



Revolutionary Government of Zanzibar

Ministry of Agriculture, Natural Resources, Environment and Cooperatives
Department of Fisheries and Marine Resources

Mnemba Island and Chwaka bay Conservation Areas:

A Preliminary Situational Assessment





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Prepared by EcoAfrica Environmental Consultants

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ACRONYMS

CC Africa	Conservation Corporation Africa
DCCFF	Department of Commercial Crops, Fruits and Forestry
DFMR	Department of Fisheries and Marine Resources
EAME	Eastern African Marine Ecoregion
EIA	Environmental Impact Assessment
FAD	Fish Aggregation Device
GEF	Global Environment Facility
IBA	International Bird Area
ICD	Integrated Conservation and Development
IMS	Institute of Marine Science
IUCN	The World Conservation Union
JECA	Jozani Environmental Conservation Association
LED	Local Economic Development
MACEMP	Marine and Coastal Environment Management Project
MANREC	Ministry of Agriculture, Natural Resources, Environment and Cooperatives
MIMCA	Mnemba Island Marine Conservation Area
MPA	Marine Protected Area
NGO	Non Governmental Organisation
PADI	Professional Association of Diving Instructors
PECCA	Pemba Channel Conservation Area
SEA	Strategic Environmental Assessment
SMOLE	Sustainable Management of Land and the Environment
SUZA	State University of Zanzibar
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
URT	United Republic of Tanzania
WHS	World Heritage Site

EXECUTIVE SUMMARY

Background

1. The current report describes the results and recommendations from a brief investigation into the Mnemba Island Marine Conservation Area (MIMCA) and Chwaka Bay on the east side of Unguja, Zanzibar, which is a major island off the mainland of Tanzania. The Department of Fisheries and Marine Resources (DFMR) of Zanzibar is strongly committed to the protection of the coastal and marine ecosystems on Unguja and Pemba Islands and to creating a sustainable network of protected areas. Unguja and its sister island Pemba fall in the target area of the Marine and Coastal Environment Management Project (MACEMP) that is currently under preparation for the United Republic of Tanzania (URT) with funding from the Global Environment Facility (GEF) through the World Bank. MACEMP aims to improve the management of coastal and marine resources, and by doing so contribute to poverty reduction and a better scientific understanding of the marine and coastal ecosystem. The project will support, *inter alia*, the establishment of a network of marine conservation areas and the creation of an enabling environment for sustainable coastal management and utilisation in a number of focus areas in the mainland and the islands of Zanzibar.
2. Specific objectives of the current short Situational Assessment were (i) to engage in a brief evaluation of the condition of the reefs around Mnemba Island following reports of damage by local fishers and the lodge manager on Mnemba Island, and (ii) to briefly examine and consider Mnemba Island, Chwaka Bay and the long stretch of coast between them in the broader context of the of Unguja's east coast and, if possible, provide recommendations in terms of the emerging network of Marine Protected Areas (MPAs) in Zanzibar. These perspectives are intended to augment those presented in the Rapid Assessment of Mnemba Island and Jozani-Chwaka Bay that was commissioned from the Institute of Marine Sciences (IMS) and the State University of Zanzibar (SUZA). Part I of the present report describes the background, purpose and methodology for the study. Part II describes the current situation in Mnemba Island and Chwaka Bay, in terms of natural resource use, management and health. Finally, Part III analyses the current situation in the broader context of the east coast of Unguja and provides recommendations for the way forward.
3. The field work was carried out during five days in the period from 19 to 29 March 2005 covering Mnemba Island, Kiwengwa, Chwaka Bay and the mangrove area south of Jozani Forest (see Map 1 for an overview of the east coast of Unguja). The team included environment and development specialists, fisheries officials and scuba

divers drawn from both EcoAfrica Environmental Consultants (Dr Francois Odendaal, Dr Claudio Velasquez, Mr Charles Maxwell and Ms Raquel Garcia) and the DFMR in Zanzibar (Mr Peter Shunula and Mr Issa Suleiman). The team would like to express its gratefulness to the DFMR who provided logistical support at often inconvenient times and to the management of the Conservation Corporation Africa (CC Africa) lodge on Mnemba Island that graciously received the team and provided all the necessary assistance that the investigators needed to do their work.

The Mnemba Atoll

4. The Mnemba Atoll is an important ecological and economic asset¹ that clearly has a significant role to play in the development of the northeast of Unguja where it is located, and in tourism in Zanzibar in general. Not only has the atoll been a source of living marine resources to the local population since time immemorial, but it clearly has high tourism value, particularly in terms of marine-based tourism. It is essential that it be managed effectively so that both marine resource use and tourism can be on a sustainable trajectory. The entire atoll including the island previously was accessible to local fishers, but in 1989 a 33-year renewable lease was granted to CC Africa for exclusive use of the island for the purpose of high-end tourism. More recently a “no touch” zone known as House Reef was declared, where corals have since been recovering and are in better shape than anywhere else on the atoll. At the same time, resentment to restrictions on their movement in the impoverished fishing community has been growing and there are complaints that tourism developments do not benefit them.

Health of the System

5. The team included three divers that systematically recorded biodiversity and damage following proven methodologies, and one above-water researcher that received further backup and information from DFMR officials and the lodge manager. While the atoll has high biodiversity and for the most part healthy corals and marine organisms were observed, the team has also found strong evidence of widespread degradation of the system. This included signs of over fishing, confirmed by fishers who have used the area for decades, degradation in the form of dead and physically damaged coral and in some instances bare patches where coral would normally be expected to occur, the recent and pervasive occurrence of a noxious blue-green algae that often is an indicator of unhealthy water-column conditions, and even a possible occurrence of dynamite fishing. ***While much more work is required to fully assess the health of the system, the investigators can say with confidence that the system***

¹ Mnemba Island will, in the current financial year, contribute nearly US\$1 million to the well-being of Zanzibar through lease fees, MIMCA contribution, VAT, Corporate tax and PAYE. This excludes any work conducted within the communities by either the lodge directly, with the Africa Foundation and/or in conjunction with other parties. It also excludes airport taxes, visa fees and the guests' contributions through itinerary extensions onto the mainland or through their local purchases.

will degrade further to dangerous levels if appropriate and sustained action is not taken soon.

Some Observations and Recommendations

6. Monitoring is an essential tool for managing natural resources, like for most other processes. It is imperative that a comprehensive monitoring system be put in place for the Mnemba reefs *as soon as possible*. Only then can convincing statements be made with respect to the health of the reef and the probable causes of degradation. The CC Africa lodge on the island is in an excellent position to drive and fund this monitoring system of which it will also be a major beneficiary. However, for monitoring to be credible it cannot be the task of one party only and it is proposed that there be a sub-committee of the MIMCA Management Committee to oversee the monitoring system and that this sub-committee must include members of government as well as the local community. These members will also have the task of conveying monitoring results to the Management Committee, the Advisory Committee and their wider constituencies. It is also suggested that the Monitoring Sub-Committee include an expert from a credible outside entity, for instance the IMS and/or another reputable entity.

7. It is recommended that the roles of the different players in MIMCA be revised and clearly defined, that the structure and function of the Management and Advisory Committees be revisited, and that co-management capacity be built. While the key stakeholder groups are currently represented in the Management Committee, more emphasis needs to be placed on building the capacity of representatives who may be lacking the necessary skills or knowledge. Thus the common problems of co-management systems arising from one or few parties having all the knowledge while others lag behind can be avoided. It is also important to ensure that the community members in the Committee do, in fact, represent the views of their communities and report the results of meetings to them. Similarly, the tourism sector needs to be better represented in the Management Committee. Currently CC Africa is the only tourism operator in the Management Committee and coordination with other operators is poor. Much effort should go into institutional capacity building of the Management Committee.

8. The Management Committee should meet regularly and undertake exchange visits to other marine conservation areas such as Misali Island of Pemba. The preparation and wide discussion of a management plan for MIMCA should be a priority. The management plan should not be rushed to completion, which is always tempting. Preparing it can be an extremely useful process to bring parties together, build their capacity, and get their full “buy-in” for implementing the plan through collaborative effort. Only then will the parties feel any sense of ownership of the plan, otherwise it will be a meaningless paper object. Emphasis therefore should be put on conducting a thorough and inclusive *process*. The Advisory Committee should have broad-based

representation, for instance from the fishing sector (DFMR), the tourism sector (Zanzibar Tourism Commission), communities and local government, as well as marine science experts (IMS). Beneficiaries should sit only on the Management Committee to avoid conflict of interest. However, both committees act mostly in an advisory capacity following their clear and separate Terms of References while a strong and dedicated Operational Management should pay attention to the practical tasks at hand. An office for management, information and public awareness should be established.

9. Equally important is the establishment of a well organised fishers association that not only can function as a voice for the concerns of its members but as a conduit for capacity building and other types of developmental assistance. Associations must be established (preferably one association only for MIMCA), but this needs to be done carefully and in a participative manner or the initiative will only fail after some time. Once a strong fishers association is in place, steps can follow to transfer ownership of the marine resources to the fishers, thereby circumventing at least some of the numerous problems that “open access” systems bring. Once fishers experience a sense of ownership of the resources in MIMCA much improvement can be expected. There already exist many “lessons learned” in terms of the establishment of fishers associations and cooperatives that can be useful here. The existence of a strong fishers association in which members will manage their activities and equipment by mutual agreement will make the overall task of managing the area much easier.

10. Presently the “open access” situation means there are few restrictions and little control with respect to what activities can be allowed where (with the single exceptions that fishers can no longer use the island itself, or fish in the small House Reef in front of the lodge). The basic tenets of any protected area, namely to control numbers and access by determining how many people can be doing what in a certain area, is therefore not in place. Clear and multiple-use zoning of the conservation area should be discussed and agreed upon. Zoning will help to solve the conflict between nearby fishers and tourism operators. One of the recommendations set out in a Baseline Ecological Survey around Mnemba Island² was to form a number of zones with each zone having a specific set of management objectives. Currently limited to the House Reef and the 200 m private area around the island, the “non-extractive zone” should be enlarged and it is also proposed that a second “non-extractive zone” be established elsewhere in the atoll once a monitoring system is in place so that fishers and tourism operators alike can enjoy the benefits.

11. Zoning must be accompanied by training of fishers in sustainable fishing methods and gears, as well training of MIMCA rangers. During the short visit at Mnemba the

² Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

rangers were not visible. No one knew exactly what they were supposed to be doing. Considering the length of the stay of the investigators there (two short visits) this observation may not reflect the reality, yet it is a common problem that rangers are thrown “off the deep end” without adequate preparation or equipment (and hence motivation). Long term involvement and training of rangers is essential. They can play a much bigger role than they apparently currently do, particularly when it comes to watching the area and reporting irregular practices to DFMR, but also providing tourists with information about MIMCA. Carefully selected and trained rangers that are given long term rather than the current three months temporary employment would certainly be more committed to the conservation aims of MIMCA.

12. The investigators observed no indication anywhere of Mnemba’s status as a marine conservation area, not even signboards on the main island’s shore. Tastefully done signs can convey a lot of information, including broad guidelines. Without guidelines people will simply follow their instincts (which can be good or bad). While it may not always be easy to control tourists, the onus can certainly be placed on the operators who are easier to hold accountable for their actions and those of the people they take there. A code of conduct for tourism operators in MIMCA is urgently needed. This code of conduct should be discussed among all stakeholders and once approved should be widely disseminated and enforced by MIMCA rangers. In a recent meeting of the Management Committee, the CC Africa representative presented some examples of codes of conduct pertaining to diving, snorkelling, anchoring and mooring, catch and release fishing, boating, whale and dolphin watching, and waste disposal, which can be used to draw up MIMCA’s code.
13. MIMCA is a multiple-use zone. Different parties experience different benefits and commit to different types and levels of investments. They also inflict different environmental costs on the system. The ways and extent by which the different beneficiaries and users of the Mnemba Atoll contribute to its conservation should be reviewed. It is recommended that a study be conducted to determine a viable price structure for the conservation area, taking into account current revenue streams, their potential diversification, and the estimated current and envisaged costs of effective conservation. The results can provide the base for renegotiating leases and access to MIMCA.
14. The large number of poor people living near the atoll and clearly depending on its resources is immediately obvious. Alternative livelihoods need to be developed or enhanced to relieve the pressure from the atoll. Poverty is notoriously difficult to address effectively at the local level. It is recommended that a Local Economic Development (LED) workshop be held *at the local level* in which obstacles and possibilities are systematically debated and worked into a logical framework with clear steps that can be taken. Such a workshop has to be carefully facilitated to keep the focus on the central issue of poverty alleviation. In situations where abject poverty exists, small-scale solutions can sometimes be found that later can develop into

sustainable sources of income or at least subsistence. All possibilities should be investigated, ranging from deploying more Fish Aggregation Devices (FADs) to drawing up a road-based empowerment plan for increasingly involving local people in the tourism industry.

15. The issue of the management of the community fund that needs to be improved came up on various occasions. This is hardly a surprise as community funds generally are difficult entities to manage (although good management can certainly be achieved). According to Riedmiller³, one obstacle to the management of nature reserves by central government agencies is the fact that the revenues generated by tourism are normally not reinvested in the management of the reserve and in related services. Currently one third of the tourism fees is allocated to community projects (usually for the development of basic social services) while very little of the remaining two thirds seems to be directly invested in conservation. Investment in conservation must cover both activities that are directly aimed at conservation—such as reef monitoring—as well as the development of sustainable fisheries or alternative livelihoods that can relieve the pressure from the MIMCA area without compromising the fishers' livelihoods. The fund should be reviewed with the purpose of making it function better and in a totally transparent manner. A good start has been made that the DFMR and its partners can be proud of, and now is the time to improve it even more.

Chwaka Bay

16. The importance of Chwaka Bay cannot be overestimated. The mangroves and sea grass beds are important breeding grounds for marine organisms, including open sea fish species, and hence the health of this shallow bay has vast implications on the marine resources along the entire east coast of Unguja and beyond. The area is under considerable pressure although more studies are necessary to quantify the health of the system. However, non-sustainable use of the mangroves for wood is clearly going on, while the effect of seaweed farming should be studied, and the extraction of living marine organisms monitored and quantified. The bay with its fringing mangroves, bird breeding small islands and strikingly beautiful sandy beaches along the Michamwi Peninsula has much tourism potential, especially when linked to the Jozani Forest protected area network. Its potential uses should be carefully reviewed in order to arrive at a basis for an Integrated Conservation and Development (ICD) approach to the planning of the area.
17. Chwaka Bay has the potential to be declared a Ramsar site and this process should start as soon as possible as it will open further possibilities for funding and programmes, including community-based ones, as well as awareness raising of the importance of the system. Chwaka Bay potentially can have a lesser conservation

³ Riedmiller, S., undated. *Private Sector Management of Marine Protected Areas: The Chumbe Island Case*. Pp 228-240.

status than national park, but still at a sufficiently high enough level to put some protective measures in place. While placed on the Tanzanian Tentative List for World Heritage Sites (WHS), it is recommended that further nomination of WHS not proceed on an *ad hoc* basis but in context with the overall framework of protected/conservation areas now emerging in all of Zanzibar, namely both Unguja and Pemba. It is possible that a properly conceived and consolidated network in its entirety could be nominated as a WHS, thus paying homage to all the unique natural and cultural aspects that occur in such areas, invoking the option of a serial nomination in which areas can be added as they become eligible in terms of WHS criteria.

The East Coast in its Entirety

18. The East Coast in its entirety is separated from the open sea by a barrier reef that runs from Mnemba to the northern opening of Chwaka Bay. The health of this reef which is under obvious and considerable pressure is critical to sustain not only the already large but still growing tourism industry but also the numerous local people who depend on marine resources for a living, or at least for a substantial part of their sustenance. Without some protective measures in place this reef will degrade to a former ghost of itself in years to come. Although there is a small marine reserve at Kiwengwa (see Map 2), it is proposed that the entire area from the north end of Chwaka Bay to MIMCA be declared as the “East Coast Recreation Area” (see Map 3), a designation under a new Protected Areas Act (see below) which will enjoy a low level of protection (yet strong enough to put some measures and monitoring in place). The Kiwengwa conservation area can then form a core area, and there potentially could be one or two more core areas that should be clearly marked with buoys. A beneficial side-effect will be the creation of a biodiversity corridor that can then run from the south of Unguja (Menai Marine Conservation Area), through Jozani Forest into Chwaka Bay, and up along the east coast to MIMCA.

Unfolding the “Big Picture”

19. The “Big Picture” described above certainly is a noble vision. It can realistically be achieved through the implementation of a carefully conceived Protected Areas Act, which will devise appropriate types of conservation/protected areas and will describe clearly what is meant by each of them. Unfolding the “Big Picture” is, however, more than a noble idea. It is also a very necessary one for this small island that is feeling increasing pressure from a growing population and a burgeoning tourism industry that appears to be insufficiently “harmonised” with conservation initiatives and environmental health requirements as prescribed by the Environmental Management for Sustainable Development Act (Environment Act) of 1996. Environmental requirements include the rigorous practice of Environmental Impact Assessment (EIA) and hopefully soon also the very useful necessary practice of Strategic Environmental Assessments (SEA), which can assist Zanzibar to make most of its resources for the benefit of the largest number of people. It is through the use of SEA that the different land and resource uses of a wider area can be balanced carefully.

PART I

BACKGROUND AND APPROACH

1 INTRODUCTION

A small island off the northern tip of Unguja Island in Zanzibar, Mnemba is part of a coral atoll formation supporting important marine life. Following the thirty-three year renewable lease of the island for private tourism development in 1989, the Mnemba Island Marine Conservation Area (MIMCA) was established in 2002 to protect its natural systems. Conflict of interests, however, exists between the fishers that have traditionally used the area and tourism practitioners including a high-end luxury lodge on the island as well as increasing numbers of operators engaged in diving and snorkelling activities in the atoll. Fishers and conservation officials have furthermore reported damage in some areas of the coral reef, citing the recent tsunami or dynamite fishing as possible causes. It was then decided to engage an outside party to assess the damage objectively.

The Department of Fisheries and Marine Resources (DFMR) of Zanzibar is strongly committed to the protection of the coastal and marine ecosystems on Unguja and Pemba Islands and to creating a sustainable network of protected areas. One avenue of support is the Marine and Coastal Environment Management Project (MACEMP) currently under preparation for the United Republic of Tanzania (URT) with funding from the Global Environment Facility (GEF) through the World Bank. MACEMP aims to improve the management of coastal and marine resources, and thereby contribute to poverty reduction and a better scientific understanding. The project will support, *inter alia*, the establishment of a network of marine conservation areas and the creation of an enabling environment for sustainable coastal investment in a number of focus areas in the mainland and the islands of Zanzibar—Unguja and Pemba. Mnemba Island is one of these focus areas. The question arises to what extent MACEMP can support a potential extension of the Marine Protected Area (MPA) network in the northeast of Unguja where Mnemba is located and what enabling actions should be taken to make this a reality.

2 PURPOSE OF THIS STUDY

Responding to the need to address the issues mentioned above, the DFMR of Zanzibar requested EcoAfrica Environmental Consultants to undertake a brief assessment of the situation surrounding Mnemba Island as an extension to a larger study in which they were involved. In view of the emerging conservation framework in Zanzibar, there was a need to assess the situation in the context of the east coast of the island and the MPA network. Consequently a Rapid Assessment was commissioned from the Institute of Marine Sciences (IMS) and the State University of Zanzibar (SUZA). The present study aims to

provide additional perspectives on Mnemba Island and Chwaka Bay to increase the overall understanding of these conservation areas and their positioning in the MPA network. Additionally, the health of the coral reefs in Mnemba Island needed to be investigated following recent reports by fishers and conservation officials that some areas are seriously damaged. Specific objectives of the current short study were:

- (i) to examine Mnemba Island and Chwaka Bay in the broad context of the east coast of Unguja and the emerging network of MPAs and provide recommendations for future; and
- (ii) to engage in a brief evaluation of the condition of the reefs around Mnemba Island following reports of damage by local fishers and the lodge manager on Mnemba Island.

This report presents the results of this tentative Situational Assessment in three parts. The present Part I describes the background, purpose and methodology for the study. Part II describes the current situation in Mnemba Island and Chwaka Bay, in terms of the natural systems and their use, management and health, based on a mixture of literature review and results from the team's fieldwork. Finally, Part III analyses the current situation in the broader context of the east coast of Unguja and provides recommendations for the way forward. Specific recommendations pertain not only to the various conservation areas and their relation with the surrounding communities, but also to the "Big Picture" of marine conservation that is emerging in Unguja and along the east coast in particular.

3 METHODOLOGY AND TEAM

The field work was carried out during five days in the period from 19 to 29 March 2005 covering Mnemba Island, Kiwengwa, Chwaka Bay and the mangrove area south of Jozani Forest. The team included environment and development specialists, fisheries officials and scuba divers drawn from both EcoAfrica Environmental Consultants (Dr Francois Odendaal, Dr Claudio Velasquez, Mr Charles Maxwell and Ms Raquel Garcia) and DFMR in Zanzibar (Mr Peter Shunula and Mr Issa Suleiman). A composite methodology was used consisting of diving, discussions with key stakeholders, visual recordings and review of previous studies. The assessment of the current situation presented in Part II of this report is based on information drawn from all these methods.

- **Diving:** a diving team performed dives in a number of sites around Mnemba Island, Kiwengwa and Chwaka Bay (see Table 1). Coral health and diversity was assessed by two divers who counted hard and soft corals in random transects during 12 minute intervals, which provided a rough index by which different sites could be compared relatively to other sites in the same area (for assessing local biodiversity) as well as to more distant sites (for comparing biodiversity between major sites on Unguja and Pemba). Two divers did the counts while a third diver recorded types of damage using video and still photography.

Table 1 Coordinates of certain dive sites in Mnemba Atoll

LOCATION AND FEATURES	COORDINATES
Kichwani Reef	05° 50. 357' S; 39° 23. 595' E
Big Wall	05° 48. 107' S; 30° 25. 047' E
Peter's Wall	05° 47. 544' S; 39° 24. 744' E
In Between Reef	05° 50. 319' S; 39° 24. 246' E

- **Discussions with key stakeholders:** informal discussions were held with key stakeholders to capture the different perceptions of ongoing and planned marine conservation efforts, tourism developments, and of their benefits. Key stakeholders included the manager and some staff members of the Mnemba Island Lodge operated by Conservation Cooperation Africa (CC Africa), rangers of MIMCA, DFMR officials, and the Chief Warden of Jozani and Chwaka Bay. As extensive participatory socio-economic interviews had already been conducted by DFMR officials with fishers in the area during the extensive IMS/SUZA Rapid Assessment, no additional interviews with fishers were deemed necessary.
- **Visual recordings:** underwater and above water photography stills and film were used to record the state of the coral reefs as well as aspects of the natural resources and livelihoods in the areas visited. This material can be used in the future by the MACEMP project and some of the photos produced are included in this report.
- **Review of previous studies:** Results of research conducted in Mnemba Island and surrounding areas were reviewed (see the References section). One particularly useful study reviewed was the biodiversity and socio-economic rapid assessment that was undertaken for MACEMP in January 2005 focusing on MIMCA as well the Chwaka Bay Conservation Area, situated further south along the east coast. It was conducted by a team of scientists and socio-economists from IMS and SUZA, with the participation of experts from DFMR. Drawing on collaboration with fishers from villages in the target area, this ten-day survey assessed fifteen sites for biodiversity parameters as well as socio-economic needs and concerns. A substantial report was produced (hereafter referred to as “IMS/SUZA Rapid Assessment”). It ought to be read in conjunction with the current study.

PART II

THE CURRENT SITUATION

4 OVERVIEW OF THE TARGET AREA

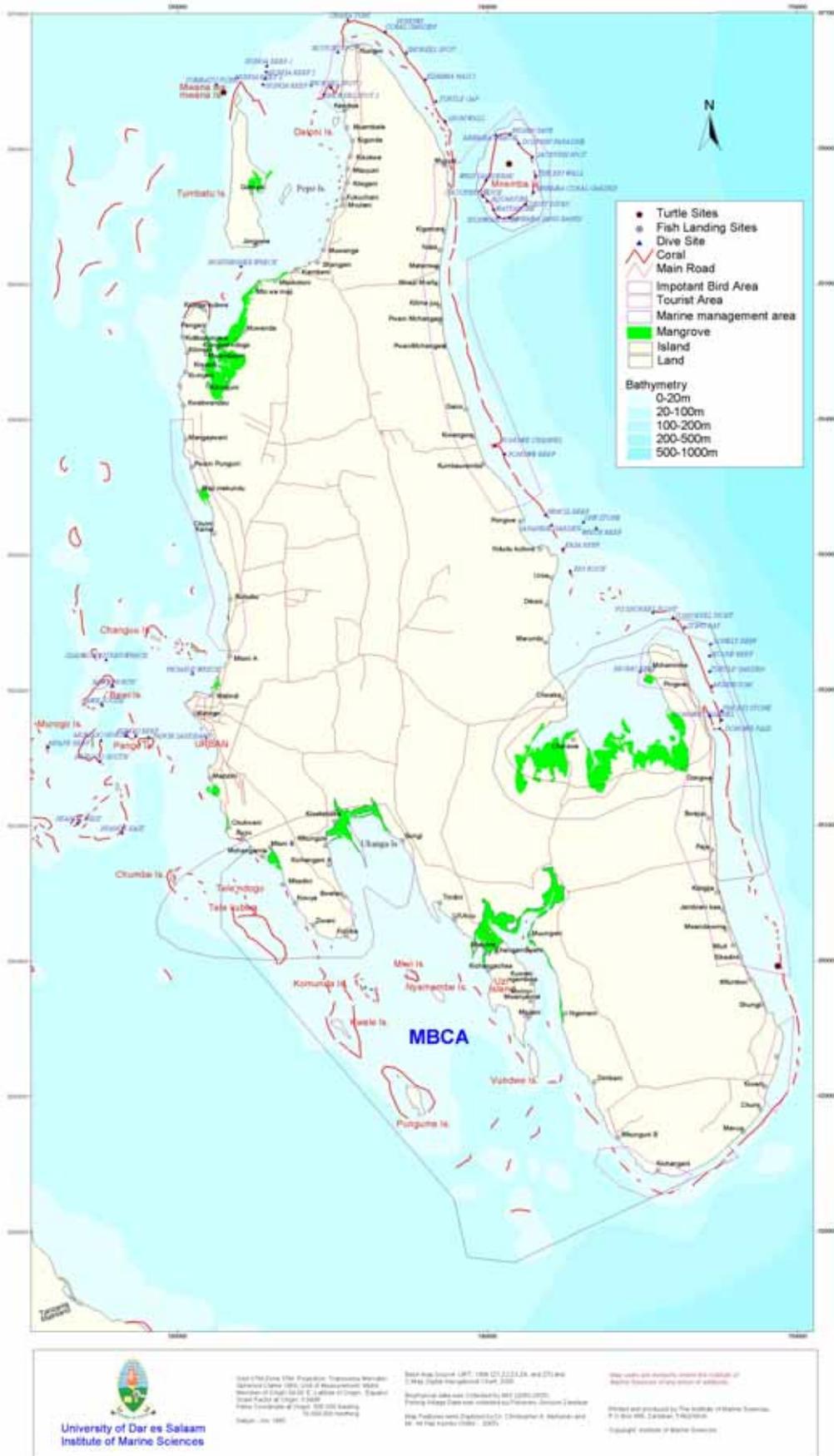
The east coast of Unguja Island stretches from Ras Nungwi in the north to Makunduchi in the south (see Map 1). It is a relatively straight coastline interrupted only by the elongated Michamvi Peninsula that protrudes in a south-north direction to form the outer barrier of Chwaka Bay, a shallow water body opening northwards into the open ocean. Chwaka Bay supports the largest single area of mangrove forest in Zanzibar and includes other coastal habitats such as seagrass beds and mudflats. The coastline on the east side of Unguja is flanked along most of its length by sandy beaches and a barrier reef of coral that shelters mostly shallow lagoons on the landward side. Mnemba Island is located inside a coral atoll formation that supports a vast array of reef fish and other marine life. It is the only island off the east coast of Unguja, and located off the northeastern side (Figure 1).



Figure 1 Aerial view of Mnemba Atoll, where the main island's shore is noticeable on the left, flanked by an inshore barrier reef, while Mnemba Island is visible as a triangle located on the west side of the large atoll⁴

⁴ Source: Sustainable Management of Land and Environment (SMOLE) Project.

MAP 1: Map of Unguja and its coastal resources



Population density and human settlement frequency along the east coast of Unguja are somewhat lower than along the west coast and decrease from north to south⁵. Mainly characterised by coral rag, with pockets of shallow, fertile soil, the main sources of income in the eastern area come from the sale of own crops, fish and seaweed⁶. The local communities living along the coast rely almost entirely on the sea, mostly through fishing but also seaweed farming. Lacking appropriate offshore vessels, most fishing activities take place along the reefs, often using destructive methods⁷ while during the north east monsoon when the sea is calmer boats sometimes venture a little further into the open sea.

Tourism is an important economic pillar in this area, yet with obviously insufficient benefits coming to the local communities that experience debilitating levels of poverty. The sandy beaches and coral reefs along the coast, as well as the forest habitats in the south, have spurred the growth of the tourism industry. A string of hotels exists along the entire coast—according to the 2004/2005 State of the Environment Report for Zanzibar, there are 200 tourist accommodation venues in Unguja Island, most of which are located on the north and east coasts. One of the few examples of Zanzibar islets that have been leased to private owners, Mnemba offers a high-end tourism experience in its luxury lodge. The number of both formal and informal tourist operators that base their operations (mostly involving diving and snorkelling) on the natural features that the area offers, is also growing.

The importance of the east coast's natural features lies not only in their tourism potential and other livelihood options but also on their conservation value. Reaching one to two km in size, the coral reef along the east coast provides protection from the erosive force of the waves and foraging habitat for artisanal fisheries. While branched corals dominate the west side of Unguja, a wider range of soft coral and massive amounts of encrusting corals occur on the east side that can withstand strong currents and waves⁸. The Chwaka Bay mangrove forest also helps to stabilise the shoreline and decrease coastal erosion by reducing the energy of incoming waves and currents and stabilising bottom sediments. The bay also provides an ideal environment for offshore reefs and seagrass beds that further produce and trap nutrients and stabilise bottom sediments. The mangrove ecosystem is furthermore a nursery and spawning area ground for many species of crustaceans and fish, including many that will venture into the open sea as adults. The coast has also important nesting beaches for endangered sea turtles.

The fishing and tourism activities that take place along this coastline are, however, posing threats to the same natural resources they depend upon. Overfishing by local fishers, the use of destructive fishing gears, and unsustainable exploitation of mangroves are usually rooted in poverty and lack of alternative livelihoods and have negative impacts on the coastal and marine ecosystems. Overfishing can, however, not be blamed

⁵ UNEP, 2001. *Eastern African Atlas of Coastal Resources, Tanzania*. UNEP, Kenya. pp1-102.

⁶ Grootenhuis, F. and Lopez, J., 2003. *Household Economy Analysis for Zanzibar*. Final Report. Revolutionary Government of Zanzibar, World Food Programme, Save the Children, pp 1-192.

⁷ Mohammed, S. M. *et al.*, 2005. *Rapid Assessment of the Proposed Mnemba Chawka Bay Conservation Area*. Draft for Comment – January 2005. pp1-57.

⁸ UNEP, 2001. *Eastern African Atlas of Coastal Resources, Tanzania*. UNEP, Kenya. pp1-102.

solely on the artisanal fishers as the tens of thousands of tourists visiting the region annually undoubtedly have a pronounced (yet hitherto not quantified in a systematic manner) consumptive effect on the living marine resources inhabiting the fragile reefs. Unguja's mass tourism and hotel development are altering the coastline and continue to consume beach areas. A massive and unsustainable increase in the number of curio trade partly founded on natural products (including trade in turtle and mollusc shells) in the north-east of Unguja was reported in a 1992 survey⁹. During the present study the investigators witnessed the proliferation of curio shops in Kiwengwa, for example, where cultural erosion can be added to the dramatic coastal erosion that can be witnessed everywhere but especially in the north of the island.



Figure 2 Economic activities along the east coast of Unguja: fishing and seaweed farming in Chwaka Bay and curio trade in Kiwengwa

However, the benefits to local communities from tourism developments along this coast are perceived by many to be low or even insignificant, especially if considered together with the impact that the tourism trade has on the same resources that local people depend on for their own livelihood and sustenance. Two-thirds of the owners of the “curio” shops that have proliferated around the hotels are from mainland Tanzania, most staff employed in hotels are from Stone Town, mainland Tanzania or even from as far away as Kenya, and hotels tend to prefer sourcing the fish they need from big markets and middlemen to dealing directly with the numerous fishers that live along the coast¹⁰.

At the same time, tourism and fishing activities are affecting the natural systems of the east coast. Worrying signs in the reefs, fish stocks and mangroves have been reported on different occasions. Along this coastline, only the Mnemba Atoll, the Kiwengwa reefs, and part of the Chwaka mangroves and adjoining Jozani Forest are legally protected. MIMCA was gazetted in 2002 to protect the entire atoll and includes a private area concession; Jozani-Chwaka Bay National Park was established in 2004 under the mandate of the Department of Commercial Crops, Fruits and Forestry (DCCFF); and the Kiwengwa Controlled Area was established in 2000 even though effective management of the area was never put in place. It is in the context of this network of protected areas (see Map 2) that Mnemba Island and Chwaka Bay are discussed in this report.

⁹ Horrill, J.C., 1992. *Ecological Monitoring Survey of the Coral Reefs Around Mnemba, Chapwani, Changuu and Bawe Islands*. Zanzibar Environmental study Series No. 11, 1992. Commission for Lands and the Environment, Zanzibar. pp1-13.

¹⁰ Grootenhuis, F. and Lopez, J., 2003. *Household Economy Analysis for Zanzibar. Final Report*. Revolutionary Government of Zanzibar, World Food Programme, Save the Children, pp 1-192.

MAP 2: Current Marine Protected Area Network in Unguja Island



5 MNEMBA ISLAND

Mnemba Island is located 400 m off the northeast coast of Unguja near the villages of Kijini, Muyuni and Matemwe. The island has a surface area of 9.9 ha and is part of a coral atoll formation of 150 ha. It is positioned toward the west side of the atoll system, while to the west a 100 m deep channel separates the island from the mainland of Unguja. This section provides a brief description of the island's natural resources, their uses and condition.

5.1 NATURAL SYSTEMS

The island is surrounded by a ring of extensive hard coral formations in a variety of exposures that increases habitat diversity¹¹. A shallow lagoon on the inside of the atoll varies from a metre deep at low tide to several metres at high tide, while the reef face has shelves, submarine terraces and walls with steep inclines¹². Coral species diversity is greatest around the outer reef slopes¹³. A 1990 survey¹⁴ found *Porites*, *Acropora*, *Stylophora*, *Pocillopora*, and *Favites* to be the five most dominant coral genera in Mnemba Island. More recent research¹⁵ concluded that the Mnemba Atoll had the highest species diversity among the reefs in the northern part of Unguja (including Mnemba Island, Nungwi, and Tumbatu). A total of 36 hard coral genera were recorded by the IMS/SUZA team in 2005¹⁶, the most dominant being *Porites*, *Goniastrea* and *Astreopora* and the highest density found at Kinani and Mnemba coral garden.



Figure 3 Marine life in the Mnemba Atoll

¹¹ Horrill, J.C., 1992. *Ecological Monitoring Survey of the Coral Reefs Around Mnemba, Chapwani, Changuu and Bawe Islands*. Zanzibar Environmental study Series No. 11, 1992. Commission for Lands and the Environment, Zanzibar. pp1-13.

¹² Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

¹³ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

¹⁴ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

¹⁵ University of Edinburgh and Institute of Marine Sciences, 2002. *Preliminary Report of the Collaborative Reef Research Expedition, 3rd July – 8th August 2002, Nungwi Village, Unguja Island (Zanzibar) Tanzania*. University of Edinburgh Davis Trust.

¹⁶ Mohammed, S. M. *et al.*, 2005. *Rapid Assessment of the Proposed Mnemba Chawka Bay Conservation Area*. Draft for Comment – January 2005. pp1-57.

The northern and south-eastern sides of the Mnemba reef exhibited the greatest variety of fish species in a 1990 survey¹⁷. The IMS has recorded 226 species of fish in 2005¹⁸. A variety of large predatory fish occurs in the open sea, including Barracuda, Mackerel, Kingfish, Sailfish and Marlin¹⁹. Marine mammals visiting the waters around Mnemba include Sperm and Humpback Whales, Striped, Spinner and Bottlenose Dolphins. White-tip Reef, Great White and Tiger Sharks, and Manta and Devil Rays also occur there^{20,21}.

Mnemba is also an important nesting ground for sea turtles, as is the case with most of the northeast coast of Unguja. In a 1993 survey of sea turtles²², slightly higher levels of nesting activity were reported in Unguja for the beaches around Ras Kizimkazi and in the Kijini area to the north of Matemwe. UNEP²³ reported 30 nesting females in Mnemba Island and in a 2002 survey under the Sea Turtle Nest Recording Programme²⁴ Mnemba was among the beaches with highest density of nests, together with Matemwe and Muungoni.

Aerial photographs have revealed a history of erosion along the southern and south-eastern shorelines of Mnemba²⁵. Yet the island's forest cover, consisting mainly of *Pandanus* and *Casuarina* trees²⁶, helps to protect the island from eroding ocean currents. Other native species on the island include the Wild Rubber Fig, Giant-leaved Fig, Coast Milkwood and Dune Cross-berry²⁷, and a total of thirty three terrestrial plant species have been recorded on Mnemba Island in a 1990 survey²⁸. This dense vegetation provides a feeding station for large numbers of wading birds. A variety of birds forage along the beach, such as the Whimbrel, Lesser (Mongolian) Sandplover, Curlew Sandpiper,

¹⁷ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

¹⁸ Mohammed, S. M. *et al.*, 2005. *Rapid Assessment of the Proposed Mnemba Chawka Bay Conservation Area*. Draft for Comment – January 2005. pp1-57.

¹⁹ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

²⁰ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

²¹ University of Edinburgh and Institute of Marine Sciences, 2002. *Preliminary Report of the Collaborative Reef Research Expedition, 3rd July – 8th August 2002, Nungwi Village, Unguja Island (Zanzibar) Tanzania*. University of Edinburgh Davis Trust.

²² Clark, F. and Khatib, A.A., 1993. *Sea Turtles in Zanzibar: Status, Distribution, Management Options and Local Perspectives*. Commission for Lands and Environment, Zanzibar. pp1-84.

²³ UNEP, 2002. *Synthesis of Party Reports. Part II: Information on Appendix 1 – Listed Species*. Convention on the Conservation of Migratory Species of Wild Animals. UNEP-World Conservation Monitoring Centre. September 2002.

²⁴ Khatib, A.A., M.H. Abdalla and N.S. Jiddawi, 2002. *Sea Turtle Nest Recording Programme. Progress Report March – September 2002*. Zanzibar Turtle Conservation Committee. Fisheries Department, Zanzibar, pp 1-17.

²⁵ Horrill, J.C., 1992. *Ecological Monitoring Survey of the Coral Reefs Around Mnemba, Chapwani, Changuu and Bawe Islands*. Zanzibar Environmental study Series No. 11, 1992. Commission for Lands and the Environment, Zanzibar. pp1-13.

²⁶ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

²⁷ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

²⁸ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

Sanderling and Ruddy Turnstone, and vast numbers of Red-eyed Dove breed on Mnemba²⁹.

The beaches possess an extremely low diversity of life, with two crustaceans (ghost crab) species recorded on Mnemba Island in a 1990 survey³⁰. No mammals are indigenous to Mnemba, but a group of Suni antelope has been released in a highly successful experimental breeding project. The Dwarf Gecko and Tropical House Gecko are common reptiles³¹.

5.2 USE AND MANAGEMENT OF NATURAL RESOURCES

With its diverse coral reefs and abundant fish life, Mnemba has much to offer to both tourists and fishers. Fishers from the villages of Matemwe, Muyuni, Nungwi and Pwani Mchangani have been using the atoll as their main fishing ground for a long time. Initially uninhabited, the island was an important camping site enabling fishers to operate in areas that were otherwise difficult to reach on day trips from the Unguja coast³². When the island was leased to private owners in 1989, these fishers were excluded from using the beaches and part of the atoll³³. In the absence of adequate information and opportunities for community participation during this process, considerable resentment developed over the entire Matemwe area. The fishers resent the loss of their rights, which is exacerbated by the limited alternative livelihoods in this area where the land is largely unsuitable for farming. Indeed, the case of Mnemba is often cited throughout Unguja and even Pemba Island as a reason for opposing tourism development, including the “giving away” of small islands to the private sector. In fact, a policy³⁴ was developed in 1994 for small islands in relation to tourism.

The 33 years renewable lease of Mnemba Island—which is now approaching its mid-term—includes a 200 m exclusion zone from the mean high water mark surrounding the island. CC Africa operates a luxury lodge on the island, also offering diving and snorkelling activities. In 2002 Mnemba Island was declared a marine protected area and, in an attempt to address the conflict between tourism and fishing activities, discussions ensued with the local communities. MIMCA was created with the four villages of Matemwe, Kijini, Pwani Mchangani and Nungwi and officially gazetted in November 2002. The MPA extends 200 m beyond the outer reef (see Appendix for the protected area’s coordinates).

²⁹ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

³⁰ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

³¹ Conservation Corporation Africa, 1997. *Mnemba Zanzibar – Indian Ocean Eco Guide*. pp1-29.

³² Commission for Lands and Environment, 1994. *Policy for Allocation and Use of Zanzibar’s Small Islets. Integrated Planning Unit*, pp 1-19.

³³ According to the Policy for Allocation and Use of Zanzibar’s Small Islets (Commission for Lands and Environment, 1994), exclusive use of Mnemba Island was guaranteed to Archers Ltd by an agreement with the Ministry of Information, Culture, Tourism and Youth in 1989 and the rights to the island and the beach were given legal basis by a lease agreement signed in March 1992.

³⁴ Commission for Lands and Environment, 1994. *Policy for Allocation and Use of Zanzibar’s Small Islets. Integrated Planning Unit*, pp 1-19.



Figure 4 Mnemba Island: view of the island from the coastal fishing village of Muyuni/Kijini, the island's lodge accommodation and sandy beaches

A fee of US \$ 1 per person per day started being charged to tourists visiting MIMCA in March/April 2003. This fee has subsequently been increased to US \$ 3 and may be further increased to US \$ 10 according to information provided by government officials in a recent meeting³⁵. Around 20 tourism operators engage in diving and snorkelling activities in the atoll, both from the formal and informal sectors, mainly from Nungwi, Kiwengwa and Matemwe. In days during the high season between June and March there may be up to 300 people visiting the reef³⁶, the preferred areas being the House Reef and Kichwani (Map 1). Some of these tourists are guests at the Mnemba Island Lodge, a luxury lodge with 20 beds that enjoys an occupancy rate around 95%³⁷.

While tourism based on the natural assets of the area is a major economic activity in the atoll area, the impression exist among some members of the local community that there are few benefits from these tourism developments and activities and that the staff employed by the lodge is mainly recruited from the mainland or other places than their villages. In contrast, CC Africa pointed out that 87% of Mnemba Island staff members are in fact employed from the local villages along the Northeast coast of Zanzibar. CC Africa further mentioned a range of activities they are involved in that would benefit communities, including donations to schools, to the deployment of Fish Aggregation Devices (FADs), etc. It is strongly recommended that a precise audit be commissioned to determine what the different commercial users of the Mnemba Atoll contribute to community development and welfare, so that such contributions can be standardized across the board and properly coordinated to avoid overlap and increase synergy between them.

Despite some positive examples of local tourism operators using the atoll and guesthouses established by local women in Kiwengwa and Pwani Mchangani, the communities around Mnemba still rely heavily on living marine resources. Considering the demography which is marked by a high percentage of children and young people, pressure in the future of the ecological system may very well become unbearable if new

³⁵ A meeting was held on 30 March 2005 to discuss the results of the Rapid Assessment of Pemba Channel Conservation Area (PECCA) and was attended by a large contingent of directors and other high ranking government officials in Zanzibar.

³⁶ Mohammed, S. M. *et al.*, 2005. *Rapid Assessment of the Proposed Mnemba Chawka Bay Conservation Area*. Draft for Comment – January 2005. pp1-57.

³⁷ Personal Communication from the Lodge Manager, March 2005.

livelihoods are not created or if local people do not get substantial entry into the tourism industry or at least significant other benefits from it.

Seaweed farming is practised largely by women in some villages around Mnemba Island such as Kijini, Matemwe, Pwani Mchangani, Kiwengwa, Michamvi and further south in Kiwengwa and Pongwe, but fishing remains the main livelihood. On one occasion during this study, the investigators counted 31 boats in the immediate area around the island. The fishers are now, however, restricted to a smaller area. Within MIMCA, the “House Reef” adjacent to the shore on the north-western side of the island and including the area that extends 200 m from the shore are legally no-fishing zones. According to the lodge manager this step has resulted in significant recovery of the reefs. There was an attempt to declare Kichwani (on the south-western side of the island) a non-extractive zone through an informal verbal agreement, but the area continues to be heavily used by fishers, as well as divers and snorkellers.

The fishers use mainly the western area, sometimes resorting to methods that are destructive to the coral reef and living marine resources. The use of traps, nets and even the movement of *ngalawas* in the atoll—sometimes trespassing the 200 m private concession in areas such as the House Reef—have been affecting the reef, and signs of dynamite have also been reported in the area. Patrolling of MIMCA is done by rangers that are usually drawn from the surrounding villages and temporarily employed for three months. Not only do they receive insufficient training, they also feel uneasy to approach fishers from their own villages using illegal methods or trespassing no-fishing or private areas. DFMR’s capacity to enforce fishing regulations is, in turn, weak due to financial constraints and lack of sufficient staff. The *shehas* are also charged with the responsibility of informing DFMR of any irregularities, but this has rarely happened.

The four villages of Matemwe, Kijini, Pwani Mchangani and Nungwi, as well as the DFMR, the District Authority (North A) and CC Africa are part of the MIMCA Management Committee. This committee meets quarterly and is supported by an Advisory Committee including the *shehas* of the four villages, the DFMR Secretariat, the District Commissioner, the Executive Secretary of the Zanzibar Tourism Commission, the Local Government Director and CC Africa. CC Africa is the only tourism operator in the Management Committee and with little coordination among the different operators, there is not one voice in the sector. Some tourism operators claim that their monetary contribution to conservation has not produced visible results on the ground. The communities, in turn, are sceptical about the benefits they receive from the conservation area and have even expressed the desire to resign from the Committee claiming that the control lies solely with DFMR.

With the roles of the different players poorly defined, conflict prevails between fishers and tourism operators in the area and conservation on the ground has not been very effective. Operational management of MIMCA needs to be enhanced. DFMR initiated the preparation of a management plan for MIMCA, yet without full involvement of the communities. It has been suggested in Committee meetings that a system for zoning of the area should be put in place and that a code of conduct be prepared. According to CC Africa, the recent installation of new FADs to promote fishing outside the sensitive reef areas is the first step required for this zoning.

Other efforts of CC Africa towards conservation have included reef education with PADI support, whereby students from schools visit Mnemba for snorkelling, lectures, and competitions, as well as support to tagging and monitoring of turtles that nest on the island³⁸. The general perception conveyed to the consultants, however, is that the operational management of MIMCA and the conservation efforts have been insufficient. In addition, little attention has been given to building local capacities with a view to transferring the management to the communities in the long term.

5.3 HEALTH OF THE SYSTEM

The healthier corals of Zanzibar occur around the small islets such as Mnemba rather than the fringing reefs adjacent to the main island, according to Muhando³⁹. The same author reported, however, that even prior to the 1998 coral bleaching event various surveys throughout Tanzania indicated widespread degradation of coral reef environments. In Zanzibar, hard coral cover ranged from 13.9% at Mnemba to 53.1% at Bawe on the western coast. In 2000, Mnemba and the eastern fringing reefs were found to have 11% coral or less due to their exposure to strong wave action, which causes physical disturbance of the corals⁴⁰.

Damage of the coral reef around Mnemba Island has been increasing over the last two years and there have been reports by local fishers and conservation officials of dynamite fishing in some areas. The IMS/SUZA Rapid Assessment observed only limited signs of destruction of coral reefs and other marine environments. The current study observed different types of destruction including anchor damage, ropes strangling coral, marks on the bottom from a boat that ran aground, and a crate-like feature that could possibly have originated from dynamite fishing. A circular area about 2 metres across showed clear disturbance of the normal surface cover that consists of sand and coral rubble, and upon closer examination recently broken (or shattered) shards of coral were found among the rubble. At another site rock boulders contained large barren areas that in similar settings would normally have contained at least some coral growth.

According to the lodge manager who accompanied the team on two dives, small fishing boats moor anywhere at low tide and people get out and work by foot. At low tide there are sometimes hundreds of people walking on the fringing reef in search of marine organisms. There were also complaints that some operators drop their anchors indiscriminately. An abundance of a reddish algae-like organism that the authors have preciously noted to be associated with degraded environments has also been observed.

³⁸ Tanzania Coastal Management Partnership, 2003. *Tanzania State of the Coast Report 2003: The National ICM Strategy and Prospects for Poverty Reduction*. National Environmental Management Council, the University of Rhode Island Coastal Resources Centre, and the United States Agency for International Development, pp. 1-62.

³⁹ Muhando, C.A., 1998. *The status of coral reefs around Zanzibar and the general environmental services they provide*. In: Johnstone, R.W., Francis, J. and Muhando, C.A., 1998. *Coral Reefs: Values, Threats and Solutions. Proceedings of the National Council on Coral Reefs. Zanzibar, Tanzania*. Institute of Marine Sciences. pp1-124.

⁴⁰ Horril et al, 2000 in Daffa, J., undated. *Status and Management of Coral Reefs in Tanzania*. ICRI East Asia Regional Workshop Proceedings. pp73-82.

The cyanobacteria (or blue-green alga) observed was probably a *Lyngbya*⁴¹, noxious algae that are often indicators of unhealthy water-column conditions.

It is difficult to assess damage when there are no baselines or control zones, and when different sites cannot be directly compared as they are subject to differing natural pressures (wave action, different currents, etc.). However, the three divers who had just finished working in the Pemba Channel Conservation Area (PECCA) all were of the opinion that the reefs around Mnemba are considerably degraded and cannot be considered pristine by any stretch of the imagination. This assessment is supported by the general observation of the lodge manager.

Undoubtedly the Mnemba Atoll is under extreme pressure. Large numbers of people that live in abject poverty populate the villages on the main island that are located immediately across from the lagoon. Odendaal *et al.* (1995)⁴² previously have shown that on the Masoala Peninsula in Madagascar, reef quality declined the nearer they are located to finishing villages. The effect of hundreds of people looking for food on a regular basis in a shallow, fragile reef system is not hard to imagine.



Figure 5 Damaged areas and signs of unsustainable use of the Mnemba Atoll

Considering the number of people that depend on the Mnemba Atoll for a living, it is hardly surprising that the area is becoming degraded. ***If there is one overall message that this study wishes to convey, is that the Mnemba Atoll is on a non-sustainable path unless steps are taken that will lead to effective protection and sustainable resource use.***

According to the lodge manager the House Reef has considerably recovered since it was declared a “no go” zone for fishers and a good watch was kept over other operators in terms of their activities at the site. The divers were impressed with the House Reef where there were signs of new growth on corals that were damaged earlier. In fact, according to the biodiversity counts the House Reef was by far in the best shape of the five sites looked at the Mnemba Atoll (Table 2). In fact, it compared favourably to the best site visited by the divers in all of Zanzibar thus far, namely the Coral Garden at Misali Island.

⁴¹ Assistance in identification of the organism by Dr Mark Littler of the Smithsonian Institute is gratefully acknowledged.

⁴² Odendaal, F.J., Kroese, M., and Jaomanana, 1995. *The strategic plan for the management of the coastal zone of the Masoala Peninsula, Madagascar*. EcoAfrica Environmental Consultants. Madagascar Working Paper No. 4. Pp 1-214+Appendices.

Table 2 below shows that House Reef had the highest diversity of the five sites visited in the Mnemba Atoll adding to the observation of the lodge manager that this site has been recovering.

Table 2 The results of biodiversity counts by two divers for fish species, soft corals and hard corals

DIVE SITES	N	BIODIVERSITY COUNTS AND OVERALL INDEX			
		FISH	SOFT CORAL	HARD CORAL	INDEX
Mnemba - Big Wall	2	37.5 (34-41)	11.5 (11-12)	20.0 (19-21)	57.5
Mnemba - In Between	6	31.0 (27-38)	9.5 (8-12)	10.2 (8-13)	41.2
Mnemba - Coral Garden	6	23.0 (18-30)	5.7 (2-8)	6.7 (5-9)	29.7
Mnemba - House Reef	6	29.8 (26-36)	5.3 (2-8)	32.8 (27-46)	62.6
Mnemba - Moon Valley	5	34.0 (20-39)	2.8 (1-6)	8.0 (5-12)	42.0
Misali Coral Garden (Pemba)	8	33.4 (30-42)	2.1 (0-4)	40.0 (29-56)	73.4
Kiwengwa	8	26.5 (20-31)	9.5 (5-14)	11.8 (10-17)	38.3

Notes: The Index column merely presents the total of fish + hard coral, *n* is the total number of readings for each site, and numbers in brackets indicate the total range in the readings.

By and large the Mnemba Atoll has considerably less diversity than Misali Island in Pemba. Of course a direct comparison of biodiversity between the two sites cannot be scientifically robust as far as damage to the reef system goes, because they are ecologically rather different areas. However, the investigators saw much more physical damage inflicted on the Mnemba Atoll than on the reefs surrounding Misali, another partially protected island atoll in Zanzibar.

According to the literature the closure of Mnemba Island itself to fishers led to an increase in fish populations both within and outside the marine protected area^{43,44}. However, the IMS/SUZA Rapid Assessment reported a low number of fish population in some areas of the surveyed sites, a notable exception being the area around Mnemba Island especially Kichwani, Mkando and nearby reefs which the IMS/SUZA team considered richly endowed with marine life. One root cause identified in the IMS/SUZA Rapid Assessment was the lack of adequate fishing gear and vessels that allow fishers to fish in deeper waters. The atoll, and especially productive areas like Kichwani, thus becomes the only area where the fishers can have a reasonable harvest (although much reduced compared to the past experience).

⁴³ Commission for Lands and Environment, 1994. *Policy for Allocation and Use of Zanzibar's Small Islets. Integrated Planning Unit*, pp 1-19.

⁴⁴ Horrill, J.C., 1992. *Ecological Monitoring Survey of the Coral Reefs Around Mnemba, Chapwani, Changuu and Bawe Islands*. Zanzibar Environmental study Series No. 11, 1992. Commission for Lands and the Environment, Zanzibar. pp1-13.

6 CHWAKA BAY

South of Mnemba Island, Chwaka Bay is enclosed between Unguja's mainland and the Michamvi Peninsula, opening up to the north. Its rich marine and coastal habitats and their uses are described in this section.

6.1 NATURAL SYSTEMS

Chwaka Bay is a shallow open bay that supports on its southern shores the largest area of mangrove forest in Zanzibar. Seven species of mangrove were identified by Shunula⁴⁵ (*Ceriops tagal*, *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Xlocarpus granatum*, *Avicennia marina*, *Sonneratia alba*, and *Heritiera littoralis*). The highest density stands are those near Ukongoroni, according to a survey conducted in 2001⁴⁶. Within the Ukongoroni mangroves, the tiny island of Shakani provides an important bird nesting ground⁴⁷. The Chwaka Bay area is also known for its sandy beaches, especially along the exposed protrusion on the east side. Green turtles have been reported in the area, with nesting beaches existing along much of the shore⁴⁸.

Other coastal habitats in the bay include seagrass beds and mudflats, while corals are sparse in the bay itself except in a small circular formation at the northern edge where the bay opens up. Seagrasses cover extensive areas of Chwaka Bay, intermixed with different species of algae and providing feeding space, breeding grounds and shelter to a wide range of marine animals⁴⁹. There is an abundance of fish species associated with the mangroves, including Milkfish (*Chanos chanos*), Rabbit fishes (*Siganus sp.*), Parrot fish as well as crabs such as *Scylla serrata* of considerable fishery potential, and the large numbers of various types of fish larvae that can be found reveal the importance of the bay to the local fisheries⁵⁰.

Chwaka Bay has been considered a priority subregion in terms of seagrass, algae and sponge community in the Eastern African Marine Ecoregion (EAME)⁵¹. The different

⁴⁵ Shunula, J.P., 1990. *A Survey on the Distribution and Status of Mangrove Forests in Zanzibar, Tanzania. Nov-Dec 1990.* Zanzibar Environmental Study Series Number 5 1990. The Commission for Lands and Environment, Zanzibar, pp 1-29.

⁴⁶ Nasser 1994 in Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁴⁷ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town.* Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

⁴⁸ Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁴⁹ Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁵⁰ Shunula, J.P., 1990. *A Survey on the Distribution and Status of Mangrove Forests in Zanzibar, Tanzania. Nov-Dec 1990.* Zanzibar Environmental Study Series Number 5 1990. The Commission for Lands and Environment, Zanzibar, pp 1-29.

⁵¹ Horill, J.C. (ed), 2001. *Proceedings of the Eastern African Marine Ecoregion Visioning Workshop, Mombasa, Kenya, April 21st-24th 2001.* pp 1-36+Annexes.

habitats of coral reef, mangrove, sandy beaches, seagrasses, coastal thickets and palm fringe are found in close proximity to each other. Because of the close relationship and natural linkages among them, it is essential that they are viewed and managed as a system. The entire area shows an ecological transition from the mangroves fringing Chwaka Bay through wetland and wet swamp forest, to closed evergreen forest and dry to evergreen thicket on coral rag⁵².



Figure 6 Chwaka Bay mangroves, seagrass beds (under water) and Jozani Forest

To the south of Chwaka Bay, Jozani Forest is the largest area of near natural vegetation on Unguja Island representing the vegetation types that were once common throughout the area⁵³. It is a small, almost entirely regenerated groundwater-forest, which includes a 12 ha plantation where virtually all forest species known for Unguja occur. Birds include three endemic races (*Tauraco fischeri zanzibaricus*, *Andropadus virens zanzibaricus* and *Nectarinia veroxii zanzibarica*), plus a fourth species (*Nectarinia olivacea granti*) that is shared with Pemba Island and a fifth (*Cercotrichas quadrivirgata greenwayi*) that is shared with Mafia Island⁵⁴. Jozani is also part of a larger biodiversity hotspot, the Eastern Arc Mountains and Coastal Forests, which runs along the coasts of Tanzania and Kenya and includes Zanzibar.

South of Jozani Forest along the road to Muungoni and Makunduchi, a mangrove stand in Pete marks the northern border of Menai Bay Conservation Area. Seven species of mangrove can be found there and less intensively cut than, for example, the nearby stands of Unguja Ukuu and Uzi. The Pete mangrove stand serves as a feeding ground and probably also a nursery ground for some species of fish. These mangroves interact also with the terrestrial habitats, as Red Colobus and possibly other small mammals from the

⁵² World Heritage Marine Biodiversity Workshop Regional Paper for East Africa. World Heritage Biodiversity: Filling Critical Gaps and Promoting Multi-Site Approaches to New Nominations of Tropical Coastal, Marine and Small Island Ecosystems. Potential Tropical Coastal, Marine and Small Island World Heritage Sites in the Eastern Africa Region. Available on <http://international.nos.noaa.gov/heritage/documents.html>

⁵³ Freeman, P., 1997. *Zanzibar's Protected Areas. An Assessment of Revenue Generating Potential from Tourism. A discussion paper*. The Environment & Development Group, Zanzibar Protected Areas Project, pp 1-30.

⁵⁴ BirdLife International 2003 *BirdLife's online World Bird Database: the site for bird conservation*. Version 2.0. Cambridge, UK: BirdLife International. Available: <http://www.birdlife.org> (accessed 16/5/2005)

nearby Jozani Forest visit the Pete mangroves in search of food. According to Shunula⁵⁵, it is very likely that animals from Jozani also visit the immediate Chwaka mangrove area.

The Jozani Wetland was considered in the EAME workshop as a unique wetland forest on porous coral base with high endemism and with a likely link to the marine system through groundwater flow. This important area has been recognised as an Important Bird Area (IBA) by Bird International⁵⁶, meeting the criteria for a Ramsar site. It has further been identified as an area of likely importance in the wetlands group that could merit World Heritage listing although information has been considered insufficient⁵⁷. Jozani-Chwaka Bay figures on Tanzania's Tentative List for World Heritage Sites (WHS). In addition to its natural values, there are a number of shrines, caves and graves that are important in maintaining village culture⁵⁸.

6.2 USE AND MANAGEMENT OF NATURAL RESOURCES

Endowed with an extensive mangrove forest, Chwaka Bay and its habitats are important sources of livelihood for the local population. The people from Chwaka, Charawe, Ukongoroni and Michamvi have for generations depended on these mangroves⁵⁹. Mangrove wood is used for poles for construction, firewood, and charcoal and lime production. *Ceriops tagal* is reported as the most exploited mangrove species in Chwaka Bay despite its high regeneration capacity⁶⁰. In 1994 the mangroves were reported to contribute to 49% of the area's household income⁶¹. Today the villagers from Charawe, Ukongoroni and Bwejuu are the main users of mangroves, selling the wood in Chwaka. Although the area has subsequently been declared protected area, over-exploitation of mangroves was still identified in the IMS/SUZA Rapid Assessment as well as the present study as a threat to biodiversity.

The people in this area also depend indirectly on the mangrove habitat that functions as a nursery and breeding ground for a number of living marine organisms that they fish. In

⁵⁵ Shunula, J.P., 1990. *A Survey on the Distribution and Status of Mangrove Forests in Zanzibar, Tanzania. Nov-Dec 1990.* Zanzibar Environmental Study Series Number 5 1990. The Commission for Lands and Environment, Zanzibar, pp 1-29.

⁵⁶ BirdLife International 2003 *BirdLife's online World Bird Database: the site for bird conservation.* Version 2.0. Cambridge, UK: BirdLife International. Available: <http://www.birdlife.org> (accessed 16/5/2005)

⁵⁷ World Heritage Marine Biodiversity Workshop Regional Paper for East Africa. World Heritage Biodiversity: Filling Critical Gaps and Promoting Multi-Site Approaches to New Nominations of Tropical Coastal, Marine and Small Island Ecosystems. Potential Tropical Coastal, Marine and Small Island World Heritage Sites in the Eastern Africa Region. Available on <http://international.nos.noaa.gov/heritage/documents.html>

⁵⁸ Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁵⁹ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town.* Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

⁶⁰ Nasser 1994 in Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁶¹ Nasser 1994 in Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar's Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

this sense it provides a very valuable “ecological service” that is not fully appreciated by its users. Villagers from Chwaka, Michamvi, Ukongoroni and Charawe obtain their livelihood from fishing in the Chwaka Bay and adjacent seagrass beds and reefs⁶², and even fishers from villages further north use the Bay. The most intensive fishing area is the bay south of the reef island, while shell collection takes place on the tidal flat that is mainly covered by sand and seagrasses⁶³. A conflict exists between the fishers from Chwaka that have been fishing with small mesh size nets for years, and Marumbi fishers that oppose this practice⁶⁴. The fishers from Chwaka claim that changing to bigger size nets would make them dependent on larger vessels to fish further in the sea, as their yield in the bay would decrease drastically.

Seaweed is another key resource that the people in Chwaka Bay rely upon. Seaweed farming has increased significantly over the past decade in Zanzibar and currently there are approximately 25,000 seaweed farmers in Zanzibar⁶⁵. It is a labour intensive activity mainly practised by women. The main species under cultivation in the area is *Eucheuma spinosum*, which is easy to grow and can be cultivated all year around, but that yields low prices to farmers—currently 80 to 90 Tsh/kg. The other species, *Eucheuma cottonii*, has a higher price (200 to 220 Tsh/kg) but is more sensitive to temperature and heavy rains and hence less used. The middlemen who sell it to private companies take the highest share as they sell the seaweed at more than double the “beach price”. One tonne of *Eucheuma spinosum*, for example, is bought from farmers at around US \$80 and sold at the market for around US \$200. In Chwaka Bay the pole and line farming method was observed, whereby fronds of *Eucheuma* are tied to strings stretched between wooden pegs. The soils in this area are more suitable for agriculture than further north along the coast and rice cultivation is practised in the area to the west of Chwaka Bay and near Kiwengwa.

The importance of the area’s natural resources and the threats they are faced with have triggered considerable conservation efforts. In 1995 the Jozani-Chwaka Bay Conservation Project was established between the Commission for Natural Resources and CARE Tanzania. Initially a Forest Reserve since 1996, the protected area in Jozani has been extended to include part of the mangrove area of Chwaka Bay that adjoins the forest in the north. The Jozani-Chwaka Bay Conservation Area has been upgraded to National Park in 2004 and consists of a core protected area of 56 km² and buffer in excess of 80 km². However, only the immediate mangrove area north of Jozani is included in the natural park, extending eastward to the Jozani-Charawe road. Since the creation of the protected area, the roads on the west coast of the park have started to disappear as they are decreasingly used for exploitation of mangroves. Initiatives have been implemented under the Jozani-Chwaka Bay Conservation Area management to plant mangroves in

⁶² Shunula, J.P., 1990. *A Survey on the Distribution and Status of Mangrove Forests in Zanzibar, Tanzania. Nov-Dec 1990.* Zanzibar Environmental Study Series Number 5 1990. The Commission for Lands and Environment, Zanzibar, pp 1-29.

⁶³ Department of Environment, undated. *Towards Integrated Management and Sustainable Development of Zanzibar’s Coast, Findings and Recommendations for an Action Strategy in the Chwaka Bay-Paje Area.* Integrated Planning Unit. pp1-54.

⁶⁴ Ali Mwinyi, personal communication, March 2005.

⁶⁵ Revolutionary Government of Zanzibar, 2004. *State of the Environment Report for Zanzibar 2004/2005.* pp1-38.

badly degraded areas at Kisakasaka⁶⁶. The southern and western shores of the bay remain, however, largely unprotected.

Over-extraction of wood is a threat in Jozani rooted in the lack of alternative energy sources⁶⁷. Protection of the area aimed to encourage decreasing dependence on the unlimited use of the forest reserve by promoting alternative ways to generate income⁶⁸. Fifteen rangers, drawn from the surrounding villages, patrol an area of 5,000 ha on a daily basis. Conservation activities are funded by the revenues from tourism, of which 85% is allocated to the communities. These funds generated cover basic operation costs but are insufficient to provide adequate patrolling and management. Funding from other sources has thus far been insignificant.



Figure 7 Uses of natural resources in Jozani-Chwaka Bay: seaweed farming, octopus harvesting, tourism and wood exploitation

At Jozani considerable efforts have been made to work with surrounding communities. Each village has an operational conservation committee, and the Jozani Environmental Conservation Association (JECA) is an NGO representing villagers from key communities around Jozani. It carries out a number of activities including conservation education and forest protection⁶⁹. The investigators were able to observe interactions between rangers and community members personally and there clearly exists mutual respect and collaboration.

Tourist arrivals in Jozani Forest have increased from 116 in 1990 to 12,793 in 1996⁷⁰, and currently 15,000 to 20,000 tourists visit the Park every year⁷¹. Hotels have

⁶⁶ Revolutionary Government of Zanzibar, undated. *Zanzibar Sectoral Biodiversity Strategy. Part two: Sectoral Papers*, pp 1-93.

⁶⁷ Mohammed, S. M. *et al.*, 2005. *Rapid Assessment of the Proposed Mnemba Chawka Bay Conservation Area*. Draft for Comment – January 2005. pp1-57.

⁶⁸ CARE, 1996. *Progress Analysis of the Jozani Chwaka Bay Conservation Project*. Zanzibar, Tanzania.

⁶⁹ Commission for Natural Resources & CARE Tanzania, 2000. *Jozani-Chwaka Bay National Park Development Project Zanzibar, Tanzania: A Medium Sized Project Brief Submitted to the Global Environment Facility*.

⁷⁰ Freeman, P., 1997. *Zanzibar's Protected Areas. An Assessment of Revenue Generating Potential from Tourism. A discussion paper*. The Environment & Development Group, Zanzibar Protected Areas Project, pp 1-30.

⁷¹ Ali Mwinyi, personal communication. March 2005.

proliferated on the east coast north of the bay and along the Michamvi Peninsula, but tourism activity in Chwaka Bay is still low despite the great potential. One example that has been reported in 2001⁷² is a small scale tourism operation whereby villagers from Michamvi take tourists by boat for bird watching at the small island of Shakani. Villagers from Ukongoroni and Charawe, however, also claim ownership of the island and benefit sharing. In the Menai Bay mangroves south of Jozani, an area where exploitation used to be high, a boardwalk was built in 1997 that reduced overexploitation and enabled tourists to explore the mangrove habitat.

6.3 HEALTH OF THE SYSTEM

The investigators visited the Chwaka Bay system only on two short occasions, each one a day trip only, during this investigation. They travelled on a boat trip through the estuary, dived random transects in the sea grass beds, visited seagrass harvesters and the southern shores with a contingent of staff from Jozani Forest. Only broad observations could be made under such circumstances.

As is mentioned in the section above, the system is clearly under heavy use and the investigators came across a number of people collecting wood from the mangroves as well as seagrass harvesters. The investigators were also told that the seagrass beds are sometimes disturbed by people collecting bait (*kwata*). Travelling south from Kiwengwa toward Chwaka Bay, 24 fishing dhows engaged in fishing were counted on the bay's northern perimeters, most of them in a fishing area north of the tip of the Michamvi Peninsula that forms the eastern barrier between the bay and the open ocean.

Without baselines it is difficult to say how degraded the system may be at this point. Certainly all of the above activities, including seagrass farming would have environmental impacts but the extent by which this is the case cannot be determined without a systematic investigation. Over long random transects the divers observed no fish at all, which is unusual for this type of system, while there were patches where a range of tropical fish lived among the seagrasses (up to seventeen species in one place). *The investigators need more time to be in a position to make any definitive statements.* However, without protective mechanisms put in place the Chwaka Bay mangrove and seagrass ecosystem can never reach a sustainable situation and will only degrade further.

7 THE AREA BETWEEN MNEMBA AND CHWAKA BAY

Along the east coast of Unguja, between MIMCA and Chwaka Bay, there is a long stretch of coast that is the target of an already huge but ever growing tourism industry. The main villages and towns along this stretch are (from north to south) Kigomani, Ndizi, Matemwe, Mnazi Mrefu, Kilima Juu, Pwani Mchangani, Cairo, Kiwengwa, Kamba Urembo, Pongwe, Ndudu Kubwa, Uroa, Dikoni, Marumbi and Chwaka.

⁷² Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

Kiwengwa occurs roughly halfway along this stretch of coast and it is here where the investigators started travelling by motorised boat down to Chwaka Bay. First observations were done at Kiwengwa on the beach over a period of several hours. Here the effect of tourism on both the local culture and the coastal zone is simply overwhelming. Large hotels occupy much of the available space in what appears to be a rather unplanned situation. The local culture is totally swamped by *Vinyago* (souvenir) shops that have no English let alone Swahili signage since everything is in Italian who is obviously the target market here. Conversations with shop owners, a government employee and a few tourists as well as observing interactions between tourists and “beach boys” (local people trying to make a living off the tourists by selling services, trinkets or encouraging them to make use of services of third parties in exchange for a small reward) indicated to the investigators that this might be a very unhealthy situation already in terms of cultural or environmental preservation.

Immediately south of Kiwengwa is located an area that has been declared a protected zone in the shape of a rectangle (see Appendix for the protected area coordinates). The divers inspected one site in this area labeled Kiwengwa in Table 2. Although not particularly special in terms of biodiversity, the site had many interesting soft corals (it clearly is a high-wave action site being on the east side with no massive coral reef protection from the open sea) and a reasonable count of fish species. At the site 8 fishing boats were counted in a section of about 4 km. It is wise to have a small protected area in a reef system that obviously supports so many villages—not to mention the hotels whose occupants probably consume large quantities of reef fish (in Stone Town it is common to have reef fish served in restaurants, including ecologically important species) and other reef organisms such as octopus.

The key question that remained to be answered, and on which some suggestions are given in the next section, is whether the conservation area at Mnemba could possibly be connected by way of a narrow corridor all along the east coast down to Chwaka Bay.

PART III

THE WAY FORWARD

8 SPECIFIC RECOMMENDATIONS

It is again emphasized that this was a very short study. The investigators need more time to do justice to this magnificent area. However, while hard primary data is largely lacking, some recommendations for future management can be drawn with confidence. The investigators addressed specific questions pertaining to the conflicting interests among fishers and tourism operators, briefly assessed current conservation efforts and their effectiveness, and reviewed the benefits and costs that the conservation areas bring to the different stakeholders. Further recommendations are provided for the “big picture” of conservation on the east coast of Unguja that also pertains to Zanzibar in general.

8.1 MNEMBA ISLAND CONSERVATION AREA

The key question to ask is whether the current efforts to conserve Mnemba Atoll’s natural resources are proving effective and the benefits shared among all stakeholders. MIMCA was created to protect the rich coral reef systems and the marine life in them. Effective protection of these resources has the potential to benefit both the fishing and tourism sectors as both rely on those same resources. It is therefore in the interest of fishers and tourism operators alike to establish effective management of the conservation area. The structure for such management is already in place—the Management Committee is tasked with the operational management of the conservation area with support from the Advisory Committee. In this sense much progress has already been made and the DFMR and associated stakeholders ought to be lauded for bringing the process thus far. However, most parties would agree that the answer to the key question above is negative. From their own observations and background studies the consultants would like to single out the following observations, each one followed by a recommendation:

Observation 1: There exists no baseline for Mnemba Atoll except in the anecdotal sense (for instance, fishers say they catch less fish than in the past, and lodge management say that the reefs are degraded as time passes). Unfortunately there is no systematic monitoring of the reefs and lagoon so that definite answers can be had with respect to the extent and pace of degradation. The assertions made in the literature are hard to compare as different methods were used and these studies will soon be outdated anyway. Quick spot checks like the current study cannot yield the necessary data in terms of trends in reef health.

Recommendation 1: Monitoring is an essential tool for managing natural resources, like for most other processes. It is therefore essential that a comprehensive monitoring system be put in place for the Mnemba Atoll *as soon as possible*. Only then can convincing statements be made with respect to the health of the reef and the probable causes. The CC Africa lodge on the island is in an excellent position to drive and fund this monitoring system of which it will also be a major beneficiary. However, for monitoring to be credible it cannot be the task of one party only and it is proposed that there be a sub-committee of the Management Committee to oversee the monitoring system and that this sub-committee must include members of government as well as the local community. These members will also have the task of conveying monitoring results to the Management Committee, the Advisory Committee and their wider constituencies. It is also suggested that the Monitoring Sub-Committee include an expert from a credible outside entity, for instance the IMS, or a reputable consultancy company, etc.

The reefs around Mnemba still contain high diversity and relatively healthy conditions in most areas, yet there are important and convincing signs that the region is now exposed to unsustainable fishing and tourism practices. The investigators dived in some areas within MIMCA where the coral system clearly was disturbed and damaged. However, since only a few studies have been conducted in the area and continuous and systematic monitoring is absent, it is difficult to evaluate the human and natural impacts on the marine ecosystem. A rigorous monitoring system thus needs to be devised and put in place for continuous monitoring of the reefs around Mnemba in which local experts and scientists, MIMCA rangers, diving operators and fishers should all be involved. It can be based upon the system that was planned during the survey conducted by the University of Edinburgh and the IMS, while “lessons learned” can be drawn from other MPAs such as Chumbe and Misali Islands.

Linked with the need for regular monitoring is the need for training of researchers and divers in coral reef monitoring techniques. *It is highly recommended that a training programme be developed for Mr Peter Shunula and other colleagues in Zanzibar. They need to be exposed to proper reef monitoring techniques, possibly in the Great Barrier Reef, and mechanisms must be built into the training programme to make sure this capacity is further transferred to other local staff.* Training and awareness raising is also essential for tourism operators and fishers, who not only can benefit from continuous monitoring but also have a duty to participate in the protection of the reefs they use. The results of continuous monitoring will show all stakeholders the effects of their actions on the conservation area.

Observation 2: The roles of the different players are not clearly defined and the Management Committee is not functioning as actively or effectively as it should, thus compromising the conservation aims of MIMCA. Without clearly defined roles no one will be able to perform optimally. Without building sufficient capacity for people to fulfil their roles any attempt at establishing co-management is meaningless.

Recommendation 2: It is recommended that the roles of the different players be revised, that the structure and function of the Management and Advisory Committees be revisited, and that co-management capacity be built. While the key stakeholder groups are currently

represented in the Management Committee, more emphasis needs to be placed on building the capacity of representatives who may be lacking the necessary skills or knowledge. It is a common problem in co-management arrangements that one or more parties have all the knowledge while others lag behind, thus disturbing the information and power balance and the possibility of a collective discovery of the best management options during decision-making processes. The community members in the Management Committee, for example, need training to ensure active participation and any attempts to further transfer responsibility for management to the communities must be preceded by this exposure and capacity building of the committee members. It is also important to ensure that the community members in the Committee do, in fact, represent the views of their communities and report the results of meetings to them. Similarly, the tourism sector needs to be better represented in the Management Committee. Currently CC Africa is the only tourism operator in the Management Committee and coordination with other operators is poor, yet the tourism sector needs to have a strong voice that is representative.

The Management Committee should meet more regularly and make use of tools such as video, photography and exchange visits to other MPAs, as these meetings also serve as education experiences. The preparation and wide discussion of a management plan for MIMCA should be a priority. The management should not be rushed, but instead must be viewed as a very useful process to bring parties together, built their capacity, and get their full “buy-in” for the plan through collaborative effort. Only then will they feel any sense of ownership of the plan, otherwise it will be a meaningless paper object. Emphasis should be put not on the delivery of the paper plan, but on the *process*. In order to play a supporting role, the Advisory Committee should include representation from the fishing sector (DFMR), the tourism sector (Zanzibar Tourism Commission), the communities (the *shehas* of the four villages and local government representatives), as well as marine science experts (IMS), yet CC Africa should sit in the Management Committee only. An office is needed for management activities, which should also serve as an information and awareness raising centre for both communities and tourists.

It is critical that both the Advisory and Management Committees have clear Terms of References, and some facilitation, or at least a workshop, is necessary to make sure they understand them. The Advisory Committee is broad-based and has a wide constituency with which it has to interact. The Management Committee mostly focuses on management issues, interpretation of monitoring data, and on giving clear direction to Operational Management whose staff should be free and well equipped to focus on, and deal with specific management tasks at hand without interference by interest groups so they can do their work properly.

Equally important is to establish stronger organisation of fisheries system. Associations can be established (or preferably one association for MIMCA), but this needs to be done carefully or it will simply fail after a time. Once a strong fishers association is in place it will be possible to instil a sense of resource ownership in the fishers for the resources of the area that the association covers. There exist many “lessons learned” in terms of the establishment of fishers association and cooperatives that will be useful here. The existence of a strong fishers association will make the tasks of managing the area much easier.

Observation 3: At present the Mnemba Atoll suffers from the same “open access” problem as most other marine areas. Anyone can come in and there is no restriction on what activities can be allowed where (with the single exceptions that fishers can no longer use the island itself, or fish in the small house reef in front of the lodge). The most important principles of any protected area, namely to control numbers and access by determining how many people can be doing what in a certain area, is not in place.

Recommendation 3: Clear and multiple-use zoning of the conservation area should be discussed and agreed upon. Zoning of MIMCA is needed to help solve the conflict between nearby fishers and tourism operators. One of the recommendations set out in a Baseline Ecological Survey around Mnemba Island⁷³ was to form a number of zones with each zone having a specific set of management objectives. Different areas should be delimited for fishing and tourism activities. Currently limited to the House Reef and the 200 m private area around the island, the legal “non-extractive zone” should be enlarged and adequately controlled to ensure their functioning as nursery areas from which the waters around may be restocked. Further benefits deriving from these non-extractive zones may also include opportunities for the development of responsible ecotourism.

It is also proposed that a second “non-extractive zone” be established elsewhere in the atoll once a monitoring system is in place so that fishers and tourism operators alike can enjoy the benefits. Exactly where the second “non-extractive zone” should be will require more investigation than the team had time for. In Misali on Pemba Island fishers have told the investigators that they understand the benefits that the “non-extractive zone” brings to the fishers as fish caught on the edge of the zone are bigger. Potentially some Management Committee members can be taken on a visit to Misali to study the situation there. Zoning must be part of the management planning *process* so that it can be mutually agreed upon from the start.

The zoning must be accompanied by training of fishers in sustainable fishing methods and gears, as well as measures that allow them to continue pursuing their fishing activities. These measures may include the installation of FADs—as was being planned when the investigators conducted the field work—but may also necessitate measures to promote fishing in deeper waters around the atoll. Recognising signs of overfishing and the use of destructive fishing methods on the north-east coast of Unguja, a 1992 survey⁷⁴ has identified the development of an offshore fishery as one possible solution.

Observation 4: During the short visit at Mnemba the rangers were not visible. No one knew exactly what they were supposed to be doing. Considering the length of the stay of the investigators there (two short visits) this observation may not reflect reality, yet it is a common problem that rangers are thrown “off the deep end” without adequate preparation or equipment (and hence motivation).

⁷³ Ngoile, M.A.K. (ed), 1990. *Ecological Baseline Surveys of Coral Reefs and Intertidal Zones Around Mnemba Island and Zanzibar Town*. Zanzibar Environmental Study Series No. 9, 1990. Commission for Lands and Environment, Zanzibar. pp1-80.

⁷⁴ Horrill, J.C., 1992. *Ecological Monitoring Survey of the Coral Reefs Around Mnemba, Chapwani, Changuu and Bawe Islands*. Zanzibar Environmental study Series No. 11, 1992. Commission for Lands and the Environment, Zanzibar. pp1-13.

Recommendation 4: Long term involvement and training of rangers is essential. The rangers can play a much bigger role than they apparently currently do, particularly when it comes to watching the area and reporting irregular practices to DFMR, but also providing tourists with information about MIMCA. Currently there are no criteria to select rangers from the villages. Carefully selected and trained rangers that are given long term rather than the current three months temporary employment would certainly be more committed to the conservation aims of MIMCA. Rangers should receive training on sustainable fishing and tourism, basic concepts of coral reef monitoring, as well as have some degree of preparation to deal with tourists. The rangers should be adequately equipped with boats for daily patrolling and communication systems. Furthermore, it is essential that the communication between the rangers and tourism operators is improved.

If rangers become an “authority” in the villages (or “conservation champions”), with adequate support and a clear mandate, then their uneasiness in patrolling fishers from their own villages would disappear. The patrolling system of Chumbe Island is often cited as a good example and shows that drawing rangers from surrounding communities can be effective. Volunteer fishers stationed on Chumbe Island manage the Reef Sanctuary with no means of enforcement other than persuasion of their fellow fishers, stressing the role of the protected area as a breeding ground for fish⁷⁵. Also in the Jozani-Chwaka Bay Conservation Area the rangers are all drawn from surrounding communities. Visits to other conservation areas including Chumbe Island and Jozani-Chwaka Bay would provide good exposure and a learning experience to MIMCA rangers.

Observation 5: There was no indication anywhere that Mnemba is a MPA, not even signboards on the shore of the main island (at least none were noted by the team). Tastefully done signs can be used to convey a lot of information as well as broad guidelines (or at least can draw attention to an existing set of guidelines that must be obtained at a certain place). Here it is again worth mentioning that a small office on the main island across from Mnemba (ideally at the launching point) can do a great deal to prepare visitors to the island as well as raise awareness in the local community.

Recommendation 5: If there are no guidelines, or people do not have access to them, they will tend to behave as their instincts guide them (which can be good or bad). Fishers and tourism operators need to have a better understanding of what MIMCA represents and what can and cannot be done in the area. Tourism activities in the area need to follow guidelines to become more sustainable. Tourism operators have benefited from the establishment of MIMCA and have been taking increasing numbers of tourists to the atoll. However, tourist guides generally lack the knowledge and training required to operate in a sustainable manner that does not harm the marine habitats. The requirements imposed by the Zanzibar Tourism Commission for tourist guides are currently very low, but a new system for guide certification is being planned⁷⁶. Control of tourism activities and enforcement of existing regulations is equally weak.

⁷⁵ Riedmiller, S., undated. *Private Sector Management of Marine Protected Areas: The Chumbe Island Case*. Pp 228-240.

⁷⁶ Revolutionary Government of Zanzibar, 2004. *State of the Environment Report for Zanzibar 2004/2005*. pp1-38.

A code of conduct for tourism operators in MIMCA is urgently needed. This code of conduct should be discussed among all stakeholders and once approved should be widely disseminated and enforced by MIMCA rangers. In a recent meeting of the Management Committee, the CC Africa representative presented some examples of codes of conduct pertaining to diving, snorkelling, anchoring and mooring, catch and release fishing, boating, whale and dolphin watching, and waste disposal, which can be used to draw MIMCA's code.

Observation 6: The Mnemba Atoll is an area used by many different parties for different purposes, ranging from putting a meal on your family's plate to high-end tourism. They all have different levels of benefits and different costs to achieve the benefits, as well as environmental costs that they carry.

Recommendation 6: The contributions to conservation from the different players should be revised. The large numbers of tourism operators that use the area on the island have the potential to make a significant contribution to the conservation of the area's natural resources for their own benefit. It is recommended that a study be conducted to determine a viable price structure for the conservation area, taking into account the sources of revenue (currently tourism fees and donations) and the estimated costs for conservation.

In situations such as the Mnemba Atoll, a variety of different tourism user fees can be charged, including entrance fees for visitors in the protected area, concession fees for companies providing services within protected areas (e.g. lodging and food), licenses and permits for operators within and outside protected areas (e.g. tour operators, guides, boats) and individuals participating in specific recreational activities (e.g. diving, fishing, snorkelling, whale or dolphin watching), and tourism-based taxes that can be levied at hotels, airports and other collection points, and channelled into conservation⁷⁷. Other taxes in Zanzibar include airport taxes, an environmental tax of \$2pp per day and an additional visa cost of \$20. It is important to review all revenues accrued from tourism periodically to make sure the revenue structures are streamlined, not over complicated, yet make sense in terms of their contribution to conservation.

In the case of the Mnemba Atoll, the responsibility for funding the many management actions and operations should be equally shared between DFMR and all operators and tourism facility owners that are involved in marine activities on the Mnemba Atoll. The CC Africa lodge, because of its strategic location, can play a very big role in funding many of the management actions and operations but also in terms of logistics and sharing expertise. The manager and his staff appeared to be very environmentally conscious and eager to see a good situation evolve in terms of the overall development of the area. It is suggested that they are constructively and positively engaged in discussions for the common good.

⁷⁷ Conservation Finance Alliance, 2003. *Conservation Finance Guide*. Available online at <http://guide.conservationfinance.org/>

Observation 7: The large number of poor people living in close approximation, and to a large extent depending on the atoll is immediately obvious. Alternative livelihoods need to be enhanced to relieve the pressure from the atoll, and the deployment of FADs is a good start. The communities surrounding Mnemba Island still resent that their traditional fishing grounds are no longer in their reach. Constrained by limited financial resources to purchase vessels to fish in deeper waters, the fishers are now limited to a smaller area. The number of fishers continues to grow and in some cases fishing is practised in no-fishing zones or using destructive methods. The protection of the atoll is obviously beneficial to the fishers, but only if they have the means to fish in other areas where the positive effects of MIMCA can be felt or if viable alternative livelihoods exist.

Tourism is one such potential alternative livelihood. While some villagers near Mnemba have established tourism operations that use the atoll for activities such as diving and snorkelling, competition is high especially from the mainland. The provision of training to people in the communities can help enhance local skills, and CC Africa can play a major role in this training.

Recommendation 7: Poverty is notoriously difficult to address effectively, and there are seldom quick solutions that can be found unless a community suddenly is awarded a mineral resource or a win a major land claim. No such option exists in the immediate vicinity of Mnemba Atoll. While the issue of the northeast can potentially enjoy special consideration in the implementation of national poverty reduction strategies, it is recommended that a Local Economic Development (LED) workshop be held *at the local level* in which obstacles and possibilities are systematically debated and worked into a logical framework with clear steps that can be taken. Such a workshop has to be carefully facilitated to keep the focus on the central issue of poverty alleviation. In situations where abject poverty exists, small solutions can often be found that later can develop into sustainable sources of income or at least subsistence.

Observation 8: The investigators heard on several occasions and from various sources that the management of the community fund needs to be improved. This is hardly a surprise as community funds generally are difficult entities to manage (although good management can certainly be achieved). According to Riedmiller⁷⁸, one obstacle to the management of nature reserves by central government agencies is the fact that the revenues generated by tourism are normally not reinvested in the management of the reserve and in related services. Currently one third of the tourism fees is allocated to community projects (usually for the development of basic social services) while very little of the remaining two thirds seems to be directly invested in conservation. Investment in conservation must cover both activities that are directly aimed at conservation—such as reef monitoring—as well as the development of sustainable fisheries or alternative livelihoods that can relieve the pressure from the MIMCA area without compromising the fishers' livelihoods.

⁷⁸ Riedmiller, S., undated. *Private Sector Management of Marine Protected Areas: The Chumbe Island Case*. Pp 228-240.

Recommendation 8: The community fund should be reviewed with the purpose of making it function better and in a totally transparent manner. When the community fund was implemented, the fishers suggested a credit system through which they could purchase new gears and vessels. The option of a credit system channelled through fishing cooperatives should be investigated, as this option would support investments that could make a direct contribution to the conservation of MIMCA. The establishment of cooperatives can make the fishers more business oriented and more self-sufficient in economic terms. Key areas for investment can be new vessels for offshore fishing, as well as conservation, processing and market facilities that can add value to the product. The 30% share of tourism revenues that is allocated to communities may also need revision, especially when compared to the 85% that is applied in the Jozany-Chwaka Bay Conservation Area. Finally, fund management needs to become more transparent, with the funds allocated directly to communities and fishers as far as possible.

Observation 9: In Zanzibar there are various existing and proposed models for the allocation of small islands for the purposes of tourism. The Mnemba Island model is an example of one of the earlier practices, namely to allocate an entire island to a private business. Presumably such an arrangement should bring in at least a comparable amount of money for local application than other models, or the local communities, in particular the fishing community, will lose out. In the long run even the private operator will lose out as the situation in the area will simply become unmanageable. It is therefore healthy to periodically review agreements to fit new situations and frameworks.

Recommendation 9: The Islets Policy⁷⁹ suggests that the 33-year lease governing Mnemba should not be renewed as the revenue from tourists could be increased by using the island for day trips rather than as a single hotel. Such a proposed land-use change should be approached very carefully, however. The investigators were impressed by what appeared to be an environmentally sound high-end tourism operation (although no audit was done, so this statement is based on a superficial experience). If not very well controlled, mass tourism in such a small area may result in adverse and potentially irreversible impacts on the environment. However, lease models in Zanzibar in general should be modified to ensure that leases are sold at realistic values (early leases were sold for a mere pittance to the private sector) and that mechanisms are built in that would lead to at least partial local equity in the long term. In some other countries, for instance, 15 year leases are given, after which 50% local ownership is granted. Again, great care should be taken that lease agreements actually have the effect that they are supposed to have, and much more study is necessary here. For instance, a comprehensive audit of different scenarios ought to be done, for example by comparing Misali and Mnemba, not only in terms of global financial figures but also in terms of environment governance, tourism management and overall *lasting benefits* to communities.

⁷⁹ Commission for Lands and Environment, 1994. *Policy for Allocation and Use of Zanzibar's Small Islets. Integrated Planning Unit*, pp 1-19.

8.2 CHWAKA BAY CONSERVATION AREA

The importance of protecting the mangrove forest in Chwaka Bay cannot be overestimated. The mangroves provide a breeding ground for marine life, helping to secure the livelihoods of the growing population on the east coast of Unguja that depends on the sea. The mangroves are, however, clearly facing threats of over-exploitation and unsustainable fishing practices. The main recommendations for the Chwaka Bay Conservation Area are listed below.

The entire mangrove forest in Chwaka Bay should be protected. The inclusion of the mangrove stands on the western shores of Chwaka Bay in the Jozani-Chwaka Conservation Area has apparently resulted in decreased levels of exploitation of mangroves. The mangrove stands on the southern and eastern shores of the Bay clearly also require some degree of protection—perhaps not at the level of national park but certainly as some kind of conservation area, to ensure that they will serve as a buffer zone. The Bay itself may require some form of protection that safeguards its values as a nursery and breeding ground. In discussions between the investigators and the Chief Warden, it was suggested that the conservation area should extend west to approximately 61 degrees longitude and north to 29 degrees latitude to include the small circular island reef (see Map 3).

According to a study conducted by the University of Dar es Salaam, Chwaka Bay has the potential to become a Ramsar site. The recognition of the Bay as a wetland of international importance would further enhance its protection and facilitate fund raising for conservation and sustainable economic development of the area. The Ramsar Convention makes provision for several types of grants that can be raised, including ones that will enable sustainable utilisation of a Ramsar Site. It is therefore proposed that the process of declaring the above-mentioned area a Ramsar Site be started as soon as possible.

Jozani-Chwaka Bay is also included in Tanzania's Tentative List for WHS and therefore funds may be requested from the World Heritage Convention to start the nomination process. However, it is proposed that the WHS framework be investigated carefully for all of Zanzibar before WHS are nominated. Already Stone Town is a WHS. It is also proposed that PECCA be nominated as a WHS. However, other exciting possibilities exist. Once the protected/conservation network in Zanzibar is properly consolidated (see "The Big Picture" below), it should be investigated whether the entire protected/conservation area network cannot be nominated as a WHS. In this way all the different and unique assets can be given recognition by one WHS rather than have several on the islands of Zanzibar.

MAP 3: Proposed Marine Protected Area Network in Unguja Island



Investment in patrolling and monitoring of the conservation area is required. The Jozani-Chwaka Conservation Area employs and trains people from the surrounding communities to patrol the area. Daily patrols are performed yet there are urgent needs in terms of equipment, including uniforms, bicycles, a communication system, a fire tower, and internet services. The conservation area is currently served with one single car and lacks mini-stations for emergency and monitoring. According to the Chief Warden, a total of US \$ 50,000 would be needed to start making these improvements. Together with better patrolling, more investment should be made in raising awareness among communities and tourists, using tools such as video.

Again, there are a number of hotels on both the western and eastern shores of the Bay and they have a strong vested interest in seeing the environment protected. They will benefit from the area being declared a Ramsar Site and its subsequent protection, and should be willing to contribute to a growing conservation fund for the area if it is properly conceptualised and managed, and monitored—especially if they can have input into decision-making on how the money is spent (and potentially be part of monitoring—see comments on Mnemba Island above).

Expansion of tourism activities in the mangrove areas would provide alternative livelihoods to local people. While the numbers of tourists that visit Jozani Forest continue to increase, tourism activities in Chwaka Bay are still very few. Yet there is great potential for tourism activities with an educational component in mangrove areas. The boardwalk that has been built in the Pete mangrove area south of Jozani forest is one good example of tourism development in an area that used to be under severe and unsustainable exploitation. There are ideas of expanding the use of the boardwalk network through an extension to the sea and starting community-based canoe trips. It is proposed that a small pilot project be started, even if it is with two canoes, to pave the way before a larger-scale operation is deployed or encouraged. The Jozani Forest management is well-organised and they have good guides. This may be the place to base the pilot project as long as several community members are also trained and involved in the pilot. There is nothing as convincing to local people than *something that actually works*.

Community-based tourism activities in Chwaka Bay can provide local employment and relieve the pressure from fishing. Examples of activities are visits to the mangroves, bird watching, and dhow trips to sandy beaches on the Michamvi Peninsula. Other potential alternative livelihoods worth investing in are seaweed farming, agriculture and agroforestry, and small scale development projects such as handicrafts. The expansion of seaweed farming is dependent on factors such as a more beneficial system to local producers to sell the seaweed and the provision of boats to transport the product.

Guidelines for sustainable tourism are essential. The east coast of Unguja has seen a proliferation of hotels, curio shops and diving operations. Apart from altering the coastline, tourism activities are not always conducted in sustainable ways and can have serious effects on the coastal and marine ecosystems. Tourism guides in Zanzibar need adequate training, as it was mentioned in the case of Mnemba Island. Guidelines need to

be drawn for new and existing tourism activities that are in line with the conservation principles in place in Chwaka Bay and that respect the local livelihoods. If new community-based ecotourism activities are to be promoted in Chwaka Bay, they should be accompanied by appropriate training and guidelines.

The funding scheme for the larger conservation area should be revised. The conservation area is currently dependent on revenues from tourist visits. There is concern that the conservation area would not survive a decrease in the number of tourists. An additional source of revenue that is recommended is a levy paid by hotels located in the conservation area or that use the area. As pointed out in the Mnemba Island discussion, a revenue system using entrance fees, concession fees, licenses and permits and tourism-based taxes should be investigated for Jozani Forest and expected tourism developments in Chwaka Bay. Funding from other sources may also be sought, especially now that the newly created Natural Parks Board will make access to funding easier and more decentralised. Training and assistance in grant seeking is also recommended for members of the conservation area management.

9 THE BIG PICTURE

The connection between the different habitats and between protected areas has been repeatedly mentioned in this report. The time has come for Zanzibar to no longer look at each protected/conservation area in isolation, but rather to assess the entire network to ensure a representative, comprehensive and connected system of protected/conservation areas. Mnemba Island and Jozani-Chwaka are thus viewed in this section in the broader context of the east coast and treated as part of the emerging conservation area framework in Unguja.

A Protected Areas Act is needed in Zanzibar to define the conservation/protected area framework and to describe the different categories and types of protected areas. In Zanzibar the overall mandate for protected areas lies with the Ministry of Agriculture, Natural Resources, Environment and Cooperatives (MANREC). Two main approaches for protected area management have evolved: co-management arrangements between local communities and the government and agreements with tourism companies that manage lodges within the MPAs. The Environmental Management for Sustainable Development Act (Environment Act) of 1996 addresses protected areas in general and defines the following categories: Controlled Areas (subsequently referred to as Conservation Areas), Reserves, Parks, and Sanctuaries. The Fisheries Act of 1998 allows for the establishment of MPAs.

Clearer definition of protection categories is, however, required through a Protected Areas Act that will include a category for protected areas managed mainly for the sustainable use of natural ecosystems—perhaps with similar objectives to Category VI of “Managed Resource Protected Area” defined by the World Conservation Union (IUCN). There is much more that can be said in terms of the development of a Protected Areas Act, but the investigators have not been asked to involve themselves in the very

important process. Therefore we abide by pointing out that Zanzibar needs to find solutions and designation for protected/conservation areas that will suit Zanzibar, and must resist the temptation to devise an Act quickly that is based on outside experience. The reason is that the Act cannot be driven purely by protectionist attitudes but in reality must be led by the intimate relationship that humans have with nature, which include diverse inter-relationships and local realities.

The conservation of marine and coastal habitats along the east coast of Unguja should be consolidated as far as is possible. The east coast of Unguja is fringed by coral reef, with the Mnemba Atoll in the north constituting an especially rich coral system and Chwaka Bay further south providing a nursery ground that feeds the coast's marine system. The case was already made earlier for consolidating Chwaka Bay into the Jozani Forest protected area network, perhaps under a different designation that is at a lower level than national park. The case was also made to extend this complex as far as the little circular area of reef located opposite Dikoni and Orua, which is a popular fishing ground (see Maps 2 and 3). Interestingly, there exists some friction between the two fishing communities related to one of them still favouring small mesh size, and this could be the starting point of putting in place a management system for artisanal fisheries.

At a larger geographic level, it will be ideal to connect MIMCA with the proposed enlarged Jozani-Chwaka Bay conservation /protected area complex. If this gap can be bridged the possibility of a mega-biodiversity corridor running from the south of Unguja (Menai Bay) through the Jozani -Chwaka Bay complex and north up to the MIMCA can become a reality. Already there is the small marine conservation area opposite and just south of Kiwengwa and it can simply be extended northwards and southwards following the reef.

The counter argument could be that tourism development has already advanced so far, and there are already so many people along this coastline, that there is no point in making it a protected area as it will be impossible to enforce and hence will only erode away the image that should accompany conservation areas. However, there may be a way of addressing this concern. The investigators believe that a corridor linking the two key conservation areas on the east coast—Mnemba and Jozani-Chwaka Bay—would be highly beneficial for the preservation of the ecological integrity of the entire system. A lower grade protection level can be assigned to this corridor than “conservation area”. A designation of “Recreation Area” can be invoked that nonetheless carries certain rules and regulations (as opposed to the area not having any designation at all).

Map 3 indicates the proposed “East Coast Recreation Area” that would require at least minimum environmental standards for construction and activities to maintain the natural values of the area, or at least slow down the inevitable rate of degradation which will be the case if nothing is done to protect the ecological system. This “East Coast Recreational Area” can have the lowest protective value designated to it of any protected/conservation area in the Protected Areas Act mentioned above, but can still open the possibility of promoting sound management practices in sectors such as fishing and tourism by preventing the worst types of abuses of the system from occurring, while at the same time minimising conflicts between resource user groups. Once again, it is important and urgent

to revisit the different types of protected/conservation areas that exist in Zanzibar and describe them carefully in a Protected Areas Act so all can understand what the different areas are, and what can and cannot happen inside them.

The corridors linking Jozani Forest to the Chwaka mangroves to the north and the Pete mangroves to the south are equally crucial to maintain the ecological integrity that appears to be present. In a 1990 survey⁸⁰ Shunula underscored the link between Chwaka Bay mangrove forest and Jozani Forest on the hinter-land. He further suggested that the vegetation gap between the Pete mangrove stand and Jozani forest should not be allowed to dwindle through agricultural practices or tree cutting for other purposes. This gap is not wider than 1 km and the investigators recommend that the Pete mangrove area be integrated in the Jozani-Chwaka Bay Conservation Area. Another corridor would then be created between the Jozani Forest and Menai Bay Conservation area in the south of Unguja. Finally, the mega-biodiversity corridor will start to take shape. Eventually, perhaps, there could even be a “North Coast Recreational Area” that could at some point reach as far as Tumbatu.

The MACEMP Project provides an ideal opportunity to envision this geographic picture of biodiversity conservation in Unguja. Other projects like the proposed UNDP GEF funded project aimed at protected/conservation areas can take the process further. Eventually the same concept of “Recreation Areas” can be applied to Pemba where PECCA covers only some, albeit the largest, of the areas that should be formally protected. Other areas like Ras Kijuu and the southeast will need to be catered for separately. What is important is to clearly envision this framework before *ad hoc* implementation of conservation areas will ensue, or before there is a legal framework in place (or at least well on its way to being conceptualized). Rome was not built in one day, and one or two donor-funded projects will not save the beautiful islands of Zanzibar. But they can help tremendously to put the country on the right trajectory.

Continuous and participatory monitoring is needed to ensure informed management and high awareness of the importance of conservation. Monitoring of coral reefs in Zanzibar has mainly only included baseline studies without proper follow-up by monitoring sessions at regular intervals using the same methods, the same sites and, when possible, the same measuring units such as transects or quadrats. Monitoring activities need to be conducted systematically at various times of the year in order to determine seasonal patterns in reef biota and abiotic factors⁸¹. A solid and uniform monitoring system in the continuum of protected areas along the east coast (including Mnemba Island, Chwaka Bay and Menai Bay) would provide information on the health of the coastal and marine habitats, as well as on the ecological connections among them. Linked with the need for regular monitoring is the need for training of researchers and divers in coral reef monitoring techniques. The participation of tourism operators and fishers in

⁸⁰ Shunula, J.P., 1990. *A Survey on the Distribution and Status of Mangrove Forests in Zanzibar, Tanzania. Nov-Dec 1990.* Zanzibar Environmental Study Series Number 5 1990. The Commission for Lands and Environment, Zanzibar, pp 1-29.

⁸¹ Daffa, J., undated. *Status and Management of Coral Reefs in Tanzania.* ICRI East Asia Regional Workshop Proceedings. pp73-82.

monitoring activities can help raise their awareness of the importance of conservation. It is proposed that the capacity is built rapidly of people in the DFMR to undertake monitoring activities. A training programme needs to be worked out that will also bring the opportunity for exposure to situations elsewhere, for instance the Great Barrier Reef.

More awareness raising among resource users is needed. Education and awareness raising are essential components of any natural resources management system. The Jozani-Chwaka Bay Conservation Area provides a good example of community-based conservation from which “lessons learned” can be drawn and used in other conservation areas in Zanzibar and elsewhere. Protection of the area’s resources have largely involved the communities as well as brought them benefits. The Chief Warden of Jozani-Chwaka has suggested that a film should be made of the conservation area and the surrounding communities, for both promotional and educational purposes. The investigators endorse this proposal. Video products can include a documentary describing the success stories that already exist in Zanzibar and of which the players involved can be very proud. The video can be made available for broadcast on Zanzibar Television in both English and Swahili. There exists an enthusiastic and ready group of producers in the national television network who are also eager to introduce talk shows and other interview-type programmes. The main video can also be packaged for educational purposes to schools and smaller “fillers” can be cut for broadcasting in-between other programmes. The infrastructure, interest and capability already exist in Zanzibar. It must just be done.

Tourism and conservation activities must be far better reconciled through planning and guidelines for sustainable tourism. While tourism can provide an alternative livelihood for the population of the east coast, strict control is required to ensure the sustainable use of the natural resources those tourism activities depend upon. The east coast has been considerably altered by hotels and curio shops that not only fall short of providing local employment but also fail to represent local traditions and cultural values. Daffa⁸² recommended that there be a conscious and deliberate shift from the mainstream, mass tourism towards ecotourism, where there is balance and mutual benefit among three components: ecosystems, tourists and the local communities. For this shift to take place, training of tourism guides and hotel developers is required, as well as promotion of community-based operations.

To this day the tourism authorities appear to be somewhat of a missing link, both in the Sustainable Management of Land and Environment (SMOLE) strategy that is now starting implementation and the preparatory activities of MACEMP. This absence should be considered a major failing that will cost the country dearly in years to come. Luckily it can be remedied relatively easily by taking every opportunity to forge stronger links between those who plan, market and promote investment in tourism and those who are trying to protect the very basis on which tourism development will proceed and sustain itself in the future.

⁸² Daffa, J., undated. *Status and Management of Coral Reefs in Tanzania*. ICRI East Asia Regional Workshop Proceedings. pp73-82.

Alternative livelihoods must be encouraged to relieve the pressure on the marine and coastal ecosystems. People in Zanzibar are generally aware of the value of their natural resources and are sensitive to the idea of establishing conservation areas. The conflict arises when poverty leads them to engage in activities that can compromise the ecological integrity of a conservation area. The establishment of an effective network of protected areas—as well as the successful management of Mnemba Atoll and Jozani-Chwaka Bay—thus requires that attention also be paid to the creation of alternative livelihoods as espoused by the concept and practice of Integrated Conservation and Development (ICD).

Unfolding the “Big Picture”

The “Big Picture” described above certainly is a noble vision that can realistically be achieved through the implementation of a carefully conceived Protected Areas Act, which will devise appropriate types of conservation/protected areas and will describe clearly what is meant by each of them. Unfolding the “Big Picture” is more than a noble idea. It is also a very necessary one for this small island that is feeling increasing pressure from its growing population and a burgeoning tourism industry that appears to be insufficiently “harmonised” with conservation initiatives and environmental health requirements as prescribed by the Environmental Management for Sustainable Development Act (Environment Act) of 1996. Environmental requirements include the rigorous practice of Environmental Impact Assessment (EIA) and hopefully soon also the very useful necessary practice of Strategic Environmental Assessments (SEA) which can assist Zanzibar to make the most of its resources for the benefit of the largest number of people. It is through the use of SEA that the different land and resource uses of a wider area can be balanced carefully.

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APPENDIX

COORDINATES OF MARINE PROTECTED AREAS ON THE EAST COAST OF UNGUJA

Mnemba Island

All that area of marine water including foreshore around Mnemba Island lying within the limits defined by the following points:

- (i) S 005⁰ 48.959'
E 039⁰ 22.952'
Being a point on the western side of the island known as *house reef* of MWAMBA MNEMBA.

- (ii) S 005⁰ 49.232'
E 039⁰ 22.671'
Being a point on the south – western side of the island known as CHOYANI

- (iii) S 005⁰ 50.034
E 039⁰ 23.092'
Being a point on the southern side of the island known as MLANGO WA NYANGE PILI.

- (iv) S 005⁰ 50.335'
E 039⁰ 23.374'
Being a point on southern side of the reef known as KICHWANI.

- (v) S 005⁰ 50.529'
E 039⁰ 23.585'
Being a point on southern side of the reef known as UKUTA MDOGO.

- (vi) S 005⁰ 50.459'
E 039⁰ 24.159'
Being a point on the south- eastern side of the reef.

- (vii) S 005⁰ 49.394'
E 039⁰ 25.053'
Being a point on the eastern side of the reef known as MLANGO MDOGO.
- (viii) S 005⁰ 48.629'
E 039⁰ 25.264'
Being a point on the eastern side of the reef known as MLANGO MKUBWA.
- (ix) S 005⁰ 48.127'
E 039⁰ 25.020'
Being a point on the eastern side of the reef known as UKUTA MKUMBWA.
- (x) S 005⁰ 47.716'
E 039⁰ 24.839'
Being a point on the north- eastern side of the reef before the area known as CHANGA REFU.
- (xi) S 005⁰ 47.199'
E 039⁰ 24.414'
Being a point on the north – eastern side of the reef known as MLANGO KIBUBEMBE.
- (xii) S 005⁰ 46.837'
E 039⁰ 24.060'
Being a point of the north – eastern side of the reef.
- (xiii) S 005⁰ 46.645'
E 039⁰ 23.827'
Being a point of the north side of the reef known as TANGINI.
- (xiv) S 005⁰ 47.006'
E 039⁰ 23.344'
Being a point of the north- western side of the reef known as JANINI.

Chwaka Bay

According to the Chwaka Bay fishing nets prohibition order, 2001, "Chwaka Bay" means all that area starting from Ras Michamvi (Kijiwe Gongoro) to Kibokoni the north border of Zanzibar safari resort at the point:

S 06° 06'14"
E 39° 25'40"

passing through the points

S 06° 07'09"
E 39° 29'44"

S 06° 07 '06"
E 39° 28' 53"

S 06° 06' 56"
E 39° 28' 00"

S 06° 06' 37"
E 39° 26' 58"

and

S 06° 06' 11"
E 39° 26' 25"

and it includes the sea area of Ukongoroni, Charawe, Chwaka Marumbi and Michamvi.

Kiwengwa Controlled Area**(i)** S 06° 01'27''

E 39° 24'14''

being a point on the south end of the *shehia* of Kiwengwa at an area known as Mwadudu Kubwa).

(ii) S 05° 57'24''

E 39° 22'13''

being a point to the north of *shehia* of Kiwengwa at an area known as Vunja Kondo); and extending seaward to the outer limits passing through the following point

(iii) S 06° 01'27''

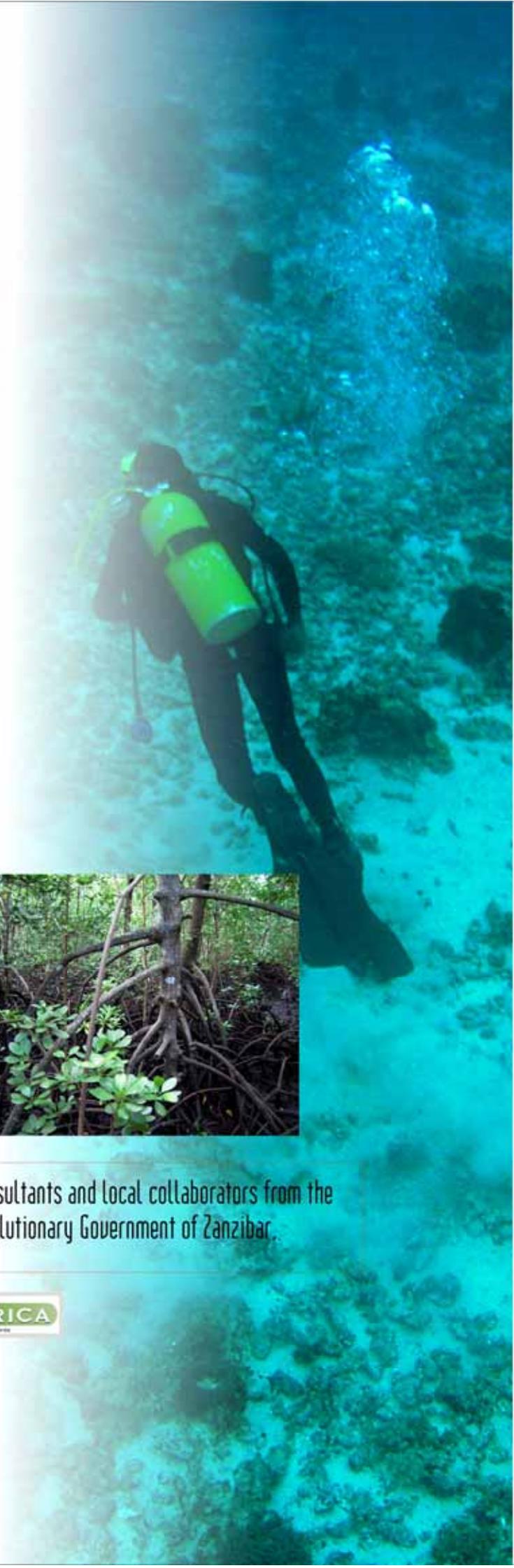
E 39° 25'08.15''

being a point to the south of the *shehia* of Kiwengwa beyond the reef crest known as Mwadudu kubwa.

(iv) S 05° 57'17''

E 39° 23'04''

being a point on the north end of the *shehia* of Kiwengwa beyond the reef crest opposite an area known as Vunja Kondo). Landward the area starts at the upper limit of the high water mark.



This report was produced by EcoAfrica Environmental Consultants and local collaborators from the Department of Fisheries and Marine Resources of the Revolutionary Government of Zanzibar.