Netherlands Commission for Environmental Assessment

Advice on Scoping for an Integrated Multi-Sector Plan and SEA for the Lower Zambezi Basin

NCEA OS25 - O90/ISBN 978-90-421-4219-0

Mozambique

Netherlands Commission for
Environmental Assessment

your reference

your letter

Ministry of Coordination of Environmental Affairs
To: Mr. Maurício Xerinda
Maputo, Mozambique

our reference
OS25-O90/SG/jz
enquiries to
Sara Groenendijk
direct phone number
(030) 234 76 59

Date: *22 November 2011*
Subject: *Advice on Scoping for an Integrated Multi-Sector Plan and SEA for the Lower Zambezi Basin - Mozambique*

Dear Mr. Maurício Xerinda,

In June 2011, you requested the Netherlands Commission for Environmental Assessment to advise on an integrated multi-sector development plan and SEA for the Lower Zambezi Basin. It is my pleasure to submit herewith the advice prepared by an independent working group of the Commission.

I would like to draw your attention to the following:

The advice proposes an integrated process for planning and SEA. In such a planning process, SEA elements aim to guarantee that environmental and social aspects are fully taken into account in the final plan. The proposed process can thus be instrumental to fulfil the mission of MICOA.

The advice stresses the importance of an independent and neutral convenor of the planning/SEA process that is recognised as such by all sector authorities involved.

The process that we propose leaves undisturbed the competence of sector ministries to formulate their sector plan. It, nevertheless, stimulates that the planning of the sectors involved is done in a coordinated manner.

The advice suggests a two-phased approach, the first phase aiming at the coordination of the interests of the sectors involved in a multi-sector agenda; the second aiming at implementing the agenda in the individual sector plans. The advice focuses on recommendations for the first phase of the planning/SEA process alone. The NCEA offers to advice on the design, coordination and methodology for the second phase, once the Government of Mozambique has formally taken the decision to agree to the suggested design, coordination and methodology of phase 1.

VISITING ADDRESS
Arthur van Schendelstraat 800
Utrecht
The Netherlands

POSTAL ADDRESS
P.O. Box 2345
NL - 3500 GH Utrecht
The Netherlands

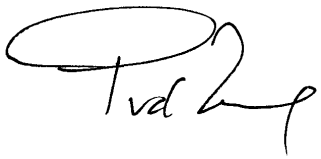
T +31 (0)30 - 234 76 60
F +31 (0)30 - 230 43 82
E mer@eia.nl
W www.eia.nl

The NCEA would be happy to be kept informed on the use that is made of this advice.

I would like to reiterate the willingness of the Commission to continue co-operation with MICOA in the coming years.

Yours sincerely,

Pieter van der Zaag



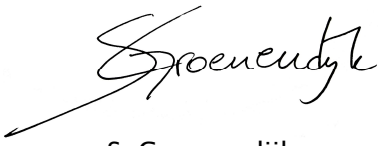
Chairman of the Working Group on the multi-sector development plan and SEA for the Lower Zambezi Basin, Mozambique

cc. Netherlands Embassy
Ms. Célia Jordão
Mr. Felix Hoogveld

Advice on Scoping for an Integrated Multi-Sector Plan and SEA for the Lower Zambezi Basin, Mozambique

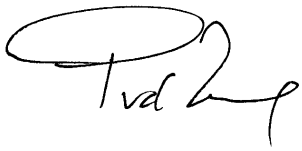
Advice submitted to the Mozambique Ministry for Environmental Affairs, by a working group of the Netherlands Commission for Environmental Assessment in the Netherlands.

the technical secretary



S. Groenendijk

the chairman



P. van der Zaag

Table of Contents

Executive Summary

The Lower Zambezi Basin holds the prospect of a future of prosperity and development as it has a high social, economic and ecological potential. This potential is reflected through the various resources that enrich the basin. At the same time, the many resources and respective sectors involved pose a complex challenge for the establishment of a development plan for the region. For the future prospect to come true, a framework that coordinates and monitors the various sector developments is needed. The Ministry for Coordination of Environmental Affairs (MICOA) therefore requested the Netherlands Commission for Environmental Assessment (NCEA) to assist in a Strategic Environmental Assessment (SEA) process that would support the elaboration of a coordinated development plan across sectors, to ensure that these developments benefit the local population and respect ecological values.

This advice recommends such an integrated plan and SEA process. Chapter 1 gives a short introduction. Chapter 2 gives some background information on the current state of affairs of the sectors involved. Chapter 3 describes the two recommended phases of the planning/SEA process and outlines the preconditions for a successful implementation of this approach. Chapter 4 suggests a methodology for phase 1 of the integrated planning/SEA approach, resulting in the definition by the Government of Mozambique of a multi-sector agenda for the development of the lower Zambezi Basin. Finally, chapter 5 discusses some operational issues of phase 1 in more detail.

The NCEA suggests that at the end of phase 1 it may be requested to make more detailed recommendations on design and methodology for phase 2 of the suggested plan/SEA process.

Key recommendations and conclusions in this advice are:

Chapter 2: Analysis of the situation

- The Lower Zambezi Basin has a highly diversified social, economic and ecological potential that offers various opportunities for sustainable development. In order to fully achieve this potential, a coordinated development plan across sectors is urgently needed.
- The need for such a coordinated development plan across sectors is recognised by the Government of Mozambique, but is still in its starting-up phase.

Chapter 3: The planning/SEA process: Design and implementation

- The NCEA recommends a 2-phased approach to the multi-sector development plan/SEA process of the Lower Zambezi Basin: the first phase aiming at coordination of the interests of the sectors involved in a multi-sector agenda; the second aiming at implementing the agenda in the individual sector plans (see figure below and Chapter 4).
- Phase 1:
    - The NCEA recommends that the first phase defines a multi-sector agenda for future development of the Lower Zambezi Basin. This agenda should be developed in a participative process with all key stakeholders involved.

Within government this includes all agencies having formal mandates for the key decisions in the implementation of the agenda.

  - The NCEA stresses the importance of deciding, first and foremost, the agency that will be formally mandated to convene the multi-sector development process, i.e. the mandated agency. It is fundamental that such an authority is recognised as neutral by all sectors involved and that it is able to take balanced decisions.
  - The NCEA highlights a number of preconditions for the successful application of the suggested approach in relation to capacities, budget, transparency, commitment, etc.
- Phase 2:
  - NCEA recommends that during phase 2 the mandated agency monitors and reports on the development and implementation of the plans and reports to the Council of Ministers on any possible conflicts or issues that need coordination.

Chapter 4: Recommended methodology for phase 1

- The NCEA suggests to use a 10 step approach in developing the multi-sector agenda for the Lower Zambezi Basin.
- Step 1 is the preparation of a formal mandate from the Council of Ministers, including: an assignment to initiate the planning/SEA process, guidelines, principles and boundaries for this planning/SEA process, an agency mandated to convene this process and reservation of the necessary financial resources.
- Step 2 is the establishment of institutional bodies that support the planning/SEA process, including: a steering committee, an inter-governmental advisory platform, a public private platform and a quality review mechanism. Where needed, the steering committee commissions expert studies. The NCEA advises that the mandated agency and MICOA provide secretariat functions to the different institutional bodies. For this secretariat function a dedicated fund should be available.
- Step 3 is setting the geographical and time boundaries and describing the political and legal context.
- Step 4 is identifying the 'business as usual' scenario: what environmental, social and economic development is expected without a multi-sector development plan. This scenario is intended to form the basis for a comparison with the common multi-sector scenario as suggested in step 8.
- Step 5 is the development of individual sector scenarios, integrating social, environmental and economic issues. The NCEA recommends the scenario development process to occur in a participative manner, where all relevant members of the steering committee participate, and where the inter-governmental advisory platform and the public private platform are consulted.
- In step 6 these sector scenarios are cross-checked, e.g. using consistency analysis, to find synergies and conflicts in the development of sectors.
- Step 7 is the organisation of an independent quality assurance of the sector scenarios and – later – of the multi-sector scenario.
- In step 8 the individual sector scenarios are combined into an integrated 'common multi-sector scenario': the best combination of all sector scenarios developed. The NCEA advises to assess this scenario on its main social, environmental and economic impacts and to compare the results of this assessment to the impacts of the

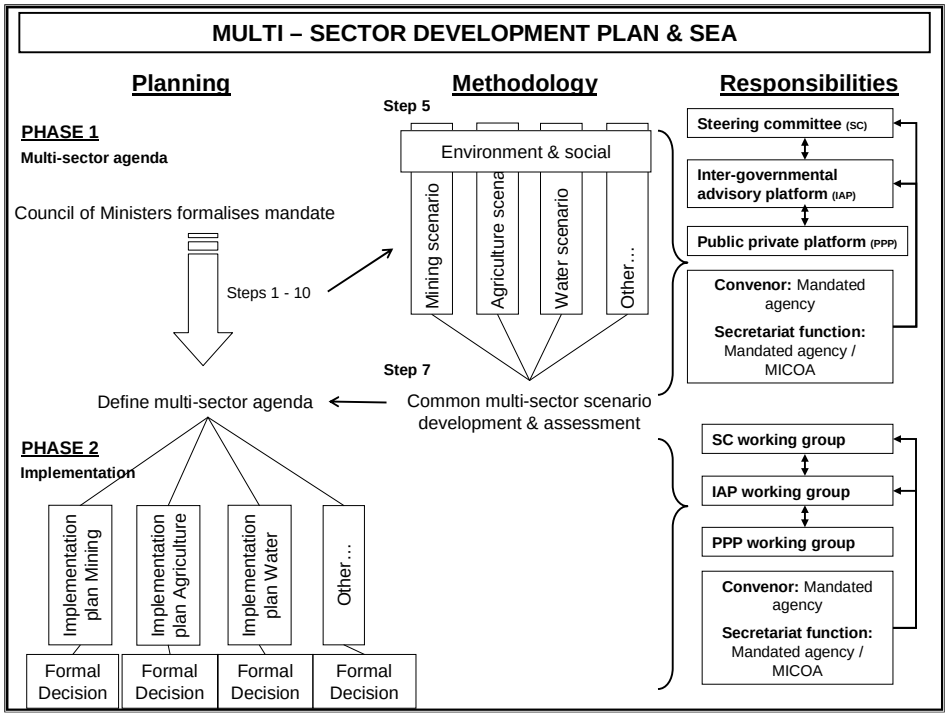
'business as usual scenario'. The NCEA stresses that this common multi-sector scenario should not be seen as a blueprint for the developments in the Basin, but that it aims to underline the urgency of phase 2 and create a common starting point for this phase.

- In step 9 the common multi-sector scenario is translated into a multi-sector agenda for the Lower Zambezi Basin.
- In step 10 phase 2 is designed on basis of the multi-sector agenda.

Chapter 5: Operational issues in phase 1

- The NCEA suggests a number of stakeholders to be included in the different institutional bodies. In each of the institutional bodies that are going to be set up, and in each of the levels they operate, participation and cooperation across parties is of high importance.
- The NCEA lists a number of relevant national laws and policies, and international treaties and agreements. However, this list is not exhaustive. The NCEA stresses the importance of a solid assessment of the political and legal context in order to determine the boundaries within which the planning process has to take place.
- Participation is particularly important in the development of sector scenarios. Governmental and non-governmental stakeholders that are directly or indirectly related to and/or influenced by a specific sector should be involved in the scenario development process for this sector.
- The NCEA makes a first analysis of synergies, bottlenecks and issues, both within sectors and those relating to the interdependencies among sectors. These should be analysed more in depth, e.g. by applying a consistency analysis across the various sector scenarios.

Schematic overview of key elements of the suggested planning and SEA approach for the Lower Zambezi Basin.



1. Introduction

1.1 Description of the Initiative

The Lower Zambezi Basin, i.e. the Mozambican part of the Zambezi River Basin[1], has a high social, economic and ecological potential. Recent socio-economic developments can make the Lower Zambezi the second socio-economic pole of Mozambique, strategically located in the centre of the country.

Recently, vast coal reserves have been discovered in the Lower Zambezi Basin. These reserves are mainly concentrated around the provincial capital city of Tete. The Government of Mozambique has issued mining concessions that may lead to a production of 100 million tonnes of coal per year by 2025, with a potential export value exceeding 10 billion USD per year. Mining is therefore a major economic potential of the region. Mining activities, moreover, will bring about substantial investment in transport infrastructure, as transportation facilities are needed in order to connect the province of Tete to the coast. In addition, the Lower Zambezi Basin provides an agriculture and fisheries based subsistence economy for 2.6 million people. From the first colonial settlements, it offered opportunities for the production of agricultural commodities such as rice, sugar and copra (the kernel of the coconut, mainly used to produce coconut oil). Plans exist for extensive new irrigation developments of up to 90,000 hectares, which would make the region the most important breadbasket of the country. Shrimps originating from coastal fisheries, which extend to the rich Sofala banks facing the Zambezi delta and depend on the river's annual high flows, is one of Mozambique's premier export products (valued at approximately 50 million USD per year). With the commissioning of the Cahora Bassa dam in 1984, the Zambezi is Mozambique's major source of electricity, reaching a value of an estimated 500 million USD per year. Plans to expand the dam's electricity generating capacity and to construct an additional reservoir are at an advanced stage. They will double electricity production and will further boost the Lower Zambezi Basin as a major source of renewable energy for the Southern African region. The Zambezi delta has unique ecological features, with the Marromeu RAMSAR site providing great potential for tourism.

The Lower Zambezi thus holds the prospect of a future of prosperity and sustainable socio-economic development in a healthy environment. However, for this prospect to come true, the Government of Mozambique emphasized that a framework is needed within which the on-going developments are coordinated and monitored, providing clear boundary conditions to spatial planning, especially those related to social and environmental aspects. Without such a coordinating framework developments can create their own bottlenecks and

[1] Hydrologically, the Lower Zambezi Basin consists of: all the districts in the province of Tete; the following districts in the province of Zambézia: Chinde, Inhassunge, Morrumbala, Nicoadala e Quelimane; the following districts in the province of Sofala: Caia, Chemba, Cheringoma, Maringué, Marromeu e Muanza; and the following districts in the province of Manica:Guru, Tambara and Macossa. Administratively (as defined in the Organic Statutes of the Zambezi Valley Development Agency), the Lower Zambezi Valley also includes the following districts in the province of Zambézia: Maganja da Costa, Milange, Mocuba and Namacurra; and further the Gorongosa district in the province of Sofala and the Bárue district in the province of Manica. Appendix 4 provides a map of the region.

undesirable and irreversible social and environmental impacts. In light of the ongoing and rapid developments at project level in the lower Zambezi Basin[2], the development of the framework is urgent.

1.2 Mandate for this advice and scope

After having consulted relevant sector ministries the Ministry for Coordination of Environmental Affairs (MICOA) proposed a Strategic Environmental Assessment (SEA) process that would support the elaboration of a multi-sector development plan for the Lower Zambezi Basin. MICOA requested the Netherlands Commission for Environmental Assessment (NCEA) to assist in this endeavour (see Appendix 1 for the letter of request) and to field a scoping mission for this envisaged multi-sector plan. By means of this advice, the NCEA intends to contribute to both improving the information base of the planning / SEA process for the Lower Zambezi and its process structuring across relevant sectors, including: environment, mining, transport, energy, agriculture, fisheries and water.

1.3 Expert working group and scoping mission

This advice is prepared by a working group of the NCEA. The group represents the NCEA and comprises expertise in the following disciplines: water management, irrigation, sociology, environmental economics and public administration and governance. The composition of the working group can be found in Appendix 2.

For the preparation of this advice, the working group visited Mozambique from 1 - 9 July 2011. During this period, the working group visited stakeholders in Maputo, Tete and Quelimane. The programme of the mission is outlined in Appendix 3.

1.4 Planning and SEA, the approach taken by the NCEA

This advice concerns an integrated planning and SEA process for a multi-sector development plan for the Lower Zambezi Basin. SEA practice has shown that an SEA is most effective if it is fully integrated into the plan-making process. In such a planning process, SEA can be seen as a process that guarantees that environmental and social aspects are fully taken into account. In the proposed planning process, the following elements are included in the SEA: scenario development; environmental and social impacts assessment of the developed scenarios; and (public) participation in the planning process. Because of the full integration of the planning and SEA processes, this advice makes no further distinction between the two and refers to the process as the 'planning/SEA process'.

In order to integrate the SEA in the planning process, it is crucial that first a number of critical questions are answered relating to the planning process, the decisions to be made and the management and purpose of the SEA. These critical questions are:

[2] An example is the proposal to transport coal over the Zambezi River. This proposal is currently subject to EIA, which MICOA has requested the NCEA to review (see NCEA advice nr 092, working title: EIA for Coal Transport Zambezi River).

The planning process

- What are the key issues that the multi-sector plan needs to address? Or, in other words: what is the purpose of the multi-sector development plan?
- What is the current stage of the planning process: e.g. is it just starting, or is a draft plan already available?

What decisions will be taken in the plan and by whom?

- Which are the decisions to be taken in the planning process and when will these be made?
- Who is/are the responsible agency(ies): i.e. the owner(s) or developer(s) of the planning process?
- What is the spatial and time horizon: what is the geographical definition of the plan and which implementation period will it consider?

Methodology for agenda setting and impact assessment

- How to develop alternative sector scenarios?
- How do these sector scenarios interact with each other?
- What are the key environmental, social and economic impacts and how to assess these?
- Who should manage the planning process and how?
- What mechanisms should be in place to start the planning and SEA process?
- What is the budget and time-line of the plan process: how much time and budget is available for the SEA? Who will undertake the SEA and who will pay for it? This includes budgeting for public participation.

These questions are addressed in Chapters 2- 5 below.

Chapter 2 gives an overview of the issues at stake in the Lower Zambezi Basin, including an analysis of all the sectors involved: their problems, opportunities and potential. It also addresses the need for, and current stage of the planning process.
Chapter 3 describes how the planning/SEA process can be phased and suggests which decisions are to be made by whom. This chapter also outlines preconditions for a successful implementation of this approach and gives preliminary recommendations on which planning issues require priority attention, based on evidence gained during the scoping mission.
Chapter 4 suggests a methodology to prioritise decisions and define a general multi-sector agenda for the development of the Lower Zambezi Basin. It also provides an outline for the organisation and management of the process.
Chapter 5 gives a more operational description of the methodology described in Chapter 4, giving concrete suggestions of institutions to be included and issues to be taken into account in the multi-sector agenda setting process.

Please note that this advice is based on a relatively short visit (7 days) to Maputo, Tete and Quelimane. Although the NCEA feels that the most important stakeholders were interviewed and the most relevant documentation has been consulted, it was not possible to meet all main stakeholders within the time frame available.

2. Analysis of the Situation

2.1 The potential of each sector, problems and opportunities

As mentioned above, the Lower Zambezi Basin has a highly diversified social, economic and ecological potential. This potential is reflected through the various resources that enrich the basin. These include minerals, agriculture, water, energy, fisheries, and nature. Below, a short overview is given of the potential of each of these resources, their inter-linkages, their current and planned development, and main challenges faced.

Minerals

Recently, new mining operations have started, mainly concentrated around the city of Tete. These reserves constitute the largest known and untapped coal reserve of the world. It is estimated that they contain about 23 billion tonnes (23,000 Mt) of high quality metallurgic and thermal coal. Vale and Riversdale are the largest mining companies operating in the area and about to start exploiting coal in 2011. Many other companies, generally smaller, have secured exploration concessions for the area and expect to start exploiting in a few years time. The coal mining industry is driven by the rapid increase in coal demand in emerging markets such as China and India. Exports are expected to grow rapidly and reach a total output of 48 Mt coal per annum by 2017 and 100 Mt coal per annum by 2025.

However, in order to reach this goal, large transportation challenges have to be overcome. Coal was expected to be transported over the 600 kilometers long Sena railway line to the port of Beira. However, the delay in the rehabilitation of this railway and the realization that the Sena line can only carry up to a maximum of 12Mt of coal per year if major improvements are made, forced mining companies to look for alternatives. Riversdale is exploring the possibilities to transport coal down the Zambezi River using barges, while Vale is exploring the railway route through Malawi to the port of Nacala. Other alternative railway routes are also currently being considered as options in the near future.

On the one hand, coal exploitation can yield huge social and economic benefits for Mozambique. It is estimated that the coal export value can exceed US$ 10 billion per year. Furthermore, progress in the mining sector can directly and indirectly catalyse economic activities in other sectors as well, such as the development of small and medium enterprises. On the other hand, coal exploitation can have significant undesired negative impacts, such as environmental pollution, increase in income inequality, land use changes, forced resettlement of populations, etc.

Agriculture

About 80% of Mozambique's population depends on agriculture as its primary source of livelihood. The agricultural production in Mozambique, which includes the production of maize, cassava, sweet potatoes, rice, sugarcane, cotton, etc., is mainly rainfed and at subsistence level. Nonetheless, Mozambique has a high potential to boost agricultural

production through irrigation. The Lower Zambezi Basin has an irrigation potential of about 1 million ha (nearly one third of the national irrigation potential). Only about 30,000 ha is presently equipped with irrigation infrastructure and about 20,000 ha is currently operational (mainly sugarcane and some rice). The river, including its tributaries, delta and lakes, is still a vast source of water that offers huge potential for irrigation. Various plans exist to significantly expand the irrigated area. If the water resources are properly managed, the Lower Zambezi Basin has the potential to become the food basket of Mozambique.

The Government of Mozambique has recently established a 10-year Strategic Plan for Agricultural Development 2010 – 2019 (PEDSA) with the aim to develop irrigation schemes and boost agricultural production in order to improve food security and rural income in a competitive and sustainable way. The PEDSA envisages doubling crop yields and increasing by 25% the area cultivated for basic food production by 2019. Investments in irrigation infrastructure, agricultural technologies and market based approaches as well as in enabling environments such as physical infrastructure, financing mechanisms and coordination are needed in order to achieve this goal.

Water

In comparison with neighbouring countries, Mozambique has considerable water resources. At the same time, the sustainability of Mozambique's water resources is highly vulnerable and insecure due to, among others, the country's dependence on upstream water management in its shared river basins, the hydrological and climate variability throughout the year, adverse climate change prospects and the historical underinvestment in water infrastructure.

The Zambezi River provides important environmental goods and services to the region and is essential for local food security and hydropower production. As stated above, water availability is not of immediate concern in the Lower Zambezi Basin. However, it is of utmost importance that negative impacts of the planned investments in mining, agriculture and hydropower on the availability and quality of water resources in the basin are controlled and mitigated.

Energy

The Lower Zambezi Basin is a major source of electricity both for Mozambique and its neighbouring countries. This electricity mainly originates from the dam site of Cahora Bassa. There are plans to expand the dam's electricity generating capacity by installing new turbines on the left bank. Also, production gains can be made by coordinating dam operation with existing upstream hydropower facilities located in Zambia and Zimbabwe. Moreover, Mozambique intends to further increase electricity production through the construction of new reservoirs on the Lower Zambezi Basin, such as at Mpanda Nkuwa. These developments will further boost the Lower Zambezi Basin as a major source of renewable energy for the Southern African region.

The existing dams have significantly altered the natural flow regime and the silt dynamics of the Lower Zambezi River over the last 35 years or more. The operation of the existing reservoirs for the sole purpose of production of electricity has diminished the natural

variation of high and low flows during the wet and dry seasons, respectively. Reduced variation in river flows and changed silt loads directly influence the ecosystems on which people, nature and fisheries (freshwater and marine fisheries, including shrimp) depend. The proposed new reservoirs may have additional negative impacts; their precise nature needs to be ascertained by on-going and future EIAs.

Fisheries

The Lower Zambezi Basin provides a fisheries-based subsistence economy for thousands of people living along the river and in and along the coast of its delta. Artisanal shrimp fishing in the Sofala Bank caters for the local market, while semi-industrial and industrial shrimp fleets concentrate on the export markets. Coastal shrimps are still one of Mozambique's premier export products. The shrimp catch rate in the Sofala Bank has decreased drastically over the last two decades. In the late 1970s fishermen managed to catch around 90kg of shrimp per hour. This catch reduced to 40kg per hour in the mid 1980s and further decreased to about 30kg per hour in the early 1990s, a rate that remained constant up to now. Some experts are of the opinion that this decrease is directly influenced by the regulation of the river flows since the construction of electricity generating dams, both in Mozambique (Cahora Bassa) and upstream (in particular Kariba dam in Zambia/Zimbabwe). The Zambezi runoff is found to have a significant influence on the dynamics of the shelf, which, in turn, influences the availability and distribution of nutrients and the recruitment of shrimp.

Nature

The Zambezi Delta is the largest and most important wetland in Mozambique. The Marromeu Complex (668,000 ha), that comprises the south bank of the Delta, was designated in 2004 as the first Mozambican Wetland of International Importance under the RAMSAR Convention. The Marromeu Complex includes the Marromeu Buffalo Reserve, two forest reserves, four hunting concessions, large commercial agricultural lands and community lands. It supports important concentrations of African game (including buffalo, elephant, antelope, eland, leopard, lion, etc.) and several endangered and threatened species. The Zambezi Delta and especially the Marromeu site have, next to a high intrinsic value for nature, a high potential for tourism and a high socio-economic value for the local population (in terms of food security and socio-economic development).

The wetland heavily depends on tidal patterns of the river and the sea and is, therefore, under pressure of upstream development of the Zambezi River basin, especially the construction of large hydropower dams on the river's mainstream and tributaries, new mining developments, large-scale irrigation development (e.g. for sugarcane and rice) and the unsustainable use of natural resources by local people.

Inter-linkages

The Spatial Development Initiatives (SDI) program provides a spatial framework that guides the current planning of governmental sector agencies. For the Lower Zambezi Basin the Beira and the Nacala SDIs are relevant. Evidently the multi-sector planning/SEA process should link to the SDI planning process.

2.2 Need for, and stage of the planning/SEA process

As discussed above, different resources offer different opportunities for socio-economic development in the Lower Zambezi Basin. The many sectors involved pose a complex challenge for the development of a planning/SEA process for the region. Overall, there is a large economic potential for each individual sector. Moreover, many sectors are interlinked and depend on each other. Developments in one sector influence developments in another sector. This influence can be either beneficial (synergy), or negative (constrain each other's development and cause adverse impacts). They may even be conditional on each other; e.g. development of the transport sector is a condition for development of the mining sector.

Balancing development of all sectors in the Lower Zambezi Basin is complex. In order to maximise benefit from the potential of the various sectors, a sound coordinated development plan across sectors is urgently needed, i.e., one that ensures that these developments benefit the local population and respect ecological values. Tradeoffs across the different sectors need to be made explicit, win-win scenarios need to be designed and potential for sustainable local livelihoods needs to be identified.

3. The Planning/SEA process: Design and Coordination

3.1 Suggested planning/SEA process design

Developing all the sectors involved in the Lower Zambezi Basin is challenging. Given the different interests that sometimes may be in conflict and the lack of tradition in – and proven tools for – multi-sector planning, it would probably be over-ambitious for the involved ministries to jointly develop a multi-sector plan as a blueprint for the valley. It will be more realistic when the multi-sector development plan consists of coordinated individual planning/SEA processes about key issues in the Basin. The challenge is to plan and coordinate these processes in such way that they serve the national interest, and not only the interest of one sector. This includes the decisions that government has to make about its role towards the private sector investment initiatives. What kind of investments will be permitted? Which investments will be stimulated? Which conditions and restrictions will the government set for these developments? What will the government build or do on its own behalf?

Example: One of the issues that play a role in the development of the Lower Zambezi Basin is to solve the transport problem of the mines. Another is to manage the waters of the Zambezi whilst realizing the potential of other sectors. These issues can, to some extent, be considered in isolation from each other. Each issue involves specific sectors, has a specific urgency and a specific importance, and therefore needs a specific approach. However, there are also cross-linkages across these issues. For example, it is evident that water management of the Zambezi affects its potential to serve as

To deal with the complexity, the NCEA suggests an approach to the planning/SEA process that identifies issues, and deals with them one by one, whilst also maintaining an overview. To that end, the NCEA proposes two phases in the planning and assessment process, which are outlined below. Ideally, the phases are consecutive, but in practice they might overlap.

Phase 1 – A multi-sector agenda for the lower Zambezi basin

The NCEA suggests to first develop an agenda for the Lower Zambezi Basin that identifies the key issues, sets priorities across them and indicates how the different responsible authorities should address each issue. The NCEA recommends this process to be convened by an agency that does not represent ANY sector interests and has the explicit mandate of the Government of Mozambique, a topic that is further elaborated in Section 3.2. The NCEA is of the opinion that under the right circumstances (e.g. sufficient budget and mandate) it should be possible to develop an agenda within 6 months.

The NCEA recommends that the agenda to be developed consists of:

- 'Scenarios': possible futures for the development of sectors, including the environmental and social dimension of these sectors. Scenarios should be qualitative descriptions of what the future might look like. In other words, the potential of each sector and conditions for achieving that potential.

- Cross-sector 'issues': these are the possible synergies, bottlenecks and issues that might arise across sectors, derived from a consistency analysis wherein their possible futures and conditions are matched.
- Priorities and guidelines for the 'implementation plan' for each of the most important 'issues', taking into account available implementation capacity. Such priorities and guidelines are based on the defined multi-sector agenda and should include the following directions:
    a. developments the government will consider to facilitate and allow;
    b. developments the government will certainly not allow;
    c. authorities responsible for implementation; e.g. for giving permission to private investments. Since most issues are cross-sectoral, it is to be expected that several authorities are jointly responsible;
    d. who else should be involved in the implementation, in particular which stakeholders should be involved;
    e. urgency of the issue and timing of the implementation.

The actual formulation of each sector implementation plan takes place in phase 2 (see next).

Phase 2 – Implementation of the multi-sector agenda

The second phase of the planning/SEA process concerns the elaboration of the sector implementation plans on the basis of the priorities and guidelines set in phase 1. During phase 2 formal decisions are taken, binding for both government and private sector. However, it may be expected that the joint agenda developed in phase 1 will already outline those (private sector) developments that government intends to facilitate and under which conditions. This will enable the private sector to better plan its future activities.

In phase 2 the relevant authorities for each sector plan – as identified in phase 1 – jointly develop the sector plan. The NCEA recommends that for each sector plan the lead is assigned to the minister who is in the best position to implement the anticipated decision, in light of the formal mandate and/or the strongest implementation power.

The lead ministry/authority for each sector implementation plan/SEA process should develop its own approach within the boundaries set in the multi-sector agenda. The involved authorities should receive a mandate from the Council of Ministers to carry out the implementation plan. The multi-sector agenda can serve as basis of that mandate.

During phase 2 new insights may require an adjustment of the agenda. Because of this, the NCEA recommends that the same agency mandated to convene phase 1, should remain in place and monitor phase 2. It can propose adjustments to the Council of Ministers where appropriate. This agency should also hold a mandate for monitoring the agenda implementation by sector authorities and for reporting the progress to the Council of Ministers. In this way coordination of phase 2 across sectors is enhanced.

A first estimate is that, depending on favourable circumstances, preparation of the sector plans should also be possible within 6 months.

In this advice the NCEA focuses on recommendations for the first phase of the planning/SEA process, although some issues in the second phase are also discussed (see Section 4.2 and Appendix 6). The NCEA suggests that it makes more detailed recommendations on design, coordination and methodology for phase 2 of the suggested planning/SEA process, once the Government of Mozambique has formally taken the decision to agree to the suggested design, coordination and methodology of phase 1.

3.2 Responsible agencies, SEA capacity and funding

The process of developing a sustainable multi-sector development plan for the Zambezi catchment is an integrated process: planning and SEA are carried out simultaneously with the aim to generate a sustainable plan as the final product of this process. This integrated planning and SEA process should be convened by a neutral convening agency.

It is crucially important that this convening agency has no interest of its own other than the interest that the plan is, indeed, made and accepted by all stakeholders. Its neutrality should be recognised by all involved sector authorities and its interventions in the planning/SEA process, such as its progress reports to the Council of Ministers, should be accepted as balanced. At the highest level such a role is in many countries, and presumably also in Mozambique, assumed by the prime minister. Or, when too time consuming, the prime minister delegates this role to a convenor of her/his choice.

The NCEA recommends that the prime minister decides on the convenor for this planning/SEA process. In this advisory report, the NCEA will further refer to the mandated convenor of the planning/SEA process as the 'mandated agency'. Remind that this mandate does not include any powers and responsibilities other than convening the parties and helping them to jointly make progress with the integrated plan, as requested by the prime minister. The SEA component of the planning/SEA process remains the full responsibility of MICOA.

MICOA guides and overseas the proper integration of SEA elements in the agenda setting (phase 1) and in implementation planning (phase 2). To fulfil these tasks, the NCEA recommends that MICOA establishes a dedicated SEA expert team specifically for this complex SEA and, in the case that MICOA is not appointed as mandated agency, that this team works in close collaboration with the mandated agency. It recommends further that the entity(ies) that will fund the SEA provide sufficient budget for the functioning of the dedicated SEA expert team of MICOA.

3.3 Preconditions for successful application of the suggested approach

1. *A network of motivated representatives of key organisations that share a common vision on the urgency of a sustainable development of the Lower Zambezi Basin*. Within a highly complex situation like this, successful SEA depends on cooperation across key organisations. The baseline of this cooperation is that there should be a network of people with the common understanding that they have an opportunity to contribute to the sustainable economic, social, and environmental development of

the Lower Zambezi Basin. They should share a vision about how they can jointly make that happen – by not primarily looking for personal but for joint successes. This network should include both people at the highest level (the right 'sponsors', see below), and people at lower levels who have more time to spend on implementation.

2. *This group should go through a joint thinking process.* They should together go through the same steps of thinking as the ones undertaken in this NCEA advice. They should share ideas about the process and commit themselves to it. It is recommended to start this whole process with a small-scale seminar, where the NCEA's advice is discussed from all angles.

3. *Need for the right 'sponsors' at the highest level*. It is the NCEA's experience that, if this group of people has the right sponsors (i.e. enabling leaders) at high level, they will have enough practical means to carry out the process. Sharing available information and listening and discussing with experts available in the group generally may be a sufficient basis for reaching conclusions underpinning decision making.

4. *Budgets for specific studies.* When issues are too complex to analyse sufficiently in phase 1 (agenda setting), it may be necessary to undertake a dedicated study to further analyse the issue with the help of experts. Such an issue should then be part of the agenda and implemented as any other issue in the implementation plan. It means that decisions that are binding to private actors are postponed by first conducting a joint study to clarify the nature of such decisions.

5. *Available capacity.* The planning/SEA process will take up considerable time of civil servants. To some extent, this is part of their regular job, which they will now do together instead of separately. The main extra input of man hours is required for the organisation of the process: preparing cross-sectoral meetings, writing minutes, etc. For the agenda-setting process this task mainly is with the mandated agency. The NCEA expects that the civil service in Mozambique has sufficient capacity to undertake a meaningful planning/SEA process, leading to an agenda and carrying out some of its sector implementation plans. However, some of its resources may have to be reallocated to these ends.

6. *Transparency*. The NCEA recommends that decisions and their justification, should be made publicly accessible. This will greatly enhance societal and private sector support to the developed agenda, which may prevent costly delays in its implementation.

7. *Support to the process*. Whereas the NCEA has drafted this advice in such a way that Mozambique may follow it up without external support, it may be helpful to make use of experience from other countries in the organisation of this kind of processes, since these are new to Mozambique. A 'process coach' could be assigned to the mandated agency or to ministries that need support. Also, experts (e.g. on transport, mining, environment, etc.) would be expected to be available within the civil service or in the non-governmental sector of Mozambique. If extensive studies are required, or knowledge has to be imported from abroad, external support may be helpful.

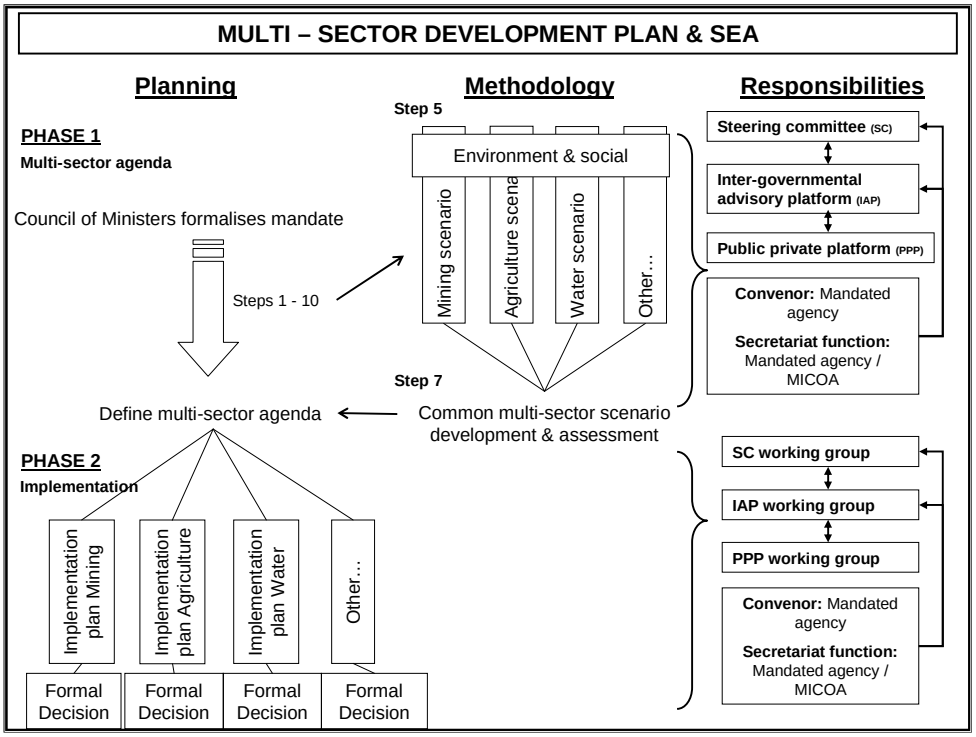
4. Recommended methodology for phase 1

4.1 Introduction

In Chapter 3, the NCEA advises to follow a 2-phased approach in the planning and assessment process for the development of the Lower Zambezi Basin. Phase 1 refers to the development of a multi-sector agenda and phase 2 refers to the development of implementation plans for each sector. This Chapter completes the advice on the agenda setting phase by suggesting a methodology for the planning/SEA process for Phase 1. Chapter 5 gives more detailed recommendations for a few individual steps of this methodology.

Figure 1 below gives a schematic overview of the recommended approach in the planning and assessment process for the development of the Lower Zambezi Basin. In the left 'column', the planning/SEA process of phase 1 and phase 2 are sketched. In phase 1, steps 1 to 10 lead to the development of a multi-sector agenda, which in turn forms a basis for the individual sector implementation plans in phase 2. The second 'column' gives a schematic overview of the two main steps in the methodology of phase 1: the development of scenarios for the individual sectors, which in turn form the basis for the development of one common multi-sector scenario. In the most right 'column', the institutional bodies that need to be established and that are responsible for this process are displayed. Below, each of these elements are further detailed, with focus on phase 1.

Figure 1: Schematic overview of the suggested planning and SEA approach for the Lower Zambezi Basin.



4.2 Methodology for setting a multi-sector agenda

The NCEA recommends that the development of the multi-sector agenda for the development of the Lower Zambezi Basin should consists of the following steps:

1. Provide a written mandate for the planning/SEA process (Council of Ministers).
2. Establish institutional setup for the planning/SEA process.
3. Set geographical boundaries, planning horizon, and describe the political and legal context.
4. Identify the 'business as usual' scenario.
5. Develop future scenarios for each individual sector.
6. Perform a consistency analysis across the sector scenarios.
7. Develop one common multi-sector scenario, assess on environmental and social consequences and compare to business as usual scenario.
8. Organise quality assurance.
9. Define the multi-sector agenda.
10. Design phase 2: i.e. the planning/SEA processes for the coordinated sector plans, that together will form the multi-sector development plan.

These steps are further detailed below.

Step 1: Council of Ministers provides a written mandate for the planning/SEA process

The NCEA understands that currently a formal, written mandate for a planning/SEA process for a multi-sector development plan for the Lower Zambezi Basin does not exist. The NCEA recommends to the Council of Ministers to formulate such mandate, and detail in this mandate the following issues:

- an assignment to initiate the planning/SEA process;
- guidelines, principles and boundaries (do's and don'ts) for the development of the multi-sector planning agenda setting and for the multi-sector development plan;
- the agency that will be mandated to convene the planning/SEA process (in short: the 'mandated agency'), as decided by the prime minister;
- reservation of the necessary financial resources for the planning/SEA process.

The NCEA recommends that the Council of Ministers makes use of the results of a multi-stakeholder workshop, in which government representatives of the following relevant sectors[3] participate: environment, mining, transport, energy, agriculture, water and fisheries. This workshop could address the following issues:

1. What is the current state of development in the lower Zambezi basin of the environment, mining, transport, energy, agriculture, water and fisheries sectors?
2. What are the main development opportunities for each of these sectors and what are the main development challenges?
3. What are the potential benefits of a more coordinated government approach toward the Lower Zambezi Valley?

[3] These are the sectors mentioned in the official letter of invitation the NCEA has received from MICOA.

Step 2: Establish institutional setup for the planning/SEA process

In order to achieve a successful planning/SEA process, the NCEA recommends to establish a steering committee, an inter-governmental advisory platform and a public private platform. Knowledge brokers / experts should be available for studies and expert hearings when needed. Each of these bodies are outlined below, and their roles and responsibilities described. The mandated agency is recommended to convene the work and operation of these institutional bodies and to ensure continuity and coordination. Secretariat function is recommended to be provided by the mandated agency. If this agency is not MICOA, then the NCEA advises that both the mandated agency and MICOA provide secretariat functions to the different institutional bodies. Chapter 5 gives a more detailed description of these bodies, including recommendations on the governmental and non-governmental institutions that could be included in each of these bodies.

Steering committee

The NCEA recommends the steering committee to be the key owner of the agenda and composed of the government organisations that have the mandates and responsibilities with respect to the issues that the multi-sector plan needs to settle. They are represented by their political representatives. The steering committee determines the scope of the multi-sector agenda as a whole: sectors involved, geographical boundaries, time horizon etc.

An important early task of the steering committee is to make sure that all involved authorities are committed to the proposed plan/SEA process and to the use of its results in decision-making. In the case of insufficient commitment, there is no use in embarking on the process.

Its operation

The steering committee advises the Council of Ministers. This implies being high-level and small sized. This steering committee draws up its own assignment and approach, for which it asks acknowledgement from the Council of Ministers. The steering committee should decide on the following issues:

- Its mandate: On all issues where the steering committee finds consensus, it should be clear which steps it is then allowed to make without consulting the Council of Ministers. On all the issues where it does not find consensus, it should equally be clear how these issues will be brought forward to the Council of Ministers level to be resolved.
- The position, role and capabilities of the chairperson, i.e. the convenor. The NCEA advises that (s)he should be available on a full time basis and be accepted by all members of the steering committee as a neutral facilitator, having no partial interest in the decisions to be made. (S)he should be able to chair the inter-governmental advisory platform (see below) and any public meetings and hearings. If a decision is truly of the highest national importance, (s)he should preferably be appointed by the prime minister and report to him/her. This is a matter for the Council of Ministers to decide.
- The composition of an inter-governmental advisory platform (see below).
- The composition of a 'public – private platform' (see below).
- The mechanism for quality assurance. The steering committee may for example decide to ask for independent external reviews on the quality of the process and the information underlying decisions made in the course of the process.

In both the steering committee and the inter-governmental advisory platform a fact finding process occurs, e.g. on alternative options. The members should agree on the feasibility and impacts of options. The NCEA recommends that communication to the public takes place once all members reach agreement on a topic. If they do not succeed in achieving consensus, the steering committee should inform the prime minister and make recommendations on how to proceed.

On behalf of the Council of Ministers, the steering committee, after consultation with the inter-governmental advisory platform, publicly announces the intentions of the government: the scope of the planning agenda setting and assessment process and the further steps to be made. Inviting reactions from other interested parties and stakeholders should also be part of the process. The NCEA advises to organise a dialogue in a public private platform (see below). The input of knowledge organisations can be organised in each of these steps, according to the needs identified.

It should be agreed in advance under which circumstances the steering committee will be decommissioned. For example, once it has completed its work.

Inter-governmental advisory platform

If a decision is complex and important, a limited number of key stakeholders, united in a steering committee, will not cover all stakes. There will be other governmental co-owners of the agenda/decision (less important than the Steering Committee members but still necessary to involve). Together, the steering committee and these other governmental co-owners form the 'inter-governmental advisory platform'.

The inter-governmental advisory platform is a fact finding and negotiating platform. It considers alternatives/scenarios and assesses the bio-physical, social and economic consequences of these. In order to broaden its view on possible options and to assess the impacts of options considered, the platform consults the public-private dialogue platform and experts and commissions studies. Subsequently, it may eliminate alternatives/scenarios, informing the steering committee thereon.

In order to keep momentum and speed up the planning agenda setting/SEA process, the NCEA advises that the Platform meets frequently.

Its operation

The platform has an advisory role to the steering committee. Even if its role is only advisory, it has to agree on the advice to be given, or at least to 'agree to disagree'. The steering committee indicates how it has taken this advice into account. The more people in a group, the more complex agreeing and decision-making becomes. This group should therefore not become 'too large to handle'.

The questions the inter-governmental platform will have to answer may include:

- Which information should be requested from developers/planners to make a next step?
- Which realistic commitments or promises can be made to developers about what the government will do and which conditions should be given?
- How are environmental impacts taking into account?

- How to deal with any earlier promises the government has made to companies and other stakeholders?
- How to involve non-governmental actors in the next the steps of the agenda setting?
- How to communicate in public about these issues?

Tasks of the platform may include:

- assessment of the relevant national regulatory frameworks to adequately regulate the various alternatives and scenarios
- assessment of the capacity of relevant government agencies to enforce the laws and regulations
- identify and propose review of inadequate regulatory frameworks
- identify and propose any institutional strengthening needed, both in terms of capacity development or creation of new institutions
- development of alternatives/scenarios to be evaluated
- assessment of the bio-physical, social and economic impacts of each alternative
- comparison of the alternatives/scenarios on their bio-physical, social and economic impact
- identify and propose mitigating and compensation measures and attribute responsibilities for their implementation
- formulation of an advice to the steering committee.

Public-private platform

The public private platform is the mechanism for involvement of the key NGOs and the private sector. It is important that the platform exists in a physical form and meets to discuss about this information and how to proceed, so that the government can take these views into consideration. Also, the NCEA advises to set-up a website where all public information is made available in a downloadable format.

Its operation

The steering committee selects and invites the organisations to be involved in the public-private platform. Here, proper preparation is necessary to ensure all major stakes are represented. This is also an encouragement of the private sector and NGOs to work together and speak with one voice. Preferably, there should be maximum 15 – 20 individuals present at meetings of the public-private platform, in order to enable stakeholder groups present sufficient time to express their views.

Knowledge brokers / Experts

The steering committee and/or the inter-governmental advisory platform may commission demand-driven expert studies or expert hearings on specific topics. This can be done by inviting experts to contribute their readily available knowledge or, if there is sufficient time and budget available, by commissioning more complex and extensive studies. This 'knowledge dialogue' with external experts should continue until the Council of Ministers makes a final decision. Experts would have to be neutral, i.e. must not represent any interest in the proposed activities. If important questions cannot readily be answered by experts, these questions should be 'framed' as opportunities or risks that can be addressed in phase 2.

Step 3: Set geographical boundaries, planning horizon, and describe the political and legal context

The NCEA recommends the steering committee to define the geographical boundaries of the Lower Zambezi Basin on which the agenda should focus, using either hydrological or administrative boundaries. In terms of planning horizon, the NCEA recommends the development agenda of the Lower Zambezi Basin to be long term, i.e. 15 to 25 years.

In addition to limitations that the Council of Ministers may have set on the agenda to be developed, the scope for planning is also determined by relevant Mozambican laws and policies. Moreover, Mozambique is bound by international treaties and agreements that may also set boundaries or limits or conditions on certain development options. Therefore, the NCEA advises the inter-governmental advisory platform to make an inventory of the relevant treaties and agreements, laws and policies and a report on what their implications and consequences are for the general agenda. Chapter 5 mentions a few of these national laws and policies and international treaties and agreements. The platform may wish to entrust the inventory to a specialised consultant company.

Step 4: Identify the 'business as usual' scenario

This step is intended to identify the scenario that would unfold without a multi-sector development plan. It consist of 1) the decisions which have already been taken within each of the involved sectors, and 2) a best estimate of the decisions that most probably would be taken if no coordinated planning would occur. The NCEA advises the inter-governmental advisory platform to prepare this scenario and to determine the likely social and environmental consequences of this scenario as benchmark for the common multi-sector scenario (see Step 8 below).

Step 5: Develop future scenarios for each individual sector

Develop, in a participatory manner, future scenarios for each of the following sectors: mining, transport, energy, agriculture, water and fisheries. In all of these environmental, social and economic issues should be integrated.

The NCEA recommends the steering committee to have final responsibility for preparation of the future scenarios for each sector. It is also responsible for ensuring that social, environmental and economic aspects are fully included in these scenarios. In developing the scenarios, existing sector policies are taken into account. Scenarios are described qualitatively, with a clear explanation of the conditions on which they depend.

The steering committee calls for the views of the inter-governmental advisory platform and the public private platform on each of these scenarios. The governmental and non-governmental stakeholders that should be part of this process are stated in Chapter 5. Where the steering group sees fit, it may invite independent experts to give their views. Once all comments have been received, the steering committee compiles all feedback and uses it to finalise scenarios. Final scenarios should once again be submitted to the inter-governmental

advisory and the public private platforms for their advice. Their opinions may either lead to adjustments of the scenarios or, in case of disagreements, the differences of opinion are included in notes to the text.

Step 6: Perform a consistency analysis across the sector scenarios

Once sector scenarios are available, they should be cross-checked with each other as the scenario of a sector most probably will have many interdependencies with the scenarios of other sectors. The methodology of 'consistency analysis' can be used to identify the issues where the realisation of a scenario depends on cooperation. In this methodology a so-called 'consistency matrix' is made wherein the interdependencies among sectors are made explicit. Appendix 6 gives an example of such a matrix.

During the development of future scenarios for each sector, various bottlenecks, synergies, and/or issues can arise. These bottlenecks, synergies, and/or issues do not only relate to the developments in the sector itself, but also to interdependencies across different sectors. In Chapter 5, the NCEA gives a first overview of the bottlenecks, synergies, and/or issues that should be taken into account in the development of the future scenarios within each sector.

The results of the consistency analysis are also important for the design of phase 2: where futures scenarios across sectors don't match, where it is unclear whether they do or don't, or where the environmental, social and economic impacts are undesirable, there is a priority issue that has to be addressed in phase 2. In other words, for those sectors where interdependency is high – both positive (opportunities) or negative (conflicts) – agencies should cooperate during the development of sector implementation plans.

The consistency matrix can also be used to identify the priority issues (see Appendix 6). For example, on the basis of information gained in the field visit, the NCEA is of the opinion that priorities should include:

- To grasp opportunities: joint planning of mining and transport issues.
- To manage risk: joint planning of hydropower & fishery issues, mining & environment issues, and mining & agriculture issues.

Within these priorities, the following issues appear at first sight to be among the most important issues to be dealt with:

1. Options for effective transport of mining products to the coast.
2. Options to combine mine rehabilitation with creating opportunities for small and medium enterprises, and the enhancement of livelihoods.
3. Measures to enhance fisheries and tourism in the Delta.
4. Establishing a long term mechanism for regional cooperation (energy, water, transport).

Again, the above NCEA suggestions on priorities are preliminary. It is envisaged that the multi-sector planning/SEA process will redo and refine this analysis in a more profound and thorough manner.

Step 7: Develop one common multi-sector scenario, assess and compare

Once sector scenarios have been developed and analysed on their consistency, the NCEA recommends the steering committee to develop one preferred common multi-sector scenario: the best combination of all sector scenarios, within the boundaries defined by the Council of Ministers. This common multi-sector scenario is then assessed on its main environmental, social and economic impacts and compared to the 'business as usual' scenario defined in step 4.

The NCEA recommends to base this assessment as much as possible on a qualitative expert judgement[4]. In this, it is important to pay attention to the consequences that developments may have on the most important ecosystem services (see appendix 5 for more information on the 'ecosystem services' approach).

It is of great importance to emphasize that the purpose of the developed common multi-sector scenario is to provide insight in synergies and trade offs across sectors. This scenario should not be seen as a blueprint for the development of the Lower Zambezi Basin. Its purpose is to underline the urgency of phase 2 and create a common starting point for this phase in the form of an agenda.

Step 8: Organise quality assurance

In order to give credibility to the process and its outcomes, the NCEA recommends to entrust an independent external expert body specialised in impact assessment with the task to verify and acknowledge the process and its results. There are several of such bodies available, both in the region (SAIEA, in Windhoek, Namibia) and outside the region (IIED and IISD). The Government of Mozambique could also invite the NCEA to conduct a review.

Step 9: Define the multi-sector agenda

The common multi-sector scenario forms the basis for the multi-sector agenda of the development planning/SEA process of the Lower Zambezi Basin. From this common multi-sector scenario, priorities and guidelines for the implementation plans within each sector department can de defined and integrated into the multi-sector agenda. The agenda should be adopted by the Council of Ministers.

Step 10: Design phase 2: i.e. the planning/SEA processes for the coordinated sector plans, that together will form the multi-sector development plan.

The NCEA suggests to provide – when requested – more detailed recommendations for the ToR for the SEA for phase 2. In appendix 6 the NCEA provides some insight into how the consistency matrix presented in Step 6 may be used for priority setting in phase 2.

[4] These can then be complemented – where needed – in phase 2 with more quantitative assessments.

5. Phase 1 methodology: operational issues

5.1 Introduction

This Chapter gives a more detailed description of several steps in the suggested methodology for phase 1. It advises, for example, on which stakeholders to include or (inter)national conventions and regulation to take into account. Of the steps described in Chapter 4, the following are further detailed:

2. Establish institutional setup for the planning/SEA process.
3. Describe the political and legal context.
5. Develop future scenarios for each individual sector.
6. Do a consistency analysis across the sector scenarios.

Also, under step 6, the NCEA includes a first discussion of issues that may come out of a consistency analysis across the sectors involved in the development of the lower Zambezi Basin.

5.2 Detailed description of Steps 2, 3, 5 and 6.

Step 2: Establish institutional setup for the planning/SEA process

In Chapter 4, the NCEA suggests to establish a steering committee, an inter-governmental advisory platform and a public private platform. In this chapter we advise more specifically on the composition of these institutional bodies.

Steering committee

The NCEA recommends to compose a steering committee composed of high level officials of the main involved ministries, including at least: Ministry for the Coordination of Environmental Affairs (MICOA), Mineral Resources (MIREM), Transport and Communication (MTC), Energy (MEnergia), Agriculture (MINAG), Ministry of Planning (MP). This steering committee is convened by the mandated agency. This agency should also provide secretariat functions to the platform. If the agency is other than MICOA, the NCEA advises that both the mandated agency and MICOA provide secretariat functions to the steering committee.

The steering committee would operate within the assignment, guidelines and boundaries set by the Council of Ministers in its mandate. It would operate and address the questions as described in step 2 of Section 4.2 and would compose the inter-governmental advisory and the public private platforms.

Inter-governmental advisory platform

The inter-governmental advisory platform includes all relevant governmental stakeholders which are not represented in the steering committee, but are co-owners of the multi-sector development plan for the Lower Zambezi Basin. These are: other governments who will have

a key role in the implementation of the agenda, representatives of some national or local interest, including social and environmental interests.

The NCEA recommends to include at least the following government agencies in the inter-governmental advisory platform: Provincial departments of each of the ministries in the steering committee, the Ministry of Public Works and Housing (MOPH), the Ministry for Tourism (MITUR), the Governmental Railway Company (CFM), the National Directorate for Water (DNA), ARA-Zambezi, National Institute for Disaster Management (INGC).

The NCEA recommends that, in addition to its role in the steering committee, the mandated agency would also technically chair the inter-governmental advisory platform, and would provide secretariat functions to the platform. If the mandated agency is other than MICOA, the NCEA advises that both the mandated agency and MICOA provide secretariat functions to the inter-governmental advisory platform.

The platform operates and addresses the questions as described in step 2 of Section 4.2 of this advice.

Public private platform

After a robust stakeholder analysis in the private and non-governmental sectors, the steering committee invites a carefully selected number of non-government stakeholders (both for-profit and not-for-profit) to sit on the public private platform. The NCEA recommends to include in this platform: a selection of the major mining companies, transport companies, the Federation of Companies Forum for Sustainable Development (FEMA), the World Wide Fund for Nature (WWF), the Mozambican Association for the Development of Mineral Coal (AMDCM), representatives of energy production companies involved in Cahora Bassa, Mpanda Nkuwa and other dams, National Union of Farmers and Peasants (UNAC), major and minor fishing companies such as Crustamos and Pescamar, and other relevant organisations.

Step 3: Describe the political and legal context

The NCEA recommends to include in the description of the context at least the Mozambique strategy for sustainable development, the Mozambique strategic plan for the environmental sector (2005-2015), policies and laws on physical planning, on fisheries, environmental quality standards and emission standards, marine and coastal environment, forests and wildlife, cultural heritage, energy, etc.

Also relevant SADC Protocols (on energy, on mining, on transport, communications and meteorology, and on shared watercourses) must be described, as well as the ZAMCOM agreement and the recent commitment by Mozambique, Zambia and Zimbabwe to coordinate the operation of the large reservoirs on the Zambezi river, including Cahora Bassa.

The NCEA also advises to make mention of the agreement to concentrate regional development initiatives in Southern Africa in corridors. In Mozambique the following corridors are defined: the Nacala corridor, the Zambezi and Beira corridor[5], the Maputo

[5] It is not clear to the NCEA if these are seen as one or two separate corridors.

corridor, the Limpopo corridor, the Lubombo corridor and the Mtwara corridor. Development of options for the Lower Zambezi Basin will involve the Nacala, the Zambezi and the Beira corridors.

Step 5: Develop future scenarios for each individual sector

The NCEA recommends to include the following stakeholders in the process of developing sector scenarios[6]:

Development of the mining sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the Ministry for Mineral Resources (MIREM), the Ministry for Transport and Communication (MTC), the interests of large and small mining companies – i.e. representatives of the Mozambican Association for the Development of Mineral Coal (AMDCM), the interests of people who need to be resettled, the small and medium enterprises.

Development of the energy sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the Ministry for Energy (MEnergia), the Ministry for Transport and Communication (MTC), Ministry of Fisheries (MPescas), the Ministry for Agriculture (MINAG), ARA-Zambeze, Vale and Riversdale[7], the dam operations of Cahora Bassa, Kariba, and of the future development plans around Mpanda Nkuwa and other dams, the fishing and shrimp farming companies (Pescamar / Crustamos), the small scale (shrimp) fisherman association.

Development of the agriculture sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the Ministry for Agriculture (MINAG), the Ministry for Energy (MEnergia), the Ministry for Transport and Communication (MTC), the Ministry of Fisheries (MPescas), the National Peasant Union (UNAC), ARA-Zambezi, the local farmer associations, investors in large scale agricultural development plans.

Development of the water sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the National Directorate of Water (DNA), ARA-Zambezi, the Ministry for Agriculture (MINAG), the Ministry for Energy (MEnergia), the Ministry of Fisheries (MPescas), the Ministry for Mineral Resources (MIREM), the Mozambican Association for the Development of Mineral Coal (AMDCM), the Ministry for Turism (MITUR).

Development of the fisheries sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the Ministry of Fisheries (MPescas), the Ministry for Energy (MEnergia), the National Directorate of Water (DNA), ARA-Zambezi, the Mozambican Association for the Development of Mineral Coal (AMDCM), the

[6] Please note that this is not an exclusive list.

[7] The NCEA has learned that Vale and Riversdale are planning to build large coal fired power plants. Therefore, they should also be included in the scenario development of the energy sector. Furthermore, Riversdale is planning to use the Zambezi River for transportation purposes. The regulation of the water flows which are needed to realise this plan do affect both the barging possibilities as well as the environment and fisheries sectors. Therefore, representatives of these stakeholders should also be present.

fishing and shrimp farming companies (Pescamar / Crustamos), the small scale (shrimp) fishers association, the dam operators of Cahora Bassa, Kariba, the future Mpanda Nkuwa and other future dams.

Development of the transport sector scenario: Representatives of: the mandated agency, the Ministry for the Coordination of Environmental Affairs (MICOA), the Ministry of Transport and Communication (MTC), the Ministry of Mineral Resources (MIREM), the Ministry of Agriculture (MINAG), the governmental railway company (CFM), the Ministry of Public Works and Housing (MOPH), the Ministry of Industry and Commerce (MIC), the Ministry of Mineral Resources (MIREM), the National Directorate for Water (DNA), the Planning Ministry (MP), the Ministry for Tourism (MITUR), and the Ministry for Fisheries (MPescas).

Step 6: Consistency analysis across the sector scenarios

Below, the NCEA gives some preliminary findings of a consistency analysis of the various involved sectors: possible bottlenecks, synergies, and/or issues that should be taken into account in the development of the future scenarios within each sector. Please note that the subjects listed do not necessarily cover all issues, but are meant to indicate directions.

Mining sector

The interaction of the mining and the transport sectors is described below. Other bottlenecks, synergies and issues may include:

- Impacts on the local population: Mining activities might take place in areas that belong to and/or are used by local people. Mozambique has rules concerning resettlement; it is up to the relevant parties to review whether these are up to the required (international) standard and provide fair compensation and mitigation of impacts.
- Impacts on the local water system: Lowering of water tables and pollution of ground and surface water during mining operations and after decommissioning of the mines. Furthermore, it may not be ruled out that very large floods of the Zambezi River may threaten and inundate certain mining sites near the river, which might even alter the river bed.
- Impacts on air quality: Fugitive emissions of particulate matter (dust) and gasses (methane, sulphur dioxide) can result in substantial air pollution in nearby areas. Coal particles released either during mining, transhipment or the transport of coal can potentially result in respiratory problems for the exposed population.
- Impacts on natural habitats: Coal mining alters the landscape (either due to the direct extraction of coal or indirectly via the disposal of extracted rock and soil) which creates negative side-effects for natural wildlife habitats. Deforestation can also be an issue.
- Impacts on climate change: While Mozambique is a relatively small emitter of greenhouse gasses (GHGs) and does not face any binding commitments to reduce its emissions, future (post-Kyoto) treaties that aim at stabilizing GHG concentrations in the atmosphere may reduce demand for coal and put downward pressure on coal prices as both coal extraction and use of coal significantly contribute to greenhouse gas (GHG) emissions.

- Macroeconomic impacts: Profits from the mining sector can have several positive economic side-effects for the local population. Mining operations as well as investments in infrastructure can create employment for the local population. Furthermore, the government can raise additional public revenues that can be invested in development projects. A prudent use of these 'resource windfalls' can potentially compensate those who lose out (e.g. dislocated population) as well as enhance public investment (e.g. in health, education, economic diversification) that supports welfare and future economic development. If the largest share of these revenues is instead directed towards consumption, this is likely to create inflationary pressures that will particularly harm the purchasing power of the local poor. An overreliance on mining can also create a bust-and-boom economy that will become very dependent on fluctuating global coal prices. The mineral boom in Tete has already contributed to rapid population growth in the area: while this is the natural outcome of increased employment opportunities, urban planning needs to accompany such rapid demographic changes.
- The cumulative impacts of many mines in one area in the various areas mentioned could, without proper mitigation, lead to major deterioration of the living conditions in the area. Individual permits should therefore be based on an assessment of cumulative impacts.

Transport sector

The NCEA has the following observations with regard to the synergies and trade-offs between the transport sector and other sectors:

- A strategic vision for transport development of MTC was presented to the NCEA during the mission in Mozambique, entitled 'Visão Estratégica para o Desenvolvimento de Transportes'. The NCEA does not know the precise status of this vision, nor of the existence of a national transport plan. The NCEA recommends this to be verified.
- The transport infrastructure in the region of Tete (especially West of Tete) needs upgrading so that ores can be transported to trans-shipment points near Tete where main infrastructure to the coast will most likely be located. Building this (additional) infrastructure by itself provides economic growth. Such infrastructure may serve other purposes than ore transport only.
- If mining companies develop solely their own transport infrastructure, beneficial outcomes resulting from co-use of transport options may not be achieved.
- Possible adverse environmental impacts:
    - Experts should be commissioned to scan the routes for transport options for major constraints that might affect the choice across the transport options. The options that the NCEA has heard of (rail and river transport, with several routes and connecting to several sea ports) may have several such constraints: the Ramsar wetland area and a nature reserve may be affected by isolation and fragmentation. Experts should envisage the possibilities of appropriate mitigation of adverse affects (for example, with eco-ducts) in the detailed design stage.
    - In the case of rail options, isolation and fragmentation, erosion and pollution may create local impacts that should be addressed at the EIA stage. At the present planning and SEA stage, a procedure for EIA at more detailed design level and design rules should be agreed upon (e.g. number of crossings per

10 kilometres). In addition, impact assessment at this planning stage would make a preliminary assessment of the cumulative impacts (aggregation of the smaller impacts). These cumulative impacts might tip the trade-off between infrastructure options over from one preferred option to another.

  - The option of river transport on the Zambezi has complex interactions with local populations, with river fisheries, with ecosystems along the Zambezi and with shrimp fishery near the coast. The NCEA recommends to consider three aspects of the river as transport option: river transport itself, dredging and depositing of river sediments, and accidents and pollution (see also NCEA's advice on the EIA for Riversdale's Zambezi River Barging Project: NCEA advice nr. 092, with working title: EIA for Coal Transport Zambezi River). First, river transport may demand specific flow regulation which might be provided by upstream reservoirs, i.e. Cahora Bassa and/or any future reservoir downstream. Such flow regulation may mostly coincide with dam releases that aim to maximise electricity production, but may not match with a possible and envisaged revision of operating rules to mitigate environmental damage, which may be in line with the Revised SADC Protocol on Shared Watercourses. Second, as the river system is highly dynamic, there is a considerable uncertainty regarding the amounts to be dredged, and, as a consequence the impacts of both initial and maintenance dredging and of depositing of river sediments. Dredging and depositing impacts on water levels, water flows, aquatic ecosystems, river banks and coastal zones should be taken into account. Third, the risks of location specific pollution at loading and transhipment points or of accidents must be assessed and their potential economic, social and environmental impacts. In sum, the NCEA recommends that assessing the river transport option requires the assessment of how river flow regulation, dredging & depositing, and pollution & accidents interact with local riverine populations, fisheries, ecosystems and the energy sector.
  - For all transport options the general impact on flooding patterns and water levels during large floods must be taken into account. This is especially relevant for rail and road transport since large dyke bodies may obstruct flows when the river is in flood, thereby worsening flood damage elsewhere but also threatening the integrity of the dyke body itself. In certain places, especially in lower lying areas, it may be considered to construct rails and roads on poles/piles. In many cases this may be the option that disturbs the existing situation the least.

- With a view to the complexity of adequate transport development, solutions for the transport problem of the mines should be developed in a participatory manner: the government should invite mining companies to discuss options and develop a joint perspective that takes company input into consideration. International options (e.g. the rail transport option through Malawi) might require cooperation with Malawi in developing and comparing options.

Energy sector

Advanced plans exist to expand the electricity generating capacity of the Lower Zambezi Basin, making it a major source of renewable energy for the Southern African region. The main issue is how the expansion of electricity generating capacity of Cahora Bassa and the

construction of more reservoirs would further alter the already heavily modified flow regime and silt dynamics of the Zambezi river, i.e. significantly reduced variations in river flows and reduced silt loads. Specifically, the following aspects are to be considered:

- The impact of a further changed flow regime on aquatic ecosystems in general, on mangroves, on freshwater and marine fisheries, including shrimp.
- The impact of a further changed silt regime on aquatic ecosystems, and on morphological dynamics in the delta.
- The impact on people's perceived safety in flood plains through the absence of small floods and the consequences this may have in case of extreme floods.
- The impact of a new dam construction on people's property (areas that belong to and/or are used by local people). The same rules around resettlement that are valid for the mining sector should be applied here and be reviewed by the relevant parties.
- The possibility to minimise or mitigate the negative impacts through improved designs of engineering works, and modified operating rules of the existing reservoir and the new reservoir(s).
- The opportunity to further optimise electricity generation and simultaneously minimise social and environmental costs through regional trans-boundary cooperation and the synchronisation of operating rules of Mozambican reservoirs with the other major reservoirs in the Zambezi river basin, i.e. Kariba and Itezhi Tezhi (see the recent study by SADC and the recently established Joint Operations Technical Committee).
- Possible factors that will influence future hydropower plans are projected energy prices (likely to increase in the future), that will also generate increased export revenues for Mozambique. In view of high energy prices, energy self-reliance is likely to be high on the political agenda.
- A fast expanding economy (as has been the case over the past decade) requires increased electricity consumption. An increase in hydropower electricity can support economic expansion (particularly for SMEs) by securing enhanced access to electricity for households and firms (and possibly at lower prices).
- Renewable energy in the form of hydropower is likely to receive increasing attention as efforts to combat climate change intensify. Such projects can potentially receive foreign investment (e.g. in the form of 'carbon credits').

Agriculture sector

The Lower Zambezi Basin offers a vast opportunity for the development of the agricultural sector through irrigation schemes. When developing a future scenario for this sector, the following pertinent issues should be included:

- Overall objective of the development of the agricultural sector. What balance between plantations/large scale agriculture and smallholder agriculture will lead to a harmonious development and sustainable situation?
- Enlarging of existing and creating new transport infrastructure could be a strong stimulus for agricultural development along railway lines and near ports if combined with additional investments such as feeder roads, processing and storage facilities, electricity supply, water control, etc.
- Revenues from the mining sector can be used for agricultural and infrastructure development.
- Decommissioned mining areas can be used for agriculture, provided that water and soil pollution are minimal.

- The risk of affected water quality due to mining (and related industries), as described above, can have severe impacts on the agriculture sector.
- Extensive large-scale agriculture development without proper conditions can lead to water pollution by agrochemical inputs, affecting other sectors.
- Different river flow regimes can impact on water control schemes in the Lower Zambezi Basin, e.g. they can impact on pumping costs for water for irrigation, drainage or flood protection.

Water sector

The future quality and quantity of the waters of the Lower Zambezi are uncertain. They are partly influenced by (a) developments inside the basin area in Mozambique, (b) developments upstream in the basin in other riparian countries, and (c) global change processes, such as enhanced climate variability and sea level rise.

With respect to water quantity: at the moment there is no shortage of water in the Lower Zambezi, and sufficient water is available for all planned developments (industry, mining, irrigation, urban and domestic needs). However, if developments of similar magnitudes as the ones in Mozambique concurrently occur in upper riparian countries, jointly with enhanced uncertainties due to climate change, then periods of water shortage may occur in the long term. Specifically, the following aspects are to be considered:

- Check existing authoritative documents on planned and possible upstream developments, and climate change impacts on water quantity. Conduct a risk analysis.
- Include coastal zone protection against cyclones in the analysis.
- Check the impact of changing existing operating rules of major reservoirs by incorporating environmental requirements. This may enhance the chance of water shortages during the dry season.
- Environmental flows could have impacts on agriculture in the lower Zambezi (e.g. for 'natural flooded' rice), and on the navigability of the river.

With respect to water quality: there are currently no reported major problems with the quality of the Zambezi river water. The planned major investments in mining, transport, agriculture and hydropower may, however, have major negative impacts on the quality of water resources. Specifically, the following aspects are to be considered:

- The impact of the envisaged mining activities on water quality, both during mining operations and after decommissioning.
- The impact of intensive irrigated agriculture on water quality, mainly leakage of nitrogen, phosphorus and agrochemicals such as herbicides and pesticides.
- The impact of new reservoirs and dredging on silt dynamics and river morphology in the Delta.
- Conduct a risk analysis of uncertainties created by upstream developments in upper riparian countries on Mozambique in terms of water quality.

Fisheries sector

The Lower Zambezi Basin provides a fisheries-based subsistence economy for thousands of people. The fish stocks, however, have drastically reduced over the past years. Experts believe that this reduction is directly influenced by the regulation of the river flows since the construction of electricity generating dams. Another factor that might influence this

reduction is overfishing. Issues that need to be taken into account while developing future scenarios for the fisheries sector include:

- The reasons for reduced fish stocks in the Lower Zambezi Basin need to be properly quantified. Overfishing can possibly be attributed both to (a) artisanal fishing (small-scale fishermen who use inappropriate fishing techniques/nets) and (b) large-scale commercial fishing (large vessels that deplete stock).
- The construction of new dams, such as Mpanda Nkuwa, and a further changed flow regime can have an impact on aquatic ecosystems in general, and in particular on mangroves and on freshwater and marine fisheries, including shrimp.
- The extent to which the government benefits from commercial shrimp farming. Current licences seem to generate little revenue for the government ($0.30 per kilo of shrimps) and appropriates only a very small share of value generated in the sector. Renegotiating licences can secure a more reasonable revenue base (that will more directly benefit the local economy) and an increased interest by the government to protect shrimp stocks and the sector.
- Possible pollution of water by mining, related industries and agrochemicals and its impact on the fisheries sector.
- The favourable impact on (shrimp) fishery and the environment of the implementation of 'natural' flow regimes at the expense of energy production.
- The possible impacts of barges transport over the river on both the (river and coastal) fish stocks as on fishing opportunities.

Social sector

Although the social sector is implicitly embedded in many of the sectors discussed above (i.e. issues of resettlement, liveability and culture have been mentioned before), there are a few issues that still need explicit mentioning:

- Resettlements can work as a catalysing factor for poverty reduction and improving living conditions of affected people (resettlement in productive areas and construction of productive infrastructure: rural roads, water control, electricity, storage and processing, education and training, ICT).
- Potential increase in income and employment opportunities through induced developments and spin-off from the mining and transport value chains (agriculture, construction, industry, services, SMEs).
- The financial revenues from mining to be used for human resources development: capacity building, (vocational) training, business development.
- The (cumulative) impacts of water and air pollution on human health.
- Due to rapid developments, the social impact of the high influx/ immigration of people (workers, fortune hunters, etc) requiring an expansion of housing, water supply, sewerage, health facilities, schools, etc.
- Increase in the number of people infected with HIV/AIDS and in its related problems due to this same influx/immigration of people.
- Increased price levels of essential commodities, including food, housing, transportation, health care, etc. This increase will be mainly prejudicial for vulnerable groups.

APPENDICES

With the advice on Scoping for an Integrated Multi-Sector Plan and SEA
for the Lower Zambezi Basin, Mozambique

(appendices 1 to 7)

APPENDIX 1

Letter of MICOA of 21 June 2011.

REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO PARA A COORDENAÇÃO DA ACÇÃO AMBIENTAL

GABINETE DO MINISTRO

To: Sra. Verónica ten Holder
Director NCEA
The Netherlands

N/Ref. n.º 58 / SP-GM/MICOA/11 Maputo, aos 21.06 de 2011

Subject: Dutch support to the Strategic Environmental Assessment (SEA) for the Zambezi River Catchment

Further to our communications concerning to the Zambezi River catchment SEA, we agree with NCEIA considerations, raised in the email of 27th May 2011, mainly the urgent need for Government to clarify the main aim of the proposed SEA exercise, before the scoping mission comes to Mozambique (the trip is expected to take place from 1st to 9th July 2011), due to its impact on the composition of the scoping team and in order to maximize the inputs of this team on the SEA process itself.

Thus, we would like to inform you that we held a meeting (in April) with all the relevant sectors on the importance of having a SEA in the Zambezi catchment. The reactions have been very positive and based on the discussions with the sectors, Government is proposing an integrated development approach for the SEA process. The SEA procedure and process should support the elaboration of a Multi - sectoral Development Plan for the Zambezi Catchment (instead of a Spatial/Territorial Zambezi River Plan), involving various sectors including environment, mining, transport, energy, agriculture, water and fisheries sectors. The goal of the exercise, based on the natural potentialities of this region, is to maximize the exploitation on equitable basis (for the state, private sector and local communities), with minimum inter-sectoral conflicts and on an environmentally sustainable basis.

With this information we do hope that we have clarified NCEIA concerns and we are looking forward to a dynamic collaboration with scoping team the first week of July to drive this important process forward.

Yours sincerely

O SECRETARIO PERMANENTE

Maurício Xerinda
(Especialista C)

CC: Embaixada da Holanda

Rua de Kassuende n.º 167 — C.P. 2020 — Maputo-Telefs: 21492355 / 21498114 / 21492403 /— Fax: 21485266 / 21496108 E-mail: micoagm@gmail.com

APPENDIX 2

Project information and composition of the Commission's working group

Proposed activity: The Netherlands Commission for Environmental Assessment has been requested by the Mozambican Ministry for the Coordination of Environmental Affairs (Ministério para a Coordenação da Acção Ambiental - MICOA) to advise on an integrated multi-sector development plan and SEA for the Lower Zambezi Basin that involves various sectors, including: environment, mining, transport, energy, agriculture, water and fisheries. The advice gives an overview of the design of the general planning process, which is further detailed in a Terms of Reference for the general agenda setting for the Lower Zambezi Basin. This ToR assures that environmental and social interests are equally represented in the planning process.

Categories: DAC/CRS: 41010 Environmental policy and administrative management; 21010 Transport policy and administrative management; 32210 Mineral/ mining policy and administrative management; 14010 Water sector policy and administrative management; 23010 Energy policy and administrative management; 23065 Hydro-electric power plants; 31110 Agriculture policy and administrative management; 31310 Fishing policy and administrative management.

Project number: Netherlands Commission for EA (NCEA): 090

Procedural information:

Receipt request for Advice	: 21 June 2011
Site visit to Mozambique by the Working Group	: 1- 9 July 2011
Submission of Final Draft Advisory ToR	: 31 October 2011

Composition of the working group of the Commission for EA:

Mr Adriaan van den Dries
Mr Sibout Nooteboom
Mr Elissaios Papyrakis
Mr Pieter van der Zaag (chair)

Technical secretaries:

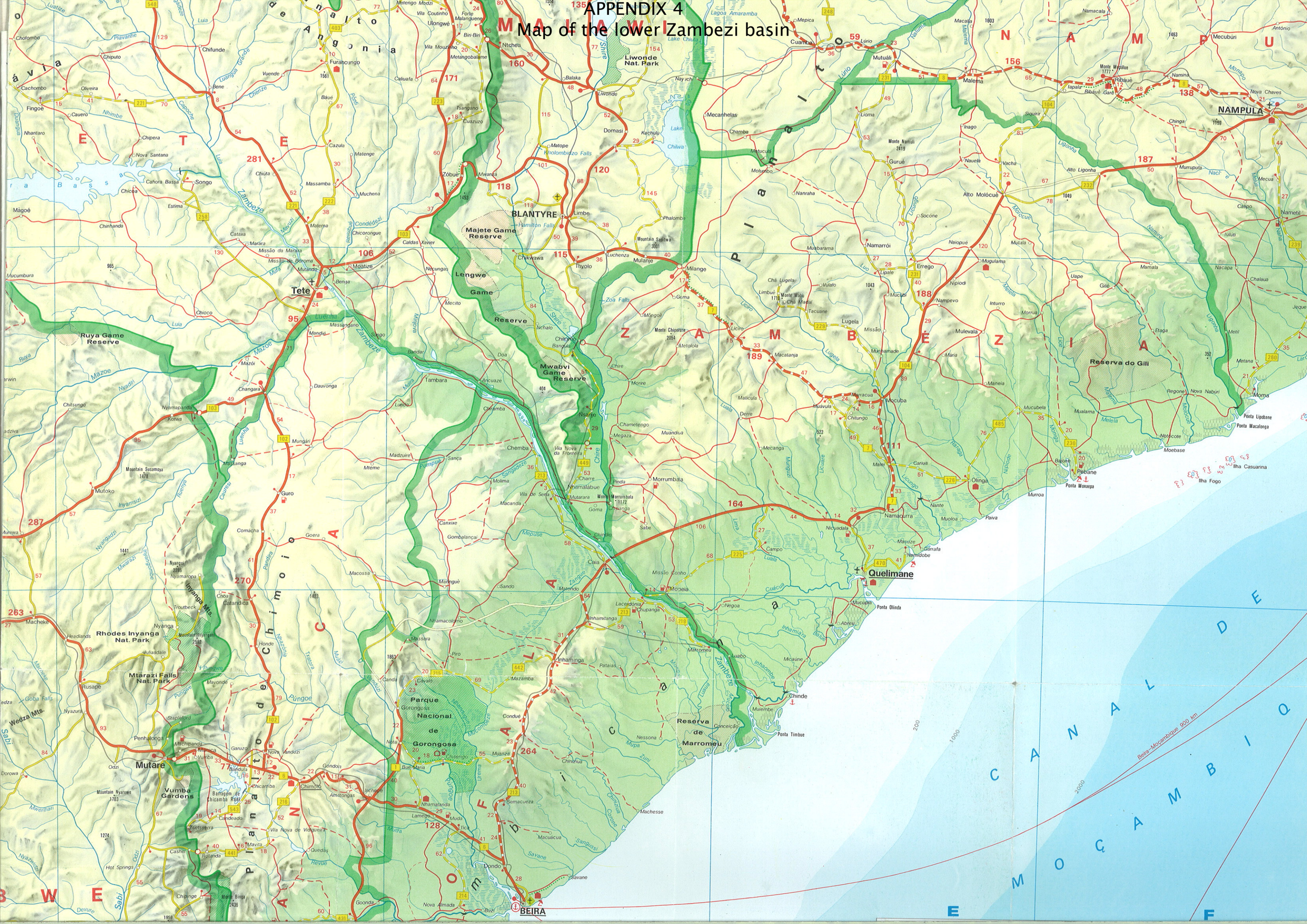
Ms Sara Groenendijk	(first technical secretary)
Mr Reinoud Post	(second technical secretary)

Appendix 3
Programme of the scoping mission

	Date	Location	Name	Position	Institute abr	Institute full
MAPUTO	fri, 1st july	Hotel Terminus	Domingos Gove	Internal Consultant	MICOA	Ministério para Coordenação da Acção Ambiental - Department of Planning and Studies - SEA Unit
	fri, 1st july	Hotel Terminus	Roberto Albino	Director General	Agência do Zambeze	Agência de Desenvolvimento to Vale do Zambeze
	fri, 1st july	Hotel Terminus	Salvo Tchamo	SEA Officer	MICOA	Ministério para Coordenação da Acção Ambiental - Department of Planning and Studies - SEA Unit
	sat, 2nd July	Travel to Tete				
TETE	sun, 3rd July	Hotel Nhungue	Team meeting future planning and strategy			
	sun, 3rd July	Hotel Nhungue	Carlos Baúte	mining expert	DP MIREM	Departamento Provincial do Ministério dos Recursos Minerais
	mon, 4th July	DP MTC office	Paz Caetano S. Catruza	Diretor Provincial	DP MTC	Departamento Provincial do Ministério dos Transportes e Comunicações
	mon, 4th July	DP MIREM office	Lago Correia	Substitute Provincial Director	DP MIREM	Departamento Provincial do Ministério dos Recursos Minerais
	mon, 4th July	MICOA DPCAA	Hermenegildo Galimoto Pacate	Gestor Ambiental (Chefe do Dpto. de Gestao Ambiental), Substituto do subs	DPCAA	Direccao Provincial para Coordenacao da Accao Ambiental
	mon, 4th July	Cateme Resettlement area	Sra. Marcela			
	mon, 4th July	DP MINAG			DP MINAG	Departamento Provincial do Ministério da Agricultura
	mon, 4th July	DP MPescas			DP MPescas	Departamento Provincial do Ministério de Pescas
	mon, 4th July	WWF office	Oscar Silembo	Senior Freshwater Ecologist - Zambezi Riveer Basin Environmental Flows Prc	WWF	World Wildlife Fund - WWF Zambia Country office
	mon, 4th July	WWF office	José A. Chiburre	Programe Leader Joint Zambezi River Basin Environmental Flows Programm	WWF	World Wildlife Fund Head Office Lusaka / Maputo Office / Tete Office
	mon, 4th July	ARA-Zambezi office	Cacilda Machavo	Director	ARA-Zambezi	Administração Regional de Águas do Zambezi
	mon, 4th July	ARA-Zambezi office	Deguilda Conceiçao	Legal Officer	ARA-Zambezi	Administração Regional de Águas do Zambezi
	tue, 5th July	Hotel Zambezi	Roberto Albino	Director General	Agência do Zambeze	Agência de Desenvolvimento to Vale do Zambeze
	tue, 5th July	Travel to Quelimane				
QUELIMANE	tue, 5th July	Hotel Jupter	Antonio Hoguane	Director Escola Superior de Ciências Marinhas e Costeiras		Universidade Eduardo Mondlane
	wed, 6th July	Jan de Moor's house	Jan de Moor	Agricultural expert Zambezi		
	wed, 6th July	Jan de Moor's house	Alcelmo Braz	Agricultural expert Zambezi		
	wed, 6th July	Travel to Maputo				
MAPUTO	thu, 7th July	MIREM office	Suzette Taimo	Funcionário do Departamento do Meio Ambiente	MIREM	Ministério dos Recursos Minerais
	thu, 7th July	MIREM office	Luís Alberto Mahoque	Funcionário do Departamento de Planificação e Desenvolvimento	MIREM	Ministério dos Recursos Minerais
	thu, 7th July	M.Energia office	Anísio Pinto	Funcionário do Departamento do Meio Ambiente	M.Energia	Ministério da Energia
	thu, 7th July	DNA office	Delario Sengo	Head Gabinete de Rios Internacionais	DNA- GRI	Direcção Nacional de Águas
	thu, 7th July	RNE	Celia Jordão	Programme Officer Sustainable Development		Embassy of the Kingdom of the Netherlands Maputo
	thu, 7th July	Riversdale office	Ivo Lorenço Jr.	Community Development Analyst	Riversdale	
	thu, 7th July	Riversdale office	Alastair Lax	General Manager Logistics	Riversdale	
	thu, 7th July	MITUR office	Abel Nhambanga Oraca	Técnico do Departamento de Estudos e Fiscalisação	MITUR	Dir. Zonas de Conservação
	thu, 7th July	MITUR office	Elias Cuambe	Técnico do Departamento de Estudos e Fiscalisação	MITUR	Dir. Zonas de Conservação
	thu, 7th July	M.Pescas office	Flora Simão	Funcionária da Direcção de Economia de Planificação Pesqueiras	M. Pescas	Ministério das Pescas
	fri, 8th July	MTC office	Ambrósio Sitoe	Diretor do Dep. de Economia e Investimento	MTC	Ministério Transport e Comunicação
	fri, 8th July	MTC office	Fernanco Ouana	Funcionário Estatística	MTC	Ministério Transport e Comunicação
	fri, 8th July	MTC office	Sérgio Rodrigo	Funcionário ...?	MTC	Ministério Transport e Comunicação
	fri, 8th July	AMDCM office	Eugenio Silva	Director General	AMDCM	Associação Moçambicana para o Desenvolvimento do Carvão Mineral
	fri, 8th July	INGC office	Rosa Almeida		INGC	Instituto Nacional de Gestão de Calamidades
	fri, 8th July	Presentation Preliminary findings MICOA				
	sat, 9th July	Presentations at AMAIA				
	sat, 9th July	Travel to NL				

APPENDIX 4

Map of the lower Zambezi basin



APPENDIX 5
The Ecosystem Services Approach

The ecosystem services approach acknowledges that the value of the whole range of services offered by our ecosystems needs to be assessed and taken into account when we evaluate different scenarios. Some of the *direct* services offered by our ecosystems can be easily monetised, since these are traded in markets and hence an appropriate price is available. This is the case, for instance, for the value of shrimps harvested and any corresponding loss incurred as a result of mangrove degradation. There is also a wide range of *indirect* uses of ecosystem services, for instance related to the coastal protection offered by mangroves or amenity ecosystem services (e.g. aesthetic enjoyment, recreation, spiritual fulfilment). Re-establishing environmental flows in the Zambezi, for instance, could provide multiple ecosystem services in the form of enhanced coastal protection by mangroves or support of the Ramsay wetland reserve. Although these indirect services may be valuable to us, there is no direct market value attributed to them. The ecosystem services approach can valuate these services with appropriate economic techniques, such as contingent valuation, revealed preferences, hedonic pricing). This is necessary for the purposes of comparison; i.e. for contrasting the value of any economic activity with the value of all ecosystem services affected as a result of it.

Non-use values can also be important and need to be evaluated. These can relate to the value of biodiversity (e.g. for future use for genetic resources), altruistic values (e.g. indigenous rights, right of existence of species) or bequest values (avoiding environmental damage for the benefit of future generations). A scenario of rapid economic growth can mistakenly rank first in a list of alternative options, if one only looks at contributions to current GDP levels. Alternatively, a scenario of more modest economic growth, that takes into account the value of ecosystem services (all positive/negative environmental and health side-effects), can rank higher when one applies the ecosystem services approach.

Provisioning Services Products obtained from ecosystems	**Regulating Services** Benefits obtained from regulation of ecosystem processes	**Cultural Services** Nonmaterial benefits obtained from ecosystems
• Food	• Climate regulation	• Spiritual and religious
• Fresh water	• Disease regulation	• Recreation and ecotourism
• Fuelwood	• Water regulation	• Aesthetic
• Fiber	• Water purification	• Inspirational
• Biochemicals	• Pollination	• Educational
• Genetic resources		• Sense of Place
		• Cultural heritage
Supporting Services Services necessary for the production of all other ecosystem services		
• Soil formation	• Nutrient cycling	• Primary production

Source: *Millennium Ecosystem Assessment, 2005; p 57: Fig.2.1. Ecosystem services*

APPENDIX 6

Example of a consistency matrix

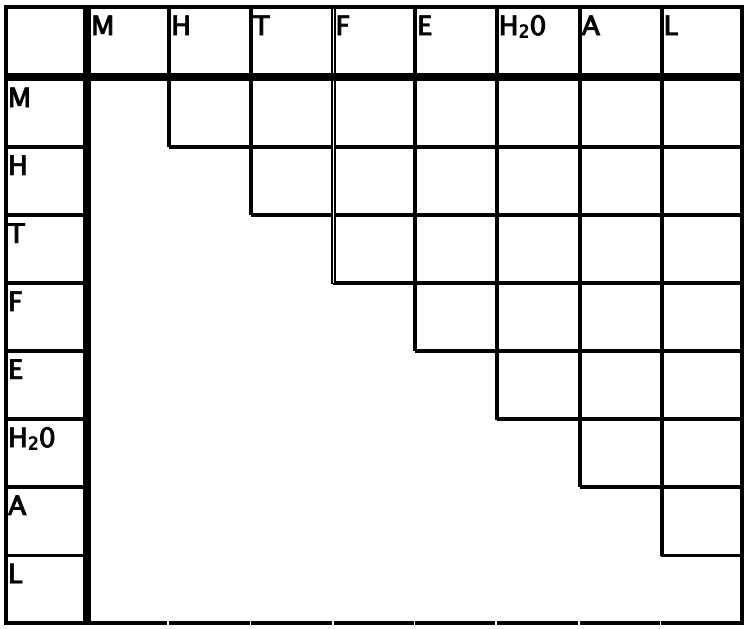


Figure 1: Example of a consistency matrix. The letters refer to the different sectors; M: Mining; H: Hydropower, T: Transport; F: Fisheries; E: Environment; H20: Water; A: Agriculture; L: Livelihoods.

This consistency matrix for planning phase 1 may also be used as a tool for setting priorities for phase 2: on the one hand to prioritise cooperation among sectors that may lead to grasping opportunities and, on the other hand, to anticipate and manage potential conflicts between sectors. This may be done the following way:

- each cell in the matrix can be ranked according to 'urgency' and 'importance' for the agenda
- issues that are both most urgent and most important are priorities for phase 2

On basis of its current knowledge of the issues in the valley, and as starting point/example for discussion, the NCEA has filled in the matrix (see Figure 2 below). From this filled in matrix, necessary cooperation may be distilled.

	M	H	T	F	E	H_20	A	L
M		0	++	−	−	−	+	+/−
H			+	−	−	0	+	0/+
T				−	−	0	+	+/−
F					+	0	+	+
E						0	−	+
H_20							−	?
A								+
L								

Figure 2: Preliminary consistency matrix for the Zambezi valley. The letters refer to the different sectors; M: Mining; H: Hydropower, T: Transport; F: Fisheries; E: Environment; H20: Water; A: Agriculture; L: Livelihoods. (+) refers to the potential of two sectors to positively influence each other's development; (-) refers to a negative influence; and (0) to no influence.

APPENDIX 7

Documents Consulted

Relatório de EPDA, 08 de Junho de 2010 : **Projecto** de Transporte Fluvial de Carvão da Riverdale no Rio Zambeze, Moçambique [p. 1-342] www.erm.com

Republica de Moçambique, Ministério das Obras Publicas e Habitação, Direcção Nacional de Aguas, Agosto de 2007 : **Estratégia** Nacional de Gestão de Recursos Hídricos [p. 1-34]

Republic of Mozambique, Ministry of Agriculture, draft October 2010 : **Strategic** Plan for Agricultural Development PEDSA 2010 – 2019, for an integrated, prosperous, competitive and sustainable agricultural sector – October 2010
[p.1- 71]

Politica de Aguas, Agosto 2008 [p.1-45] , **revisão** de Governo da Politica de Aguas.

Concept Note : **Oportunidades** para desenvolvimento rural na base de infrastruturas de control de agua para agricultura: O Delta do Rio Zambeze. [p.1-6]

Riversdale Mozambique Limitada, February 201 1: **Riversdale** Coal Barging Project Phase 2: Scoping and Environmental Social and Health Impact Assessment – Environmental Flow Assessment, Vol 1: Main Report [p.1-109]

Riversdale, Relatorio de EPDA, Julho 2011: **Projecto** da Mina de Carvao do Zambeze [p.1-96] www.erm.com

Ministério dos Transportes e comunicações : **Visão** estratégica para o desenvolvimento de transportes – Visão e Implementação; estratégia MTC.ppt [slides 1-51]

Influencia da precipitação e escoamento do Rio Zambeze na abundância de camarão na região do banco de Sofola ; CHAPATA - Camarão - Trabalho de licenciatura.doc [p.1 - 39]

Eduardo Mondlane University, Faculty of Sciences, Department of Physics, P.O. Box 257, Maputo - Mozambique; A.M. Hoguane (e-mail: hoguane@hotmail.com) Abstract : The **role** of Zambezi runoff in the shrimp abundance in Sofala Bank, Fluctuations in shrimp abundance are positively correlated to the Zambezi runoff during the wet season and negatively correlated to the dry season runoff.

Eduardo Mondlane University, Faculty of Sciences, Department of Physics, P.O. Box 257, Maputo - Mozambique; Hoguane, A.M. (e-mail: hoguane@hotmail.com) and WWF Mozambique Country Office, R. Reinaldo Ferreira, 72 , P.O. Box 72, Maputo – Mozambique; Motta, H. (e-mail: hmotta@wwf.org.mz) Oct 2004 : **Major** threats to coastal and marine environment in Mozambique- Mozambique National Report, 30 November 2001[p.1-125]

SADC-WD Zambezi River Authority, SIDA/DANIDA, Norwegian Embassy Lusaka, Euroconsult Mott MacDonald : **Integrated** Water Resources Management Strategy and Implementation Plan for the Zambezi River Basin, April 2008 [p.1-127];

http://www.elmed-rostov.ru/Projects/Zambezi%20Strategy/PDF/Final_Strategy_Apr08_ZAMWIS.pdf

The World Bank, Water Resource Management, Africa Region The Zambezi River Basin : A **Multi-Sector** Investment Opportunities Analysis, Volume 1, Summary Report, June 2010 [p.1-52]
http://siteresources.worldbank.org/INTAFRICA/Resources/Zambezi_MSIOA_-_Vol_1_-_Summary_Report.pdf

Centre de Integridade Publica Moçambique; Selemane, T., Nombora, D. : **EITI** Implementation, natural resources management and urgency of renegotiating and publishing the contracts with mega-projects: The case of Mozambique, Maputo June 2011 [p.1-24]

Museum of National History, Eduardo Mondlane University, Faculty of Sciences, Department of Physics, P.O. Box 257, Maputo - Mozambique; compiled by Beilfuss, R. (Carr Foundation-USA and International Crane Foundation-USA) and Browne, C. (Southern Water Ecological Research and Consulting-South Africa : **Assessing** Environmental Flow Requirements for the Marromeu Complex of the Zambezi Delta: Applications of the Drift Model (Downstream Response to Imposed Flow Transformations) [p.1-163]

AgDevCo, draft report 21 February 2011 : **Beira** Agricultural Growth Corridor (BAGC) Breadbasket Strategy and Investment Plan, Mozambique [p.1-88]

IIED, 2010; Nhantumbo, I.; Salomão, A. : **Biofuels,** land access and rural livelihoods in Mozambique [p.1-58]

Global Crisis Solutions, June 2011; Swain, A.; Swain, R.B.; Themnér, A.; Krampe, F. : **Climate** Change and the Risk of Violent Conflicts in Southern Africa [p.1-118]

WWF, September 2010; Geenen, B.; Schepers, F. ; Chiburre, J.; Nell, D. : **Joint** Zambezi River Basin Environmental Flows Programme, Inception Phase Description [p.1-19]

Waterschap de Dommel, WWF, ARA-Zambeze, Mission Report, Boxtel The Netherlands, 2 December 2010; Heijnen, T.; Bekkers, J. : **Fact-finding** mission to ARA Zembeze, Mozambique 3-16 October 2010 [p.1-28]

UNDP-GEF International Waters Project; Paisley, R. et al : **International** Waters: Review of Legal and Institutional Frameworks [p.1-309]

Hydroplan; EUROPEAID/119860/C/SV/multi - Lot No.2 : **Prefeasibility** Study for the Reopening of the Shire - Zambezi Waterway Malawi - Mozambique [p.1-97]

WWF/MICOA (? Draft?) Report January 2010 : **General** Management Plan for the Marromeu Complex - A Wetland of International Importance; Part 1 [p.1-106] and Part 2 [p.1-21]

JA! Justiça ambiental - FOE Moçambique; Ribeiro, D. (Mestrado em Ecologia);; Dolores, S. (Licenciado em Biologia) e tal : **Gestão** da Bacia Hidrográfica do Médio e Baixo Zambeze em Períodos Críticos [p.1-34]

WWF, International Crane Foundation (ICF); Baloura, J.; Milice, A. et al : **Zambezi** Delta Wetland – Vision and Project Proposal for Zambezi Delta Wetland

Vale Columbia Centre on Sustainable International Investment, Columbia University, June 1, 2011 : **Resource-Based** Sustainable Development in the Lower Zambezi Basin - A draft for consultation [p.1-150]