

MOZAMBIQUE ANNEX IV. AREAS OF CONCERN

From version MEDA_Mozambique_Rose_Lucy_Clousa1-v2

2. BIOPHYSICAL ENVIRONMENT

2.1 Description of the Coast and distinctive features

A study carried out by the ENVISION (2006) under the ODINAFRICA project, has identified coastal pollution, overfishing and coastal erosion as the main issues to be addressed in Mozambique to provide answers to a number of uncertainties arising nowadays with direct consequences on the livelihoods of the coastal population and even those depending on coastal resources.

2.2 General description of the climate

The precipitation in Mozambique has many influences on the livelihood of the coastal population, as these populations normally live in lowland terrain. It was also mentioned in this text that the climate of Mozambique is characterized by temporal variability. The issues related to the capacity to predict the occurrences of droughts and floods seem to be of the main interest.

2.3 Marine and coastal geology and geomorphology

The lack of systematic observations of geological variables such as the seismicity of the Mozambican coastal zones.

The effects of mangrove harvesting by the fisherman, on the stability of the coast

The need to understand the effects of the recent earthquake and subsequent landslides which happened in the center of Mozambique on the stability of coastal areas.

2.4 Freshwater resources and drainage, including rivers, estuaries, deltas and coastal lakes

Most of international rivers which cross Mozambique exhibit temporal variability in their discharges, due to the variability inherent to seasonality and the variability due to the demand on fresh water in the other countries. It seems that there is a need to establish a set of agreements with the countries crossed by the international rivers, so that the negative impacts (sedimentation, accretion, salt intrusion) of their water usage on Mozambique can be avoided.

2.5 Physical Oceanography

2.5.1 Currents

A better understanding of current regime in the Mozambique Channel is the main requirement, as this would improve our knowledge of the water mass balance between Indian and Pacific as well as the Indian and Atlantic Oceans. At the small or medium scale, the understanding of the current regime in Mozambique Channel would lead to a better understanding of the behavior of the cyclonic and anticyclonic gyres occurring in the Channel, and their influence on the marine systems.

2.5.2 Tidal regime and waves

As mentioned before in the section 2.5.1, coastal degradation needs to be addressed at high or medium priority level. In order to do this, a knowledge of wave patterns is crucial to understanding the coastal processes that underlie coastal erosion. The Mozambique coast is the third largest coast in Africa, and there are at this time only four tide gauge in operation Ref

or pers comm.). The observation of tides and the posterior analysis in order to get data base is other of the issues, as this would lead to carry out studies which would allow a deeper understanding of sea level variation and trends.

2.5.3 Sea Level Change

The main areas vulnerable to the effects of sea level change in Mozambique are the coastal zones along the whole extent of the country, mainly the major cities of Maputo, Beira and Nampula that have the largest populations and thus experience the effects of the human intervention in the coast. Modifications of the natural structure along the whole coast are also observed, due to the increasing tourism activities in Mozambique, including in non urban areas. The Ministry for Environmental Affairs (MICOA) is struggling to produce a platform that will regulate the occupation and use of coastal areas, including pollution due to inland activities, without major negative effects.

Sea level changes will demand adaptation measures in most Mozambican estuaries prone to salt intrusion associated with their natural configuration, causing big changes in the estuarine ecosystem. Agriculture in the lower plains of the rivers flowing into the Indian Ocean will be affected due to salinization (Cossa 2001).

Many wetlands and marine protected areas will also be affected due to the circulation changes linked to the possible rise in the sea level; ecosystems will be affected in most of the marine protected areas such as Arquipelago das Quirimbas, Bazaruto, Inhaca and Ponta do Ouro (Chemane *et al.* 1994)

2.5.4 Ocean Temperature

This whole section can be moved to inshore resources /fisheries, as it is descriptive, not necessarily relevant to ocean temperature. Two productive areas are recognized in Mozambique Coast. The Sofala Bank and the De Lagoa Bight, contribution through their rich fisheries to the economy of Mozambique, while the northern coast is renowned for holding most of the marine protected areas rich with coral reefs. According to Chemane *et al.* (1997) the surface temperature of the sea in Mozambique varies between 25 and 29 °C and the marine fauna and flora are typical of warm waters. Coral reefs exist along the Mozambique Channel, especially in Bazaruto, Nacala and Pemba, Mozambique Island and other areas located further south. All these areas are protected by law, the law of the environment, but the major difficulties are linked to the enforcement of these laws.

The territorial offshore waters extend for about 100 000 km², with potential for commercial fisheries to be of about 391 000 t, representing one of the most important resources Chemane *et al.* (1997). These quantities correspond to 41 000 t of crustaceans (Shallow and deep water shrimp, lobster and crabs), 325 000t of demersal and pelagic fishes and 5500t of mollusks and seaweeds.

In Mozambique the total mangrove coverage has been estimated at 500000 ha as a result of the many rivers draining into the coast. Chemane *et al.* (1997) pointed out that this was depleting at a rate of 4 % in 18 years up to 1998, reaching levels of 15.2 % in Maputo province and 4.9 % in Sofala, The growth of population in coastal regions, associated to the developing tourism has been continuing to increase the mangrove depletion rate, although some projects of reforestation exist in the ministry of environmental affairs.

Several measures are to be carried out in order to protect coral reefs. As underlined by Schleyer *et al.* (1999), some of the measures include monitoring reef recovery at bleaching and COTS sites and develop a management plan for Mozambique's coral reefs. This demand capacity building and financial resources.

2.5.5 Salinity patterns

Full understanding of ocean circulation will contribute to the understanding of global changing of the climates, since the Agulhas Current that receives water from the Mozambique Channel is known to influence global climate.

Research in the coastal region will also need to be done, due to the augmentation of land based activities in the country bringing major concerns for the management of the coast.

Influence of sea level rise and cyclones increases the vulnerability of the coastal zones, causing deterioration of the conditions of life for most of the people that live there.

2.5.6 Ocean Atmosphere Interactions

Although the Mozambique Channel is linked to the generation of cyclones, it's not clear what the mechanism behind their generation is. Coupled ocean-atmosphere models should be run in order to clarify this subject.

Air pollution in Mozambique is not a major problem at the moment but it is estimated that in the near future, a problem may arise due to the projected economic growth.

2.6 Chemical and Biological Oceanography

2.6.1 Nutrients

The biological and oceanographic characteristics of the Mozambique Channel and adjacent shelf regions are poorly known due to the lack of research studies in these regions (eg. Barlow et al, 2007 and 2008).

2.6.2 Persistent organic/inorganic pollutants

Sewage and Domestic Solid Wastes

Fecal coliform content in the water within the channel adjacent to the Infulene River in Maputo is high (4.6×10^5 bacteria counts/100 ml). In the river mouth it exceeds 2400 bacteria counts/100 ml. Faecal coliform, faecal streptococci and *E. coli* were also detected in both marine waters and shellfish tissues in other places within Maputo Bay (REF). The concentrations found in the shellfish were extremely high. The water in some places in Maputo Bay, particularly where the discharge of sewage takes place, such as Miramar at the entrance of the Maputo Estuary, is not safe for swimming. High values of biological pollution have also been recorded at the Beira Bay and Nacala Bay, although in lower concentrations compared with those observed in Maputo Bay (Motta *et al.* 1998). There is only one sewage water treatment plant in the country, located in Maputo city, in the Infulene river mouth.

Eutrophication

High levels of BOD and COD, and low content of dissolved oxygen have been detected in the Infulene River, downstream of the factories. The presence of water hyacinth and *Pistia* is a clear evidence of nutrient rich water (Motta *et al.* 1998). Although no data are available, we believe that the situation in the city of Beira would be similar to that of Maputo.

Untreated industrial waste

Most of the industries in Mozambique are located in the coastal cities Maputo, Matola and Beira. Most of these industries do not treat or do not have adequate treating mechanism for their effluents, which in most of the cases contain toxic elements. These are discharged directly into the tidal channels or in coastal waters. Analysis by the National Laboratory for Food and Water and the Maputo Water Authority has revealed the presence of heavy metals particularly lead in different locations such as the Port of Maputo, in the mouths of Matola and Maputo rivers and in Nacala Bay.

Agricultural run-off

Agricultural activities within the coastal region and in the hinterland areas contribute to the pollution of coastal, marine and associated freshwater environment, through sediments and use of

pesticides and fertilizers. Since most of the agricultural activity takes place along or close to the main river basins, the rivers are the main pathways through which agrochemicals enter the coastal and marine environments. The major rivers with intensive agricultural activity are the Monapo (in Nampula Province), the Zambezi, with agricultural activity of Zimbabwe and Zambia, among others, the Pungué, with tobacco plantations in Zimbabwe, the Limpopo and the Incomati, used in intensive farming in South Africa and the Umbeluzi, used for sugar cane plantation in Swaziland (Massinga and Hatton 1997). The contribution of Mozambican farming to the pollution of water is negligible. However, one should take note of the increasing agriculture activity as a consequence of the increasing foreign investment and following the peaceful environment in the country.

Oil spills

The main international ports in Mozambique are Maputo, Beira and Nacala. The port of Beira is the one which handles most petroleum products as it has the largest petroleum refinery (with a capacity of nearly 110 000 m³). The Pipeline transporting petroleum to Zimbabwe is connected through the port of Beira. About 1 to 1.5 million tons of petroleum is pumped to Zimbabwe through this pipeline every year. There are more ports in the country with oil deposits from or to which oil is pumped with associate risks for oil spill during the course of the operation. Pollution from ships along the Mozambican coast is often related to:

- Oily bilge water and oil sludge from engine rooms discharged at sea
- Accidental oil spills from damaged tankers
- Blasting and cleaning operations.

It is estimated that ca. 450 millions tones of hydrocarbon products transit annually through the Mozambique Channel transported by tankers including large crude carriers. The potential risk for oil spill is therefore high. The prevailing winds (South-easterly trade winds) make the Mozambican coast most vulnerable, as evidenced during the Katina-P oil spill in 1992 near Maputo Bay (Massinga and Hatton 1997).

Suspended solids

Bad land-use practices which, among others, include poor farming practices and deforestation in the coastal and in the hinterland areas, are the main reasons for the excessive inflow of sediments in the coastal and marine environments of Mozambique (Hatton 1996). In Maputo and Beira bays the siltation is further aggravated by the systematic dredging of the navigational channels. A recent survey by the dredging company (EMODRAGA) indicated that about 1,200,000 m³ and 2,500,000 m³ of sediments are annually dredged in the ports of Maputo and Beira, respectively.

2.6.3 Primary production

The cruise conducted throughout the coast of Mozambique, in 2007 showed that areas of high concentration of phytoplankton are the located in the vicinity of the rivers. These areas are the Sofala Bank in the central zone, Delagoa Bight, in the south and Angoche in the north

2.6.4 Secondary production

The Sofala Bank and North of Mozambique coast are the only studies areas that have data information about zooplankton from cruises report and some studies (Lutjeharms 2006, Barlow *et al.* 2008, Leal *et al.* 2009). The ASCLME program, Dr. Fridtjof Nansen, survey 2008 is reported about the north region of Mozambique.

2.7 Coastal zone and continental shelf

2.7.1 Description and extent of coastal and marine habitats

In general, the major threats to Mozambican coastal ecosystems involve mangrove harvesting, inappropriate development of the tourism industry which promotes degradation of coral reefs, beaches and other natural resources, disproportionate fishing effort allocation and the

use of inappropriate and destructive fishing methods (eg beach seine, Mosquito nets, poisoning) and accidental capture of sea turtles by fishermen.

Bleaching is an area of concern. According to Schleyer *et al.* (1999) there was evidence of bleaching in some localities, and these, can be seen below in order, from north to the south.

- Pemba Wimbe Beach, Quilalulia Channel, Quilalulia, Pemba Bay
- Nacala Fernao Veloso Bay
- Angoche Baixo St. Antonio, Mafamede Island
- Bazaruto Island Inner Two-mile Reef, Coral Garden, Lighthouse Reef
- Inhambane Mike's Cupboard, Coral Garden, Anchor Bay (all at Ponta da Barra), Cabo dos Correntes (Paindane)
- Inhaca Island Pta Torres, Pta Torres Channel, Barreira Vermelha

The effects of El Nino bleaching in Mozambique were most extensive according to Schleyer *et al.* (1999) having affected the reefs in the north to the greatest extent (up to 99%) with the effects diminishing considerably further south except at Inhaca Island where serious recent bleaching (90%) was encountered. Extensive COTS damage was also found at Bazaruto (80%) and Inhambane (95-98%). The COTS outbreaks commenced in 1995-1996 and, as sufficient time has elapsed for reef erosion and collapse to occur, the damage on these reefs was more pronounced. The consequences of the El Nino bleaching are going to be even more serious as coral mortality on the northern reefs was as high as 99%; a similar progression in the collapse of reef structure on the seriously bleached reefs is anticipated. The biodiversity of these sites will be impaired as only low coral recruitment was observed at the Bazaruto COTS site. The fish populations on the damaged reefs, the basis of many of Mozambique's valuable artisanal fisheries, were also poor. Both the fisheries and the tourism value of these sites will thus be affected, parameters that will have to be quantified.

Comment [R1]: Plagiarized from Schleyer et al 1999 please revise completely

2.9 Macrofauna (state of biological knowledge)

2.9.2 Fish and fish resources (state of biological knowledge)

Catch locations of non-commercial threatened species (eg coelacanths, dugongs).

The Fishery Law /Lei das Pescas 3/90, is attempting to protect the threatened species (sea turtles, dugongs, etc) through the establishing the Marine protect areas such as Parque Nacional das Quirimbas, Parque Nacional de Bazaruto, Reserva Especial de Ponta de Ouro. The conservation police has been developed by the Mozambican government. The potential areas for threatened species are Arquipélago de Bazaruto, Ponta de Ouro, Reserva de Maputo, Ilha da Inhaca and Ilhas Primeiras e Segundas.

Pollution /fishing methods (seabirds and coastal birds)

Destructive fishing methods

The main practices of destructive fishing reported and used in Mozambique are associated with the use of inadequate gears such as mosquito nets, dynamites and poison with pesticides or poisonous plants. These practices are destructive because they do not discriminate between species and also kill eggs and larvae, as well as they destroying the habitat. They threaten protected species such as the dugongs and sea turtles.

On the Sofala Bank there is little marine vegetation near shore that could be damaged by beach seines. It is certainly possible that beach seines may damage the seabed, but in the absence of any study it is not possible to take a definitive position. Whatever is the case, the degree of damage will be influenced by the technical specification of the net. In addition, the beach seine fishery harvests adults and juveniles of both small and large species. Generally, catches of small and juvenile shrimp outweighs those of adult shrimps. The catches of small

and juvenile shrimps are a result of two factors; firstly, because seining is undertaken in estuarine systems which are used by juvenile shrimp as nursery areas and secondly, because of the widespread use of nets with smaller size, such as bags and mosquito nets, to line the cod-ends of seine nets. The high level of mosquito nets utilization can be partially explained by the existence in Angoche of beach seine fisheries targeting *Solephorus* (of similar size to whitebait) and the shrimp *Acetes* where its adult is typically less than 4 cm long. No specific study has been done to document the quantity of juveniles of other species that are caught by either of these nets, nor the impact on stocks. The mini beach seine developed at least partially as a secondary gear, deployed in shallow water behind a mechanized beach seine and a small net (Quinea) are still occasionally deployed behind the larger seine nets to catch small and escaping fish.

Effects of aquaculture

Habitat destruction

The use of mangroves as firewood and in construction by local communities has been identified as the major cause for mangrove losses and deforestation in Mozambique. Any pressure placed on mangroves and marine grasses can affect other coastal ecosystems because of their permanent relationship in the environment. These habitats are nursery areas for many species and have high diversity. Their fragile condition makes them extremely vulnerable to exploitation. The people on the coast are involved in fishing activities and collection of invertebrates as a source of animal protein. The consequences in many cases are habitat degradation because of the use of destructive gears and methods of collecting these invertebrates.

Maputo Bay and Beira (Sofala) are the main areas where mangroves degradation is more accentuated. The corals are exploited for house construction and for sale to tourists. Coral destruction is also caused by beach seine fishing, dynamite and diving practices (fishing and tourism). The main areas with more accentuated destruction of the corals include the whole North area where the destructive fishing practices are more prevalent. No specific studies have been made looking at the damage caused to the seabed by beach seines in Mozambique. During some observations made in Inhambane, large amount of sea grasses were landed at each haul. It was invariably dead and showed no signs of having just been ripped from the seabed (Ref?). Detritus is a very important form of nutrient transfer in seagrass beds so this would impact the ecosystem.

Effects of tourism

Recreational fishing is practiced across the Mozambican coast where tourist resorts exist. The recreational sector comprises ski boats, shore anglers and spear fishers. Also included should be (non-consumptive) SCUBA divers, who depend on healthy reefs and fish resources to practice their form of recreation, much of it tourist related. The landings made by these fishers' amounts to many tons per annum. Around 30-40% of catches of the recreational fishing (by numbers) consist of demersal species (mainly Serranidae, Sparidae, Lutjanidae, and Lethrinidae) and the game fish catches are mainly comprised of *Scomberomorus commerson* (sierra) and *Thunus albacares* (albacore) (ref?)

2.9.3 Marine Mammals

Marine mammals are vulnerable to destruction of habitat, accidental and intentional catches and pollution (Guissamulo 1993).

Little is known of the extent of marine mammal bycatch in Mozambique. Entanglements in gillnets appear to be a major cause of dugong mortality along the whole coast. The level of this threat has increased since the early 90s alongside an increase in gillnet use (WWF EAME 2004). Interview surveys with fishers confirmed that humpback dolphins are also caught in the drift gillnet fishery (Guissamulo and Cockcroft 1997). Gillnets seem to affect small coastal cetaceans, particularly bottlenose and humpback dolphins. A marked decline in coastal dolphin populations was observed in the early 90's (Cockcroft and Krohn 1994). Intentional

captures also contribute to the decline of humpback dolphins (Guissamulo and Cockcroft 1997).

2.9.4 Reptiles

Threats to the marine turtles in Mozambique were detailed by Louro *et al.* (2006). These included some destructive fishing methods such as trawling, beach seining and illegal long lining

According to Louro *et al.* (2006) due to the lack of information from remote areas, it is difficult to predict in which areas marine turtle mortality is highest. Turtle mortality is widespread throughout almost the entire coastline. Nevertheless, the Sofala Bank (Gove *et al.* 2001), Vilankulos to Inhassoro (Gove and Magane 1996) and Barra-Tofo-Tofinho and Bilene (Pereira pers. Comm.) deserve special attention.

2.9.5 Coastal and Marine Birds

Studies conducted by de Boer and Longamane (1996) and de Boer (2000) demonstrated that human activities in the intertidal habitats may have a serious impact on shorebirds. They verified a negative correlation on foraging time with human presence. Exploitation of littoral organisms by the local population are a very common activity along the Mozambican coast represents a potential threat to the conservation of the shore bird. The accelerated growth of the tourist industry along the Mozambican coast promotes very high disturbance levels and represent a serious threat to the conservation of the shore bird (Ref?).

In Mozambique, seabirds are used as protein resources by local people, but harvesting of both eggs and adults may be unsustainable. Harvesting of breeding adults should be avoided as it has quick negative effects on the population dynamics of long-lived species like oceanic seabirds (Le Corre and Jaquemet 2005).

2.9.6 Exotic and invasive species

Ballast water

International shipping industries are responsible for the majority of alien species invading foreign waters. Over 3,000 marine species travel around the world in ships' ballast water on a daily basis (Carlton 1995).

An assessment of the impacts caused by ballast water in Mozambique has not yet been done, but the country possesses 3 big harbors where large vessels arrive and depart daily.

Aquaculture and diseases

The Mozambique aquaculture industry is very young. While the culture of freshwater species such as tilapia existed for many decades (since 1950), the cultivation of marine species has emerged only since 1995 (Ministry of Fisheries 2006).

The main marine species farmed in Mozambique are native and include black tiger prawn (*Penaeus monodon*), Indian white prawn (*P. indicus*, *P. japonicus*, *Fenneropenaeus indicus*), pink prawn (*Macrobrachium monocerosi*), Kuruma prawn (*Modiolus philippinarum*), bivalves, (*Perna perna*, *Meretrix meretrix*, *Modiolous philippinarum*, *Eumarcia pauperkulata*, *Sacrostrea cucullata*, *Cassostrea gigas*, *Veneruspis Japonica*) and mud crab (*Scylla serrata*). The exotics species farmed are seaweeds (*Kappaphycus alvarezii* and *Eucheuma spinosum* the red algae) (Ministry of Fisheries 2006). These exotics seaweed species were introduced from Zanzibar, Tanzania in the late 1990s (FAO 2009). Exotic seaweeds are farmed in Northern Mozambique (Cabo Delgado and Nampula Provinces) in a system of poles installed in shallow areas close to the shore. In 2008 the total production of seaweed was about 70 tons (INAQUA 2008). There is a specific legislation that regulates all rights and obligations of all stakeholders. The legislation defines specific norms and requisites for aquaculture farms and establishes restrictions on the

import of live animals and the conversion of mangrove into aquaculture ponds and establishes other environmental and consumers protection measures.

Invasive Crown-of-thorns

Increasing numbers of crown-of-thorns starfish (COTs), *Acanthaster planci*, are being found in the Indo-Pacific region (Schleyer 1998). The Oceanographic Research Institute (ORI) staff gathered evidence of COTs in Mozambican coral reefs (Table 3).

Table 3: ORI record of COTS damage and outbreaks on some reefs of Mozambique (Schleyer 1998)

Data	Locality	Co-ordinates	Depth (m)	Observations
October 1994	Two-mile Reef, Bazaruto Archipelago, Mozambique	21° 48.6'S 35° 29.9'E	13	Observed ±40 COTS and extensive reef damage in a 70 min dive. Size estimated to be 30-35 cm.
February 1996	Baixo de San Joao, Mozambique	26° 21.5'S 32° 58.4'E	23	Observed 5 COTS on severely damaged reef; measured one (58 cm); very little left alive on the reef.
February 1996	Reef S of Baixo de San Joao, Mozambique	26° 24.1'S 32° 58.3'E	26	Observed considerable reef damage but no COTS.
February 1996	Ponta Techobanine, Mozambique	26° 37.8'S 32° 54.8'E	19	Observed no COTS but very extensive feeding scars in a band through a bed of <i>Acropora austra</i> .

A notable feature of these outbreaks is that they are small, localized and isolated. Poisoning with sodium bisulphate was recommended to control outbreaks at Bazaruto Island (Two-mile reefs). Most of the COTs were physically removed by volunteers at Bazaruto within a year (Schleyer 1998).

Consideration should be given to the eradication of COTs outbreaks, such as the one encountered on two-mile reef, in view of the small size of the reefs and the nature of the damage observed in the afore-mentioned case (Schleyer and Celliers 2005). Further information is needed to produce recommendations concerning the effective management of COTs in Mozambique.

4. COASTAL LIVELIHOOD

4.6 Aquaculture, Agriculture and Forests

Forest exploration is highly dependent on the existence of an operational net of roads and electricity.

In the generality of the country, it has been noted that many people apply for licences to conduct this activity without having the required equipment, such as the equipment to drag the wood and a yard for storage.

It is important to note that the country lacks forest supervisors; in Nampula Province there are 45 forest supervisors, while the ideal number would be 100 effective officials, bearing in mind the width of the territory (Diário de Moçambique 2008).

Comment [R2]: Ref list?

Regarding Law, at agriculture level eminence is drawn to Environment Law, Land Law, Forest and wild Fauna and its regulation.

For the forest sector, the aim of the Ministry of Agriculture is to potentiate the number of farmers orientated for the exploration in a concession regimen¹, who receive from the Government, the right to develop their activities in areas superior to 20.000hec, based on a management plan, against the regimen of Simple License, which is regarded as the one that puts most of the pressure to the resources (Domingo, 05/07/09).

Some provinces, as it is the case with Maputo, introduce the initiative of resources management without necessarily going against the legislation. In Maputo, the operators of coal, since 2009, are forced to contribute by planting a tree to each bag or coal to be sold. This measure aims at assuring replanting, and thus reduces the problem of flora disturbance.

5. POLICY AND GOVERNANCE

5.1 Administrative Regions on land (Coastal districts, municipalities)

At national level the ministry of Statal (referring to the state) administration has the jurisdiction to draw plans for governance. This ministry draw strategics plans, for a maximum period of five years, to ensure sustainable land and infrastructure use. The actual plan in validity is the PESAE 2006-2010, with seven action plans concerning public reform and regional administration and they are lack because all became implemented in 2010 in very few districts of the State:

1. Institucional desconcentration and reform of public Administration- means having more instutions, comparing to the number before 2006, caring for municipalities, urbanizations and public sectores. In fact more institutions were created but not with total jurisdiction for care an appointment, the first principal institution still with jurisdiction then, instead of population go to one now they have to go for two or more institution to have the documents credenciated.
2. Urban and autarchy decentralization by gradual autarchyrization of the country where the districts and localities has her own autarchy which shall be financial and administrative autonomous
3. More participation in communitary management enlarging and fortify the contact main govern and communitary lidere
4. Modernization of public administration, more electronic machines and less man work to ensure no corruption
5. More capacity and professionalism building to ensure public function reform
6. Give more morality to the public function in his work as to avoid corruption
7. More capacity building to the Ministry in order to guarantee good results in the duties to public function and municipalities institutions

¹ There are, in the country, 84 operators in the Forest Concession regimen

5.2 Administrative / Legislative Zones of Sea (Territorial Waters, EEZ)

There should be a mechanism of control over the sea, on which the Republic of Mozambique can carry out its powers of legislation under international law and on the various types of vessels that carry out illegal discharges of oil and of other substances harmful to the sea and coastal environment.

The African waters, including Mozambique support some of more productive marine ecosystems of the world, on which millions of people depend for food and income. Although the majority of the countries of the region of the SADC do not possess the resources to police their territorial waters efficiently (Exclusive Economic Zones, EEZs), they are extended for 200 nautical miles in the sea.

5.3 Legislation

Implementation/enforcement of legislation

The law of the sea and environmental law have to be implemented for or nationals without cultural, religious distinctions. The government concedes licenses of exploration or exploitation of the land and/or resources (living and non-living) as the way to ensure implementation of the law. The enforcement, for nationals becomes by a payment of a value, higher than the license value, when found exploring or exploiting the coastal zone. The case of construction of the immobile is distrusted and value has to be paid to the appropriate government institution.

The implementation and consequent enforcement have some lack, weak management that can be that the coastal management has been made with activities not properly for coastal areas, the governance has been as in normal urban zone. This lack of governance because of clash in the jurisdiction between two or more institutions in implementing the legislation or convention. For instance in fishery activity the law gives jurisdiction to fishery ministry to enforce the implementation of the veta period while the Maritime authorities does not enforce. And the fishermen obey the authority that is favorable for them.

Overlapping legislation

The legislations with incidence in Coastal Zone can be found in sea law, environmental law and also in fishery law. These laws have some articles clashing because of definition (the basic definition as high sea and territorial sea, for instance, are not in consonance and could be seen with different meaning). That notatory differences could happen in situation of:

- Cultural and significant mentality variation of legislators and the implements coordinators, in the time that each legislation came on.
- Different Techno-Administrative facts in period of time that each legislation came on

The Legislation for the Sea (LOS), for instance, is too old and is very detailed in transport article, commerce article, fisheries article, help to navigation and environment protection. Years after the article on fisheries was taken off from LOS and the law of fisheries was created and this two laws lost are overlapping in their application.

The law of Sea and the law of fisheries have overlapping in his article one of both. In this article can be read the definition of interior water and open sea that have not the same meaning.

5.4 Continental shelf extents (current claim and any proposed extensions)

Technical capacity

There are a multisectorial technical, as work group, capacity coordinate by IMAF that meet for solve one or other issue concerning national maritime zone.

There still lack few technician in law of the sea obligations and implementation for a long coast that Mozambique has.

More accurate technics have to be learn for a rapid and efficient analysis of processes and phenomenas altering the continental shelf

5.6 NGOs / Private sector

Coordination between the government and NGOs is weak and affects implementation of plans.

The scientific information shearing between the state and Non Governmental Organization is weak.

5.7 Internatinal Relations, Convections and Committees

Inadequate nationalization of international conventions

Most of international conventions are sustented with internacional laws and some of them are difficult to implement in Mozambique because of different coastal processes within the subscribers of the convention.

The national politic systems are determinant for implementation of the convention. The system shall not be so different from the others states in the convection.

6. PLANNING AND MANAGEMENT

6.1 National Disaster Management Plans

According to the disaster policy document approved by resolution 18/99, the Instituto Nacional de Gestão de Calamidades (INGC) of Mozambique is the executive body of the Coordinating Council and has representatives at national and provincial levels. Its tasks include:

- Coordination of multi-sectorial activities, including prevention and preparedness, relief assistance and rehabilitation of infrastructures damaged by disasters.
- Promotion of training and research on disaster management.
- Mobilization of resources for post-disaster rehabilitation and reconstruction.
- Propose to the Government legislative action concerning disasters and ratification of international conventions on natural disasters.

Considering the multidisciplinary nature of vulnerability, and recognizing the interdependence of socio economic development with the occurrence of disasters, the Government of Mozambique has adopted:

- The practice of preparing and implementing annual contingency plans since 1998. The preparation of contingency plans has been revised to incorporate lessons learned after the floods of 2000 and 2001.
- A master plan in March 2006 for the prevention and mitigation of natural disasters which defines the strategic outline and an action program for a period of 10 years. In this context the government has established the National Operative Centre for

Emergency (CENOE) based in Maputo and Regional Operative Centres for Emergency based in Vilanculos, Caia and Nacala. The role of CENOE is the multi-sectorial coordination of agencies and institutions to manage the process of emergency during 24/7.

Implementation of contingency plans

This is based on the rainfall season forecast provided by the National Institute of Meteorology, who has a mandate for monitoring and issuance of early warnings related to extreme weather events and tropical cyclones. The main disasters considered in contingency plans are floods, drought and cyclones.

The preparation and implementation of the contingency plan is done by the members of disaster management board which covers all government institutions, non- governmental and United Nation agencies that play important role in the management of natural disasters. The awareness and communication of plans in place are done by the provincial representatives of INGC, local authorities and the local communities.

In 2005 the Government of Mozambique agreed with UNESCO IOC the establishment of National Centre for disseminating tsunami warnings. The Centre was established at National Institute of Meteorology and is composed by a system that allows the reception of tsunami warnings from Japan or United States of America through internet or from global telecommunication system (GTS).

The tsunami monitoring is been coordinating by Meteorology Institute (INAM) and in coordination with IOC they put a system of earthquake register in three Institutions: INAHINA, INAM and INGC.

5.2 Environmental Sensitivity Mapping

Floods of 2007/2008, maps of settlement

Comment [R3]: This needs to be finished

5.3 Coastal Management / Development Plans

Coastal Population growth

The census of population of 1980 saw that 42 percent of population was living in Coastal Zones, it was about 5.068.433 people. In 1997 the number increased to 7.9 million (MICOA 1998).

Comment [R4]: Not in reference list

The demography of Population in Urban cities of Mozambique grows up 2.5% per year and the demography movements in Coastal Zone are were 2.7% between 1980 and 1997 (MICOA 1998). This numbers in addition to International numbers take us to conclude that the Coastal Population is not high density.

Comment [R5]: Not in reference list

Comment [R6]: Did you not say it was due to the fact that 42% lives on the coast?

The cause of immigration to coastal zones is to be near the Ports in order to get jobs and assault the ships and exploitation of fisheries resources. The Coastal zone of Maputo Province is the highest density, second Beira, Xai-xai, Quelimane and Nacala are on third then Pemba and finally the Mozambique Islands in Nampula Province (MICOA 1998).

Comment [R7]: Not in reference list

5.4 Areas under Special Management

Because of the war for independence, the socialism and civil war Mozambique is living in a sign of restoration of social practices and land recuperation and still to be establish socio-economic.

In coastal regions the tourism can be a vector to explore and base of reorganization and dinamization of agriculture and artesanal fisherie. The turism in your demand for local products can create a lot of jobs but could happen also that the Turism force social exclusion, desegregation and environmental degradation.

5.5 Monitoring, Control and Surveillance

Education of coastal Population to enforce regulations is difficult because the population traditionally practice conservation and preservation of nature based on cultural rituals and miticism.

The artisanal fishery use inadequate fishing technology which is destructive and results in low catches. This happen because they cannot afford adequate fishing gear.