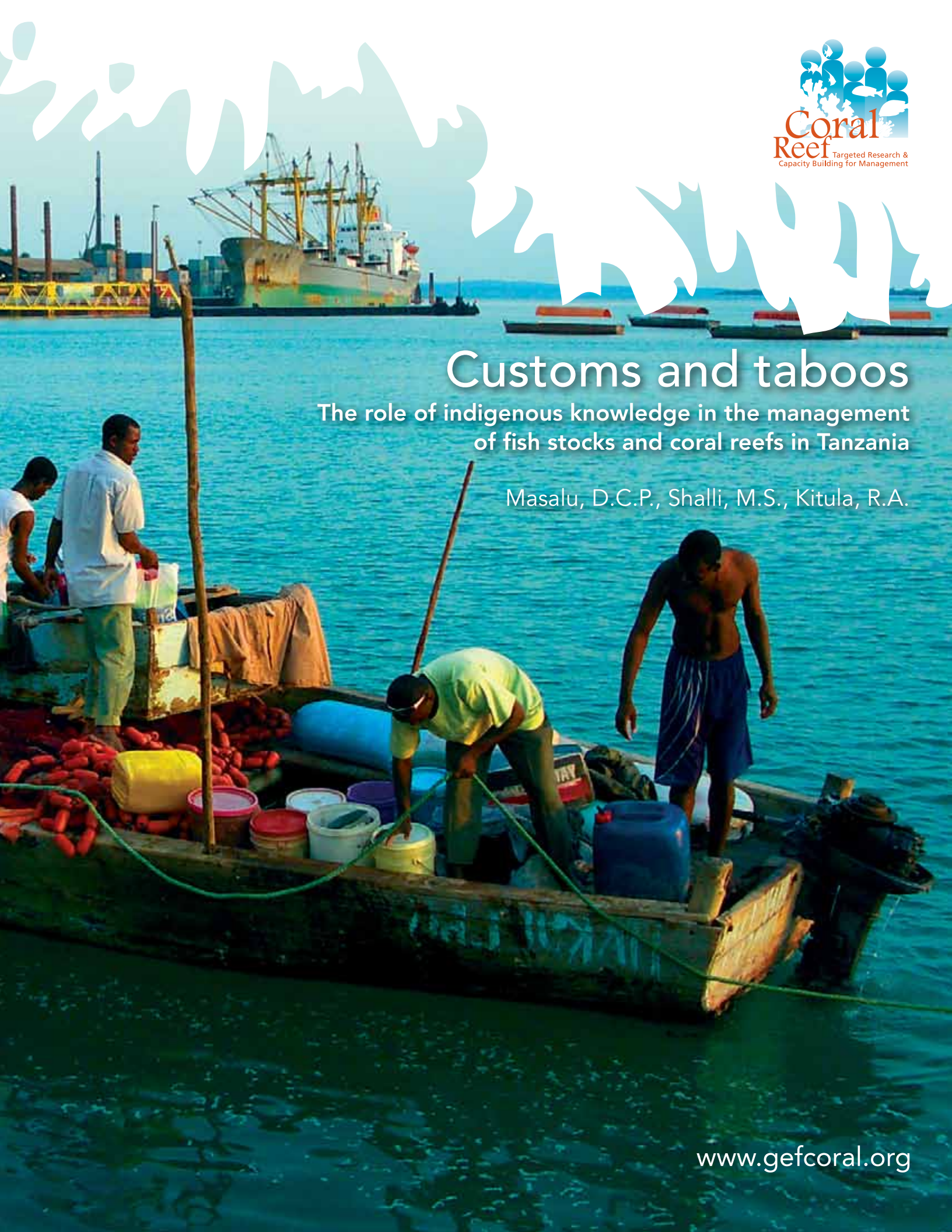

Coral Reef Targeted Research & Capacity Building for Management

Customs and taboos

The role of indigenous knowledge in the management of fish stocks and coral reefs in Tanzania

Masalu, D.C.P., Shalli, M.S., Kitula, R.A.

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Acknowledgements

We would like to thank University of Dar es Salaam, Institute of Marine Sciences (UDSM-IMS) for enabling us to write this book. We also sincerely thank the Global Environmental Facility (GEF) and the Development Grant Facility (DGF) of the World Bank (WB) for supporting this work via the Coral Reef Targeted Research and Capacity Building for Management (CRTR) Program.

We would like to express our appreciation to the Ministry of Livestock Development and Fisheries, Regional Fisheries Officers of Tanga, District Fisheries Officers of Tanga, Kizingani, Mafia, Kinondoni, Temeke, Mtwara and Unguja for the various supports including provision of relevant data and information and accompanying us to the field sites.

Much appreciation also goes to the Regional Administrative Officer (RAS) of Tanga, District Executive Directors of Tanga, Kizingani, Mafia, Kinondoni, Temeke, Mtwara and the Department of Fisheries and Marine Resources of Zanzibar for receiving and allowing us to work in their areas of jurisdiction and for the logistical support they provided us.

We also extend our special thanks to Mnazi Bay-Ruvuma Estuary Marine Park, Sustainable Environmental Management through Mariculture Activities (SEMMA, ACDI/VOCA), World Wide Fund for Nature (WWF) and Dar es Salaam Marine Reserves for the various logistical supports they accorded us. Also we thank the Dar es Salaam Marine Reserves for accompanying us to the field sites.

Sincere thanks go to the people and leaders of all thirteen villages of Kunduchi pwani and Kimbiji (Dar es Salaam); Mkokotoni, Tumbatu, Bweleo, Kizimkazi and Mangapwani (Unguja island); Bweni and Chunguruma (Mafia Island); Kizingani and Mwarongo (Tanga) and; Msangamkuu and Mgao (Mtwara) for accepting us into their lives and homes with open hearts and allowing us to work with them during data collection.

Last but not least we would like to thank all who helped us in one way or another in making this book a success.

Published by:

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Citation: Masalu, D. C. P., Shalli, M. S. and Kitula, R. A. (2010). Customs and Taboos: The role of indigenous knowledge in the management of fish stocks and coral reefs in Tanzania. 64 pp.

Photo credits: Mohammed, Z., Maneno, H. and Mukaka, D, University of Dar es Salaam Institute of Marine Sciences.

Cover photograph: Melanie King

ISBN: 978-1-921317-07-1

Product code: CRTR 008/2010

Editorial design and production: Currie Communications, Melbourne, Australia, May 2010.

Foreword

The Coral Reef Targeted Research & Capacity Building for Management (CRTR) Program is a leading international coral reef research initiative that provides a coordinated approach to credible, factual and scientifically-proven knowledge for improved coral reef management.

The CRTR Program is a partnership between the Global Environment Facility, the World Bank, The University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA) and approximately 50 research institutes and other third-parties around the world.

The goal of the CRTR is to address fundamental information gaps in the understanding of coral reef ecosystems, so that management options and policy interventions can be strengthened globally.

The role of local communities and indigenous knowledge in the management of natural resources and ecosystems has received increasing attention in recent years. There are serious indications that with development and modernization, this knowledge and its application are being lost. This book documents customs and taboos in the management of coral reefs and fish stocks in Tanzania. The subject of customs and taboos is of major interest for Tanzania as they contribute extensively to the conservation of local resources and the spiritual, cultural and economic well-being of coastal communities. However, little information on this subject is available about Tanzania on customs and taboos on marine resources. This makes this book a 'must-read' for coastal resource managers, decision-makers, academics and all other stakeholders.

Finally, it has been a privilege to be asked to write this foreword for this important work from staff members at the Institute of Marine Sciences. My personal thanks go to them for the efforts. I also gratefully acknowledge the financial support provided by the Global Environmental Facility (GEF) and the Development Grant Facility (DGF) of the World Bank which facilitated the production of this book.

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May 2010

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Introduction

Corals are known locally in Swahili as 'matumbawe' and coral reefs are known as 'miamba ya baharini'. They are among the most diverse and productive marine ecosystems on earth. Coral reefs provide habitat for one-third of all marine fish species, build tropical islands, protect coasts from waves and storms, and contain an array of potential pharmaceuticals, and support tourism and fishing industries worth billions of dollars. Coral reefs are also fundamental to the fabric of local communities, providing a source of food, materials and traditional activities.

Marine resources of Tanzania are utilized for both subsistence and as a source of income, with fish being among the most important resources. Fishing is an important coastal occupation. The majority of people of Tanzania rely on marine resources obtained from a variety of habitats which include coral reefs, mangroves, seagrass beds, and estuaries along the 850km stretch of the coastline and around the islands. Fisheries are typically small scale and employ a variety of fishing techniques, which target a large number of species. About 95% of the total marine catch is from this type of fishery, using traditional vessels and gear.

The demand for fishery resources has been gradually increasing following the increase in population and tourism development. This has caused an increase in fishing pressure and the use of gear and techniques that are destructive to the fishing habitats. As a result of this, fishing habitats are degraded and fish stocks are declining. Currently, the management of fishery resources and fishing habitats under the conventional measures is failing to properly take into account the indigenous knowledge of the local communities. Indigenous knowledge refers to the large body of knowledge and skills that have been developed outside the formal education system where the culture and knowledge of local people and their institutions provide useful frameworks, ideas, guiding principles, procedures, and practices that can serve as a foundation for effective endogenous development options, for restoring social, economic and environmental resilience in developing world. Thus, there is an urgent need for revisiting management strategies for fish stocks and fishing habitats particularly coral reefs, focusing on customs and taboos as well as conventional approaches.

Tanzanian coastal communities have long histories of interaction with the marine environment. Their unique customs and taboos have been developed over many centuries and communicated from generation to generation to ensure the sustainability of coral reefs and fishery resources. However, very little has been documented on indigenous knowledge in Tanzania, particularly customs and taboos.

SECTION A: Executive summary

- Key findings, insights
- The benefits of indigenous management
- Status of coral reefs and other fishing habitats
- Recommendations

SECTION A

Key findings, insights

Indigenous knowledge (IK), traditional knowledge (TK), and local knowledge generally refer to the knowledge, innovations and practices of indigenous and local communities around the world. This knowledge encompasses the wisdom, knowledge and teachings of these communities, and is developed from experience gained over the centuries and adapted to the local culture and environment. It is communicated via word of mouth from generation to generation and is not often recorded in writing.

Some forms of IK are expressed through stories, songs, myths, proverbs, cultural values, beliefs, rituals, community laws and local language. IK is mainly of a practical nature, particularly in such fields as fisheries, agriculture, health, horticulture, forestry and environmental management in general.

In the section on indigenous fisheries management we look at taboos, beliefs and superstitions of local communities and how this has served to indirectly protect fishing habitats and fish stocks. However, visitors and improved education is causing a breakdown in many of the original beliefs with a negative impact on marine environments.

Indigenous management of coral reefs explores 'unexplained events' and how these too served to inadvertently protect the reefs from being overfished. Some reefs were not fished at all due to beliefs in the presence of devils nearby. Similar beliefs could be found with regard to the islands and coastal forests which were also preserved as a result. However, over time local communities are taking less and less notice of these traditional beliefs, with a negative impact on the environment.

In indigenous management strategies, fishing practices and vessels are investigated. Past fishing practices and vessels (many of which are still in use today) have a relatively small impact on the environment, however, modern fishing gear and practices, such as dynamite fishing, are resulting in overfishing and damage to reefs. Larger communities and poverty compound this problem.

Our review of the conditions of fishing habitats looks at the current state of the marine environment, including seagrass beds and mangrove forests and finds there is some concern over fishing habitats changing with the seasons. Destructive fishing practices, such as dynamite fishing were a major reason for the decline of fish stocks.

The breakdown in indigenous management of coral reefs is undoubtedly having a negative impact on the condition of the marine environment. Fortunately, some government actions, such as the enforced closures of fishing grounds, are improving the situation but there is still some way to go.

The benefits of indigenous management

The benefits of indigenous management of coral reefs are well documented in this publication. A number of traditional management strategies have served to indirectly protect coral reefs and the marine environment for years. These include:

- Taboos and beliefs which restricted access to reef at some times;
- A closed season with elders responsible for dictating the times and punishing offenders; and
- Restrictions on fishing gear.

However, the advent of improved fishing gears and vessels and a breakdown in the old belief systems has meant a number of changes in recent years negatively impacting on local coral reefs and the marine environment.

Status of coral reefs and other fishing habitats

Coral reefs and other fishing habitats in Tanzania are in bad condition. This can partly be attributed to a decline in the effectiveness of indigenous management strategies which has been primarily caused by the increase in commercialisation of fisheries and a reduction in faith of traditional beliefs.

Fishers are reluctant to observe limited access criteria unless it is effectively enforced. Education and the arrival of outsiders with different beliefs have reduced the effectiveness of indigenous management strategies which once protected reefs and other fishing habitats.

Today, overfishing, though difficult to document, appears to be a major threat as more fishers use effective techniques without effective self- or external- regulation. Population growth in fishing communities and the growing cost of living adds to the problem.

Recommendations

Indigenous knowledge promises to play a key role in improving development strategies by:

- Helping identify cost-effective and sustainable mechanisms for poverty alleviation that are locally manageable and locally meaningful;
- Building a better understanding of the complexities of sustainable development in its ecological and social diversity; and
- Helping to identify innovative pathways to sustainable human development that enhance local communities and their environment.

Given the reduction in effectiveness of indigenous management of coral reefs for a number of reasons, it is necessary to incorporate modified or alternative strategies to preserve coral reefs and other fishing habitats. The following recommendations have come about, as a result of the study:

- There is a need to build capacity among local communities to develop, share and apply their indigenous knowledge to monitor their resources.
- Provision of alternative livelihood strategies to alleviate poverty because hunger is the major driver of the erosion of tradition and customs of coastal people.
- There should be an urgency to collect, disseminate and systematize indigenous knowledge, taking into account the specific context in which it developed and exists.
- There needs to be research conducted and public awareness raised in the use of indigenous knowledge for sustainable development and facilitating national debate in order to promote the science and art of inculcating indigenous knowledge into development.
- There is a need for the dissemination of innovations in indigenous knowledge periodically to development practitioners and the beneficiaries.
- In order to make indigenous knowledge in natural resource management sustainable, there should be national strategies to support the use of indigenous knowledge in natural resource management. This should include incorporating indigenous knowledge system into development programs of government and non-governmental organizations.
- Before the establishment of marine reserves government should involve elder fishers to identify their priorities and incorporate them into the management plan.
- There is a need to formulate village bylaws governing the sustainable utilization of marine resources.
- To avoid fossilization, indigenous knowledge should be put in curriculum and be taught in schools, especially primary schools.
- Indigenous knowledge needs to blend with scientifically developed and improved technology.

SECTION B: The role of customs and taboos in fishery management

The customs and taboos governing interactions between people and their environment in any society are complex and dynamic. Many customs and taboos regarding fisheries may be difficult for outsiders to understand as they have developed, and continue to develop, through long processes of association and interpretation of natural phenomena. Custom is a practice followed by people of a particular group or region while a taboo is generally defined as a prohibition. This prohibition can be on what one is not allowed to do, objects with which one must not come into contact, words which must not be uttered and places which must be avoided.

Many of the customs and taboos in the management of fisheries resources in Tanzania have been eroded with time. However, indigenous management strategies of fisheries resources that this study did identify in Tanzania, most commonly had inadvertent benefits for reefs and fish stocks. These include customary marine tenure, taboos and beliefs, magical power, technical inadequacies, closures for octopus fishery and restrictions on destructive fishing gear. This chapter looks at these traditional management strategies in further detail.

Summary of key points

- *Restrictions on fishers in certain areas, and guarding of fishing grounds from other fishers reduce pressure on fish stocks.*
- *Fourteen taboos and beliefs inadvertently protect fish stocks and fishing habitats.*
- *Certain dietary requirements protect fish stocks.*

Customary marine tenure

In Tanzania customary marine tenure takes the form of restrictions of fishers on the fishing grounds and guarding.

(i) Restrictions of fishers in certain areas

The traditional restriction on the amount of fishing gear in one area led to the creation of informal territory within the fishing ground for each fisher. About 30% of respondents interviewed in Kimbiji village mentioned that it is a tradition for youth not to fish at the same place as elder people. This kind of customary marine tenure exists even today as each fisher has their own territory for fishing using names like *kati*, *kilango cha boya*, *kizima*, *kilango cha kasa* and *vyambani*. These places are often used during the northeast monsoon wind.

In Mangapwani village basket trap fishers have their own fishing arrangements. Each fisher had their own territory to avoid theft, conflict and destruction of the traps. Likewise, at Kizingani village 20% of respondents reported that it was a tradition for hook and line fishers not to fish at the same place where net fishers were fishing. In Msangamkuu and Mgao villages, about 25% and 30% of respondents respectively reported the existence of traditional restrictions on concentration of fishing gear in one place. The restriction required that fishing takes place at a different location between basket traps and net fishers. This was traditionally done to respect elders and ensure that there was no competition between the two groups of fishers.

This tradition inadvertently protects fish stock and fishing habitats. However, due to poverty, this type of customary marine tenure is no longer used in some parts. In some areas such as Kunduchi-pwani village fishers concentrate on one reef where fish stocks are abundant.

(ii) Guarding

It was mentioned that it is not common for all fishers to return to camp while out fishing. Some fishers remain behind at the fishing ground to guard the fishing ground from encroachment. This inadvertently protects fish stock and fishing habitats.

Taboos and beliefs

Fourteen forms of taboos and beliefs that inadvertently protect fish stocks and consequently protect fishing habitats have been identified in Tanzania. These are:

1. Dietary restrictions
2. Restrictions on fishing before bathing after sex
3. Restrictions on fishing for a menstruating woman
4. Restrictions on fishing during strong winds and heavy rains
5. Lost fishers during fishing
6. Death events
7. Mentioning names of terrestrial animals
8. Alcohol consumption
9. Festivals and special days.
10. Meeting with one person
11. Fishing without success
12. Receiving payment for fish in advance
13. Fabricating of fishing vessels and gears
14. Impurity of fishing vessels and gears

1. Dietary restrictions

Taboos against eating certain marine species because of religious influence or beliefs exist among coastal villagers in Tanzania.

Table 1 lists some of marine species that are restricted in a dietary sense and the reasons behind the restrictions. In Table 1, "P" stands for presence of dietary restrictions while "A" stands for absence of such restrictions. These taboos, which caution against eating certain marine species, unintentionally limit fishing.

Table 1. List of some marine species that have dietary restrictions and their reasons

Influence	Marine species in local names	Reasons for prohibition	Village names												
			Kunduchi	Kimbiji	Mkokotoni	Tumbatu	Bweleo	Kizimkazi	Mangapwani	Bweni	Chunguruma	Kizingani	Mwarongo	Msangamkuu	Mgao
Religious	Kasa	Not eaten by some Muslims because they live both in marine and terrestrial	P	A	P	P	P	P	P	P	A	P	A	P	P
	Kaa koko	Not eaten by some Muslims because they live both in marine and terrestrial	P	A	A	A	A	A	A	A	A	A	A	A	A
Beliefs	Bunju	They are poisonous, may cause death	P	P	P	P	P	P	P	P	P	P	P	P	P
	Chafi	Many people do not eat for fear of getting spots on the skin	A	A	A	P	P	P	P	A	A	A	P	P	P
	Chewa	Not eaten by pregnant mothers as infant will be born with large mouth and a habit of frequent crying	A	A	A	P	P	P	A	P	A	A	A	P	P
	Chewa	Many people do not eat for fear of getting spots on the skin	A	A	A	A	P	P	A	A	A	A	P	P	P
	Chichimvue	They are poisonous	A	A	A	A	A	A	A	A	P	A	A	P	P
	Damba	If touched by male causes impotence	A	A	A	P	P	A	P	P	A	A	A	A	P
	Danzi	Not eaten by pregnant mothers as infant will be born with a large mouth	P	P	A	P	P	A	P	P	A	A	A	P	A
	Pomboo	Its flesh has lots of blood that need to be washed thoroughly with water, poisonous that may cause death, its physical appearance	P	P	P	P	P	P	P	A	A	P	P	P	A
	Mkunga	They resemble snakes	P	P	P	P	P	P	P	P	A	P	P	P	P
	Kapungu	Not eaten by pregnant mothers as infant will be born with skin rashes. It also dies after giving birth, so is not eaten by pregnant mothers to avoid this	A	P	P	P	P	P	P	P	A	A	A		
	Kidimbwiri	They are poisonous, may causes death	A	A	A	A	A	A	A	A	A	A	P	A	P
	Kiwavi	Many people do not eat for fear of getting skin rashes	A	A	A	A	A	A	A	A	P	A	A	A	A
	Luwayo	This fish has abnormal eyes, it is not eaten by pregnant mother as the infant will be born with abnormal eyes	A	A	A	A	A	A	A	A	P	A	A	P	A
	Mbuzibahari	They are poisonous	A	A	A	A	P	P	A	P	A	A	A	A	A
	Mishe	Not eaten by pregnant mothers as infant will be born with long mouth	A	A	A	A	A	A	A	P	A	A	A	A	A
	Mkizi	They cause diseases	A	A	A	A	A	A	A	A	A	A	P	A	A
	Mkundaji	Many people do not eat for fear of getting skin rashes	A	A	A	A	A	A	A	P	P	P	P	A	A
	Mzia	Not eaten by pregnant mothers as infant will be born with angry behaviour	A	A	A	A	A	A	P	P	A	A	A	P	P
	Ng'amba	They are poisonous that may cause death	A	A	A	A	A	A	A	P	P	A	A	A	A
	Ngiliwili (samaki mrefu)	Not eaten by pregnant mothers as infant will be born heavy and lazy	A	A	A	A	A	A	A	A	A	A	A	P	P

Influence	Marine species in local names	Reasons for prohibition	Village names												
			Kunduchi	Kimbiji	Mkokotoni	Tumbatu	Bweleo	Kizimkazi	Mangapwani	Bweni	Chunguruma	Kizingani	Mwarongo	Msangamkuu	Mgao
Beliefs	Pono	Not eaten by pregnant mothers as infant will be born lazy and sleep frequently	A	A	A	A	A	A	A	P	A	A	P	P	A
	Kamba	Not eaten by pregnant mothers as infant will be born with skin rashes	A	A	A	A	A	A	A	P	A	P	A	A	A
	Taa	Many people do not eat for fear of getting skin rashes	A	A	A	A	A	A	A	A	A	A	A	P	P
	Jongoo bahari	They are not eaten because of their are appearance	P	A	A	A	A	A	A	A	A	A	A	A	A
	Ngisi	Not eaten by pregnant mothers as infant will be born without hair and cause prolonged labour	A	A	A	P	P	P	P	P	A	A	A	P	P
	Tasi madoa	Many people do not eat for fear of getting spots on their skin	A	A	A	A	A	A	P	A	P	A	A	P	P
	Tasi manga	Many people do not eat for fear of getting skin rashes	A	A	A	A	A	A	A	P	A	P	A	A	A
	Tasi mwamba	Many people do not eat for fear of getting skin rashes	A	A	A	A	A	A	A	A	P	A	P	A	A
	Zumari	If touched by male causes impotence	A	A	A	A	A	A	A	P	A	A	A		

2. Restrictions on fishing before bathing after sex

For coastal fishers, whether married or not, it is a taboo not to have a bath after having sex before fishing. This is due to a belief that having intercourse dirties the body. The ocean is the home of evil spirits and, according to beliefs, they dislike meeting with impure person. This taboo is strictly adhered to in order to avoid misfortune during fishing activities. This taboo again involuntarily limits fishing in the study areas.

3. Restrictions on fishing for menstruating women

According to Islamic religion, a menstruating woman is considered impure. She is not allowed to fast, pray or read the Koran. Additionally, to avoid misfortune it is a taboo for a menstruating woman to go fishing. This taboo involuntarily protects fishing habitats on the near shore reefs.

4. Restrictions on fishing during strong winds and heavy rains

It is taboo for the artisanal fishers to fish when there are heavy rains and strong winds. This is due to the nature of the fishing vessels – most fishers still use traditional fishing vessels and gears which can not withstand strong winds. Heavy rains during fishing may result in poor visibility and loss of direction. In most places fishing activities are generally reduced during the strong winds (southern monsoon winds) and heavy rains. This unintentionally allows some marine fish species to breed and grow.

5. Lost fishers during fishing

In early times when fishers were lost while fishing, other fishers would not continue fishing but rather search for the lost fishers until they were found. This taboo unknowingly limited pressure on marine habitats in the study areas. Nowadays, this is not common in some areas, but in other places like Kizimkazi and Mkokotoni villages, the practice still exists although it is not as strongly adhered to as it was in early times.

6. Death events

In early times when there was a death at the village, no fishing activities could take place until the body was buried. According to this taboo, misfortune would occur if you went out to fish while others were involved in burial activities. This taboo involuntarily helped to limit pressure on marine habitats. Nowadays some people continue with fishing activities even if there is a death in their village.

7. Mentioning names of terrestrial animals

In some fishing communities, for example Mangapwani village, fishers cancel fishing activities if one among them inadvertently mentions a name of terrestrial animal. This is considered to be a sign of bad luck.

8. Alcohol consumption

It is a taboo for coastal fishers to drink alcohol when going out for fishing. This taboo is connected with the Islamic religion which says that consuming alcohol makes the body impure. If a fisher is identified by others as having consumed alcohol, he is dropped off to avoid misfortune and other dangers during fishing. This taboo, too, decreases pressure on marine habitats and reduces the destruction of the coral reef.

9. Festivals and special days

It is a taboo for Muslim fishers to go out to fish during the Islamic religion ceremonies. This inadvertently protects fish stocks and protects coral reefs habitats.

Most coastal fishers are Muslims and accordingly it is a taboo for them to fish on Fridays. This day is regarded as a special holy day for them to rest at home and conduct the Friday pray. However, some fishers, because of poverty and lack of alternative livelihood, continue to fish on Friday night.

It is also a taboo for Muslim fishers, who have been fasting, to dive for octopus during the holy Ramadhani month. Similarly, it is a taboo for some fishers to fish during 'mwaka-kogwa', wedding ceremony, election days and during neap tides. Furthermore, in early times, there was a one-day ceremony during male circumcision during which there was no fishing. These taboos inadvertently reduce pressure on marine habitats and hence protect the environment.

10. Meeting with one person

Some fishers cancel fishing activities if, when going out to fish or check nets/traps, they meet with one person. This is believed as a bad omen on that day and nothing will be caught. On the contrary, it is considered a lucky sign to meet with two or more people when a fisher goes out to fish. This reduces pressure on the fish stocks and coral reef environment.

11. Fishing without success

If a handline fisher goes out for fishing and spends some time without any success, they do not continue but rather return home because it is a sign that something is wrong at home. For example, their wives might be having sex with another man, or there may be a death in the family. Handline fishers also cancel fishing activities if they hook a bottle, which is a bad sign. These believes inadvertently reduces fishing pressure.

12. Receiving payment for fish in advance

Most fishers believe that it is a taboo to receive payment for fish in advance. If this happens, some fishers don't accept the payment and cancel the fishing activities on that day. To some extent it reduces fishing pressure in the coral reefs environment.

13. Fabrication and deployment of fishing vessels

It is a taboo for another carpenter to take up unfinished fabrication work on a vessel without prior approval of the initial carpenter. It is believed that both the vessel and the new carpenter will be accompanied by bad omens.

The vessel may not be able to catch fish and may cause accidents during fishing. This controls much the number of fishing vessels and thus reduces fishing pressure.

Another carpenter cannot finish the fabrication of a vessel without the first carpenter's approval.

14. Impurity of fishing vessels and gears

Fishing vessels and gears must be free from impurity of any kind. For instance, in most places it is believed that nothing will be caught if a goat urinates on the basket traps. It is also a taboo for fishers to defecate or urinate inside or nearby the fishing vessels in the belief that nothing will be caught on that day. Impure fishing vessels and gear reduce the pressure on fishing. For many fishers it is a taboo for a woman to touch basket traps (madema) and nets during fabrication and deployment. If they do, it is believed the basket traps and nets won't catch fish.

A goat urinating on a basket trap is bad luck.

It is a taboo for women to touch basket traps.

Magical power

Fisheries in coastal communities have long been associated with innumerable magical practices. Some fishers believe that, in order to catch more fish, a talisman must be tied to the fishing gear or vessels, and/or a prayer must be said in order to give fishermen confidence in the face of a wide range of hazards and threats. The traditional healer should be consulted to find the best time and day to leave home and the best direction for fishing and camping. In addition, some fishers believe that a big tree found along the coast is a home of evil spirits, so a special prayer must be said before cutting down the tree for vessel construction to avoid misfortune. In the absence of traditional healers the number of fishing vessels is greatly reduced, thus reducing fishing pressure and protecting fishing habitats.

The traditional healer must be consulted about when and where to go fishing.

Closures for octopus fishery

In early times area-based restrictions were used in some villages to manage octopus stocks. In Kisimkazi village, there was a traditional management system which included seasonal closures of fishing for octopus, with controls on fishing gear, such as spears, and controls on access to the area by outside fishers.

Closing and opening was entirely based on norms and traditions. The closing periods were not fixed, it could be three months or more depending on their needs. They normally closed and opened the area when religious festivals were approaching. They did so in order to have money for the festivals.

Management of offenders during the closed season was through supernatural sanctions. There were special elders responsible for punishing offenders. For example, if a fisher was found fishing octopus during the closed season, the octopus would stick around their body with the removal requiring traditional healing. A good example of these supernatural sanctions was of one woman who fished for octopus during closed season. The octopus stuck to her body with one of its tentacles entering her vagina. The thought of such a punishment made many people afraid to conduct fishing for octopus during the closed season. However, this traditional management strategy has recently collapsed due to the erosion of traditions and customs.

Technical inadequacies

Traditionally, most of artisanal fishers in Tanzania use traditional fishing vessels without engines such as dugout canoes (*mtumbwi*), outrigger canoes (*ngalawa*), and dhows (*dau*). They also used mashua for ferrying people. These vessels are not capable of carrying many fishers and can not withstand harsh conditions of the sea. As a result, the number of fishers and the time duration of fishing was greatly minimized. Also, artisanal fishers use traditional fishing gears, such as basket traps, hook and lines, as well as scoop nets, which are environmentally-friendly. This, to some extent, protects fish stocks and reefs.

Restrictions on destructive fishing gears

In some villages there are regulations restricting or banning fishing gears as a way of reducing the impact on fishing habitats. Restricted fishing gears are dynamite, beach seine, the use of small meshed nets, poisonous plants, drag nets and spear fishing. These gears have a varied impact on the habitats and fishery resources. The use of dynamite and poisonous plants destroys fishing habitats and kills all marine fish species. Beach seine, drag nets and spear fishing destroy fishing habitats while the use of small, meshed nets harvests all sizes of marine fish species which interferes with the continuity of species generation.

Dhow boats

Canoes

SECTION C: Customs and taboos in habitats management

When talking about indigenous coral reef management, you cannot ignore local beliefs regarding coral reefs, peninsulas, islands and sand banks, caves, mangrove forests and coastal forests. In addition, indigenous practices on agriculture, islands, mangrove forests and coastal forests must also be considered.

However, due to the erosion of customs and traditions, nowadays people don't place as much importance on cultural beliefs and indigenous management practices.

This chapter focuses on key marine and terrestrial habitats that have a direct and indirect impact on coral reefs.

SECTION C

Summary of key points

- *Some reefs, islands and sandbanks remained untouched and healthy because they were associated with evil spirits.*
- *Most traditional fishers associate rip currents with supernatural powers.*
- *The coastal forests around caves are never touched because they are associated with ancestors who reside in the caves and are used for traditional rituals.*
- *The presence of sacred mangrove and coastal forests act as a good mechanism for forest protection.*
- *Local communities do value agricultural land, islands, mangrove forests and coastal forests and have developed their own indigenous management strategies.*

Beliefs on coral reefs

In early times, traditional beliefs built around evil spirits protected some coral reefs. Traditionally, some reefs remained untouched and healthy due to unexplained events that were observed by fishermen during fishing. Information on the presence of evil spirits in some reefs was spread to others orally. These beliefs inadvertently helped to protect the reefs from being overfished and hence they remained in good health. Some of the reefs and the specific beliefs are outlined below:

Reef *Ungi(e)*

It was believed in Mkokotoni village that in order for people to pass through and or fish around a coral reef *Ungi*, the leaves of the water lily plant, *Ungi*, had to be dropped at the reef.

Reef *Mijimile*

In Mkokotoni village it is believed that evil spirits use reef *Mijimile* to conduct their prayer leaving people afraid of fishing in this area especially during noon and on Fridays.

Reef *Mfahanuku*

Fishers in Mkokotoni village are afraid to fish at reef *Mfahanuku* during southeast monsoon winds due to the belief that during that period if one dies at this reef his body will never be seen and hence won't be available for formal burial services.

Reef *Nyemembe*

Bweleo village people believed that at reef *Nyemembe* there were evil spirits, making some fishers afraid of fishing in this area.

Reef *Kipwajini*

In Bweleo village, because of the presence of evil spirits in some reefs, an offering of a special food must be made. For instance, in order to catch more fish at reef *Kipwajini*, three days before fishing, a cooking pot containing sweetmeat, dates, sugar cane, ripe bananas and perfume (*haliudi*) and covered with a lid must be prepared and placed at the reef. It is a condition that the food must not be tasted.

Reef *Masoni*

At Kizimkazi village it is said that unnatural creatures like big octopuses or sharks would be seen when fishing at reef *Masoni* if your body is impure (e.g. fishing before taking bath after having sex or gleaning for menstruating woman). To avoid supernatural sanctions such as becoming seriously sick and dying fishers are required not to shout once they see such extraordinary creatures. Also fishers might become seriously sick and may end up dead if they eat sweet things at reef *Masoni* without throwing parts of them into the four directions of the earth before eating.

Reef *Mawemawili*

In Kizingani village, reef *Mawemawili* is associated with evil spirits. Impure people are not allowed to go in this area and neither sweet foods nor perfumes are allowed to be taken into this area. In addition, many people do not fish in this area to avoid death. The area is used for performing traditional rituals to remove misfortune. The rituals are normally done when the fish catch is decreasing.

Reef *Kijiweni*

Reef *Kijiweni* near Mwarongo village is associated with evil spirits which are dangerous to fishers as they might cause death. It was believed in the past that diving for octopus was not possible, because many people have died in the area.

Reef *Nyama*

Despite a belief in the presence of evil spirits at the reef *Nyama*, which is in Mwarongo village, fishing activities are still conducted in that area. This is associated with the erosion of indigenous conservation measures of marine resources.

Reef *Mkatani*

Reef *Mkatani* found near Mwarongo village is associated with unexplained events that are believed to cause death when fishing in that area.

Reefs *Ukuta* and *Vijamba vya chini*

It is believed that reefs *Ukuta* and *Vijamba vya chini* in Chunguruma village have evil spirits. In early times people did not fish in those areas for the fear of misfortune and health problems.

Reef *Misanga*

Reef *Misanga* in Bweni village is believed to be associated with evil spirits which are dangerous to fishers. Dates and chicken must be offered before fishing in this area.

Reef *Mkaratani/Jiwe Fatuma*

It is believed in Bweni village that evil spirits that are associated with death are present at reef *Mkaratani/Jiwe Fatuma*, which is an islet. The reef is used by traditional healers for disease treatments. Many artisanal fishers are afraid to fish on this reef for the fear of misfortune and death.

Reef *Nunda*

Many traditional fishers are afraid to fish in reef Nunda in Bweni village for the fear of death because the area is believed to have evil spirits.

Reef *Msangamkuu*

In Msangamkuu village, reef *Msangamkuu* is associated with evil spirits. Impure people are not allowed to go in this area and neither sweet foods nor perfumes are allowed to be taken into this reef. In addition, many people do not fish in this area to avoid death. The area is used for traditional rituals to avoid misfortune; the rituals are usually performed when the fish catch decreases.

Reef *Mawe mawili (majovi)*

Reef *Mawe mawili* in Mgao village is associated with evil spirits considered dangerous to fishers as they are believed to cause death.

Dead coral.

Beliefs on peninsulas

Morphology of coastline may cause refraction of waves which result in wave turbulence and long shore currents. The effects of long shore currents are rip currents which are very strong so that fishers with traditional fishing gear and vessels cannot withstand them. Most traditional fishers associate rip currents with supernatural powers. The presence of rip currents in fishing grounds near a peninsula sometimes limits fishing activities, which unknowingly protects fishing habitats and fishery resources.

Mbizi peninsula

In Chunguruma village, the fishing grounds near *Mbizi* peninsula were associated with evil spirits and people were not allowed to conduct any fishing activities in these areas.

Nkumbi/Mnarani/Silambi peninsula

Nkumbi/Mnarani/Silambi peninsula in Bweni village has strong winds which are believed to be associated with evil spirits. Sacrifice in form of eggs, tobacco, lime and rice flour mixed with sugar is placed in the area for safe fishing. However, fishers with modern fishing vessels go there without problems.

Beliefs on islands and sandbanks

In early times it was believed that islands and sandbanks were the home of evil spirits. Traditionally people were not allowed to take anything from the islands due to the belief that by doing so you would take evil spirits back home. Islands and sandbanks were used as sites for performing traditional rituals.

Islands

Fishing close to the islands was also influenced by traditional beliefs. For example, in past years people did not fish at Pungume Island (located in the Menai Bay area) due to the fear of evil spirits and misfortunes. At Nyemembe island (Menai Bay area) people were afraid to fish during the night because of beliefs. Some islands have been protected from humans because of their physical features. For instance, Pangavini Island (in Dar es Salaam) is surrounded by steep cliffs so it is not accessible by humans.

Sandbanks

In early times, the Fungu Yasini sandbank at Kunduchi pwani village was used by fishers and other people for performing traditional rituals to avoid misfortune and natural disasters like droughts, floods and diseases. Also the sandbank was used as a teaching ground to test trainees to see if they had mastered fishing methods properly. The experienced fishers might request the trainee fishers bring sands from the sandbank to estimate the time taken to and from Fungu Yasini sandbank.

Beliefs on caves

Cave tourism is leading to the clearing of surrounding forests.

Caves are used for performing traditional rituals. The coastal forests around the caves usually are never tampered with because they are associated with ancestors who reside in the caves. In this regard, coastal natural forests around caves are ecologically important for protecting coral reefs from sedimentation.

The presence of *pange, kwamwinyingazi, fufuma, kitokambe* and *kwamwanamkuu* caves at Bweleo village, *machomwe, usine, pange, maegea, mnarani, kivuka, kwaza* and *juga* caves at Kizimkazi village and *kisima cha chini kwa chini* (coral well), *Nyumba ya chini kwa chini* (slave chamber) and *Mbozani* caves at Mangapwani village helped to maintain patches of coastal natural forests in Zanzibar. These caves were used by responsible clans to perform traditional rituals. They are located close to the Indian Ocean and surrounded by small patches of forests, although in early times they were surrounded by dense forest.

Pange cave

The *Pange* cave was originally surrounded by a dense forest. The cave was used for performing traditional rituals to ask for rains, avoid misfortune and diseases. Due to the erosion of traditional beliefs, currently fish and turtles have been placed in the cave as a trial for mariculture. Water inside the cave has a direct link with the ocean tides.

Kwamwanamkuu cave

Kwamwanamkuu cave is located at the beach edge. In it there are two statues, one is a female sitting on a coconut grater stool weaving a traditional mat and the other, a male standing close to her. It is believed that these statues were sister and brother in-law. It is believed that many years ago there was a conflict between a woman and her husband over the question of marrying another woman. The woman became angry and entered into the cave and her brother in-law followed behind her to reconcile and they were both turned into the statues by the ancestors of the cave.

Fufuma cave

Fufuma cave is used for traditional ritual performance. In the past, the area was covered by dense forest. Because of clearing for farms, the cave is now surrounded by a very small patch of forest.

Coral well (*Kisima chini kwa chini*) cave

In early times this cave was surrounded by thick forest. Historically, the coral well in this cave was discovered during the slave trade era by one of the slaves who lost a goat during grazing.

The water in the coral well is used for domestic purposes and for performing traditional rituals to cure diseases, promotion to a higher rank and safety during fishing. Impure people were prohibited from entering the well.

Recently, the Department of Archive, Museum and Antiquities in Zanzibar upgraded the coral well site with the generous support of the UNESCO Cluster Office in Dar es Salaam and it has become a historical and tourist site. Because of the tourist activities the forest has now been cleared for easy access.

Slave chamber (*Nyumba ya chini kwa chini*) cave

This is an historical site used during the period of slave trade, as a centre for collecting slaves before they were transported to Asian countries and other parts of the world. In past years the area was surrounded by a thick forest. Currently, the Department of Archive, Museum and Antiquities in Zanzibar have upgraded this site with the generous support of the UNESCO Cluster Office in Dar es Salaam.

Mbozani cave

Mbozani cave in Mangapwani village is used for traditional rituals. The cave is located close to the ocean and was surrounded by dense forest. Nowadays, the forest is almost open.

Beliefs on mangrove forests

Mangrove trees act as sinks which concentrate pollutants such as sewage, toxic minerals, pesticide, herbicides and trap sediments. The impact of pollution and sedimentation on reefs ranges from coral bleaching to death. Mangroves are common in sheltered bays and estuaries, providing shelter to many important fish species and prawns. However, they are now threatened by intensive cropping, firewood collection, poles harvesting, tannin extraction, medicinal products extraction, paper pulp and timber harvesting, space for aquaculture and salt production. Mangrove swamps are also threatened by fluctuations in the amount of fresh water and sediment reaching them as a result of upstream damming of rivers.

The presence of sacred mangrove forests acts as a good mechanism for mangrove forests protection. In Mwarongo village there is a sacred mangrove forests known as *Mzimu wa kwa Baalawi*. Impure people are not allowed to enter this area and it is forbidden to cut down a mangrove tree in this forest to avoid misfortune and/or death. Similarly, in Kizingani village, it is believed that the *Kilingoni* mangrove forest is associated with evil spirits and it is forbidden to cut down mangrove trees to avoid health problems.

Beliefs on coastal forests

Sacred coastal forests are one of the most important forms of biodiversity conservation. Their use is strictly regulated based on faith or fear associated with the local deity. These forests are protected through customary taboos and sanctions with significant cultural and ecological implications. Ecologically these sacred forests protect coral reefs from sedimentation.

In Kunduchi pwani village there is a sacred coastal forest which is used as the centre of cultural and religious life. Found in the sacred forest at the Kunduchi pwani, are remains of Arab tombs and mosque. Due to these features and other taboos, people are scared to pass close to the forests for the fear of being possessed by evil spirits. In order to maintain the traditions of the area, the forest guard must come from the Kunduchi pwani village.

At Kimbiji village, *Shavureni, Mwezi nane* and *Kavuma* are sacred coastal forests which are used for performing traditional rituals to ask for safe fishing, bigger and more catches, marriage, rain, cure diseases and to remove misfortune. On the day when traditional ritual prayer is performed, an offering to the evil spirit in the form of sweetmeat (*halua*), ripe banana and dates are thrown in the ocean. A traditional healer is consulted to advise on the best day and time to perform the traditional ritual.

Big trees such as baobab and tamarind found in the burial sites at Bweleo village are respected as sacred trees. These trees are strictly not allowed to be cut down as they provide shade and cool conditions to the deceased. Generally, these big trees are believed to be the home of evil spirits and cutting them down may results in unexplained events and misfortunes.

In Bweni village there is a patch of forest and in it a tomb of an esteemed person called Mfaume Ngazi. The place is used for performing traditional rituals to ask for rain, prevention of diseases, better crop harvests and safe elections. The other forests in Bweni village used for performing traditional rituals are *Nduzimaji* and *Kinolo* forests. In these forests it is a taboo to cut down trees, light fires and carry out agricultural activities.

In the past *Mwinyimwambao* forest in Kizingani village was very thick. The forest was used for performing traditional rituals to avoid misfortune and goats were slaughtered as a sacrifice. Due to population growth, the desire for more land for socio-economic activities has increased. A large part of the forest area has been converted into a settlement. Currently, a very small patch of forest has remained to protect the shoreline.

In Msangamkuu village there is a patch of forest in which there is a sacred tree and well. The place is used for performing traditional rituals to ask for rain, cure of diseases, better crop harvests and safe elections. In this forest it is taboo to cut down trees, light fires and carry out agricultural activities.

Indigenous management of agricultural land, islands, mangrove forests and coastal forests

Indigenous knowledge is an integrated pattern of human knowledge, behavior and beliefs. Indigenous human knowledge of agricultural land, islands, mangrove forests and coastal forests management is managed by local communities. Their approach is based on local traditional values that emphasize the sustainable utilization of natural resources through application of indigenous knowledge.

Local communities value resources as well as habitats. These communities are conscious of the needs for sustainable management resources and habitats and have developed their own management measures and skills.

Agricultural land

Agriculture probably comprises the largest collection of indigenous practices worldwide. Farming practices in Tanzanian coastal villages involve home gardens, mixed cropping, rotational cultivation and permanent cultivation. These farming practices reduce the level of siltation and thus the impact on the coral reefs. In most coastal villages, the communities apply organic fertilizers in their farms, which are less harmful to corals compared to inorganic fertilizers. Now commercial practices and modern farming have led to the erosion and loss of indigenous knowledge in the area.

In the past during harvesting seasons, marine related activities were not carried out which resulted in the reduction of fishing pressure. However, the situation has changed and the activities are now done concurrently.

Islands

Before the introduction of the Menai Bay Conservation Program in Zanzibar, people living in the Menai bay area had indigenous management strategies for coral reefs. They established traditional seasonal camping in *Pungume* Island in order to fish on the nearby islands of *Sume, Miwi, Nyemembe, Komonda* (*Komonda ya fungu, Komonda dogo,* and *Komonda ongo*), *Nguruwe, Kwale, Pungume* and *Vundwe* Islands which are uninhabitable. Wind direction (southeast and northeast monsoon winds) and lunar cycle were factors for deciding fishing periods on the islands. Fishing arrangements were such that villagers would camp on *Pungume* island for two months then leave the area for six months and the pattern continued. They normally didn't camp on the island for fishing during strong winds (southeast monsoon winds) for the safety of themselves, vessels and gears.

Currently the management of the islands (*Sume, Miwi, Nyemembe, Komonda Komonda ya fungu, Komonda dogo,* and *Komonda ongo, Nguruwe, Kwale, Pungume* and *Vundwe* Islands) is under the Menai Bay Conservation Program, and they have adopted the traditional closed system of fish management, although the program does not follow monsoon winds and lunar cycle periods.

Mangrove forests

Traditional fishing communities have developed strategies of conserving and managing mangrove forests. It is a tradition for villagers at Mkokotoni and Tumbatu to have rotational harvesting of mangrove forests. The forest is closed for a period of five years and opened for one year for harvesting. Harvesting during the closed period is restricted for emergencies. For example, following a fire in one of the houses in the village, mangrove poles were permitted to be harvested for the renovation of the house. The area is patrolled by the village natural resources committees.

Traditional fishing communities developed strategies for the management of mangrove forests.

Coastal forests

Mwanze coastal forest in Chunguruma village is traditionally protected by its local communities. Farming activities and cutting down trees are restricted due to its ecological importance as a catchment area. These practices help the Chunguruma people to have a constant supply of water (from digging holes along the *Mwaliusende* river in the forest) even during the dry season when almost all rivers in the area dry up.

SECTION D: The status of customs and taboos in fishing gears and vessels

The knowledge of customs and taboos is communicated via word of mouth between generations and within the community. However, this knowledge is increasingly threatened and disappearing. The major reason for the disappearance is elders dying before their knowledge is adequately transferred or documented. Likewise, because the younger generation spends much of its time at school it is missing out on knowledge associated with customs and taboos.

The external forces affecting customs and taboos are the effects of colonialism; modern government policy and legal change; the abolition of traditional local authority; demographic changes; urbanization; globalization; changes in education systems; modernization and economic development; commercialization and commoditization of aquatic resources; technological changes; the policies of external assistance agencies; and national policies for economic sectors other than fisheries.

Due to the weakening and disappearance of knowledge of customs and taboos, this section reviews the current status of fishing gears and vessels.

Summary of key points

- *Statistical data revealed that traditional fishing gear and vessels are still in use despite the introduction of more modern ones.*
- *Some of the traditional fishing gear and vessels have been improved.*
- *The introduction of modern gear and vessels has significantly improved catching ability, safety and working conditions for fishers.*

Status of fishing gears

Artisanal fisheries in Tanzania are characterized by the use of simple, traditional fishing gears that are mostly used in depths not exceeding 30 metres. The types of gear and their uses vary within and between coastal communities. Table 2 gives a summary of the most important traditional fishing gears in Tanzania. The majority of fishers (73.2%) use nets of differing mesh sizes followed by hooks and lines (39.2%), basket traps (19.6%), sticks for octopus (19.6%), gleaning (18.8%), weir/fence traps (3.5%) and cotton cloths (3.5%). This fishing gear is mainly used near the shore.

Table 2: Percentage distribution of respondents by types of traditional fishing gears

Village names	Types of traditional fishing gears						
	Nets	Hook & line	Basket traps	Stick	Glean	Weir	Cloth
Kunduchi pwani	70%	60%	35%	50%	-	10%	5%
Kimbiji	85%	30%	10%	70%	-	10%	5%
Mkokotoni	90%	30%	20%	-	-	-	
Tumbatu	50%	30%	40%	75%	50%	-	
Bweleo	45%	40%	30%	-	40%	-	
Kizimkazi	80%	50%	10%	-	20%	-	
Mangapwani	95%	65%	50%	60%	-	-	
Bweni	70%	65%	5%	-	15%	-	5%
Chunguruma	85%	75%	5%	-	25%	5%	5%
Mwarongo	85%	5%	5%	-	40%	10%	10%
Kizingani	45%	45%	-	-	20%	-	5%
Msangamkuu	100%	-	-	-	-	5%	5%
Mgao	60%	15%	45%	-	-	5%	5%
Total count	*192*	*102*	*51*	*51*	*49*	*9*	*9*
Total%	**73.2%**	**39.2%**	**19.6%**	**19.6%**	**18.8%**	**3.5%**	**3.5%**

Source: Own survey, 2006 – 08

i. Nets

The main types of nets used are gill nets, shark nets, beach seine nets, scoop nets (senga), cast nets and mosquito nets. Most of the netting activities are conducted in groups and involve locating fish from a distance, getting close to them and entangling them without disturbing them. In this case fishers have to be familiar with the nature of the fishing habitats to avoid injuring themselves, as well as the gear and habitats.

Gill nets (jarife) and shark nets (sinia)

In the past, gill nets and shark nets were made from coconut husk fibres for catching large pelagic species such as rays and sharks in deep waters. Since the size of the mesh for the shark nets was large (to about 6 inches), the nets were assembled with a large plate locally known as sinia. These nets (gill and shark nets) are generally friendly to benthic habitats. However, sometimes these nets get lost and become entangled around corals. This results in incidental catch ("ghost fishing") which is one cause of the drastically reduced populations of dugong and sea turtle.

Beach seine nets (juya)

Traditional beach seine nets are used in shallow waters by dragging onto the beach to catch demersal and pelagic species. Beach seining often damages seagrass beds and sometimes coral communities. The method disturbs breeding activities and leads frequently to the capture of juveniles because shallow waters close to the shore are often spawning or nursery grounds. For these reasons, the use of beach seine fishing is restricted by law.

Mosquito nets (vyandarua), cast nets (kimia) and scoop nets (senga)

Mosquito nets are sheets of fine nets which are used by women in intertidal areas. The nets are held by several women while others approach them over a decreasing cycle, splashing and making noise to chase fish into the nets. Cast nets are circular nets that are thrown over a shoal of fish or allowed to sink to the bottom and are closed during retrieval. They are used in sheltered areas. Scoop nets are used in the light to attract fish.

These nets are used for catching prawns, shrimps and other small pelagic fish such as eels, cat fish, mullet and silver biddy swimming near the water's surface in shallow waters. The catching of juvenile fishes cannot be avoided, but they can be released alive if needed.

ii. Hook and line (mshipi)

Using a hook and line is one of the most popular fishing methods. It can be done from a vessel or from the shore and is available in different weights so that the fisher can alternate his lines depending on what he expects to catch. In the past, a hook and line was made from locally available materials like sisal or tires and not nylon as is the case now.

This gear is less energy-intensive and it can be used even by elder fishers. This fishery practice is considered environmentally-friendly and selective. However, one of its drawbacks arises when it takes place from boats anchored on coral reefs. Furthermore, a fisher can put more hooks on one line something that could not be done earlier. Additionally, the nylon lines are cheaper and easily available. These two benefits make it easier to catch more fish.

iii. Basket traps (dema)

Basket traps are made from bamboo trees. They are hexagonal in shape with a single opening. These traps are of three different sizes – small (locally known as towe), medium and large. The traps are designed to catch larger, mature fish as the tide goes out. Basket traps are usually set in a seagrass bed, among wild or cultured seaweed or coral reefs. The traps may cause little damage if they are set on reefs, or where fishers use broken coral to weigh them down. When made with small mesh, the traps tend to take large numbers of juvenile fish.

Hook and line fishing is better for the environment.

Basket traps made from bamboo trees.

iv. Sticks (kijiti)

Sharp pointed wooden sticks were used to catch octopus on foot around coral reefs during low tides. Due to the modernization of fishing gear and tools, men are able to collect octopuses by diving in far reefs using modern diving equipment. Women are unable to go to far reefs to collect octopuses because they are more fearful and are poorer divers. Therefore, women's collection of octopus continues during low spring tides only in intertidal areas. Currently the use of sticks is increasingly being replaced by metal rods.

v. Gleaning (kuchokoa)

Hand collection of marine animals is typically done by women and children, who target molluscs and crustaceans during spring tides in intertidal areas. During collection they may sometimes use sticks. The reef flat and intertidal area can be damaged by trampling if large numbers of people are involved. Certain high value species such as sea cucumbers, shells and some species used in the aquarium trade have been over-collected. It is noted that the use of bare hands and sticks is increasingly being replaced by metal rods.

Women and children are responsible for gleaning.

vi. Weirs/fence traps (uzio/wando/tando)

Traditionally, fishermen used barriers or fish fences. These barriers comprised fish fences made from mangrove sticks or reeds from coconuts tree leaves constructed within the inshore reef sand flats. The fence has an opening to the shore. The barrier is usually left for a day or two before catching the trapped fish. The barriers are constructed to trap fish that come in with the tide to feed in estuarine locations or those that are swept towards the sea by floodwaters. At high tide the enclosures are submerged and when the tide recedes fish are trapped inside. Fishermen then use hand thrust spears, nets and bare hands to catch the trapped fish.

vii. Cotton cloth

Cotton cloth is a big piece of cloth, usually 2–10 m long, which is used by women in the intertidal areas. The cloth is held by several women while others approach them over a decreasing cycle, splashing and making noise to chase fish into the cloth. In early times long cotton cloth was mostly used by women to fish shrimps, prawns and small fish in shallow waters during spring tides. However, currently the cotton cloth has been replaced by mosquito nets. The catching of juvenile fishes cannot be avoided, but they can be released alive if needed.

Women use cotton cloths to catch fish.

Overview of fishing gear

Competition for fisheries resources together with advances in technology has slowly brought about an improvement in fishing methods. As the pattern of community develops, fish become not only food for the catchers but also a commodity for trade. This triggered a change in fishing gear over time and enabled fishermen to increase efficiency. The negative outcome of increased technological advances in fishing gear has been unsustainable harvesting of fish in many fishing habitats. Nevertheless, even among less technologically-advanced fishermen the types of gear used also result in the destruction of habitat and unsustainable fishing. Statistical data on fishing gear that was collected from District Fisheries Officers reveals that traditional fishing gear is still in use, despite the introduction of modern gear.

Status of fishing vessels

Dhows are made out of wooden planks.

In early times, fishers hunted fish on foot and by using traditional fishing vessels such as non-motorized outrigger canoes (ngalawa), dugout canoes (mitumbwi), boats (mashua), and dhows (dau) (Table 3). An outrigger canoe consists of a single log with outriggers which provides additional stability to these vessels. A dugout canoe is made up from a single log – its bottom is usually flattened for stability and it has no outriggers. The boat is constructed out of timber planks and has a square stern. Dhows are constructed out of timber planks. Its bow is more pointed than the boat and the stern is rounded or pointed.

Today, there is a wide range of vessels which enable fishers to go offshore fishing. Many of the traditional dhows and boats have been motorised and are used for catching small pelagic species (sardines and mackerels). New larger vessels, some made up of fibre glass and capable of fishing for deep water species, are now used for both pelagic and demersal fish. These larger vessels are leased by businesses as they are generally too costly for individual traditional fishermen to own. This makes the enforcement of rules and regulations difficult because often the owner is not directly involved in the fishing itself. The use of boats has significantly improved catching ability, safety and working conditions for fishermen.

Table 3: Fishing vessels used and their number by district

Fishing vessels	Number of fishing vessels								
	Temeke	Kinondoni	North A	North B	West	South	Mafia	Tanga	Mtwara
Boat (M)	135	14	16	37	130	28	-	15	28
Dugout canoes (T)	74	69	112	65	0	28	428	342	-
Dhow (T)	25	27	269	2	20	68	60	244	195
Mashua (T)	20	6	57	2	19	0	132	169	21
Outrigger canoe (T)	100	48	134	339	163	326	406	621	825
Ngwanda	0	0	6	0	0	0	-	0	-
Boats with engine	88	87	-	-	-	-	134	177	27

Source: District Fisheries Survey, 2006 - 08

Fishing vessels are now more likely to be motorised.

A wide range of fishing vessels allow fishers to go offshore.

SECTION E: The status of habitats and fish stocks

The coastal environment of Tanzania is characterised by many key habitats, including coral reefs, seagrass beds, estuaries, sand banks, mangrove forests, intertidal areas and islands. These habitats are home to a variety of fish such as finfish, shell fish (prawns and lobsters), cephalopods (octopus and squids) and crabs. The catches of subsistence and artisanal fisheries are mainly composed of a few species groups, namely parrot fish, rabbit fish, sardines and mackerels, which together account for more than 50% of the total catch. The rapid growth of the coastal population, urbanization, tourism and industrial development is exerting growing pressure on key coastal habitats and fish stocks.

SECTION E

Summary of key points

- *Coral reefs are degraded due to fishing in reef areas, destructive fishing practices and unsustainable tourism.*
- *Coral reefs are recovering near Kunduchi pwani due to law enforcement and awareness campaign.*
- *Seagrass beds have deteriorated due to sea urchins and fishing.*
- *Decreased depth in estuaries due to siltation has affected fish stocks.*
- *Tourists degrade sandbanks.*
- *Mangrove forests are being protected.*
- *Intertidal areas have deteriorated.*
- *Fish stocks have declined.*

Conditions of fishing habitats

Most of the fishing habitats in Tanzania are in bad condition as detailed below.

Coral reefs

Many fishermen prefer to conduct fishing around coral reef areas due to their biological diversity and their ability to provide a variety of habitats to house the valuable fishery resources. Coral reefs found in many Tanzanian coastal villages are in bad condition. Figures 1a and 1b depict the summary of responses regarding conditions of the coral reefs. Destructive fishing practices (like dynamite fishing, poison fishing, ring net fishing and seining) and sea urchins are the main threats to coral. Other threats include unsustainable tourism and octopus fishing with sharp metal rods.

However, coral reefs near Kunduchi pwani and Chunguruma villages appear to be recovering due to strong law enforcement and an awareness campaign about coral resettlement. In addition, people in Chunguruma village are currently not using corals for lime making; instead they are using sea shells.

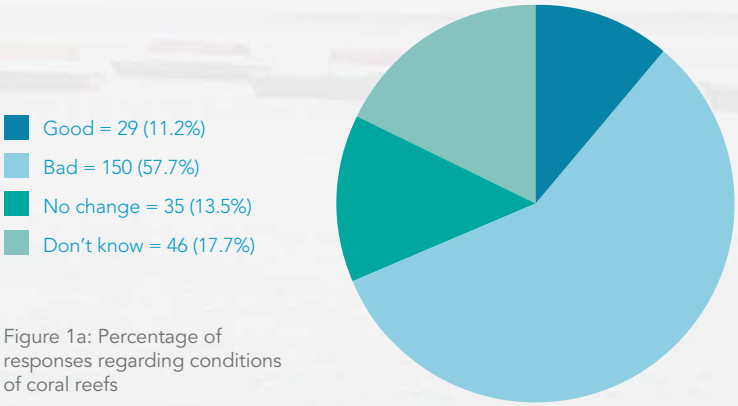


Figure 1a: Percentage of responses regarding conditions of coral reefs

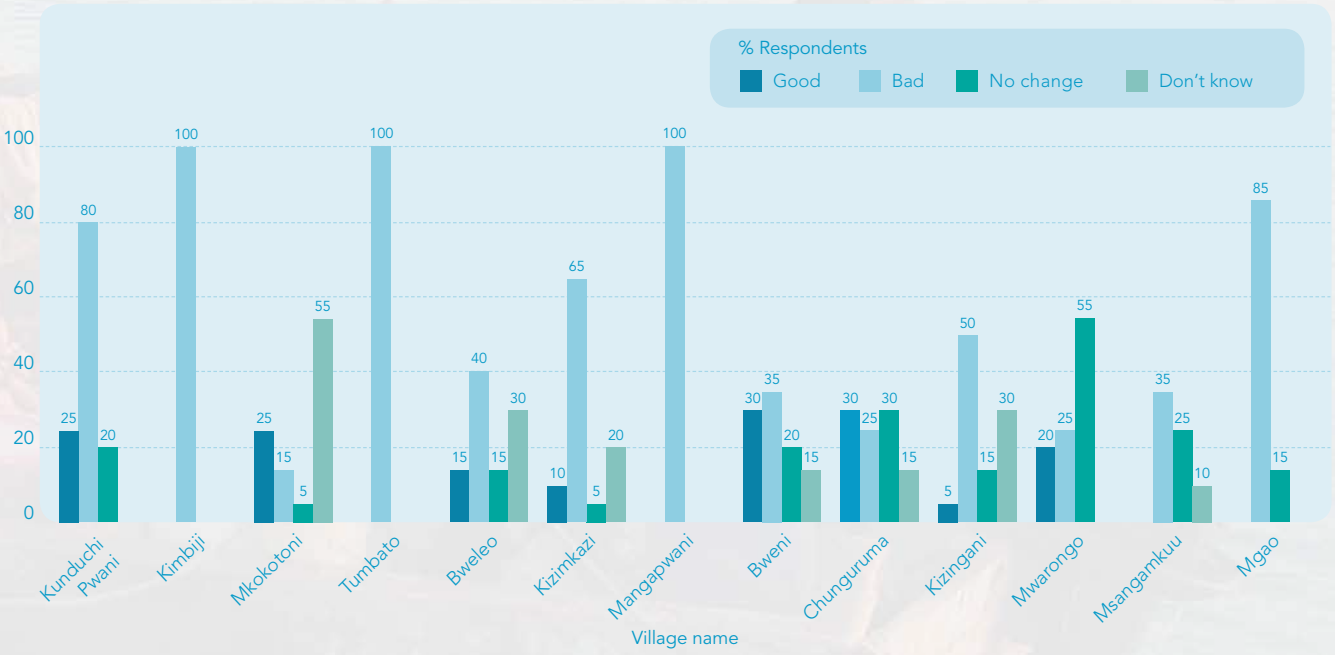


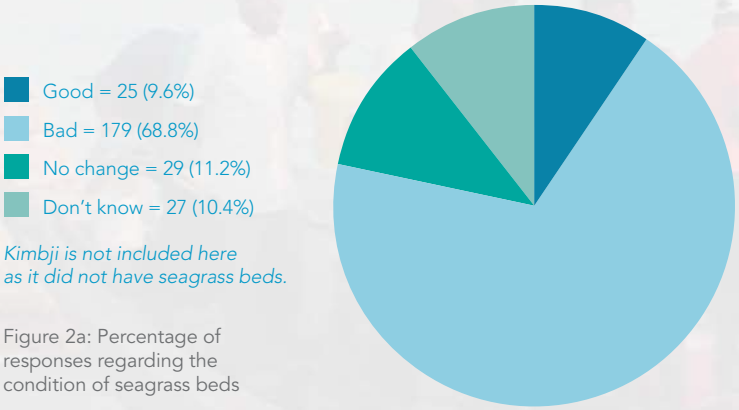
Figure 1b: Percentage of responses on coral conditions by village.

Seagrass beds

Seagrass beds represent one of the most productive and important habitats in the near-shore marine system. They are used by a wide range of species as feeding grounds for nurseries, and refuges from predation, providing food for various organisms both directly (herbivorous) and indirectly (as the base of detrital food webs).

In Tanzania seagrass beds are widely distributed from high intertidal to shallow sub-tidal areas. They are in bad condition (Figures 2a and 2b) and are mostly threatened by sea urchins, ring net fishing (when conducted in shallow waters) and beach seining. The condition of seagrass beds changes, according to the seasons. They are mostly abundant during northeast monsoon and less abundant during southeast monsoon. The southeast monsoon is thought to be associated with strong winds causing rough conditions in the ocean that uproot and sweep away seagrasses.

Pile of coral ready to be burnt to make concrete.



Kimbji is not included here as it did not have seagrass beds.

Figure 2a: Percentage of responses regarding the condition of seagrass beds

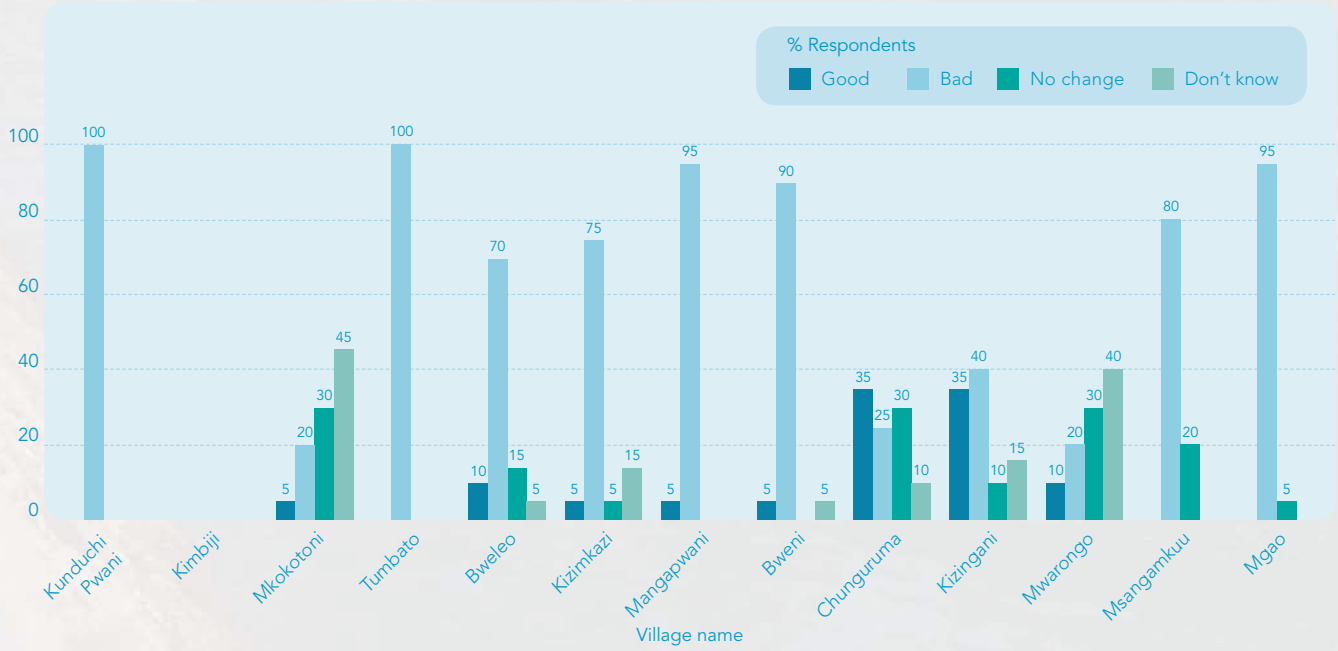


Figure 2b: Percentage of responses on the condition of seagrass beds by village

Estuaries

Most of the coastal villages in Tanzania lack estuaries. However, in villages where estuaries are present, there is an indication of decreased depth due to siltation that decreases fish stocks. For example, in Kunduchi pwani village the amount of fish stock in the estuary has decreased since 1960s because of siltation.

Tourism is to the detriment of sandbanks.

Sandbanks

Sandbanks are a deposit of sand forming a shallow area in the sea or a river. They are elevated, elongated, rounded or irregular topographic features. They consist mainly of sandy sediments, but larger grain sizes, including boulders and cobbles, or smaller grain sizes including mud may also be present on a sandbank. They are important areas for tourism, migratory birds and marine life. Tourist activities at Kwale sandbank in Zanzibar have reduced the size of the area. Due to a high concentration of tourists, the area has become easily eroded by waves, especially during southeast monsoon winds, because of trampling. In early times the Kwale sandbank was not submerged even during high spring tide which is not the case now. In Mgao village, the condition of the sandbanks is good and new, small ones have emerged due to the destruction of coral reefs and seagrass beds.

Mangrove forests

During the past, mangrove forests were over-harvested for tannin, lime making and house construction. In some areas of Unguja Island, the traditional mangrove management practices, which involved the closing and opening of the forests, have helped to protect mangrove forests. Nowadays, in most areas mangrove forests are in good condition due to good governance and replanting of mangroves in the degraded areas. For instance, the introduction of a Joint Forest Management (JFM) system on the Tanzania mainland is helping to conserve mangroves.

Intertidal areas

The intertidal area is one of the important fishing grounds for women and children. The condition of intertidal areas in Tanzania has deteriorated. This is due to beach erosion which is probably the result of a break down of barrier reefs. Beach erosion on the Tanzania coast is more pronounced in Kizingani, Kizimkazi, Bweni, Mgao and Bweleo villages. The indicator used to judge the presence of beach erosion in Mgao village is the submergence of big stones which were in the terrestrial area close to the ocean. In Kizimkazi village the indicator of beach erosion was the decreased size of the forest along the coastline. The forest is now located very close to the ocean. In Bweni village indicator used to judge beach erosion was the exposure of roots and falling down of coconuts and casuarinas trees.

Islands

Most fishermen prefer to fish around Bongoyo, Mbudya and Pangavini islands in Dar es Salaam, small islands in Mafia as well as Sume, Miwi, Nyemembe, Komonda (Komonda ya fungu, Komonda dogo, and Komonda ongo), Nguruwe, Kwale, Pungume and Vundwe Islands in Unguja. Due to the introduction of marine parks and reserves most of these islands are protected by law, hence fish stocks are high year-round. Some of the islands, such as Maziwe Island, have submerged.

Low tide

Palms on beach

Status of fish stocks

Fishery resources are an important source of food and contribute to the economy of the local communities involved in fishery activities along the Tanzanian coastline. However, several factors are causing serious problems on the availability of fish stocks. Figures 3a and 3b show a declining trend in the fish catch in Tanzania.

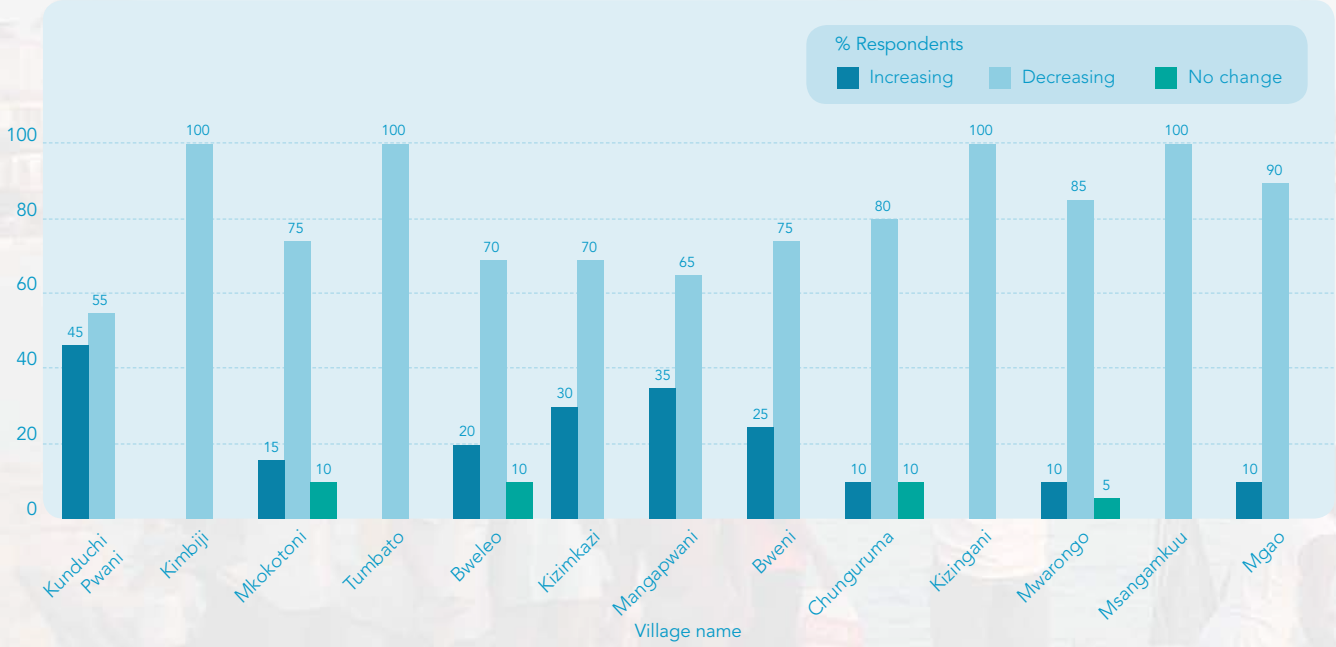


Figure 3a: Percentage of responses regarding the trend of fish catch by village

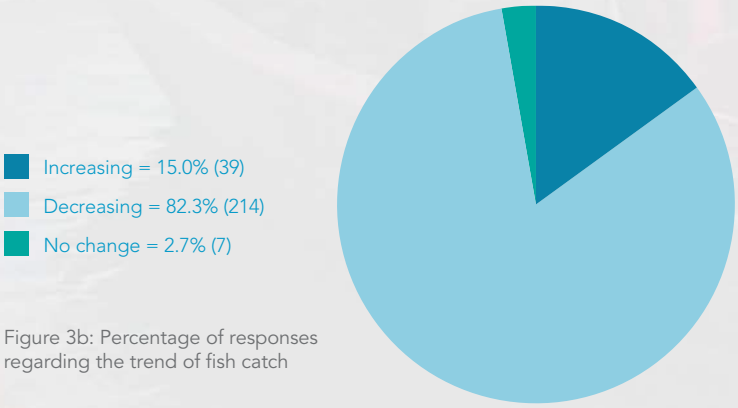


Figure 3b: Percentage of responses regarding the trend of fish catch

Factors for the declining trend of the fish catch from the various fishing grounds were investigated (Figure 4). Fifteen factors were identified and are detailed below.

a. Destructive fishing practices (73.8%) such as dynamite fishing, poison fishing, drag nets and beach seine were seen as a major cause of the declining trend of the fish catch.

b. Lack of marine closures (66.2%) (either traditional or modern) contributes to the declining fish catch. Areas where marine closures are practiced because of either government or traditional initiatives proved to have high fish stock all year round.

c. Overfishing (59.6%) was blamed for contributing to the declining fish catch.

d. An increased number of fishers caused a decrease in the fish catch. In coastal villages, most primary or secondary school leavers whose performance does not allow them to continue with their education opt for fishing as a source of income.

e. Degraded habitats. The increased number of degraded habitats results in reduced stock.

f. Poverty among fishing communities. Because of poverty, fishers in most cases do not think of the sustainability of their fishery resources. They just harvest whatever is available to sustain their lives.

g. Lack of awareness on environmental conservation. This contributes to the failure of many initiatives aimed at conservation of coastal and marine resources. Fishers are reluctant to embrace strategies and conditions that would favour the success of indigenous management of coastal and marine resources. They feel that such measures would harm fishing arrangements in their fishing grounds.

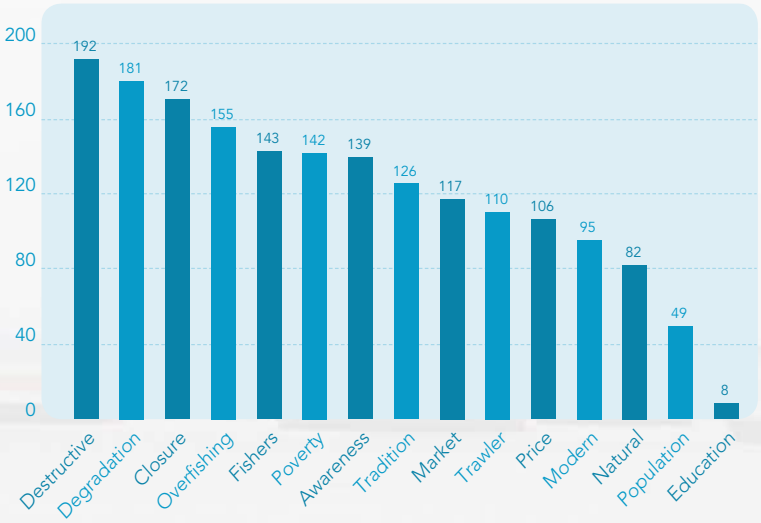


Figure 4: Reasons provided by respondents on trend of fish catch

h. The breakdown of indigenous conservation practices. This causes the increase of open access to most of the fishing grounds.

i. Commercialization of fishery resources. Fishery resources have been commoditized. With the presence of an assured market, it attracts many people to engage in fishing as a source of income.

j. Trawling and ring net fishing. When trawling is done in shallow waters, it causes damage to the fishing habitats. Ring net fishing used to catch sardines contributes to the decrease in fish catch in shallow waters.

k. Price increase of fish resources. An increase in prices for fishery resources motivates many people to engage in fishing.

l. Improved fishing gear and vessels. The improvement of fishing gear and vessels has resulted in more efficient fishing. Increased fishing efficiency contributes to fast depletion of marine resources.

m. Seasonality. Availability of fish depends on seasons. During the northeast monsoon, fish are plentiful compared to during the southeast monsoon. During the northeast monsoon the ocean is calm and many more fish roam around even to the near shore.

n. Population increase. The increase in human population, particularly in coastal areas, results in an increase in fishers and in the demand for fish.

o. Lack of formal education. A lack of formal education makes it difficult for fishers to associate the decline of fish resources with degradation of fishing habitats.

Fish are plentiful during the northeast monsoon.

SECTION F: Materials and methods, references and appendices

This section focuses on the description of study areas, methods used for data collection, data analysis methods, references and appendices.

SECTION F

Materials and methods

Description of study areas

The study to document indigenous knowledge used in the management of coral reefs and fish stocks was carried out in 13 villages of Dar es Salaam (Kunduchi pwani and Kimbiji villages), Unguja island (Mkokotoni, Tumbatu, Bweleo, Kizimkazi and Mangapwani villages), Mafia island (Bweni and Chunguruma villages), Tanga (Kizingani and Mwarongo villages) and Mtwara (Msangamkuu and Mgao villages). Below is the detailed information for each study area.

a. Dar es Salaam

Dar es Salaam is located at 6°48' South and 39°17' East. It lies on the East Coast of Africa on the Indian Ocean. It is the largest city in Tanzania with an estimated population of 2,497,940 (according to 2002 population census). To the North of Dar es Salaam there is Bongoyo Island, Fungu Yasin sandbank, Mbudya Island and Pangavini Island and along the seaward side there is a well developed fringing reef. In the south of the city there are three charted parch reefs and a broken coastal fringing reef mainly associated with headlands such as Kimbiji peninsula and other uncharted and unnamed patch reefs. Originally, the Zaramo ethnic group inhabited the area that is now Dar es Salaam. During the 20th century, however, the population became a mixture of many of the country's ethnic groups. Thus, its population is currently a mixture of people from all parts of Tanzania.

b. Unguja Island

Unguja Island is one of the major two islands of Zanzibar. It is situated in the Indian Ocean about 40km east of Bagamoyo on the Tanzanian mainland. The island is about 85km long and 30km wide at its widest point. It has a population of 622,459 (according to 2002 population census). There is a scattered coral development all around the Unguja Island. On the Eastern coast, from the northern and southern extremities there is a fringing reef which is broken by Chwaka Bay. There is also a well developed reef formation associated with Mnemba Island in the Northeast and two deeper reef formations to the north at Leven Bank and south of the island at Bedford Bank. In the west there are a number of patch reefs and islands extending from Menai Bay up to Nungwi peninsula.

The natives of Zanzibar Island include the three Shirazi groups of Wahadimu, Wapemba and Watumbatu. Other ethnic groups that inhabit Zanzibar today include Arabs, Asians (Indians and Pakistanis), Comorians, and people from the mainland of Tanzania. Its inhabitants are believed to have strong beliefs and customs.

c. Mafia Island

Mafia Island and its chain of small islets lie approximately 120km south of Dar es Salaam and 20km offshore from the eastern extent of Rufiji which is one of the largest delta systems in Africa. To the east of Mafia Island is the Indian Ocean. The main island of Mafia is about 48km long and 17km wide at its widest point. Several smaller islands and islets are scattered to the west and south. Mafia receives an average annual rainfall of 2,000mm. The island experiences two main rainy seasons: the short rains in November/ December and long rains from March to May. Over 80% of the rain occurs during the long rains. The temperature on the island is firmly stable rarely dropping below 20°C or rising above 33°C. June to September is the coolest period.

d. Tanga region

Tanga lies between 38°53' and 39°10' E, and 5o and 5°16' S. It extends 20km inland from the coast between 0 – 17 metres above sea level. It has an area of 600km^2, of which about 62km^2 is covered with bodies of water. The topography of the city is mainly flat with some small, gently slopping hills punctuated by river valleys and streams. Tanga has a humid tropical climate with seasonal average temperatures ranging from 24°C to 33°C. It has three rainy seasons in a year: the long rains in March to May (1000mm to 1400mm of rainfall), light rains in June to August (100mm) and short rains in October to December (500mm – 800mm). Humidity and evapotranspiration levels are high and there is plenty of sunshine, as is typical of tropical coastal areas. The natural vegetation of Tanga is mainly shrubs and scattered trees. Mangrove forests cover between 1,200ha to 3,000ha of the coastal strip and other natural forests cover about 1,500ha. The land is covered with four types of soils, namely sandy, clay loamy, and red and black valley clays. These types of soils are suitable for the cultivation of cassava, cashew nuts, pineapples, sweet potatoes, maize, legumes, coconuts and fruits (citrus, mangoes, jackfruits).

e. Mtwara

Mtwara district is one of five districts in Mtwara region. The district is bordered by the Indian Ocean to the east, Lindi region to the north and Tandahimba to the west. The district has a total area of 3597km^2. According to the 2002 population census, the district has a total population of 204,770 of which 107,901 are females and 96,869 males. The district has 50,637 households with an average of four people per household. The rainfall seasons are in the months of November to May of the year. The average annual rainfall is estimated at between 800mm to 900mm. The dry season starts from the middle of May to October. The average temperature ranges between 23°C in the month of June to 30°C in the month of October. The district depends on farming as the main source of income, which contributes to about 75% of the total income. Other activities include fishing, small (petty) businesses and small industries. Food crops include cassava, maize, sorghum, millets, paddy and legume and cash crops include cashew, groundnut, simsim and coconut.

Methods used for data collection

Overview

Both primary and secondary data were collected. Primary data was obtained through a semi-structured questionnaire, key informants interviews, participant observations, video shooting and field visits to the historical sites. Secondary data sources included documentary materials (government reports, research reports, village records and various publications) obtained from libraries, district offices and websites. These were reviewed to get information on general aspects and specific issues relating to the use of indigenous knowledge in the management of coral reefs and fish stocks that has been carried out in different areas.

Data collection methods

a. Semi-structured questionnaire

A semi-structured questionnaire (Appendix I) was administered to a sample of 260 households to capture both qualitative and quantitative information on indigenous knowledge in the management of coral reefs and fish stocks.

b. Key informant interviews

Key informants are people who are accessible, willing to talk and having great knowledge regarding the issues under discussion. Checklists of questions were used to guide the interview with District Fisheries Officers (Appendix II) and Village Leaders (Appendix III). It was done to supplement the information collected through participant observations and the semi-structured questionnaire.

c. Participant observations

When carrying out participant observations the observer becomes part of the situation being studied. This method helped to gain more understanding on indigenous knowledge in the management coral reefs and fish stocks. Also the method facilitated bringing together discrete elements and information collected by other methods.

d. Video shooting

Video footage of fishers interviewed and photographs of different areas were taken to support the subject under study.

e. Field visits

A field visit to the islands, historical sites, sacred sites and other respected areas found in each village was done to ensure first hand information and to supplement the information obtained during questionnaire survey.

Data analysis

Both qualitative and quantitative data analysis was carried out.

(i) Qualitative data analysis

Qualitative information, collected from key informants, through participant observations, video footage, field visits and document reviews, were subject to content analysis. In this case, the recorded dialogue was broken down into small meaningful units of information to determine the values and attitudes of the respondents.

IMS researchers Rukia Kitula (left) and Mwanahija Shalli during the data collection phase of the project.

(ii) Quantitative data analysis

Quantitative data from questionnaires was coded and analysed using the Statistical Package for Social Sciences (SPSS) computer software version 12.0. Descriptive statistical analysis such as cross tabulation was used to calculate frequencies, percentages and means for multiple comparisons of various data.

Characteristics of the studied households

i. Age structure

The age of 260 respondents was divided into three groups: 20 to 35 years old (youths), 36 to 55 years old (adults) and above 55 years old (elders). Out of 260 respondents interviewed, 137 (52.7%) were at age group 55 years old and above followed by age group 36 to 55 years old (34.2%). A small proportion of respondents (34 respondents) came from age group 20 to 35 years old. The implication of this age structure is that fishers above 55 years old have first-hand indigenous knowledge of coral reef management covering a long period. It is increasingly important to record and document their knowledge for future use before they die. Youths were deliberately involved in this study to establish the level of indigenous knowledge regarding coral reef conservation they inherit from elderly indigenous fishers.

ii. Sex

Male respondents accounted for 207 (79.6%) of the studied sample while females formed the rest. The involvement of both men and women was crucial for capturing diversity of indigenous management on coral reefs and fish stocks. Male fishers have the knowledge of far and nearby reefs while most women are only knowledgeable on conditions of the intertidal areas since they are mostly involved on gleaning activities in the habitat. Some women have knowledge of far reefs from discussing marine issues with their husbands.

iii. Marital status

Most of the respondents interviewed in all villages were married. This is probably because marriage is highly valued within the coastal communities. According to Tanzanian culture marriage increases respect. This means, when old married people explain indigenous knowledge to youths it is believed, valued and respected.

iv. Ethnic Groups

Domination of ethnic groups increases influence and respect of traditional knowledge in natural resources management. It was noted that most of respondents interviewed came from the ethnic group of that particular area. This indicates that management of the coastal and marine resources still has strong ties.

v. Education level

The majority of respondents interviewed in Tumbatu (40%), Bweleo (40%), Kizingani (70%) and Msangamkuu (50%) villages had no formal education. Forty percent in Kunduchi pwani, 55% in Kimbiji, 45% in Mangapwani, 85% in Bweni, 65% in Chunguruma and 70% in Mwarongo villages had attained a primary level of education which enabled them to associate the decline of fish resources with degradation of coral reefs, seagrass beds and mangrove forests. Almost all respondents knew how to read and write Quran.

vi. Religion

All of the respondents interviewed were Muslim – a characteristic feature of coastal people. This could be due to the fact that most of the East Africa coastal strip was under Arab domination which spread the Islamic religion.

vii. Duration of residence

Most of the respondents interviewed were residents (66.5%) who had stayed in the area for more than 20 years. As a result they were more familiar with the environment and indigenous knowledge associated with coastal and marine resources.

viii. Family size

Family size was divided into three groups namely 1 – 3 people (small family), 4 – 6 people (medium family) and above 6 people (large family). Most of the respondents interviewed were from medium (42.7%) and large families (41.2%). It is likely that a large family coupled with lack of formal employment would force the head of the household to go out fishing.

ix. Sources of income

Most respondents interviewed depend on more than one source of income (Table 4). It was noted that fishing (72.3%) and agriculture (71.3%) are the major sources of income. Other sources of income include a small business (21.7%), gleaning (11.2%), a fish business (6.5%), seaweed farming (6.3%) and remittance (5%). A small number of people were involved in keeping a few livestock (2.7%), casual labour (1.7%), carpentry (1.3%), coconut fibre (0.8%), tailoring (0.4%) and mat making (0.4%).

Table 4: Percentage distribution of respondents by income sources

Village name	Fishing	Fish business	Agriculture	Livestock	Carpentry	Remittance	Business	Seaweed	Casual	Glean	Tailor	Mat	Coconut fibre
Kunduchi pwani	35%	40%	15%	-	-	25%	40%	-	-	-	-	-	-
Kimbiji	90%	-	80%	-	-	-	100%	-	-	-	-	-	-
Mkokotoni	80%	15%	75%	5%	-	-	-	-	-	-	-	-	-
Tumbatu	45%	5%	20%	-	-	5%	5%	-	-	50%	-	-	-
Bweleo	30%	10%	90%	-	-	10%	35%	45%	15%	30%	-	-	-
Kizimkazi	70%	15%	45%	5%	-	5%	10%	-	5%	10%	-	-	10%
Mangapwani	90%	-	-	-	-	-	-	-	-	-	-	-	-
Bweni	95%	-	100%	15%	-	-	-	-	-	-	-	-	-
Chunguruma	70%	-	95%	5%	5%	5%	35%	-	-	20%	5%	5%	-
Kizingani	90%	-	90%	-	-	5%	25%	30%	-	-	-	-	-
Mwarongo	75%	-	55%	5%	-	-	5%	-	-	37%	-	-	-
Msangamkuu	75%	-	90%	-	10%	5%	5%	-	-	-	-	-	-
Mgao	95%	-	100%	-	-	-	-	-	-	-	-	-	-
Total count	*188*	*17*	*171*	*7*	*3*	*14*	*52*	*15*	*4*	*29*	*1*	*1*	*2*
Total%	**72.3%**	**6.5%**	**71.3%**	**2.7%**	**1.3%**	**5.4%**	**21.7%**	**6.3%**	**1.7%**	**11.2%**	**0.4%**	**0.4%**	**0.8%**

Source: Own survey, 2006 - 08

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SECTION F: Appendices

Appendix I: Household questionnaire on indigenous knowledge on fish stocks and coral reef management

SECTION 1: GENERAL INFORMATION

1.1	Date			
1.2	Region/District /Village			
1.3	Name of the interviewee			
1.4	Age			
1.5	Sex			
1.6	Marital status			
1.7	Tribe			
1.8	Do you know how to read and write?			
	01 Very well	02 Little bit	03 Don't know	
1.9	Type of education			
1.10	Education level			
1.11	Religion			
	01 Muslim	02 Christian	03 Others (specify)	
1.12	For how long have you been living here? …….. years			
1.13	How many households do you have and their family sizes?			
	No. of households	Family size		
1.14	The type of a house you own?			
	01 Mud house with palm fronds	02 Mud house with iron sheets	03 Block house with palm fronds	
	04 Block house with iron sheets	05 Others (specify)		
1.15	How do you treat sewage and solid wastes from your house?			
1.16	What are your sources of income? Indicate their proportional contribution (%)			
	a.	b.	c.	d.
1.17	If engaging in agriculture, how is it done?			
	Farm location	Farm size …….. acres		
	Types of crops grown			
	Cropping system(s) of the mentioned crops grown			

SECTION 2: FISHING BEHAVIOUR

2.1	a. What type of fishery practice do you undertake?			
	b. What is your fishing behaviour in terms of the following:			
	Time of day	Lunar stage	Ecological zone	Tide
	c. What are the possible threats to the coral reefs caused by boat anchorage, explain? Hint – ask on past and present anchors			
2.2	How often do you perform marine related activities? (per month)			
	Fishing	Mangrove activities	Seaweed farming	
	Collection of marine animals	Tourism activities	Fish business	
	Others (specify)			
2.3	What is your income trend from fishing?			
	a. Increasing	b. Decreasing	c. The same	d. Others (specify)
2.4	Explain the conditions of the following fishing habitats in your area:			
	Habitat	Condition of the habitats		
	a. Coral reefs			
	b. Seagrasses			
	c. Estuaries			
	d. Sandbanks			
	e. Mangroves			
	f. Intertidal areas			
2.5	What is the trend of the catch harvested?			
	01 Increasing	02 Decreasing	03 No change	04 Don't know
2.6	What do you think are the causes for their increasing/decreasing?			

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SECTION 3: TABOOS AND CUSTOMS

3.1	a. Is the eating of marine species forbidden for religious, superstitious beliefs and government influences?	
	01 Yes	02 No
	b.If yes, list them and explain why and to what particular group or sex	
	Are there any fishing method tabooed for religious or superstitious beliefs and government influences?	
	01 Yes	02 No
	b. If yes, explain all fishing methods that are forbidden for religious or superstitious beliefs and government influences and their meaning?	
	c. Are there taboos associated with the fabrication and deployment of traditional fishing gear and techniques?	
	01 Yes	02 No
	d. If yes, explain with examples	
3.3	Are there any actions that you are not supposed to do:	
	a. Before and during performing marine related activities?	
	b. When fabricating fishing gears and vessels?	
3.4	Are there any taboos in your area associated with the following?	
	a. When there is a death in the village?	
	b. When there is election?	
	c. When harvesting of agricultural crops? Explain.	
	d. During circumcision events and other ceremonies in the village? Explain.	
3.5	a. Are there areas in the coast/sea/rivers associated with the taboo?	
	01 Yes	02 No
	b. If yes, mention the area and explain	

SECTION 4: INTENTIONAL TRADITIONAL MANAGEMENT

4.1	a. Please list and explain if you have traditional coastal and marine closures on particular species and explain how it is done and at what periods and length of time.	
	b. Explain the traditional restriction on the number of fishing gears in your area	
	c. Explain the closed seasons or banning of fishing during spawning periods	
	d. Mention and explain the traditional management of forests present in your area	
	e. Explain, if you have a custom of not going fishing during special periods e.g. fasting, Friday, Sunday	
4.2	a. Are there particular areas e.g. lagoons, reefs, rivers that are restricted to fishery/agriculture or any other activity and are controlled by the local community?	
	01 Yes	02 No
	b. If yes, explain the areas restricted	
	c. Explain the punishment given to anyone going against	
4.3	a. When resources are unavailable in your ground/village, do you obtain permission to harvest the same on your neighbors' ground/villages?	
	01 Yes	02 No
	b. If yes, explain with specific examples and what is the repayment?	
4.4	a. Are there any traditional ceremony when the closures are announced?	
	01 Yes	02 No
	b. If yes, what do they do to bless the ceremony? Explain	
4.5	Please suggest strategies and conditions that would favor the success of traditional management of coastal and marine resources	

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Appendix II:
Checklist for Fisheries Officers

1	Date	
2	Name	
3	Designation	
4	Village	District/Region
5	List the fishery practices conducted in your area	
6	Please indicate the type of fishing vessels used in your area and their numbers: Please tick which is traditional and which is modern	
	Fishing vessel type	Number
	a.	
	b.	
	c.	
	d.	
	e.	
	f.	
7.	Please indicate the number of motorized and non motorized boats, subsistence and commercial boats in your village/district	
	Motorized boats	Non-motorized boats
	Artisanal boats	Commercial boats
8.	Please indicate the type of fishing gears used by the fisherfolk in your area, and their numbers: Please tick which is traditional and which is modern	
	Fishing gear type	Number
	a.	
	b.	
	c.	
	d.	
	e.	
	f.	

9. What is the trend of fishing catch for the last 5 years?

a. Increasing	b. decreasing	c. nearly constant

Please provide fishery statistical data for the last 5 years (if available)

Year	Fishery statistics data

10. Please indicate the approximate number of fishermen, fishing boats and fishing gears used at different sites in your Village/District.

Site name	Fishermen	Fishing boats	Comments

11. What do you think are the threats to coral reefs in your area? Explain

12. Are there any management measures/strategies (Governmental) in place to prevent threats to marine ecosystems and coral reefs in particular in your area? Explain - Hint, if possible mention activity and its management

13. Are there any traditional management measures/strategies in place to prevent threats to marine ecosystems and coral reefs in particular in your area? Explain - Hint, if possible mention activity and its management

Appendix III: Checklist for Village Leaders

1.	Questionnaire number	
2.	Date	
3.	Name of the village leader (optional) and or designation	
4.	Name of the Village	District
5.	How many people live in your village/area? (According to 2002 population census)	
6.	How many households are there in your area?	
7.	Do you have any other historical data on the village population during the last 5 years?	
	Year	Village population
8.	List and describe the socio-economic activities which are done in your village/area	
	Activity	Description
	a.	
	b.	
	c.	
	d.	
	e.	
	f.	
	g.	
	h.	
9.	How agriculture is done in your area?	
	Farm locations	
	Types of crops grown	
	Cropping system(s) – if using fertilizers, what kind of fertilizers is used on your farms, explain more on the traditional systems	

10.	Do you have tourism activities in your area? Explain
11.	What are the environmental management measures that are in place for coastal and marine areas? eg law enforcements, community awareness etc - Hint, mention activity and its management
12.	What are the indigenous environmental management measures that are in place for the coastal and marine areas? eg law enforcements, community awareness etc – Hint, mention activity and its management

The CRTR Program is a partnership between the Global Environment Facility, the World Bank, the University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA) and approximately 50 research institutes and other third-parties around the world.

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