2 EIA APPROACH AND METHODOLOGY

This chapter outlines the approach to the EIA process and the methodology used to assess the potential impacts.

2.1 APPROACH TO THE EIA

The EIA process followed was designed to assess potential environmental impacts of the Project to in order assist MICOA during the approval process, and to comply with the relevant Mozambican environmental legislation.

Undertaking an Environmental Impact Assessment (EIA) is a legal requirement under Mozambican Environment Law (*Law Nr. 20/97*) and is regulated by the EIA Regulation (*Decree Nr. 45/2004*, dated 29th September 2004). The EIA Regulations highlight the importance of stakeholder consultation as an integral part of the EIA process and stakeholder consultation requirements are subsequently detailed in the Guidelines for Public Participation Process (*Decree Nr. 130/2006*). The Legal Requirements are discussed in *Chapter 4* of this report.

2.2 THE EIA PROCESS

One of the objectives of the EIA process is to support decision making regarding the environmental licensing of a proposed activity and/or development. In achieving this, the EIA process consists of the following four key phases:

- **Screening:** The objective of the Screening phase is to define the level of environmental assessment required.

- **Scoping**: The Scoping phase aims to identify key issues and concerns associated with the proposed development. These could include project-related activities which may have the potential to contribute to or cause potentially significant impacts to environmental and socio-economic receptors and resources in the area.

- **Specialist Studies**: Based on the above, specialists studies are undertaken to establish and review the existing conditions and legislative requirements pertaining to the Project and its surrounding, and also to highlight receptors and resources sensitive to potential impacts.

- **Environmental Impact Report and Environmental Management Plan:** The Environmental Impact Assessment process aims to identify and evaluate the likely extent and significance of the potential impacts on identified environmental, social receptors and resources according to defined assessment criteria. The Environmental Impact Assessment Report (EIR) details the findings of the EIA process and also provides recommended measures to avoid, minimise, reduce or compensate for any potential adverse environmental effects, and reports the significance of the residual impacts that remain following mitigation. The EIR informs the development of an Environmental Management Plan (EMP). The purpose of the EMP is to develop a plan that integrates mitigation measures with the various components of the Project. These are intended to be adopted as firm commitments by the project proponent, with specified timing and responsibilities.

The phases of the EIA process used during the PCMRB Rovuma Basin EIA are illustrated in *Figure 2.1*, and each phase is described in more detail below.

2.2.1 *Phase 1: Screening*

The primary aim of the Screening phase is to initiate the EIA by liaising with MICOA to identify the level of environmental impact assessment required.

Based on Annex 1 of the EIA Regulations, this Project has been classified as a *Category A* Project, and is therefore subject to a full Environmental Impact Assessment, which includes a Scoping Phase.

2.2.2 *Phase 2: Scoping*

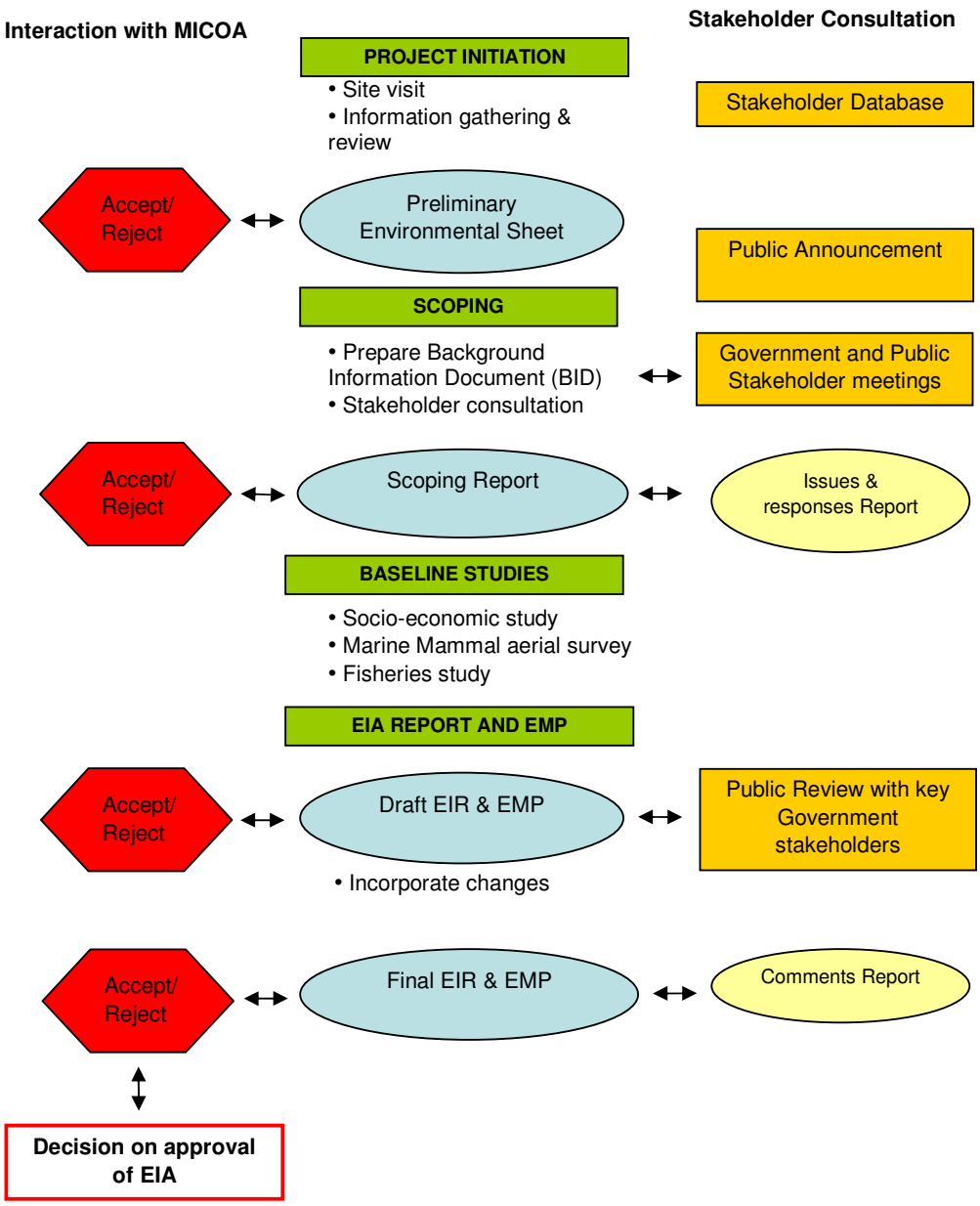
The objective of the Scoping phase is to identify potential impacts that the proposed project may have on the environment. The Scoping report also highlights key potential environmental impacts that need to be considered and further investigated during the EIA phase. Scoping also identifies any potential significant negative environmental impacts related to the project.

The Scoping phase consisted of the following activities:

- Initial consultation with key stakeholders, including relevant government departments;
- Conducting a desktop study to identify the environmental and social constraints, potential environmental and social impacts, and potential mitigation measures;

- Distributing a Background Information Document (BID) to Interested and Affected Parties (I&APs) detailing the proposed development, potential environmental impacts, and the proposed stakeholder consultation process;
- Arranging and undertaking meetings with key stakeholders and the general public in the district areas;

Figure 2.1 Overview of the EIA Process



- Compiling and reviewing existing information regarding the Project and Project area; and
- Producing a Scoping Report for MICOA approval based on project information, biophysical and socio-economic baseline information, and any issues and concerns highlighted during the stakeholder and stakeholder consultation process.

The Final Scoping Report was submitted to MICOA on 19 January 2010 and a copy of the MICOA approval letter is included in *Annex B*.

2.2.3 Stakeholder Consultation during the Scoping Phase

Stakeholder consultation is a critical component of the Scoping phase, allowing for the identification of public expectations and concerns that need to be considered and addressed as part of the EIA process. The objectives of the Stakeholder Consultation Process in the Scoping phase are to present the details of the proposed development to I&APs, and then to identify any issues and concerns related to the proposed development.

A range of stakeholders were identified which included national, provincial and local authorities, neighbouring and adjacent landowners and occupiers, other companies active in the area, specialist interest groups and other interested parties (eg job seekers, local businesses, agricultural unions).

An overview of the activities undertaken during the Stakeholder Consultation Process is presented in *Table 2.1* and is discussed further in *Chapter 3*.

Table 2.1 ***Summary of Stakeholder Consultation Process***

Activity	Purpose and discussion	Date of activity	Reference
Meeting with MICOA	To present the proposed project and the proposed EIA process	03 November 2009	*Annex C*– Project brief to MICOA and Letter of Classification of the Proposed Activity
Compile stakeholder database	Identify stakeholders to be included in the consultation process	October 2009	*Annex D* - Stakeholders Database
Compile and distribute Background Information Document (BID)	Provide information on the EIA process, the proposed development and dates of public meetings	13 – 30 November 2009	*Annex D* - Background Information Document (BID)
Distribute invitations to public meetings	To invite stakeholders to public meetings	13 November 2009	*Annex D* - Invitation to public meetings
Advertise public meetings on press and radio	To invite stakeholders to public meetings	November 2009	*Annex D* - Advert for public meetings
Hold public meetings: Maputo, Nacala, Pemba	To present the proposed EIA process and project to the public and to allow the public to identify issues of concern	27, 28, and 30 November 2009	*Annex D* - List of participants and minutes of the meetings
Poster display	To present EIA process and project description at the public meetings	At public meetings held on 27, 28, and 30 November 2009	
Written comments received	Written comments received during the scoping process	13 November to 7 December 2009	*Annex D* – Comments received on the BID and at the public meetings
Update Stakeholder Database	Registration of new I&APs	December 2009	*Annex D* - Updated Stakeholders Database
Submit Final Scoping Report and ToR to MICOA	For MICOA´s decision	January 2010	See approval of Scoping Report in *Annex B*
Distribute updated information letter to stakeholders	To update the stakeholders on issues regarding the ongoing project, and informing them about the location of Reports for public review, and upcoming public meetings	29 January 2010	*Annex D* – Update Information Letter to Stakeholders
Draft Scoping Report available for public review	For public review and comment	01 -12 February 2010	

Activity	Purpose and discussion	Date of activity	Reference
Receive written comments on the Draft Scoping Report and summarise issues raised	*No comments received*	-	-

Key issues identified

The issues raised in the public and community meetings were related to the four broad areas of employment, access to water, compensation and community development (*Table 2.2*).

Table 2.2 Key issues raised during the Stakeholder Consultation Process

No.	Issue	Responsibility/ Way forward
Conflict with tourism and fishing activities		
1.	Exclusion zones could affect shipping activity in the area, as well as other sea users as tourism operators (egdivers, game fishing).	Details regarding shipping lanes in the project area will be obtained during the EIA phase of the study. A detailed communication plan will also be developed as part of the Environmental Management Plan (EMP) to inform key stakeholders and other sea users of seismic survey activities.
2.	The Mecufi area is a priority tourism development area, with new large scale investments. Tourism operators could be affected by the activities.	The International Finance Corporation (IFC), USAID and other key tourism development related stakeholders will be engaged as part of the Stakeholder Consultation component in the EIA phase of the project.
3.	Is hydrocarbon exploration compatible with tourism, nature conservation, fishing and other economical activities in the coastal area?	The EIA process will take note of potential conflicts between the hydrocarbon industry and other economic activities and will propose appropriate mitigation measures where necessary. However, it is beyond the scope of the EIA to address the strategic issue of compatibility with fishing, tourism and nature conservation.
4.	Some fisherman could go further than the expected three miles offshore, possibly reaching the concession area.	Meetings will be scheduled with the various artisanal fishing committees. A detailed communication plan will be developed for the operational phase of the seismic survey in order to effectively communicate with the affected fishers
Communication and stakeholder liaison		
1.	How would stakeholders be communicated with before and during the activities?	A detailed communication plan will also be developed as part of the Environmental Management Plan (EMP) in order to inform key stakeholders and other sea users of the seismic survey activities.
2.	Need to involve communities in the consultation procedures, including local communities and other key stakeholders such as local leaders and fishing committee representatives.	As indicated above, as part of the stakeholder consultation component of the EIA phase meetings will be scheduled with the various artisanal fishing committees relevant to the Study Area.

No.	Issue	Responsibility/ Way forward
Impacts of the noise on people and marine fauna		
1	Possible impact of the sound in water: what is the true area of noise dispersion and what is the safe distance for humans and marine fauna?	Potential impacts associated with noise dispersion and sound in the water will be clarified and addressed using existing studies, as part of the EIA phase of the project.

Further details of the stakeholder consultation process and key issues raised are provided in C*hapter 3*.

2.2.4 *Phase 3: Specialist Studies*

The issues raised during the Scoping phase were used to develop the Terms of Reference (ToR) for the specialist studies to be undertaken during the Environmental Impact Study phase of the EIA. The outcome of these studies formed the basis for the baseline description and impact assessment of the potential impacts on the affected environment.

The objectives of the specialist studies were to:

- Describe the existing environmental and socio-economic conditions;
- Identify those resources or receptors that may be affected by the project;
- Assess the impact on the environment using predefined criteria; and
- Identify potential mitigation measures.

The specialist studies undertaken as part of the EIA process are listed in *Table 2.3*.

Table 2.3 Specialist Studies

Specialist Study	Specialist	Affiliation
Marine Ecology Study	Dr Almeida Guissamulo	Marine Ecologist UEM – Natural History Museum. Maputo. Mozambique
Socio-Economic Study	Dr Gaye Thompson & Cecilia Pedro	SAL Consultoria em Desenvolvimento Social Lda
Fisheries Study	IIP	IIP – National Fisheries Research Institute

2.2.5 *Phase 4: EIR and Environmental Management Plan (EMP)*

The results of the specialist studies have been integrated into the EIR and have informed the development of the EMP. These reports have been prepared in accordance with the requirements of *Decree Nr. 45/2004*.

The EIR provides an assessment of the potential impacts associated with the proposed Project and recommendations on how the potential negative impacts can be best mitigated and positive impacts enhanced. Mitigation measures are also based on best practice in the oil and gas sector as required by the Petroleum Regulations.

Clear, practical measures applicable to the local conditions have been adopted from mitigation measures stipulated in the EIR to form the basis of the EMP (*Annex E*). The EMP will also form part of the Environmental Licence to ensure that the Project is conducted and managed in an environmentally responsible manner.

The Draft EIR and EMP will be made available for public comment throughout the Project area, and the key findings presented at public meetings to be held in Maputo and Pemba. These reports will also be placed on the internet to provide for wider public access.

The Final EIR and EMP will incorporate and reflect all comments and inputs received from I&APs. The Final EIA and EMP will be submitted to MICOA for consideration and approval.

2.3 IMPACT ASSESSMENT METHODOLOGY

The purpose of impact assessment and mitigation is to identify and evaluate the likely significance of potential impacts on identified receptors and resources according to defined assessment criteria; to develop and describe measures that will be taken to avoid or minimise any potential adverse effects and enhance potential benefits; and to report the significance of any residual impacts that remain following mitigation.

2.3.1 *Impact Types and Definitions*

There are a number of ways that impacts may be described and quantified. An impact is essentially any change to a resource or receptor brought about by the presence of the Project component or by the execution of a Project related activity.

The evaluation of baseline data provides crucial information for evaluating and describing how the Project could affect the biophysical and socio-economic environment. The types of impacts and terminology used in this assessment are outlined in *Table 2.4*.

Table 2.4 Impact Assessment Terminology

Nature of Impact	Definition
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct impact	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (eg between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (eg in-migration for employment placing a demand on resources).
Cumulative impact	Impacts that act together (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

2.3.2 *Predicting the Magnitude of Impacts*

The EIA describes what will happen by predicting the magnitude of impacts and quantifying these to the extent practicable. The term 'magnitude' is used as shorthand to encompass all the dimensions of the predicted impact including:

- the nature of the change (what is affected and how);
- the size, scale or intensity;
- the geographical extent and distribution;
- the duration, frequency, reversibility, etc;
- where relevant, the probability of the impact occurring as a result of accidental or unplanned events.

It also includes any uncertainty about the occurrence of scale of the impact, expressed as ranges, confidence limits or likelihood (1).

Magnitude therefore describes the actual change that is predicted occur in the resource or receptor (e.g. the area and duration over which air or groundwater may become polluted and the level of increase in concentration; the degree and probability of impact on the health or livelihood of a local community; the probability and consequences in terms of fatalities from a major explosion).

(1) A distinction is made here between the probability of impact arising from a non-routine event such as an accidental explosion of spill, and the likelihood of an uncertain impact; for example it may not be certain that migrating species will be present during construction, that health will be affected by air emissions or that jobs will be obtained by local people.

An overall grading of the magnitude of impacts is provide taking into account all the various dimensions of to determine whether an impact is of negligible, small, medium or large magnitude. This scale is defined differently according to the type of impact and a more or less detailed scale may be used for particular impacts depending on the circumstances. For readily quantifiable impacts such as noise numerical values can be used whilst for other topics a more qualitative classification is necessary. The details of how magnitude is predicted and described for each impact are presented in Chapter 9 of this report.

2.3.3 Assessing Significance

The next step in the assessment is to take the information on the magnitude of impacts, and explain what this means in terms of its importance to society and the environment, enabling decision makers and stakeholders to understand how much weight should be given to the issue in deciding on their view of the Project. This is referred to as Evaluation of Significance.

There is no statutory definition of significance; however, for the purposes of this EIA, the following practical definition is used:

> *An impact is significant if, in isolation or in combination with other impacts, it should, in the judgment of the EIA team, be reported in the EIA report so that it can be taken into account in decision making on whether the Project should proceed and if so under what conditions.*

This recognizes that evaluation requires an exercise of judgment and that judgments may vary between parties in the process.

There is no single accepted definition of '*significance*' and its determination is, therefore, somewhat subjective. However, it is generally accepted that significance is a function of the **magnitude** of the impact and the **likelihood** of the impact occurring. Furthermore, it is widely accepted that impact magnitude (or severity) is a function of the extent, duration and intensity of the impact.

The criteria used to determine significance are summarised in *Table 2.5*.

Table 2.5 Significance Criteria

MAGNITUDE – the degree of change brought about in the environment	
Extent	**On-site** – impacts that are limited to the seismic area. **Local** – impacts affecting an area within ~20km of the seismic area. **Regional** – impacts affecting regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. **National** – impacts affecting nationally important environmental resources or affecting an area that is nationally important/ or have macro-economic consequences. **Transboundary/ International** – impacts affecting internationally important resources such as areas protected by international conventions.
Duration	**Temporary** – impacts of short duration or intermittent/occasional. **Short-term** – impacts predicted to last only for the duration of the seismic survey. **Long-term** – impacts that will continue for the life of the Project, but cease when the Project stops operating. **Permanent** – impacts that cause a permanent change in the affected receptor or resource (eg removal or destruction of ecological habitat) that endures beyond the Project lifetime.
Intensity (1)	BIOPHYSICAL ENVIRONMENT: *Intensity can be considered in terms of the sensitivity of the biodiversity receptor (ie habitats, species or communities).* **Negligible** – the impact on the environment is not detectable. **Low** – the impact affects the environment in such a way that natural functions and processes are not affected. **Medium** – where the affected environment is altered but natural functions and processes continue, albeit in a modified way. **High** – where natural functions or processes are altered to the extent that it will temporarily or permanently cease. ***Where appropriate, national and/or international standards are to be used as a measure of the impact.*** *Specialist studies should attempt to quantify the magnitude of impacts and outline the rationale used.*
	SOCIO-ECONOMIC ENVIRONMENT: *Intensity can be considered in terms of the ability of project affected people/communities to adapt to changes brought about by the Project.* **Negligible** – there is no perceptible change to people's livelihood **Low** - People/communities are able to adapt with relative ease and maintain pre-impact livelihoods. **Medium** - Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support. **High** - Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.
LIKELIHOOD - how certain an impact will occur	
Unlikely	The impact is unlikely to occur.

(1) The frequency of the activity causing the impact also has a bearing on the intensity of the impact, ie the more frequent the activity, the higher the intensity.

MAGNITUDE – the degree of change brought about in the environment	
Likely	The impact is likely to occur under most conditions.
Definite	The impact will occur.

Once a rating is determined for magnitude and likelihood, the following matrix (*Table 2.6*) can be used to determine the impact significance.

Table 2.6 ***Significance Rating Matrix for Positive and Negative Impacts***

SIGNIFICANCE RATING				
	LIKELIHOOD	**Unlikely**	**Likely**	**Definite**
MAGNITUDE	**Negligible**	Negligible	Negligible	Minor
	Low	Negligible	Minor	Minor
	Medium	Minor	Moderate	Moderate
	High	Moderate	Major	Major

Table 2.7 ***Colour scale for significance ratings***

Negative ratings	Positive ratings
Negligible	Negligible
Minor	Minor
Moderate	Moderate
Major	Major

Table 2.8 outlines the various definitions for significance of an impact.

Table 2.8 ***Significance Definitions***

Significance definitions	
Negligible significance	An impact of negligible significance is where a resource or receptor will not be affected in any way by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background levels.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that "moderate" impacts have to be reduced to "minor" impacts, but that moderate impacts are managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the

Significance definitions	
	Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (eg the visual impact of a development). It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors, such as employment, in coming to a decision on the Project.

2.3.4 *Mitigation Potential and Residual Impacts*

It is expected that for the identified significant impacts, the consultant will work with the Project Proponent in identifying suitable and practical mitigation measures that are implementable. Mitigation that can be incorporated into the Project design in order to avoid or reduce the negative impacts or enhance the positive impacts will be developed. A description of these mitigation measures will be included within the EMP.

Residual Impacts are those impacts which remain once the mitigation measures have been designed and applied. Once the mitigation is applied, each impact is re-evaluated, assuming that the mitigation measure is effectively applied, and any remaining impact is rated once again using the process outlined above. The result is a significance rating for the residual impact.

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