)



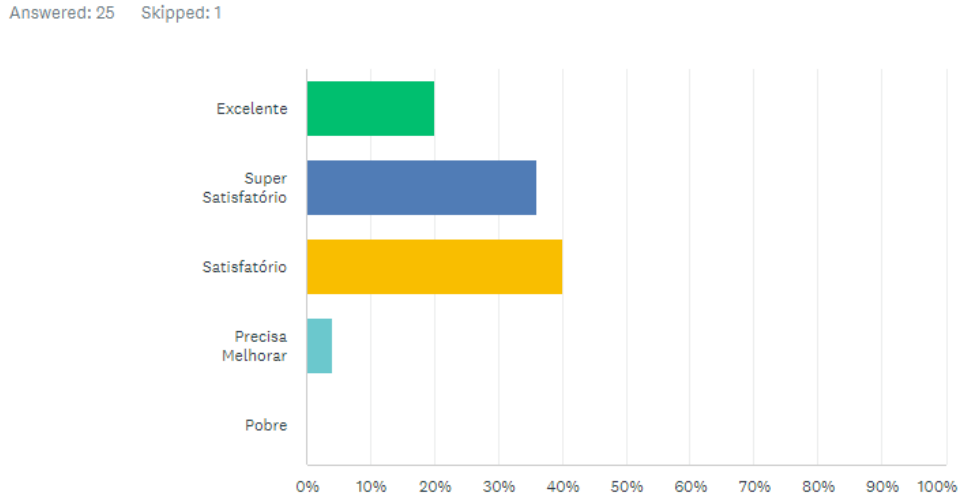
Participants were also asked to rate the extent to which individual Modules (1-3) including groupwork exercises, met their individual learning needs (score range of 1= not met to 5 = fully met). Most participants rated each Module 4/5 or 5/5 (Fig 2).

Fig 2. Participant Rating of each Module against their learning needs



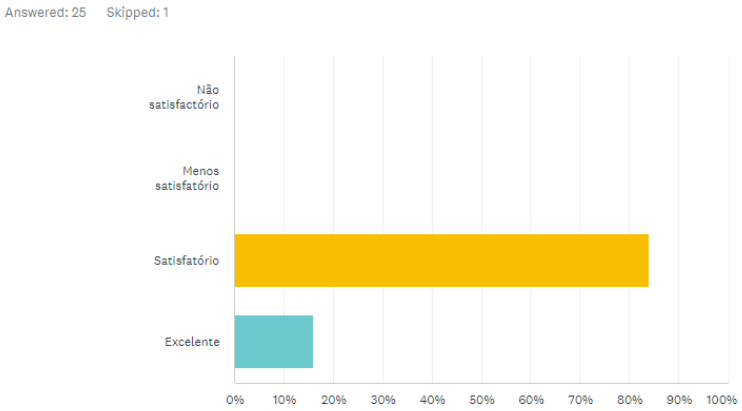
When asked to rate their overall satisfaction with the training, 20% of participants rated the training as 'excellent', 36% rated the training as 'highly satisfactory', 40% rated the training as 'satisfactory', and 4% indicated that it 'needs improvement'.

Figure 3. Participants' overall rating of training



Participants were also asked to rate their experience of having the training delivered online at the training venue in an in-classroom setting, and 16% of participants rated the training as 'excellent', and 84% rated the training as 'satisfactory'.

Figure 4. Participant Rating of online training delivery in in-classroom setting



Participants were also asked how they would apply knowledge gained from the training: 54% indicated that they would share workshop materials with colleagues, 50% indicated that they would organize a follow up meeting to share knowledge with colleagues who did not attend the training, 40% indicated they would apply knowledge in the review of SEAs/EIAs submitted by operators, and 19% indicated through other means.

Sharing training materials with other colleagues	14

Organizing a follow up meeting to share knowledge and training materials with other colleagues who could not attend this training	13
Reviews of SEAs/EIAs	11
Other	5

Table 5. Participants' feedback on the training

What did you like about the training? Which part of the training was most useful to you?	• Environmental Sensitivity Mapping • Approaches to the themes and practices of the exercises • Mitigation and sensitivity • The interaction was between the facilitators and the participants was good but I believe that the topics covered would require more time to better absorb what we were taught • The part of the training that I enjoyed and was most useful to me is the Environmental Sensitivity Mapping, because I realized that Environmental Sensitivity results from the combination between the importance of an asset and the susceptibility of it. • I learned the importance of biodiversity, how to avoid impacts in ecologically sensitive areas, the importance and sensitivity of ecological areas, which are the regions of greatest risk and where you can implement a project as well as the impactful density of the same project. • Know and learn how to use the mitigation hierarchy in order to reduce the impacts caused to the environment; to know the challenges encountered in the process of building infrastructures of the oil and gas industry, mapping of environmental sensitivity • Mapping and importance of environmental susceptibility • The way the training was given, the most ulterior part was the interaction between the speakers and the group, and the reflection exercises. • Impacts of oil and gas exploration projects in sensitive areas of high biodiversity, hierarchy of mitigation of impacts, and their monitoring, analysis of options for the best location of projects taking into account the sensitivity of the areas and the mapping of sensitive areas • I liked the Participatory Approach. The information on the mapping of environmental sensitivity was more useful • The issue of biodiversity • Yes. The part of the exercises to see the consolidation of the contents • Development of Sensitivities maps • THE IMPACTS ON THE DIFFERENT PHASES OF THE UPSTREAM OPERATIONS LIFECYCLE

	• Interactivity; hybrid model; practicity (exercises); sensitivity mapping and information on environmental data acquisition and management • I generally enjoyed the whole training process. For me everything was very useful, because I have just been framed in the Regional Center of Excellence in Oil and Gas Engineering of the Eduardo Mondlane University. This training served as induction • Smart assessment criteria, mitigation hierarchy and the need to map sensitive areas of biodiversity and to carry out baseline studies • Apply the Impact Mitigation Hierarchy, Environmental Sensitivity Mapping, Basic Assessment and Environmental Asset Issues • DEFINITION OF PRIORITIES WHEN DETERMINING SENSITIVE AREAS • All themes presented • All. with emphasis on the practical work in the mitigation hierarchy component • Others responded 'all' or left the response blank.
Which session or part of the workshop did you find least useful, and why?	• Overall none. But the part of the disappearance of a tablet of a colleague, was very negative. • All were helpful • Some topics have been treated in a superficial way, especially for those who do not have much basic knowledge about the matter, especially with regard to sensitive habitats. • No part or session of the workshop I found less important, because all subjects covered are important • None of them, therefore, all form a thousand wonders and I would like to be formed more often by this team. • THERE WAS NO LESS USEFUL PART • Honestly speaking, all the training was helpful to me because I was working at the Centre I mentioned earlier. • did not have • I did not find a session or part of the workshop less useful, because I had a unique opportunity and for the first time I had the opportunity to know aspects about oil and gas operations in very sensitive areas, and their integration in the aspects related to biodiversity management. • All had their importance for my learning of the subject in question • I didn't think so, everything was helpful • acquisition of knowledge has always been a gain for the better. • Other participants responded "none", "all was useful" or left the response blank
What do you think could be improved?	• The linguistic barrier at some point made those present a little shy, that the presentations were in Portuguese including the slides, could bring more examples of how we can overcome the difficulties that may be faced in the field. • I would like us to have face-to-face and experience in practice

	• It seems to be in a good pattern. • more judicious approach in the decommissioning phase • It is important that participants take a hands-on class on the subject. • "That more training time is needed to absorb and learn well the type of information that was passed to us, With regard to the presentations of the exercises in group the ideal would be that all groups present or at least send the work and only then the facilitator could make the correction of the exercise. Thus avoiding a copy in the replies " • Logistics (the airport transportation round trip we did not have, allowances not well clarified), field work should exist and manuals on training. • The safety in the training site is to send more material for our reading, as well as to give more application exercises to better fix the contents. The next formation should last longer as 10 business days. • In my opinion it would be even better if the training happened in person, the interaction between the participants and organizers would be much better • "Output to the field Supply of Logistics Manuals" • We can have more time, 3 days is very tight, and maybe some field visits, for practical classes. • The logistics were not efficient because it did not give all the necessary information to the participants, which created in a way a certain discomfort especially for the participants from out of town. A logistics technician could have been appointed to explain all matters related to logistics to the participants, especially those from outside Maputo. For me, to reach the excellent level the trainers i.e. the course should be presential to ensure a direct accompaniment mainly for the practical work as an example of the process of elaboration of sensitivity maps, however the course was super satisfactory, that there are more similar to support the technicians who analyze the EIAS. • Logistic organization related to simultaneous translation. • Face-to-face training as it helps to improve interaction with trainers and gain more knowledge about oil and gas issues. • Timely sharing of didactic material • For me everything was good, the organization and teaching methodology was good • It is necessary to present increasingly specific and current content. Greater focus on new technologies. • Quality of the Internet signal, the level of security of the goods of the participants, pay equal attention to all. • But examples of countries that are already implementing the process of biodiversity offsetting, once in our country are not yet implementing. • "sending the training course material in a timely manner;

	• The logistics for participants outside the venue (transport, accommodation, food and ADS, in my humble opinion, should be taken care of by UNEP directly, that is, from its headquarters, by the experience of this course); • add up a variant of exchange of experiences for the top 2 groups (as a prize)." • They are on a good path • Availability of thematic material in a timely manner, better logistical articulation of all participants, through identification badges, as well as the clarity of the logistics of the participants coming outside the venue of the event. • In my humble assessment, in the online situation, practical examples should be a more visualizada.as experiences should be shared in a strand of the mitigation hierarchy image.

Annex 3. Training Programme

Training Programme

Timing	Module	Session	Presenters
Day 1, 26 October			
Pre-training preparations (Individual time requirement: 2 hours maximum) Nominated participants are asked to (i) fill in the Training Needs Assessment online survey before 22 October (here) (ii) undertake an online baseline knowledge assessment by 24 October (here) (iii) watch 1 lecture video which provides an initial overview of biodiversity considerations in upstream oil and gas operations here Completion of pre-training assignments is also a requirement for obtaining a UNEP Training Course Completion Certificate			
08:30	Participants log in		
09:00	Welcome Remarks & Introductions Course Overview		Mr. Jan Eriksen, Counsellor, Embassy of Norway DINAB UNEP: Marisol Estrella
09:30	Module 1: Impacts and business case for mitigation	1.1 Making the case for biodiversity and ecosystem services in the context of oil and gas"	UNEP: Matt Richmond UNEP-WCMC: Sharon Brooks & Joe Turner

10:30	*Tea/Coffee break*		
10:45	Module 1: Impacts and business case for mitigation	1.2 Industry overview of the upstream oil and gas sector	IPIECA: tbc
12:00	*Lunch break*		
13:00		Icebreaker questions	UNEP: Chidinma Zik-Ikeorha
13:15		1.4 Potential impacts on biodiversity and ecosystem services from oil and gas development through the project life-cycle	UNEP: Matt Richmond
14:00	Introduction to Module 2: Biodiversity impacts of the oil and gas sector	2.1 Overview of ESIA and mitigation hierarchy	UNEP: Matt Richmond
14:30	Team Reflections End of Day 2		
Day 2, 27 October			
08:30	Participants log in		
08:45	Participants led Recap of Day 1 Online Quiz		UNEP: Chidinma Zik-Ikeorha
09:15	Module 2: Biodiversity considerations at the project-level	2.2 Screening, scoping and biodiversity baselines	UNEP-WCMC: Joe Turner
10:00	*Tea/Coffee break*		
10:15	Module 2: Biodiversity considerations at the project-level	2.3 Mitigating and monitoring biodiversity impacts	UNEP-WCMC: Luca Koerner NEA: Mathilde Juel Lind
11:00		2.4 EIAs in practice in Mozambique DINAB	DINAB
11:45		2.5. EIA exercise	UNEP: Chidinma Zik-Ikeorha & Matt Richmond UNEP-WCMC: Joe Turner & Luca Koerner
12:30	*Lunch break*		
13:30	Module 2: Biodiversity considerations at the project-level	2.5. EIA exercise cont'd Report back	UNEP: Chidinma Zik-Ikeorha & Matt Richmond

14:30	Team Reflections End of Day 2		UNEP: Chidinma Zik-Ikeorha
Day 3, 28 October			
08:30	Participants log in		
08:45	Participants led Recap of Day 2		UNEP: Chidinma Zik-Ikeorha
09:15	Module 3. Planning for oil and gas development	3.1. Environmental sensitivity mapping in the context of area-based planning	UNEP-WCMC: Joe Turner
10:15	*Tea/Coffee break*		
10:30		3.2. Environmental sensitivity mapping in practice	UNEP-WCMC: Joe Turner NEA: Ragnvald Larsen INP
12:30	*Lunch break*		
13:30		3.3. Environmental Sensitivity Mapping Group Exercise	UNEP: Chidinma Zik-Ikeorha & Matt Richmond UNEP-WCMC: Joe Turner & Luca Koerner
15:00	*Tea/Coffee break*		
15 :15	Action planning Group discussions and reflection from the training. Follow-up task to be determined to ensure concepts and actions are being integrated after the training (e.g. progress report)		UNEP: Chidinma Zik-Ikeorha
16:00	Wrap Up Session: • Final Knowledge Assessments online • Online training evaluation • Recognition of Teams for High Achievement Closing Remarks		UNEP: Chidinma Zik-Ikeorha

Annex 4. List of Participants

N.	Name	Institution	Gender	Email
National Government				
1	Rosana Luis Francisco	Ministerio da Terra e Ambiente -DINAB/DLA	F	
2	Nehemias Mungoi	Ministerio da Terra e Ambiente -DINAB/DLA	M	

3	Alexandre Bartolomeu	Ministerio da Terra e Ambiente -DINAB/DGA	M	
4	Felicio Fernando	Ministerio da Terra e Ambiente -DINAB/DGR	M	
5	Margarida Mabjaia	Ministerio da Terra e Ambiente - DINAB/DAA/DLA	F	
6	Nuria Falume	Ministerio da Terra e Ambiente -DINAB/DGR	M	
7	Ligia Chamo	Ministerio da Terra e Ambiente - DINAB/DAA/DGCB	F	
8	Fatima Ali Uacheque	Ministerio da Terra e Ambiente -DINAF	F	
9	Gold Chinder	Ministerio da Terra e Ambiente -ANAC	M	
10	Josimar Biosse	Ministerio da Terra e Ambiente -AQUA	F	
11	Eusebio Nazario Mbaua	Ministerio da Terra e Ambiente -ITA	M	
12	Jaime Timoteo	DNGM- MIREME	M	
13	Paulino Costa Bzintonga	IGREME - MIREME	M	
14	Fernanada Cossa	ENH- Empresa Nacional de Hidrocarbonetos- MIREME	F	
15	Abelina Chambule	INP- Instituto Nacional de Petroleo- MIREME	F	
16	Guilhermina Honwana	INP- Instituto Nacional de Petroleo- MIREME	F	
17	Milton Zibane	INP- Instituto Nacional de Petroleo- MIREME	M	
18	Velasco Mahanjane	INGD - Instituto Nacional de Gestao de Desastres	M	

19	Maria Arminda Mlauze	INAMAR - MTC	F	
20	Aurelio Sadiana	INAMAR - MTC	M	
21	Paulo jose Sigauque	INAHINA -MTC	M	
22	Rafael de Morais	IDEPA -MMAIP	M	
23	Carlota Amoda	IIP-Instituto de Investigacao Pesqueira -MMAIP	F	
24	Rosario Viador	IIP-Instituto de Investigacao Pesqueira -MMAIP	M	
25	Nicolau Mutambe	UEM	M	
26	Absalão Alberto Machava	UEM	M	
27	Julieta Jetimane	CONSULTEC , LDA	F	
28	Jose Tiburcio Paulino	RMS CONSULTORES	M	
29	Augusto Assane	Servico Provincial do Ambiente -Cabo Delgado	M	
30	Hales Adriano	Servico Provincial do Ambiente -Nampula	M	
31	Gestao Portugal	Servico Provincial do Ambiente -Zambezia	M	
32	Cesário José	Servico Provincial do Ambiente -Sofala	M	
33	Afonsina Fernando	Servico Provincial do Ambiente -Inhambane	F	
34	Natercia Cuna	Servico Provincial do Ambiente -Gaza	F	

35	Joao Tsembane	Servico Provincial do Ambiente -Maputo	M	

Resource Persons

Name	Institution	Contact
Mathilde Juel Lind	NEA	
Ragnvald Larsen		
Sharon Brooks	UNEP-WCMC	
Joe Turner		
Luca Koerner		
Artemis Kostareli	IPIECA	
Madeleine Gray		
Matthew Richmond	UNEP	
Marisol Estrella		
Chidinma Zik-Ikeorha		
Kareiman Altayeb		

Annex 5. Group work I Submissions

TEAM 1

Members: Guilhermina Honwana; Augusto Assane; Heles Francisco Adriano; Paulino Chagunda; Milton Zibane

Local Selecionado	Componentes da Biodiversidade ou serviços ecossistémicos	Descrição dos impactos Chave	Potenciais medidas
B2	Mangal degradado	Aumento da pressão sobre o mangal degradado (para o uso da biomassa, construção)	• Evitar (Preservação do mangal, proibição do uso de recursos do mangal) • Minimizar (Criação de Planos de maneio e programas de educação ambiental) • Restaurar (Repovoamento do mangal) • Compensar (criar e expandir a area do mangal)
	Vegetação arbustiva (*Shrubland*)	Restrição do uso de recursos naturais pelas comunidades e do exercício da actividade de pastagem do gado	• Evitar o corte da vegetação arbustiva (em particular especies ameacadas) • Minimizar o *footprint* das instalações do acampamento, plataforma e vias de acesso • Reabilitar a área após as actividades de perfuração
	Lagoas	Poluição, sobrexploração de recursos hídricos superficiais, assoreamento	• Preservação da lagoa • Planear actividades de perfuração de forma que não crie impactos na lagoa (usar outras fontes de água para as actividades e planificar as rotas de acesso) • Gestão de resíduos sólidos e dos fluídos da perfuração

TEAM 2

Members: Natercia Cuna (SPA-Gaza); Afosina Fernando (SPA-Inhambe); Rosana Francisco (DINAB); Alexandre Bartolomeu (DINAB)

Locais selecionados	Componentes da biodiversidade ou serviços ecossistêmicos	Descrição dos impactos chave	Potenciais medidas de mitigação
B2 Justificacao: Na area de influencia directa do projecto temos um mangal degradado, que ja deixou de fornecer os servicos ecossistermicos (habitats viavel, alimentacao, local de reproducao de especies marinhas)	✓ mangal degradado, ✓ servicos ecossistermicos (habitats, alimentacao, local de reproducao de especies marinhas)	✓ Lamas de prefuracao ✓ Desmatamento ✓ Aumento da pressao sobre o mangal ✓ Aberturas de vias de acesso ✓ Residuos solidos	✓ Cortar a vegetacao em locais inevitaveis ✓ Tratamento das Lamas de prefuracao antes do destino final ✓ Fazer repovoamento do mangal ✓ Boa gestao dos Residuos solidos

A1	A2	B1	B2
1. Area marinha 2. Proxima a area da pesca artesanal 3. Proxima a rota de megracao de baleias 4. Proxima area de nidificacao das tartarugas	1. Area marinha 2. Proxima a area da pesca artesanal 3. Proxima a rota de megracao de baleias 4. Proxima area de nidificacao das tartarugas 5. Dentro da area de proteccao marinha 6. Proximo de recifes de corais (area de inflencia indirecta) 7. Proxima a zona de turismo	1. Area costeira 2. Dentro da zona de turismo intenso 3. Cobertura arbustiva 4. Proxima da cidade 5.	1. Area costeira 2. Proximo de mangal degradado

TEAM 3

Members: José Paulino-RMS Consultores; Aurélio Sadiana-INAMAR; Gastão Portugal-SPA; Aurora Sousa-AQUA

Respostas do questionário 2

1. A área escolhida pelo grupo 3 para a implantação da plataforma é a área de pastagem do gado pela população.

a) Impactos resultantes: Perda da vegetação importante para a alimentação dos animais incluindo algumas espécies como minhocas no solo;

b) Redução da reprodução dos mesmos animais e morte de alguns animais por falta do pasto;

c) Redução da evapotranspiração e consequentemente o manifestação de microclimas secos e redução da precipitação;

2. As medidas de mitigação para cada impacto são:

a) Colocar o gado em estábulos e produzir a sua alimentação numa área de produção agrícola e transferir para o estábulo para a sua alimentação; a empresa deve apoiar a comunidade com a tecnologia de produção de ração;

b) Fornecer ração com mais nutrientes principalmente para os machos para estarem em condições de acasalar várias fêmeas e aumentar a reprodução em curto espaço de tempo;

c) Após a implantação da plataforma deve-se efectuar o replanto de espécies vegetais em volta da área ocupada pelo empreendimento para servir como pulmão verde e igualmente para regeneração de algumas espécies animais;

d) A empresa deve efectuar a compra de carbono, isto vai obrigar a mesma a trabalhar com a comunidade para o reflorestamento de várias áreas para ter uma imagem excelente.

TEAM 4

Members: Rosário Viador; Paulo Jose Sigaque; Carlota Amoda; Julieta Jetimane; Eusébio Nazario Mbaua

O grupo escolheu a area B2, por considerar que os impactos são menores em relação as outras areas e são de facil mitigação.

Locais selecionados	Componentes da biodiversidade ou serviços ecossistêmicos	Descrição dos impactos chave	Potenciais medidas de mitigação
B2	Mangal degradado; Mangal não degradado;	• Perda de servicos de proteção a costa; Destruição do habitat de algumas especies marinhas; Perda da fauna do mangal.	Restrigir o desmatamento do magal e implementar programas de reflorestamento do mangal degradado;
	Floresta Arbustiva	• Migração de especies faunisticas;	Monitorar a presença e expancao de especies da flora dentro da area do projecto
	Area de proteção marinha	• Perda de servicos ecosistemicos	Programa de recuperação das areas degradadas
	Turismo	• Alteração paisagistica	Estabelecer horarios de navegação que possam causar uma minima pertubacao aos turistas

TEAM 5

Members: Cesário Fernandes; Fernanda Cossa; Margarida Mabjaia; Nehemias Mungoi; Arminda Mlauze

Escolha da opcao B2:

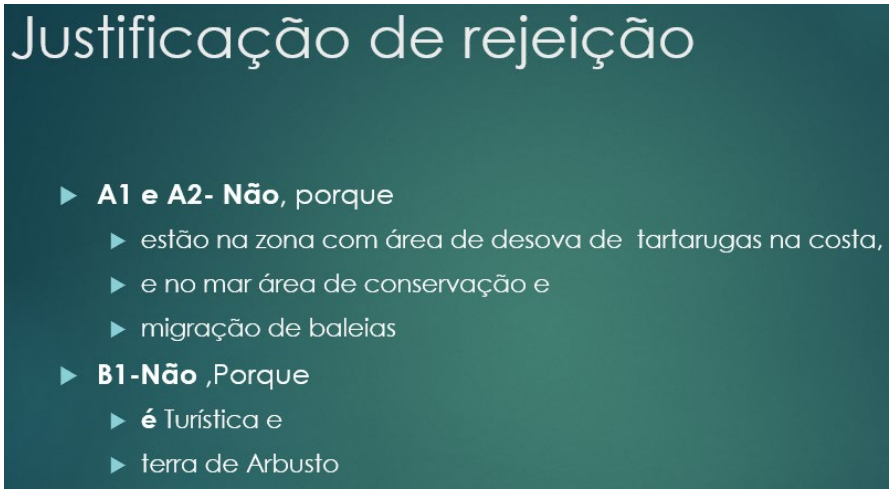
- Mangal degradado.

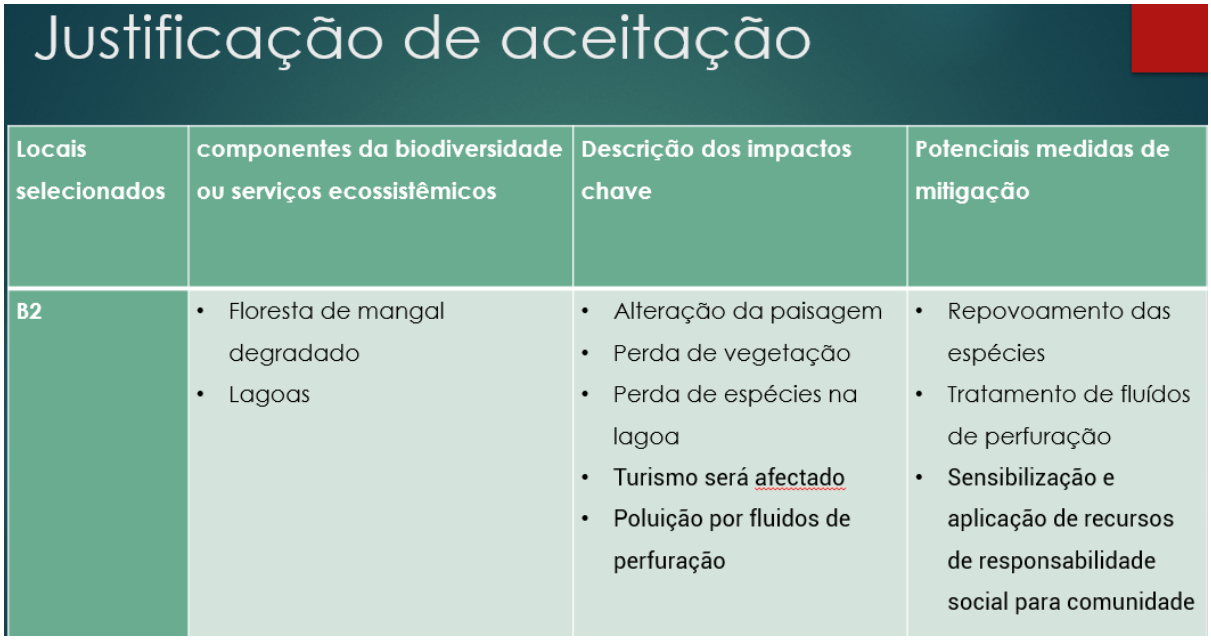
Locais selecionados	componentes da biodiversidade ou serviços ecossistémicos	Descrição dos impactoschave	Potenciais medidas de mitigação
B2	Mangal degradado	Remoção parcial do mangal degradado	Remoção do mangal no local da implantação da plataforma de perfuração
		Agravamento da degradação da área do mangal	Restauração da vegetação (mangal) da área remanescente
		Impacto social: Acesso restrito a comunidade as actividades complementares da pesca	Criação de alternativas para as comunidades pesqueira; Reaproveitamento dos restolhos do mangal para lenha, material de

			construção, etc.

TEAM 6

Members: Nuria Falume; Ligia Filomena; Josimar Biosse; Felicio Fernando; Celia Tafa





TEAM 7

Members: Jaime Rofasse Timóteo; Rafael De Morais; Absalão Machava; Velasto Mahanjane; Gold Bento

Locais selecionados	componentes da biodiversidade ou serviços ecossistêmicos	Descrição dos impactos chave	Potenciais medidas de mitigação

B2	Os componentes da biodiversidade a serem afectados pela plataforma de perfuração são: o mangal (apesar de o mesmo já se apresentar degradado) e a floresta matagal. A degradação da floresta do mangal, pode comprometer a reprodução das espécies marinhas (cadeia alimentar), pode igualmente ternar a área susceptivel a erosão e outros eventos climáticos extremos.	Remocao da vegetação que vai implicar na fragmentação do habitat e consequentemente perda de espécies -Presenca humana -Uso de equipamento pesado	Mapeamento e classificação de espécies; Controlo e redução de emissão de efluentes e ruídos; Campanhas de sensibilização no âmbito de proteccao de espécies locais

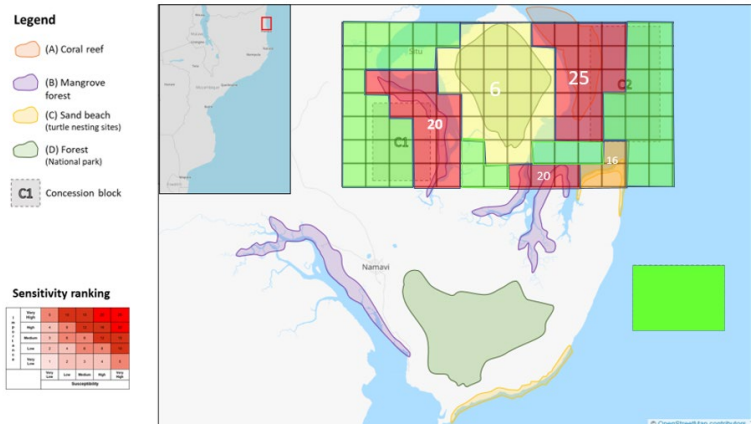
Annex 5b. Group work II Submissions

TEAM 1

Bens ecológicos	Classificação de importância	Razão
Recife de coral	5	• Chave de biodiversidade, habitat • fornecendo locais para a alimentação dos peixes dos quais a comunidade pesqueira local depende (e um bem ecológico com grande importancia para actividade socio-economica)
Manguezal	5	• bem ecologico, habitat de ecossistemas e biodiversidade, • fornece protecao natural contra eventos climáticos extremos • activo socio económico
Praia de areia (nidificação de tartarugas)	4	• Local desprotegido, • Local de nidificação de um espécie em perigo
Floresta (Parque Nacional)	3	• Abriga especies protegidas • Protegido ao abrigo da lei

Bens ecológicos	Classificação de suscetibilidade	Classificação de importância (da Parte 1)	Classificação de sensibilidade
Recife de coral	5 (muito alta)	5	25
Manguezal	5 (muito alto)	4	20
Praia de areia (nidificação de tartarugas)	4 (alta)	4	16
Floresta (Parque Nacional)	2 (muito baixa)	3	6

Tabela 2: Classificação de susceptibilidade por bem ecológico



Resultados sobre sensibilidade

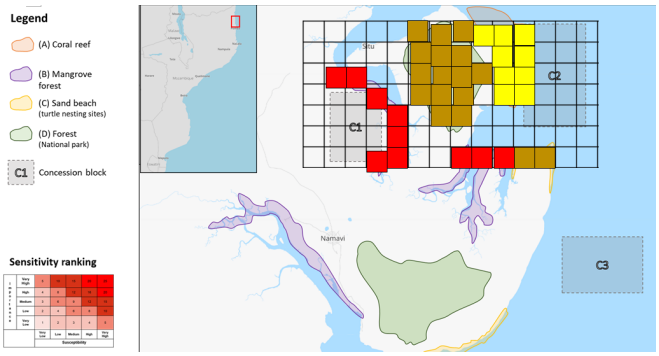
- Bloco C3 esta livre de estudos especializados
- Blocos C1 e C2 carecem de estudos especializados para planos de gestao da biodiversidade (existencia de Parque Nacional, Mangais, Recifes de corais e local de nidificacao de tatarugas

TEAM 2

Bensecológicos	Classificação de importância	Razão
Recife de coral	4	De princípio, as gotículas resultante do uso de dispersante químicos no mar e processo normal de sedimentação pode atingir os recifes. O processo de recuperação natural leva o seu tempo comprementendo os serviços ecossistermicos
Manguezal	5	Uma vez poluído tempo de recuperação e mínimo que varia de 25 a 50 anos o que compromete a contribuição dos serviços prestados para funções ecológicas e para sócio economia. Dai seja necessário mapear os locais que ocorrem os mangais em todas costa moçambicana de forma a proteger as barreiras físicas (boons)
Praia de areia (nidificação de tartarugas)	2	Admissivel que a mancha de petróleo atinja as praias de areias finas colocando em risco o proceso de nidificação das tartarugas marinhas
Floresta (Parque Nacional)	1	Localizado em terra (zona costeira). Pode ser impactada por óleo de petróleo em eventos extremos. O período de recuperação em variável passível de medidas de mitigação (limpeza ou bioremediaçao)

Bensecológicos	Classificação de suscetibilidade	Classificação de importância (da Parte 1)	Classificação de sensibilidade
Recife de coral	2 (baixo)	5	10
Manguezal	5 (muito alto)	5	25
Praia de areia (nidificação de tartarugas)	3 (média)	3	9
Floresta (Parque Nacional)	4 (Alta)	1	4

Tabela2: Classificação de susceptibilidade por bemecológico

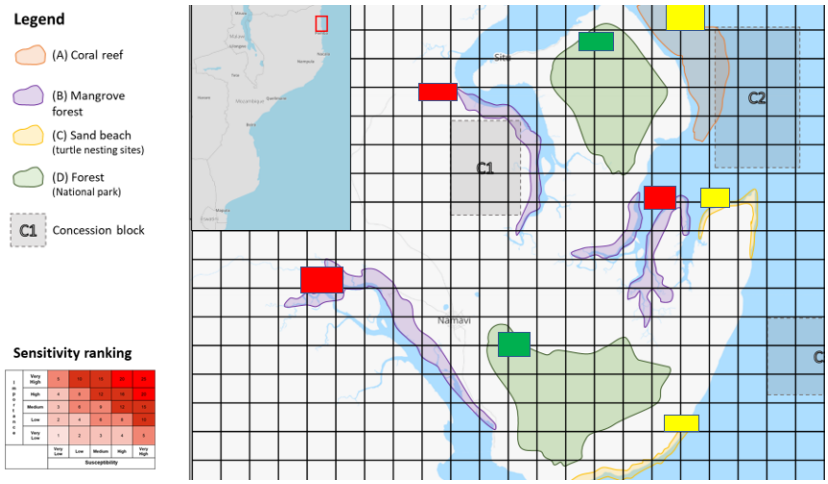


TEAM 3

Bens ecológicos	Classificação de importância	Razão
Recife de coral	3	Serve habitat, fonte de alimentação e área de reprodução dos peixes. E a área rica em pescado para a população daquela região que depende muito destes recursos, protegem as comunidades costeiras de surtos de tempestades e erosão das ondas, e uma região importante para o turismo e recreação, são armários de remédios da terra antivirais como anticancerígenos, são também importantes locais de herança cultural.
Manguezal	5	Serve como barreira para efeitos catastróficos dos eventos extremos. Vão impedir as inundações costeiras e em períodos de ciclone podem reduzir os efeitos deste evento. São locais de reprodução de crustáceos, assim como evita a erosão nas zonas costeiras, efetua o sequestro de carbono e regula o clima contribuindo para a ocorrência da precipitação continua.
Praia de areia (nidificação de tartarugas)	3	Serve para a reprodução das tartarugas que são espécies ameaçadas, portanto, e imperioso que esta zona seja muito protegida para evitar a destruição dos ninhos das tartarugas e fatalidade das mesmas.
Floresta (Parque Nacional)	2	Habitat para várias espécies animais e vegetais, fonte de sequestro de carbono e emissão de oxigénio, região de evapotranspiração e regulamento climático, proteção dos solos contra erosão, região de solos bastante férteis e também são regiões de proteção de espécies ameaçadas, área de produção de economia através do turismo, fonte primária de subsistência e manutenção de vida (fornecem alimentos, equilibram a temperatura e controlam o efeito de estufa).

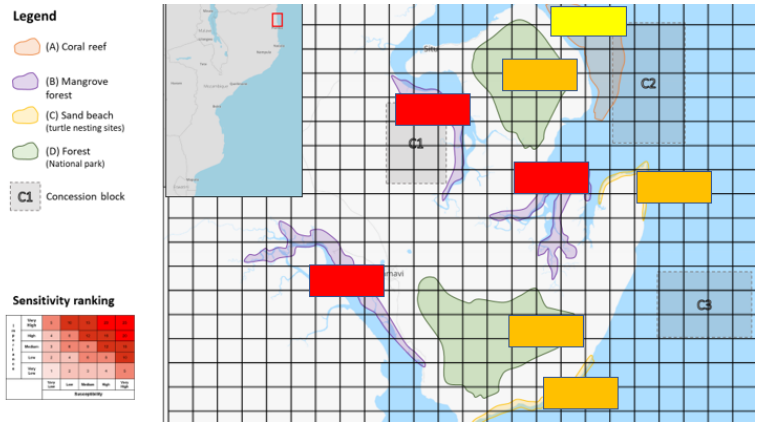
Bens ecológicos	Classificação de suscetibilidade	Classificação de importância (da Parte 1)	Classificação de sensibilidade
Recife de coral	3	5	8
Manguezal	5	20	25
Praia de areia (nidificação de tartarugas)	3	8	11
Floresta (Parque Nacional)	2	5	7

Tabela 2: Classificação de susceptibilidade por bem ecológico



TEAM 4

Bens ecológicos	Classificação de importância	Razão
Recife de coral	5	Habitat para algumas espécies Atração turística para mergulho Elevada diversidade de espécies (área chave da biodiversidade)
Manguezal	5	Proteção costeira Bercário e Habitats de espécies
Praia de areia (nidificação de tartarugas)	5	Local de nidificação de espécies ameaçadas Potencial turístico
Floresta (Parque Nacional)	4	Importância na proteção Ambiental sobre efeitos de mudanças climáticas; Conservação de espécies



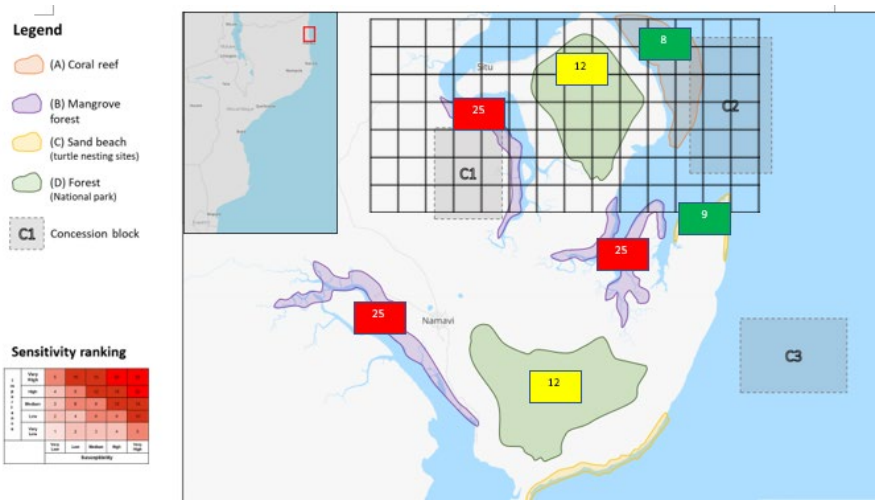
Bens ecológicos	Classificação de suscetibilidade	Classificação de importância (da Parte 1)	Classificação de sensibilidade
Recife de coral	2 (baixo)	5	10
Manguezal	5 (muito alto)	5	25
Praia de areia (nidificação de tartarugas)	3 (média)	5	15
Floresta (Parque Nacional)	4 (Alta)	4	16

TEAM 5

Bens ecológicos	Classificação de importância	Razão
Recife de coral	4	Grau de importância alto, porque é fonte de alimentação de peixes.
Manguezal	5	Porque fornece protecção as comunidades próximas contra eventos climáticos e outras funções ecológicas
Praia de areia (nidificação de tartarugas)	3	Por servir apenas como área de nidificação das tartarugas e de lazer.

Floresta (Parque Nacional)	3	Abriga pelo menos uma espécie ameaçada e outros serviços ecossistémicos

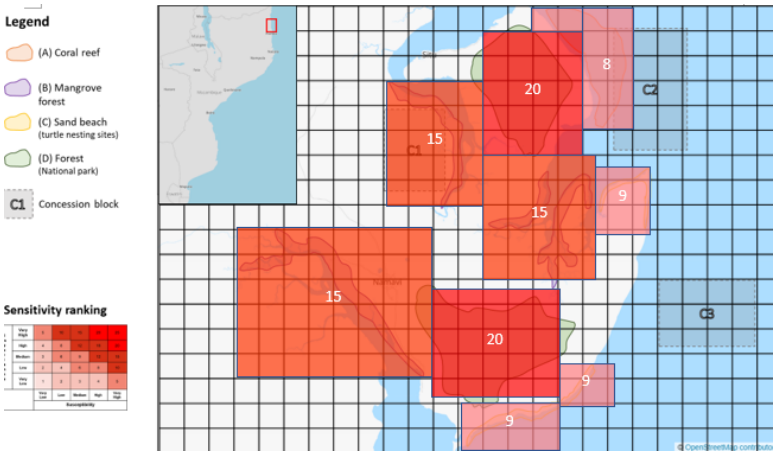
Bens ecológicos	**Classificação de suscetibilidade**	**Classificação de importância (da Parte 1)**	**Classificação de sensibilidade**
Recife de coral	2 (baixo)	4	8
Manguezal	5 (muito alto)	5	25
Praia de areia (nidificação de tartarugas)	3 (média)	3	9
Floresta (Parque Nacional)	4 (Alta)	3	12



TEAM 6

Bens ecológicos	Classificação de importância	Razão
Recife de coral	4	Os recifes de coral fornecem os terrenos de desova e viveiro que as populações de peixes economicamente importantes precisam para prosperar. Os recifes de coral ajudam a proteger as comunidades costeiras dos

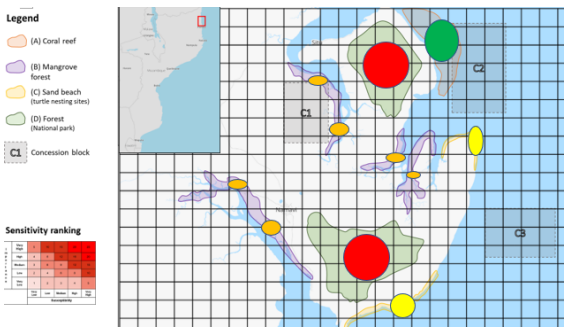
		surtos de tempestades e a erosão das ondas, que provavelmente aumentarão em face do aumento do nível do mar. Até 50% de nossos recifes de coral já foram perdidos. De acordo com relatórios recentes do Painel Intergovernamental sobre Mudanças Climáticas (IPCC), até 90% dos recifes de coral podem ser perdidos até 2050
Manguezal	3	é fundamental para o equilíbrio ecológico. Devido a sua grande biodiversidade, essas áreas são grandes berçários naturais para aves, peixes, moluscos e crustáceos, sendo um dos ecossistemas mais importantes do planeta. Protecção contra a erosão costeira.
Praia de areia (nidificação de tartarugas)	3	As tartarugas marinhas são muito importantes para os ecossistemas marinhos,pois são fonte de alimento para diversos animais, são consumidores de organismos marinhos e servem como substrato para outras espécies, ou seja, outros organismos podem viver sobre as tartarugas, como por exemplo as cracas e plantas que são encontradas sobre o casco.
Floresta (Parque Nacional)	5	Esta Floresta contem especieis ameacadas, factor este importante na sua definicao como area chave de biodiversidade. compreende o contributo do turismo para o desenvolvimento local sustentável e consequente melhoria da qualidade de vida das comunidades. E uma area de protecao formal. Local de bens históricos e culturais.



TEAM 7

Bens ecológicos	Classificação de importância	Razão
Recife de coral	3	Apesar de ser um activo com valor funcional para o ecossistema e para a comunidade se, é possível fazer sua transferência para outro local
Mangal	3.5	É um activo extremamente sensível e protegido pela legislação nacional e internacional
Praia de areia (nidificação de tartarugas)	4	Além de ser um hábitat sensível faz parte da rota migratória desta espécie, sendo que a sua perturbação iria reduzir ou extinguir a sua população
Floresta (Parque Nacional)	5	São áreas de máxima protecção a nível da legislação nacional

Bens ecológicos	**Classificação de suscetibilidade**	**Classificação de importância (da Parte 1)**	**Classificação de sensibilidade**
Recife de coral	2 (baixo)	4	8
Manguezal	5 (muito alto)	3	15
Praia de areia (nidificação de tartarugas)	3 (média)	3	9
Floresta (Parque Nacional)	4 (Alta)	5	20



Annex 6. ACTION PLANS

TEAM 1

Desafio prioritário para acção	Esforços Actuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
1. Planear as actividades do sector (concessão de áreas de prospecção e pesquisa) tendo em conta as questões de biodiversidade, e áreas ambientalmente sensíveis/vulneráveis	• mapeamento de areas ambientalmente vulneraveis/ sensiveis • Em curso a consulta e colheita de informação • Consulta a diferentes stakeholders e instituições relevantes para a colheita de informação	• Formação técnica para colheita de informação uso e actualização da base de dados ambientais alvos • Partilha da informação de domínio publico	INP ponto focal, MTA (ANAC, DINAB), MIMAIP, Instituto Nacional de Pesca Cena carta ONG's

TEAM 2

Desafio prioritário para acção	Esforços Actuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
Elaboracao de Atlas de Mapas de Sensibilidade Ambiental da Zona Costeira	Elaborado o esboco do mapa estrategico, no ambito projecto da autoestrada maritima (marine highway) no oceano indico	1. Consolidar o mapa estrategico; 2. Elaborar mapas tacticos 3. Elaborar mapa operational 4. Capacitacao tecnico institucional	INAMAR DIPOL MTA-DNAB INAHINA INP Academias

TEAM 3

Desafio prioritário para ação	Esforços Atuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
1. Fase de descom issionamento dos pocos abandonados	Mapeamento dos pocos abandonados	Continuacao do mapeamento dos pocos abandonados permanentemente e temporariamente em todo territorio nacional em particular na zona de Pande e Temane (Bacia de Mocambique)	Inspeccao Geral / INP

TEAM 4

Desafio prioritário para ação	Esforços Atuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
Acesso a informação os estudos de base (relatórios, dados georefereciados).	Criacao de base de dados para a disponibilização de files das areas concencionadas.	Redução do processo burocrático para o acesso a base de dados	MTA/MIREME
Capacidade técnica em matérias ligadas a petroleo e gas.	Capacitações e treinamentos de técnicos nacionais		Instituções parceiras
Elaboracao de mapas de areas senciveis e areas chaves para a conservacao da biodiversidade	Em curso Projecto dos cenarios para a expansao das ACMs em Mocambique Plano de ordenamento do espaco maritimo	Parcerias,	MIMAIP/WCS/MTA

TEAM 5

Desafio prioritário para ação	Esforços Atuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
2. Fraca capacidade institucional a nível técnico (pessoal e equipamentos) para lidar com assuntos de biodiversidade, mapeamento de áreas sensível e monitoria e avaliação.	1. Elaboração de instrumentos legais 2. Elaboração de Avaliações estratégicas 3. Mapeamentos (de forma isolada) de zonas com ecossistemas sensíveis	1. Fortalecimento da coordenação interinstitucional 2. Garantir a melhoria continua da capacidade técnica ao nível das instituições cheves no tocante a accoes em zonas sensíveis	MTA, MIMAIP,INP, ENH, Representações de sectores chaeves ao nível das Provinciais.

TEAM 6

Desafio prioritário para ação	Esforços Atuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
1. Capacidade de verificação (monitoramento ambiental) do	Parceria com outras instituições (capacitações; auditorias e fiscalizações	• Capacitação em matérias de modelação de processos físico-	AQUA INP CENACARTA IIP

cumprimento dos planos (exploração, gestão ambiental, contrabalanços da biodiversidade) pelos operadores	ambientais conjuntas; Ex: parceria AQUA-INP)	• químicos, sensoriamento remoto, fotogrametria • Capacitação de resposta a derrames e outras situações de emergência	

TEAM 7

Desafio prioritário para ação	Esforços Atuais	Etapas adicionais a serem realizadas	Pontos Focais / Instituições Líderes
1. Elevar o nível de treinamento de Recursos Humanos na perspectiva prática.	Mobilização de parceria, melhorando o fluxo de informação ao nível das instituições que albergam os técnicos presentes neste treinamento.	Replicar os conteúdos abordados a nível das Insttituições e das Entidades de governação e outros actores	Instituições Governamentais a nível Central, Academia, Sector Privado, ONGs e outros intervenientes

Annex 7. Resources for Further reading

- CSBI, Application of Mitigation Hierarchy http://www.csbi.org.uk/our-work/mitigation-hierarchy-guide/
- IOGP, Environmental management in oil and gas industry https://www.iogp.org/bookstore/product/environmental-management-in-the-upstream-oil-and-gas-industry/
- IPIECA, Ecosystem services guidelines https://www.ipieca.org/resources/good-practice/ecosystem-services-guidance-biodiversity-and-ecosystem-services-guide/
- CBD, National Report on Implementing Biodiversity Convention https://www.cbd.int/doc/nr/nr-06/mz-nr-06-en.pdf
- Offset videos https://youtu.be/LNXeS57VB0E
- IFC, Guidance Note Biodiversity Conservation and Sustainable Management of Living Natural Resources https://www.ifc.org/wps/wcm/connect/5e0f3c0c-0aa4-4290-a0f8-4490b61de245/GN6_English_June-27-2019.pdf?MOD=AJPERES&CVID=nL622je
- **Accelerating action: an SDG roadmap for the oil and gas sector (2021)**
- **A cross-sector guide for implementing the Mitigation Hierarchy (2015)**
- **Biodiversity and ecosystem services fundamentals (2016)**
- **Biodiversity and ecosystem services fundamentals: A summary (2018)**
- **Biodiversity and ecosystem services horizon scanning (2021)**
- **Environmental management in the upstream oil and gas industry (2020)**
- **Good practices for the collection of biodiversity baseline data (2015)**
- **IPIECA 2021-2024 strategy (2021)**
- **Managing biodiversity and ecosystem services in oil and gas: Mainstreaming the mitigation hierarchy (2020)**
- **Sustainability reporting guidance for the oil and as industry: Module 4 Environment (2020)**