Final VERSION

COASTAL FORESTS OF MOZAMBIQUE

Socio- economic aspects
(review)

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ACRONYMS

AMETRAMO	Association of Mozambican Practitioners of Traditional Medicine
ARPAC	Archive for Research on Cultural Issues
CEF	Center for Forestry Research
CITIES	Convention for International Trade of Endangered Species
COGEP	Consul for Participatory Management of Natural Resources
DEF	Department of Forestry
DNAC	National Directorate for Conservation Areas
DNFFB	National Directorate for Forestry and Wildlife
EACFE	Eastern African Coastal Forest Ecoregion
EWT	Endangered Wildlife Trust
FAEF	Faculty of Agronomy and Forestry Engineering
GECORENA	Coastal Resources Management committee
GEMT	Department for Research in Traditional Medicine
INIA	Institute for Agronomic Research
IUCN	International Union for Conservation of Nature
MADER	Ministry of Agriculture and Rural Development
MER	Maputo Especial Reserve
MICOA	Ministry for Environmental Affairs
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organization
PARPA	Strategy and Action Plan for Eradication of Absolute Poverty
SADC	South African Development Community
SPFFB	Provincial Services for Forestry and Wildlife
TMPs	Traditional Medicine Practitioners
UNESCO	United Nations Agency for Science, Education and Culture
WWF	World Wild Fund

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1. INTRODUCTION

Coastal forests comprise a mosaic of different vegetation types including lowland forest extending from Somalia to Southern Mozambique. The strip is believed to reach further to northern Kwazulu Natal (South Africa).

According to current estimates Mozambique alone contributes to about two thirds of total area covered by coastal forests in the eastern Africa, Kenya and Tanzania share the rest. The existence of large area of coastal forests in Mozambique can be explained by the several years of struggle in the country. The civil unrest has contributed positively to ecosystem conservation.

About half of the total people in Mozambique are found along the coast. Most of these people live below the poverty line. They find on the natural resources in the coastal areas the main means for subsistence.

The coastal forests in Mozambique provide diverse types of goods and services. The common goods include timber, fuelwood, logs for carving, poles for construction, medicinal products and honey. Some forests are used as burial grounds, for traditional ceremonies and provide environment for ecotourism opportunities. Coastal forests are home for several animal and plant species and other highly valuable species found nowhere else in the world. Despite all these values coastal forests are undervalued and thence not accounted for in the national budget.

Nowadays, coastal forests face many threats being increased human pressure and poverty the major root causes. Due to these and other factors, coastal forest are declining in favor of expanding agriculture land, tourism facilities and human settlements.

The immediate threats posed onto coastal forests include illegal logging, poaching, uncontrolled fires, agricultural land expansion and unsustainable collection of forest produce. These factors contribute for reduced forest cover, loss of biodiversity, loss of land productivity that impact negatively to people livelihoods and biodiversity conservation. In order to reverse this tendency urgent measures need to be taken.

To address the above challenge, the Wild Wide Fund for Nature – WWF- together with other country stakeholders have launched an initiative aiming to support a coordinated development of long term strategy approach which will help to tackle these issues, in a regional perspective. The East African Coastal Forest Programme (WWF-EAFCE) initiated in 2001 with a workshop in Nairobi and produced a draft document containing the Strategic Plan for action. The present document builds on the previous workshop by revising the existing draft document and filling in the gaps on socio-economics aspects.

2. DESCRIPTION OF COASTAL FORESTS

2.1 Management of coastal forests

The coastal forests of Mozambique fall under the following types of management:

Forests in National Parks

There are some closed forests falling under the Quirimbas and Gorongosa National Parks. The Quirimbas National Park has been gazetted recently and it includes a vast area occupied by both wildlife and people. The park falls outside the park definition by the Forestry and Wildlife Act 10/99 (MADER, 1999). According to this Act parks are places only gazetted for conservation of nature and any human activities are excluded.

Forests in National Reserves

Patches of coastal forests can also be found under Forestry Reserves. The Forestry Reserves include the Matibane (Nampula province), Moribane (Manica province) and Gilé (Zambézia province) that are managed by the National Directorate of Forestry and Wildlife [DNFFB] authorities. The main aim of these Reserves is conservation of flora and fauna.

The National Directorate for Conservation Areas (DNAC), Ministry of Tourism manages the reserves used for not just conservation but also for tourism purposes such as the Maputo Especial Reserve (MER).

Forests on concession Lands

The concession is a management system introduced under the Forestry and Wildlife Act 10/99. It is a long-term lease of an area, which is attributed to an individual or group of people through a contract aiming at resource exploitation for industry according to an approved management plan (MADER, 1999). The concessions are attributed to individuals willing to establish, on site, industry for processing more than 500m^3 of timber, on a long run. The maximum allowed period for the concession is 50 years, renewable. To date, there are 46 concessions approved or under request covering a total area of about 1,900,000 ha (Sitoe *et al*., 2003). The area includes some highly timber productive coastal forests in Sofala, Zambézia and Cabo Delgado Provinces.

Forests under collaborative (community based) management (Pilot Projects)

In recognition of the need for local people involvement in the management of the natural resources, the Government of Mozambique is implementing some community based natural resources management pilot experiences. Some coastal forests fall under these experiences. These are the case of the Communities in Nariri and Senhote (Nampula Province), Nimanru (Cabo Delgado), Madjadjane (Maputo province) where local communities are engaged in the management of forestry resources. Although implemented by the local people, all these experiences have been triggered by external organizations. Until recently they were dependent on external funding sources.

Forests under the local management practices

The Forestry and Wildlife Act of 1999 establishes that the Land and its resources belong to the state [article 3 (a)] that is in line with the Constitution [Article 35]. Despite this, most of the land in Mozambique is communal land under the traditional management systems. These systems are based on local norms and regulations.

2.2 Coastal forests values

2.2.1 Local community level

Mozambique has about 18.0 million inhabitants of which 43% live along the coastal area. Despite that the population is not evenly distributed in the country, coastal areas are much more crowded as compared to anywhere inland. The average population density in the country has increased from 15.2 hab/km^2 in 1980 to 23.2 hab/km^2 in 1997. The overall increase in population density has also affected the coastal area where the population density changed from 23.2 inhab/km^2 (1980) to about 51.7 inhab/km^2 (1997). That is about 19% (154.004 km^2 out of 799,800 km^2) of the total country surface area inhabits almost half (43%) of the total population (INE 2004). The high density of coastal areas can be explained by historical and socio-economic reasons.

Most of the urban areas are found along coastal areas. The urban areas have provided better living opportunities such as employment and schools, since the colonial period. Most of the people moved from rural areas to look for better opportunities in the cities, creating thus "*rural exodus*". Recent studies undertaken in southern Mozambique have shown that women head about 70% of the households because men have moved to cities or neighbouring countries to look for employment (Hatton *et al*., 1995).

Another reason has to do with the fact that coastal areas were seen as safer during the struggle in Mozambique. Most of the people from inland secured refuge in coastal areas.

The people of Mozambique are characterized by high poverty levels. This level of poverty is reflected in the coastal areas (Table 1).

Table 1. Population and poverty level in selected coastal districts of Mozambique

District	Population	Men (%)	Women (%)	Average Size of the household	Poverty level (%)
Mocimboa da Praia	75,001	48.3	51.7	4.1	59
Palma	42,182	50.3	49.7	3.9	58
Macomia	69,973	47.3	52.7	3.9	51
Mueda	98,654	47.5	52.5	4.4	80
Nangade	50,483	47.8	52.2	4.1	45
Mecufi	35,644	47.1	52.9	3.9	53
Memba	188,992	48.8	51.2	3.7	84
Moma	238,655	49.6	50.4	3.7	55
Mossuril	89,457	49.4	50.6	3.8	62
Chinde	129,115	47.9	52.1	3.8	51
Namacurra	160,879	47.4	52.6	3.7	74

Mopeia	71,535	48.8	51.2	4.2	57
Maganja da Costa	229,230	46.8	53.2	3.7	61
Inhassunge	87,396	47.0	53.0	3.8	79
Pebane	135,275	48.8	51.2	3.7	60
Sussundenga	92,622	47.0	53.0	4.8	69
Buzi	143,152	47.2	52.8	4.8	89
Marromeu	69,895	48.6	51.4	4.3	84
Chemba	49,634	45.9	54.1	4.2	98
Caia	86,001	47.1	52.9	4.8	91
Machanga	44,784	45.3	54.7	4.6	94
Vilanculos	113,045	44.1	55.9	4.3	82
Massinga	186,650	42.8	57.2	4.3	82
Inharrime	76,518	44.0	56.0	4.6	82
Mabote	39,661	40.3	59.7	4.8	89
Bilene	133,173	42.6	57.4	4.5	60
Manhiça	130,351	44.3	55.7	4.3	71
Matutuine	35,161	49.2	50.8	3.9	64

Source: INE 2004, GoMoz 2001

The major economic activities are subsistence agriculture, fisheries and procurement of forestry products. The slush and burn shifting agriculture on poor sandy soils is common in coastal areas. The productivity of the sand soils is high in the first year but declines along time, after which the land has to be abandoned to recover its fertility. Local people cultivate 1 to 2 hectares for a period of not more than four years. The main crops produced include cassava, maize, sweet potatoes and beans.

Due to high level of poverty of the people and low agricultural potential in coastal areas, local communities depend on natural resources for subsistence. They collect both timber and non-timber products from coastal forest.

Timber products

The timber products collected from coastal forests include charcoal, firewood, construction material and wood for carving.

Firewood and charcoal

More than 80% of the energy requirements in rural areas in Mozambique is met on firewood and low-income households use charcoal and firewood as a source of income (Pereira *et al*., 2001). According to the authors the requirement for firewood and charcoal per year amounts to about 3000 tons of wood of which Maputo/Matola consume 41% and most of it come from forests along the coast.

The high level of wood biomass requirement in both rural and urban areas imposes a great pressure on the forest resources. Recent studies undertaken in southern Maputo Province estimate an average annual conversion of forests and other wooded vegetation of 7% between 1990 and 1997 (Monjane, 2001).

Construction materials

Most of the houses in the rural areas and peri-urban areas are of traditional nature. The frames are made up of poles and laths and grass for roofing. The species *Diospyros rotundifolia, Catunaregam spinosa, Apodytes dimitiata* are

among the most valuable species for poles in southern Mozambique due to their resistance to insects and high durability. All these species are found in coastal forests.

Carving
The carving industry can be divided into two parts. First, the commercial carving that involves selected species such as *Dalbergia melanoxylon* (African blackwood, “mpingo”, “pau preto”) and *Spirostachys africana* (“sandalo africano”, sandal wood). Articles made of these species are sold to tourists. Secondly, the carving industry aiming at production of household tools/utensils/handles such as spoons, plates, etc. These instruments are manufactured and mostly given as gifts or presents. The species used for these purposes include *Trichilia emetica*, *Olax dissitiflora, Apodites dimitiata* among others.

Non timber products
Coastal forests are a source of non-timber products such as food plants (eatable fruits and tubers), mushrooms, medicinal plants, gums, resins, game and others.

Eatible fruits
The coastal area is characterized by unpredictable agricultural produce due to adverse climatic conditions and poor soil fertility. Wild fruits from coastal forests such as *Strychnos spinosa*, *S. madagascariensis*, *Trichilia emetica*, *Vangueria infausta*, and *Mimusops caffra* are highly valued by local people. Apart from being used to supplement the diet, some are used as a source of vitamins, minerals and proteins during periods of famine, others are used to make local brew that can be sold and the money used to upgrade the household income. Women and children are the ones who collect the fruits.

Tubers
The tubers supplement carbohydrates, vitamins and minerals to rural communities. Species of *Dioscorea* sp. are the most readily available food reported to be eaten by local communities around the coastal areas in northern Mozambique. Women collect eatable tubers for the household consumption.

Medicinal plants
About 80% of the people in Mozambique use traditional medicine to treat or cure various ailments. Despite the existence of specialized people involved in the collection and administration of traditional medicine, knowledge about the use of medicinal remedies is widespread. Everyone in the rural areas knows at least one plant species used because of its medicinal properties. Lambert & Albano (1997) found that 100% (50) of the households interviewed in Matutuine District use medicinal plants for healthcare. The medicinal plants are widespread because they are readily available in the rural areas and believed to be effective by the local communities.

Some plant species found in the coastal areas of Matutuine District are being protected by local communities because of their perceived scarcity. *Cladestemon kirkii, Cardiogyne africana, and Acridocarpus natalitius* are some

of the species. These species are highly demanded because treat various diseases as well as can be sold in markets of neighbouring cities.

The use of medicinal plants by households is estimated at $0.20/person/week (Lambert & Albano 1997). Considering a total of 7,740,000 (43% *18,000,000) people living in coastal area who depend on medicinal plants, it amounts to about $80.5 a year. The value is far above the budgetary commitment of Government of Mozambique of $23 million /year (in 1997). If coastal forests were to disappear, these medicines would not be available for those people and government funds were to be available to provide imported drugs to fill up the gap left by scarce medicinal plants.

Game

Bush meat or game is a source of protein for rural communities. Although hunting of animals for commercial purposes is illegal, the practice is widespread through out the country. However, hunting of some species for household consumption such as *Neotragus moschatus, Sylvicapra grimmia* and *Redunca arundimon* is granted by the Decree 12/2002 (DNFFB, 2002). These species occur also in the coastal forests.

Other products and services

Beekeeping

Honey has been used for both food and medicinal purposes. In most parts of the country honey is collected from two both underground and the bee hives. The production of honey depends on the availability of flowering plants. The flowers provide the substances (e.g. nectar) for production of the honey. Therefore the conservation of the whole forest is crucial for quality honey production.

The beekeeping activity has been used as a livelihood improvement strategy in Madjadjane area, Matutuine District. The local communities were provided with improved hives to produce honey as a strategy to conserve the forest. In the first produce a total of about 500 kg of honey were collected. The cost of honey at the local market amounts to at least $2/liter.

The revenue from the sale of the produce can help to increase the household income. Everyone involved in this initiative understands the relevance to preserve the coastal forest for the improvement of local community well being through honey production.

Sacred values

There are at least two types of sacred coastal forests in southern Mozambique: the “gwendzelo” and “phahlelo”. The Gwendzelo is the place where the graves of the ancestors (“régulo”) are located. The local communities use these forests for sacrifice ceremonies such as thanks giving, pledge for good harvesting season, pledge for rain during drought seasons, etc.. A traditional leader performs these types of ceremonies.

The “phahlelo” are the ceremonies made at the household level for the well being of a restricted family. The family headmen or a traditional medicine

practitioner performs the ceremonies. The “phahlelo” can also be undertaken under a sacred tree. The most common sacred trees in the coastal areas of southern Mozambique include *Sclerocarya birrea*, *Garcinia livingstonei* and *Manilkara discolor*. In northern Mozambique, local communities use baobab tree (*Adansonia digitata*) for ceremonies.

Tourism
The utilization of forests for tourism purposes is taking shape in Mozambique. Various initiatives are being tried out throughout the country. These initiatives are based on the conservation of coastal forest for enhancing better life for the local communities.

In the Quirimbas National Park, tourism is used as a means to conserve various ecosystems including coastal forests through income generation for improvement of standards of living of the local communities. WWF-Mozambique and other counter- parties fund the idea.

Similarly, communities in Madjadjane are implementing Ecotourism projects. The projects aim at establishment of ecosystem management approach that can be used to discourage non-sustainable practices by local people, providing, in the meantime, ways of exploitation of natural resource for income generation. Local communities are setting up income earning activities based on forestry resources. Specifically, camping sites and “picnic” infrastructures for leisure activities are being constructed under coastal forests. The initiative is being funded by IUCN.

2.2.2 Macro/National Value of coastal forests

Tourism
Coastal forests are one of the components responsible for the success of ecotourism activities along the coast. The Government of Mozambique has defined the development of tourism as one of the key strategies for the poverty reduction schemes (GoMoz, 2001). In view to achieve poverty reduction, there are several initiatives with emphasis on the utilization of the natural resources for the development of ecotourist opportunities. One of such initiatives is the Beach and Bush corridor that aims at linking Great Limpopo Transfrontier Park (international park including South Africa, Mozambique and Zimbabwe) into the beach in southern Mozambique. The corridor includes patches of coastal forests in Bilene and Vilanculos Districts. Along the corridor several tourism opportunities exist ranging from forest walks, scenery attractions (including birds, butterflies and mammals) to marine resources. The implementation of this corridor will benefit the conservation of coastal forests along the corridor.

Mining
The mining sector has a great contribution to national economy. Mineral resources are found in the Chibuto District (Gaza Province), Moebasa (Zambézia Province) and Moma (Nampula Province). The mining operation in Moma is carried out closed to a coastal forest where a new species for science has recently been described. The *Incuria dunengis* is a tree only known from

that forest - endemic. Measures need to be undertaken to ensure the mining activity do not jeopardize the continued existence of the species.

Woodcarving

The wood carving industry in Mozambique is old, however, there is no data about its real market value. It is only known that shops selling crafts products are widespread in the country. The presence of the shops can be taken to infer the relative importance of the market. One of the species used for carving is *Dalbergia melanoxylon* (African blackwood) a species growing in the coastal forest. Until recently, there were some speculations regarding the species conservation status.

Genetic resources

Due to their high value in biodiversity, coastal forests of Mozambique exhibit diversified genetic pool to be explored. Local communities use a diverse number of species for various purposes (e.g. food, medicine). Some of these products have only been known at the local level through traditional knowledge requiring further research for improvement. Mozambique is involved in a regional initiative (SADC programme) aiming to preserve the genetic pool of some food plant species.

2.2.3 Regional level

Regional trade

Coastal forests are a source of various products traded at the regional level. For example, some medicinal plants from the Matutuine districts are being sold across borders. Species such as *Securidaca longepedunculata, Hypoxis hemerocallidea* and *Warburgia salutaris* are the most sought after. The high demand for *H. hemerocallidea* in both South Africa and Swaziland are due to the fact that the tuber is believed to alleviate the opportunistic diseases associated with HIV/AIDS. South Africa is one of the countries in the region highly affected by the pandemics.

Biodiversity

All together the coastal forests of eastern Africa contain 554 species of plants and 53 of animals that are known to be endemic to the forests. The surrounding non-forested vegetation of the coastal strip of eastern Africa is also important containing at least 812 strictly endemic plants and 47 endemic vertebrates. Despite the high level of endemism in non-forested land as compared to forested land the endemism ratio (endemic/100 km^2) is higher in forested land as compared to non-forested land. Therefore, there is a need to conserve the forest.

Two species of elephant shrew have been recorded from coastal forests in southern Mozambique. These species, also identified in coastal forests of Tanzania, are known to have survived millions of years of evolution and the coastal forests provide habitat for most of them. The species require further research to understand their biology and population status (Macandza, pers.

comm. 2004). This finding shows the contribution of the coastal forests in southern Mozambique to the conservation of the biodiversity in the ecoregion.

2.2.4 Global Economy and environment

Biodiversity value

The coastal forests of Mozambique were once continuous, however, due to various factors (e.g. human interference) they are fragmented and nowadays only relatively smaller patches exist. The patches are seen as refuge to some endemic species, therefore, the global recognition of the forests as places of high levels of endemism. Despite that, the real value of coastal forests in Mozambique is yet to be disclosed. It is acknowledged that they function as habitat for a variety of bird and plant species. The recent identification of *Incuria dunenges* in northern Mozambique and 10 species (of which one new species (*Barleria* sp.? nov.)) in forests of Niassa Reserve adjacent to the Quirimbas National Park is an indication that there could be much more to discover in coastal forests.

The southern part of Mozambique has been recognized by its value in biodiversity. The sand forest in Matutuine District is the largest so far recorded nowhere else in the world and it is the place where many tropical species reach the southernmost limit of their range (van Wyk 1994). The ecosystem is included in the Maputaland Centre of endemism that accounts for 1100 species of vascular plants. Of these 168 species/infraespecific taxa and 4 genera are endemic /near–endemic to the center. The endemic genera include *Brachychloa, Epippicarpa, Helichrysopsis* and *Inhambanella* (van Wyk, 1994). According to the author, of the 472 species of birds in the Maputaland Center 47 subspecies are endemic /near endemic to the center.

One of the key and charismatic species found in coastal areas in Mozambique is the elephant (*Loxodonta africana*). Elephants are present in both Maputo Especial Reserve and Quirimbas National Park. The presence of the species in MER has enabled the reserve to gain recognition and research support. One of the studies undertaken in the reserve dealt with habitat selection by elephants. This study concluded that elephants have a preference to the coastal forest rather than any other habitat present in the reserve (Ntumi, pers. comm. 2004). This highlights the importance of coastal forests for the conservation of a CITIES listed species and thence the need to conserve the ecosystem because of its biodiversity value.

Tourism

Due to their recognized biodiversity value, the coastal area has turned to be also highly valued for tourism based on attraction of the natural environment. This type of tourism has been seen as a major money generator in the region. Several tourism investments are being implemented along the coastal area. The current tourism endeavour emphasizes the utilization of environment as the main menu for their activities.

Carbon sequestration

In Mozambique there is no data on the contribution of coastal forests to carbon sequestration activity. However, as any other forests coastal forests act as carbon sinks.

3. ANALYSIS OF MAIN STAKEHOLDERS

3.1 Local and international users

Local authorities and organizations
The legal framework in Mozambique gives attention to local communities as the key partners for any development opportunities in the country. The Forestry and Wildlife Policy and strategy for its implementation recognize local communities as the main users and beneficiaries of the forestry resources and, therefore, the need for their active involvement in the management of the resources. According to the Policy the local people involvement can be achieved through the following:

- Participation in the conservation and use of forestry resources;
- Establishment of committees for the management of Natural Resources; and
- Definition of access mechanisms to the natural resources

The implementation of these objectives is further elaborated in the Act 10/99. Despite that some issues still remain answered, specifically on what exactly this participation is all about. Most of the decision making power is still being held at higher level in the government administration system. This is illustrated by the case of access to the Chirindzene sacred forest.

There has been a strong involvement of Government authorities at the Provincial, District, “Post administrativo” and “Grupo dinamizador” levels to manage the Chirindzene sacred forest in the Gaza Province. At the local level there is a good coordination between the traditional authorities and the “Chefe da localidade” (the lowest level in the official administrative system) in the management of the forest. Despite the strong involvement of these local authorities (“régulo”-traditional leader and the “Chefe da localidade”) right to access to the forest by outsiders is still granted by the “Posto Administrativo”. The local authorities are only seen as guardians of the forest and do not have the power to decide about who is eligible to enter/visit the forest. This procedure leaves the question on how decentralized is the decision-making process regarding the Chirindzene sacred forest.

Association of Practitioners of Traditional Medicine (AMETRAMO)
Traditional Medicine Practitioners (TMPs) are the only practitioners available to virtually every rural resident, as well as many of the urban poor. The Ministry of Health (MOH), through its Department of Traditional Medicine (GEMT) is actively encouraging the traditional healers to join the association at the district, provincial and national levels. The number of registered TMPs in the country is over 30,000.

In Matutuíne district there is a nucleus of TMPS registered with AMETRAMO. They reported some concerns on the current disturbance level of coastal forests in the area. The existing concerns are motivated by the fact that, the ecosystem is home for specific species such as *Securidaca longepedunculata and Warburgia salutaris*. The species is gregarious and have only been identified from a specific habitats in the area.

3.2 Government agencies

Ministry of Agriculture and Rural Development
Agriculture and renewable resources account for 35% of GDP, employ about 70% of the labour force and contribute 80% to foreign exchange earnings. Agriculture production is carried out mainly by household subsistence families who account for 95% of land under cultivation. Few smallholders use modern inputs.

The National Directorate for Forestry and Wildlife (DNFFB) is the ministry directorate responsible for the management of fauna and flora outside protected areas. One of major concern of DNFFB is the uncontrolled use of forestry resources. Trees are indiscriminately cut for charcoal, timber and building materials. If these activities are to continue, it is likely to result in the loss of biodiversity.

In order to reverse the tendency and because of global changing in forestry perspective, DNNFB has changed its strategy towards the management of forestry resources through a legal reform. The new legal framework has a strong social component. It recognizes the right of local communities as users and guardians of the resources and the need for their active involvement in the management. The idea is to decentralize the decision making process to the local communities and establishes the benefits for the local people from that involvement. At the Provincial level the DNFFB is represented by the Provincial Services for Forestry and Wildlife (SPFFB). Most of the SPFFB lack technicians, financial resources and means of transportation to undertake their duties.

The Center for Forestry Research (CEF) is the research branch for DNFFB and was established in 1985. The Center has five operating units: Silviculture, forest management, wood technology, Environmental Sociology, and Economics and Developments. Likewise all other Government research stations, CEF has limitations on qualified personnel and financial resources. The CEF is an agency, which can be actively involved in the research on coastal forests.

The National Institute of Agronomic Research (INIA)
The National Institute of Agronomy (INIA) is under MADER has responsibility for the National Herbarium (LMA). The herbarium houses one of the best plant collections in Southern Africa. There are more than 5,000 collections on file. It is this unique collection with its supportive ecological documentation that has been the primary information base for the coastal forests studies on floristic aspects of the ecosystem.

Ministry of Tourism

The Ministry of Tourism was created in 2002 as a means to better explore the opportunity offered by the natural environment and facilities in Mozambique for tourism activities. The Ministry of Tourism is responsible for most of the conservation areas once under DNFFB. The policy and strategy for its implementation has been promulgated. The policy identifies different zones and the priority for their development for tourist destination. Most of these areas are in the coast where the terrestrial and the sea environments meet. The policy emphasizes the need to explore ecotourism opportunities offered by the infrastructures in a rationale manner. The management of natural resources and creation of jobs for the local people are the fore most aims of the Ministry.

Recently, the Ministry of Tourism has passed a new decree (27 de /2003 of 17 June) which opens up an opportunity for a collaborative management of the conservation areas. This is recognition that the Government alone will hardly achieve the conservation objectives and the involvement of other sectors is needed for the conservation and development of the areas due to inadequate technical capacity and strict financial resources.

Ministry for Coordination of Environmental Affairs

The Ministry for Coordination of Environmental Affairs (MICOA) was established in 1995 with the mandated to coordinate, supervise and monitor environmental management in the country. Under the mandated Mozambique has adopted a National Management Program (NEMP) comprising a national environmental policy, an environmental framework law and an environmental strategy.

Mozambique participated in the Earth Summit in 1992 and ratified the Biological Conservation Convention in 1995.

The Ministry has the Environmental Policy and Law published. The legal framework establishes the need for the conservation of the environment including the flora and fauna. In the current framework there is no specific mention to coastal forests, although it is implicitly acknowledged the fragile condition of coastal areas and therefore the need to account for these in any development project / activity in coastal area. The environmental framework determines the need for an Environmental Impact assessment (EIA) study for the projects before their implementation.

A National Strategy and Action Plan (NEAP) for the conservation of Biological Resources has been approved. The NEAP accounts for the national flora and fauna, vegetation types, all genetic resources (germplasm), bio-safety and tourism. At the present no specific consideration is given to the role or importance of coastal forests in the conservation and sustainable use of their resources. Information available is related to mangroves and watershed management.

The Conservation of resources is recognized as being not only the responsibility of MICOA, but also the Ministry of Agriculture and Rural Development. Duplication of planning and activities is common between the two ministries.

Ministry of Culture (ARPAC)
The National Archive for the socio-cultural issues [ARPAC] within the Ministry of culture is involved in research on socio-cultural issues in Mozambique. The institution has several interests including the use of traditional knowledge in the management of natural resources. ARPAC has been seriously involved with the conservation of the Chirindzene sacred coastal forest in Gaza Province.

Eduardo Mondlane University (UEM)
The Eduardo Mondlane University is the oldest high education institution in Mozambique. Within the University, the Department of Forestry (DEF) in the Faculty of Agronomy and Forestry Engineering (FAEF) is the first high-level institution to undertake research on coastal forests in Mozambique. The involvement of the Department with coastal forests dates from the 1996 when the first research study was undertaken on coastal forests in northern Mozambique. From that stage the ecological, socio-economic aspects and policy issues related to coastal forest ecoregion have become part of the research programs in the Department.

Several initiatives are underway including the mapping of the coastal forests in southern Mozambique. Several students have been directly involved during practical and research in different themes available for BSc students thesis. The research is done with limited funding provided by UNESCO.

The goal of the Department is to become the information-base source for the coastal forests in Mozambique. Although there is some capacity to undertake research there are limited resources. Therefore, the goal can only be achieve provided adequate funding is available.

3.3 Non Governmental Organizations (NGOs)

There are many organizations actively working for the conservation of coastal forests in Mozambique. These NGOs include WWF, IUCN, EWT, UNESCO, GECORENA, ORAM and Forum Florestas.

The involvement of NGOs has been instrumental to disseminate information related to the new legislation framework (Land, Forestry and Wildlife, Environmental) to local communities in remote rural areas. Through the involvement of NGOs many awareness campaigns were carried out at the local community level.

The IUCN Maputo office is developing a sensibilization campaigns in Matutuine District, for the management of natural resources. The project includes the identification and implementation of Natural resources based enterprises as a strategy to reduce poverty and enhance the conservation of natural resources.

The WWF Mozambique has embarked on an initiative with local NGOs in Cabo Delgado and through their assistance the Quirimbas National Park was recently gazetted.

The Endangered Wildlife Trust (EWT) is developing a project with local communities in Catuane, Matutuíne District aiming at conservation of the natural resources. Despite all the effort, there is a need to reach many more communities. Most of the initiatives are concentrated to specific geographic area. There is a need for coordination for the dissemination of the information all over.

Forum Florestas
The forum Florestas is a consultative forum were different groups interested on forest resources are involved. The forum includes researchers, decision makers, forestry operators, policy makers, politicians and many more. Therefore, it can be a good opportunity to lobby for inclusion of coastal forest issues in the themes for discussion.

3.4 Regional organizations

Mozambique is a member for the SADC forestry and Wildlife forum, within the region, and NEPAD at the African level. Despite the recognition of the value coastal forests in some african countries, there is no mention in none of these forum about the commitment of the Governments and Political powers of respective countries on coastal forests. In fact, the forum seems appropriate for discussion of transboundary issues such as coastal forests.

Lobbies to ensure cross-country measures are undertaken for the conservation of the ecoregion are needed. The existence of coastal forest related themes in the agenda of these regional and African forums could encourage investment as well as more funding for research and development.

3.5 Private individuals or companies

Tourism and wood industry operators are major local level stakeholders for the conservation of the coastal forests. They play a role in the management of the ecosystem, as they are the ones whose activitities can produce larger negative impacts as compared to local people. Furthermore, they rely on the ecosystem for the prosperity of their business.

4. MAIN CHALLENGES AND THREATS TO CONSERVATION AND SUSTAINABLE MANAGEMENT OF NATIONAL COASTAL FORESTS FROM A SOCIO-ECONOMIC PERSPECTIVE

4.1 Increased human population

There is a high tendency of population increase along coastal areas in Mozambique. According to the population projections, the situation will be

maintained for the next decade (without considering the HIV/AIDS impact). Growing population will enhance the need for increased agricultural production. Within the context of slush and burn shifting cultivation system this is achieved not by raising productivity per unit area of land, but rather by constantly extending the amount of land under cultivation (Massinga, 1996). Subsistence agriculture expansion has been identified to be the major factor for conversion (degradation) of coastal forest into other types of vegetation in Matutuine District, southern Mozambique (Monjane, 2001).

The increase of agricultural land is undertaken hand in hand with shortened fallow periods and many plots are being farmed continuously without being given time to recover their fertility. The tree cover is increasingly reduced to meet the growing demand for fuelwood and building material. This means that if adequate measures are not taken in the near future, the extent of coastal forests will be reduced and the ecosystem biodiversity threatened.

4.2 Poverty

The degradation of the ecosystem has also been enhanced by the collection of products from the forest such as firewood and charcoal. In Matutuine area charcoal production is the main cash earning activity for rural households. Local communities spend about 70% of daily working hours on charcoal production and the average annual revenue from charcoal making per household amounts to US$450 (Pereira *et al.*, 2001). Even though, charcoal production is not yet the major threat to coastal forest conservation in Matutuine area, it is important to note that the forested area is limited. Most of the remaining forest patches are in one or another way of protection. However, the situation can change if the level of adherence to local norms and institutions changes.

4.3 Degradation of local institutions

The sacred forests are one of the key components for the management of coastal forests. The maintenance of these forests has been enhanced by the existence of local institutions. The maintenance of the integrity of these forests depends on the continued existence of local strong authorities that guarantee observance of these institutions.

Nowadays, most of the young people from the rural areas seek better opportunities in towns/cities where they are exposed to external influences not always the same of that from their home background. Given that most of the local institutions are not yet documented and they are passed from generation to generation in an oral way, most of the knowledge could be lost with the reduction of the elders.

4.4 Lack of land use planning and zoning

Much of the clearance of forests for establishment of human settlements do not take into account the ecosystem vulnerability. Aspects of biodiversity value due to plant endemics, wildlife habitats, fragile land and rare species are not always accounted for. There is a common understanding among the wildlife managers

that the crop raid claimed by local communities in some coastal areas in northern Mozambique is the result of occupation of animal migratory rotes for various human activities. These rotes have always been the habitat for those animals.

4.5 Infrastructure development on coastal Forests

The establishment of infrastructures can be a potential source of wealth and employment. However, the establishment of the harbor at Ponta Dobela, in southern Mozambique has had controversial arguments among different interested groups. There are fears that its establishment could interfere with the ecosystems surrounding the area, one of which is coastal forest. This would mean immediate threat to all plant and animal species depending on the ecosystem.

4.5 Wildlife damage

Big mammals such as elephants have contributed substantially to destruction of indigenous forests in Mozambique. Although the intervention of elephants in the forest is not all that negative, their presence could affect the conservation of specific species. In Matutuine, for instance, local communities and Traditional Medicine Practitioners (TMPs) claim that the population of *Cladestemon kirkii* has dropped in the forests because of elephant destruction. The species is locally very important because of its medicinal properties. On the other hand, the pachyderm uproots the whole plant for food contributing for the decline of plant population.

4.6 Mining industry

Several mining industries are being established in Mozambique. The exploitation of Gas in Inhambane Province and other minerals in the Gaza Province are some of them. Most of these industries involve the degradation of coastal forests. For instance, the exploitation of titanium in Moebase could be a threat to survival of coastal forests. These forests could be very valuable in terms of biodiversity given that a new species for science has recently been discovered from the area.

4.7 Uncontrolled Fires

Uncontrolled fires are a threat to survival of coastal forests in Mozambique. The use of uncontrolled fire for hunting small animals and clearing land for agriculture is widespread in the country.

Depending on the frequency, uncontrolled fires in coastal forests could be detrimental to the biodiversity of the forest as well as its integrity. The interference of fires destroys the structure of the forest and exposes the ecosystem to colonization by non-specialist species.

Table 2. Analysis of root causes of coastal forest degradation

Root cause	Manifestation	Root cause	Manifestation
Increase in human population	Increased demand for natural resources	Weak adherence to local norms and regulations	Compromised maintenance of key ecosystems (e.g. sacred forests)
Poverty	Over exploitation of resources, involvement on illegal activities (poaching, corruption)	Reduced opportunities to evolve from environmentally less adequate lifestyles to environmentally friendly options	Low experience and incentives to develop alternative livelihoods strategies
Wildlife crop damage	Increased famine incidence	Weak forest governance	Inadequate stakeholder involvement
Lack of land use policy and zoning	Inadequate land occupancies	Weak concern to coastal forests	Inadequate conservation initiatives on coastal forests
Inadequate land use practices	Low agricultural yields, declining soil fertility, increased demand for land		

Table 3. Major threads to specific Mozambican forests

Forest	Threats
Bilene/Matutuíne	Urbanization Agriculture Procurement of forest products/resources (medicinal plants, firewood, charcoal, hunting, etc.) Uncontrolled Fires Encroachment Grazing
Mossuril	Agriculture Uncontrolled Fires Procurement of forest products/resources (medicinal plants, firewood, charcoal, hunting, etc.) Encroachment
Mecufi /Memba Complex	Agriculture Timber harvesting Uncontrolled Fires Procurement of forest products/resources (medicinal plants, firewood, charcoal,

	hunting, weaving material, etc.)
Cheringoma complex	Timber harvesting Agriculture Illegal logging Uncontrolled fires Grazing
Macomia/Palma complex	Timber harvesting Agriculture Uncontrolled fires Procurement of forest products/resources (medicinal plants, firewood, charcoal, hunting, weaving material, etc..)

5. MAIN ISSUES/CONSTRAINTS TO CONSERVATION AND SUSTAINABLE MANAGEMENT OF NATIONAL COASTAL FORESTS FROM A SOCIO-ECONOMIC PERSPECTIVE

5.1 Policy issues

a) Limited tenure (rights of access and use of natural resources)

The rights and use of natural resources by various stakeholders are clearly indicate in the Forestry and wildlife legal framework, however there is insufficient clarity regarding the ownership. Issue of tree tenure has arisen especially with regard to local communities involvement in the management of forests. Some local people may not see any motivation on their involvement in the management of forests /trees because the ownership of the resources is not yet clear.

b) The issue of devolution vs. decentralization

Most of the legal framework regarding the management of natural resources indicates clearly that there is a need for the involvement of local people in the decision making process as means to guarantee that the management objectives are met and local people get benefits from the resources. Furthermore, the framework acknowledges the creation of local committees for the management of natural resources (COGEP), however this is much of decentralization of the decision-making and do not really address the devolution of power to the local level.

c) Under valued resources

The Mozambican legislation focuses on productive and extensive areas of forests in contrary of “less productive” small patches. Despite of the social and biological values of these small patches, there is no idea about their economic value. Most of the products these forests provide have not yet been evaluated and therefore, not accounted for in the national assessment. The lack of valuation of these products and services has led to underscored importance of these forests in the legal framework in Mozambique.

d) Cross border issues

Lack of harmonized policies and laws in the South African region has played a role in forest degradation. For instance some medicinal plant species such as *Warburgia salutaris* and *Securidaca longepedunculata* are being traded across the boarders with the neigbouring countries. So, this species are illegally harvested in Mozambique and traded illegally in the neighbouring countries in the region.

e) Lack of alternatives to forest products and economic activities

Most of the rural people in Mozambique are poor and they see the natural resources as the main means for subsistence.

Poverty and lack of economic activities is closely connected to detrimental use of natural resources.

5.2 Weak Inter-institutional coordination

The coastal forests fall under the Ministry of coordination of Environmental affairs, Ministry of Tourism and DNFFB (MADER). The lack of coordination between the ministries may create overlap of programs leading to inefficient use of resources that the country lacks as well as can be a des-incentive for other stakeholder involvement in the management of coastal resources. The coordination among the ministries needs to be improved.

5.3 Inadequate institutional and financial capacity

a) At the Government Level

There are insufficient qualified human resources and financial capacity within the Directorate Forest and Wildlife in the Ministry of Agriculture and Rural Development to pursue its duties. The lack of both human and financial capacity has restrained the Directorate to enforce the rules and regulations.

The situation tends to be identical (sometimes worse) at the provincial level and local level. The capacity in qualified personnel, financial resources and infrastructures needs to be addressed in order for the sector to undertake its duties and responsibilities.

b) At the local community level

The local communities are the most direct beneficiaries of the sustainable management of the natural resources. On the other hand, however, they are the ones whose activities have a major impact to coastal forests. Therefore, they involvement in the management of those resources is crucial. The legal framework on Forestry and wildlife as well as other natural resources sectors acknowledge the relevance of active involvement of local people in the management of coastal forests. However, this objective has yet to be met in most coastal forests. Despite the recognition of the legal framework, its implementation on the ground is still to be effective. This fact is mainly

enhanced by lack of legal awareness about the rights and obligations of local people, as far as the legal framework is concerned.

Moreover, there is a weak (inadequate) legitimate organizational structure that can be instrumental for the application of the existing legal framework. Therefore, the work being developed by some NGOs on advocacy and awareness campaigns about the new legal framework need to be strengthened and supported.

c) Law enforcement

Due to weak/inadequate organizational structure at the local level and the weak institutional capacity of the agencies implementing the legislation, there is weak law enforcement.

d) Diverging viewpoints regarding conservation of coastal forests

The viewpoints about the value of coastal forests to various stakeholders are not identical. Each stakeholder may perceive differently about the coastal forest resources values. The forest sector may perceive the resources as the source of employment and of conservation, and the local community may perceive the coastal forests as the place for agriculture and firewood collection. The diverging views have led to disputes and controversies, for example, on Inhaca Island. Most of the people on Inhaca Island depend on agriculture for subsistence. On the other hand, however, most of the forests have been set for conservation measures. The forests are the only areas suitable for slush and burn agriculture because of their nutrient content. The differing viewpoints on the coastal forests may jeopardize the implementation of coastal forests conservation projects.

e) Poverty

Poverty is major thread to the conservation of coastal forests. The current people living in coastal areas show high level of poverty and they see on the coastal resources the source of food, income, construction material and many more.

The management of the coastal forest requires that poverty is adequately addressed and the mechanisms for their reduction implemented. The government of Mozambique is highly aware about the need to address the issue of poverty across all sectors. The Government has approved a strategy for poverty reduction and its means for implementation.

f) Illiteracy

The illiteracy level for Mozambique is about 56.7% being the women the most illiterate (with 71.2%). The most illiterate people live in the rural areas where most of the coastal forests are located.

The high illiteracy level has been seen as an issue for example in the implementation of revised legislation in the forestry sector. Under normal circumstances, literate people are much more ready to changes than illiterate ones. The illiterate people need much more time to comply with the changes. For example, the legislation in Mozambique is all written in the official language

(Portuguese). However, most of the people who live in rural areas can not write or read in Portuguese. This makes the implementation of the new legislation very slow. As the time for the implementation of the law expands more degradation is accrued to the resources.

5.4 HIV/AIDS

There is no data regarding the impact of HIV/AIDS on coastal forests. However, it is expected that HIV/AIDS will affect both Human capacity related to coastal forests as well as the forest diversity.

The existence of high rates of HIV/AIDS in the personnel dealing with the conservation of coastal forests could reduce the effort being undertaken to the conservation of coastal forests.

The use of medicinal plants to treat opportunistic HIV/AIDS related diseases has enhanced collection of those plants from coastal areas. The continued extraction of these species due to their increased demand may contribute to the degradation of the ecosystem.

6. THE WAY FORWARD

Mozambique has the largest extension of coastal forests in the southern Africa ecoregion. Most of the coastal forests are adjacent to highly populated areas being most the people living under absolute poverty levels. These people find on the available forestry resources means for subsistence.

Most of the products and services provided by the coastal forests are of household (community) consumption, which makes their economic value diluted and the real value of the ecosystem remains still unrevealed. This leads to coastal forests being undervalued and not unaccounted for in the national economy. Though, most of these forests are very rich in terms of biodiversity and their value could be of regional and international dimension.

Nowadays, coastal forests pose several challenges and the ecosystem is threatened to various human non-sustainable activities. The overcrowding in coastal areas, poverty, degradation of local institutions, lack of land use planning and zoning and uncontrolled fires are just a few of the threats. Despite some legal and institutions reforms coastal forests continue to deserve special attention.

Various initiatives need to be developed and undertaken at various levels: resource assessment, institutional strengthening, capacity building and inter-institutional coordination.

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