



Natural resource dependence, livelihoods and development

Perceptions from Kiunga, Kenya

Melita A. Samoilys and Nyaga W. Kanyange



IUCN Eastern and Southern Africa Regional Office 2008



The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN, KNCF, IDRC or the Ford Foundation concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed in this publication do not necessarily reflect those of IUCN, KNCF, IDRC or the Ford Foundation, nor does citing of trade names or commercial processes constitute endorsement.

This publication has been made possible through funding from KNCF, IDRC and the Ford Foundation.



Published by: IUCN Eastern and Southern Africa Regional Office 2008

Copyright: © 2008 International Union for Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holders.

Citation: Samoilys M.A. and Kanyange N.W. 2008. Natural resource dependence, livelihoods and development: Perceptions from Kiunga, Kenya. IUCN ESARO 2008.

ISBN: 978-2-8317-1118-8

Photographs: © Melita Samoilys, Nyaga Kanyange, Kate Macintyre

Available from: IUCN Eastern and Southern Africa Regional Office (ESARO)
PO Box 68200, 00200 Nairobi, Kenya
www.iucn.org/esaro
www.cordioea.org

Table of Contents

Acknowledgements	4
Acronyms and Abbreviations	4
Executive Summary	5
1. Introduction	7
1.1 Study location	7
1.2 Marine conservation, resource management and community development	9
1.3 Study objectives	9
2. Methods	10
3. Results and Discussion	11
3.1 Fisheries	12
3.1.1 Sea cucumber collection	13
3.1.2 Shark fishery	13
3.1.3 Cowrie and shell collection	15
3.1.4 Lobster fishery	16
3.1.5 Mangrove crab fishery	18
3.1.6 Summary findings from fisher interviews	18
3.2 Conservation and management programmes	18
3.2.1 Education and awareness	19
3.2.2 Sea turtle conservation initiative	20
3.2.3 Coral reef, fish, lobster and invertebrate monitoring programme	20
3.2.4 Gear exchange programme	20
3.2.5 Kibodo Trust	21
3.2.6 Private tourism operators	21
3.2.7 Conclusions on management and conservation programmes	21
3.3 Comanagement	22
3.3.1 Natural resource management policy	22
3.3.2 Beach Management Units	23
3.3.3 Land access	24
3.4 Alternative Income Generating Activities	24
3.4.1 Eco-Friendly handicraft project	25
3.5 National coastal community lessons learning workshop	25
4. Conclusions and Recommendations	26
5. References	28
Appendix 1. Focus group discussion representatives by village	30
Appendix 2. Key stakeholders and government officials consulted	30

Acknowledgements

This study was funded through two IUCN Eastern and Southern Africa Regional Programme projects: “Building capacity and strengthening policies for coastal communities to manage their marine resources in East Africa”, supported by Keidanren Nature Conservation Foundation (KNCF); and “Conservation as an Asset for Livelihoods in Eastern Africa”, funded by the International Development Research Centre (IDRC) and the Ford Foundation.

We are grateful to all those who agreed to meet with us to discuss and share their knowledge and ideas on the topic of the study. We are also grateful to Mike Watson from Kibodo Trust and Sam Weru from WWF for their support and for a large amount of background information on the Kiunga area. We are particularly grateful to Hamid Makowe from Kibodo Trust who helped to organise and participated in our village meetings in the Kiunga area and provided transport on the mainland, and to WWF and Captain Lali who provided us with boat transport.

Acronyms and Abbreviations

AIG	Alternative Income Generating activities
BMU	Beach Management Unit
CBO	Community Based Organizations
CMA	Collaborative Management Area
CORDIO	Coastal Oceans Research and Development in the Indian Ocean
CPUE	Catch per Unit Effort
EARO	IUCN Eastern African Regional Office
EAWLS	East African Wildlife Society
EEZ	Exclusive Economic Zone
FGD	Focus Group Discussion
IUCN	International Union for the Conservation of Nature
KES	Kenya Shillings (currency)
KESCOM	Kenya Sea Turtle Conservation Committee
KMNR	Kiunga Marine National Reserve
KSV	Kiwayu Safari Village
KWS	Kenya Wildlife Service
NALEP	National Agriculture and Livestock Extension Programme
NGO	Non-governmental Organisation
ORI	Oceanographic Research Institute
USAID	United States Agency for International Development
USD	United States Dollar (currency)
WWF	World Wide Fund for Nature

Executive Summary

Numerous marine resource management initiatives have been implemented in East Africa over the last 15 years. However, success has been limited if poverty and natural resource health are used as indicators, although the capacity to manage marine resources has improved. This study seeks to map coastal peoples' perceptions of marine resource use and their dependence on these resources, changes in resource status, and what effect conservation and natural resource management have had on coastal peoples' socio-economic development, in order to understand the bottlenecks to good governance of common pool marine resources. The Kiunga area in northern Kenya and the Tanga area in northern Tanzania were selected for case study analysis due to considerable conservation and management intervention in these areas over time. The findings of the Kiunga case study are presented herein.

The objectives of the study were to compile existing information on the link between coastal peoples' livelihoods and marine resource management in Kiunga, with a particular focus on fisheries; and to analyse past work on livelihood enhancement and associated capacity building, empowerment and participatory approaches to marine resource management. Special attention was paid to the semi-commercial invertebrate fisheries associated with this area, particularly lobster and crab, as well as shark, mollusc and sea cucumber fisheries. Attention was also paid to the level and extent of involvement of the local community in the management of their marine resources. Information was obtained through literature research; meetings with resource managers and government officials; and a combination of focus group discussions and key informant interviews in the villages in Kiunga Marine National Reserve (KMNR).

Management and conservation interventions by several institutions in KMNR have had a positive impact on the lives of the people living in the Kiunga area, primarily through providing health, education and transport services. However, the socio-economic status of the people has improved little. Also, development of the region does not appear to have changed significantly since the 1980s, especially in terms of infrastructure: the road is still a sand track, there is no public vehicle service and telecommunication north of Mkokoni village is non-existent.

With little development in the area the people living in KMNR are still highly dependent on fishing for their livelihoods - 95-100% dependency in terms of income was recorded in this study. However, fisher catch rates and earnings are declining as human population numbers increase and greater pressure is put on marine resources.

Co-management initiatives are a relatively recent introduction and are yet to reap tangible benefits in terms of improved fisheries management and improved livelihoods. The area sustains important and valuable fisheries such as the lobster and mangrove crab fisheries. With better management and effort reduction these fisheries could be sustainable and productive in the long term. This would ensure the fisheries bring an important source of income to the region as well as maintain a traditional form of livelihood. Considering the high levels of poverty and dependence on natural resources, alternative income-generating activities (AIG) now need to be vigorously pursued. The area has enormous wealth in terms of a very high aesthetic value due to minimal development and high biodiversity, and community based eco-tourism presents an opportunity. Mariculture development is also being explored.

However, a number of bottlenecks exist which, if addressed, would help create an enabling environment for livelihood enhancement and development. For example, this study found that the local communities in Kiunga Marine National Reserve view conservation efforts as somewhat separate to their primary livelihoods of fisheries and not directly benefiting them, except through side programmes such as education and health. More direct involvement and empowerment of communities is needed to address this, although ultimately it is tangible benefits stemming from conservation activities and accruing directly to communities that will ensure buy-in. An essential step in this process is the establishment of Beach Management Units that are anchored in the communities while enjoying the trust of the authorities, structured in such a way that they cover areas that are sufficiently large and reflective of traditional fishing practices in the area.

There is a risk of conservation successes already achieved becoming undone, further undermining resource management initiatives. Programmes in the area have created wide support for conservation of marine turtles, and local poaching has been significantly reduced, but mechanized, mainly foreign, fishing vessels illegally fishing near shore (within 12nm) are implicated in incidental turtle by-catch and mortality as well as habitat destruction. Communities identify this as one of the main drivers of resource degradation, and have repeatedly asked authorities and conservation agencies for assistance in tackling this problem, which is beyond their capacity to address. Intervention in the form of more coherent enforcement of regulations, more clear progress on natural resource management, as well as an increased focus on empowering and involving communities in these, are all urgently needed.

The unique natural and cultural characteristics of the area will remain its greatest opportunity for socio-economic development in the foreseeable future. In order to make possible local development that benefits all people in the area without compromising resource sustainability, the area must become more closely connected to outside markets, for sale of products such as from fisheries or local manufacturing, for attracting tourists and development capital, and for providing opportunities to build capacity and increase livelihoods development and specialization. This could e.g. allow taking a cautious approach to development, targeting specific niche markets such as high-end, low impact tourism, or sustainably farmed seafood, but must be coupled with sound planning and management.

Lastly, continued commitment to improved education in the area and empowerment of people to participate in and indeed become drivers of conservation as well as development are fundamental to sustainable development in the long term.

1. Introduction

Sustainable use of biodiversity has significant links to human wellbeing and poverty reduction. More than 10 years after the 1992 Rio Declaration on Environment and Development, demographic trends, health epidemics and the pressing need to reduce poverty have strained natural resources and threatened to greatly diminish the world's collective biodiversity. These trends have serious implications not only for future poverty reduction and development, but also for the health and wellbeing of the human population today.

In Africa, millions of people depend heavily on the continent's genetic, species and eco-system diversity to support their livelihoods. This biodiversity contributes both directly and indirectly to human health and nutrition. The direct contribution of biodiversity is seen as an invaluable source of food through fisheries and through ecosystem services.

Some 30 million people live in the coastal region of the Western Indian Ocean, many highly dependent on its marine resources and having a significant impact on resource status. A majority of these coastal communities are categorised as living at or below national poverty lines. In Kenya poverty appears to be strongly linked with fishing communities, with the highest poverty prevalence in the country of 62-63% (2000 national statistics) in the Coast Province.

Over-fishing and destructive fishing techniques that cause habitat destruction, coupled with a rising population are of increasing concern in East Africa (Obura 2005, Weru 2007). These unsustainable practices are embedded in poverty and continue because poverty reduction strategies are failing in coastal communities in East Africa. Further, coastal communities remain disempowered in terms of having ownership over the marine resources they exploit, which remain common pool.

The link between improving the health of the marine environment and improving coastal people's livelihoods has not been quantified in East Africa (Samoilys and Church 2004), and national poverty alleviation strategies tend to neglect the importance of natural resources in peoples' livelihoods. However, it is clear that reduction of poverty through sustainable livelihood development, which in turn helps maintain biodiversity and improve conservation strategies (Ireland et al 2004, Harrison 2005), is a pressing theme that requires careful analysis, community consultation, and integration of cross-sectoral planning and management. The many marine resource management initiatives implemented in Kenya over the last 15 years have generated a considerable amount of information and know how as well as community institutions and infrastructure, but in spite of this success has been limited in terms of poverty alleviation and improved natural resource health (Kenya poverty statistics 2000, Obura 2005).

In this study we ask how dependent coastal communities are on marine resources, and what effect conservation and natural resource management has had on coastal peoples' socio-economic development, in order to understand the bottlenecks to good governance of common pool marine resources and poverty reduction in coastal communities. The study is also designed to identify locally appropriate mechanisms for enhancing and diversifying livelihoods for fishing communities. The Kiunga area in northern Kenya was chosen as a case study because of considerable conservation and management intervention in the area over time. A similar study has also been carried out in Tanga, Tanzania, with results presented in a separate report (Samoilys and Kanyange 2008).

1.1 Study location

The Kiunga area is located in the northernmost part of the Kenyan coast, bordering Somalia in the north and stretching to the Lamu archipelago in the south (Figure 1). It is characterised by a hot and humid climate with rainfall of around 500mm per year. There are three natural reserves within the area, two terrestrial and one marine. The terrestrial reserves Doodori and Boni were declared a UNESCO Biosphere Reserve in 1980 (Church and Palin 2003). Kiunga Marine National Reserve (KMNR), gazetted in 1979 under

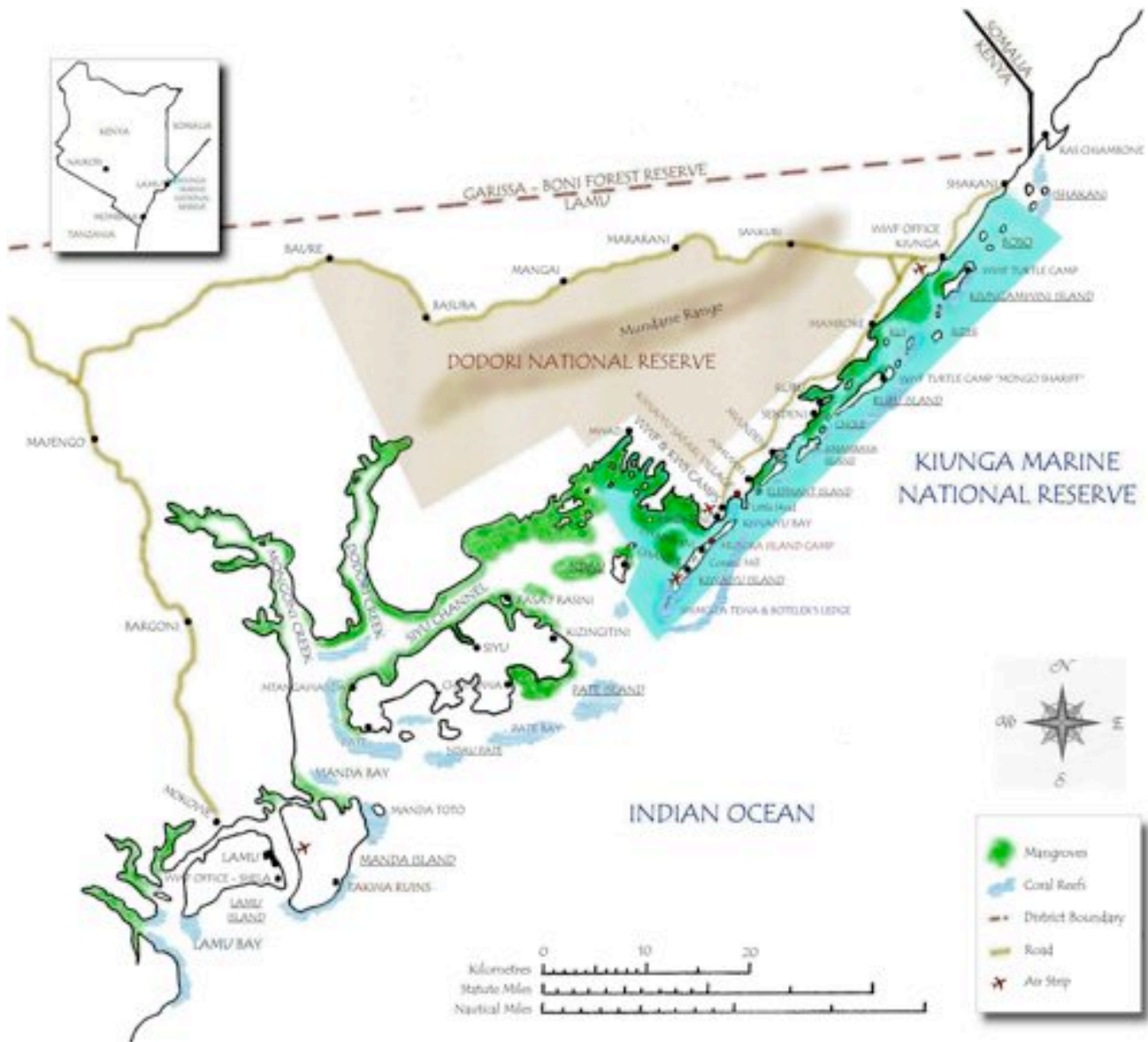


Figure 1. The Kiunga area (Source: WWF East Africa Regional Programme Office).

the Wildlife Conservation and Management act (1976) comprises a primary fishing ground for communities living in the area and from as far south as Lamu.

The location of KMNR at the convergence of the nutrient rich and cool Somali counter current and the East African Coastal Current makes the area highly productive. Patch reefs, seagrass beds, and extensive mangrove forest together combine to form interdependent bio-complex ecosystems that support high densities of marine fauna. The coral reefs of the KMNR and the Bajun Archipelago are, unlike the continuous fringing reef of southern Kenya or the extensive reef systems of Tanzania and northern Mozambique, marginal and not well formed due to the influence of upwelling (Church and Obura 2004). Nevertheless, at least in the past they have supported high densities of large predatory reef fishes, crustaceans such as lobster, and sharks (Samoilys 1988; Fielding and Everett 2000; Obura 2000; WWF 2001). Undisturbed sand dunes and beaches provide good habitat for turtle breeding, while some marine mammals such as dolphins, whales and dugongs reside in the waters for breeding and feeding (Church and Obura 2005). Mangroves provide habitat for the mangrove crab and birds, and a breeding ground for some fish species and crustaceans. These resources, specifically fishes, crustaceans and other invertebrates, are important for the artisanal, subsistence and semi-commercial fisheries within and around KMNR (Olendo and Weru 2006).

The coastal people of Kiunga, consisting of predominantly the Boni and the Bajun, are among the most remote and marginalised communities on Kenya's coast. The primary livelihoods of the Bajun are fishing and harvesting of marine resources, as well as household level farming. The Boni people, traditionally hunter-gatherers, are dependent on the reserves in the area for hunting and fishing as well as mangrove cutting, although their economy now relies more heavily on small scale farming and honey harvesting (Church and Obura 2004; Church and Palin 2003). Other income generating activities in the region include mat weaving, lime making, coral block cutting for construction and shell collection (Gubelman and Kavu 1996). The estimated population of Bajun and Boni people is now over 30000 and 4000 respectively (Weru in prep.).

1.2 Marine conservation, resource management and community development

Factors that restrict community development and contribute to unsustainable resource use cited include inadequate fresh water supply, insecurity, in large part due to the proximity to Somalia, poor infrastructure, lack of employment, and lack of incentives for sustainable utilisation of natural resources (Gubelman and Kavu 1996). Threats to marine resources include overfishing, exploitation of endangered species such as the critically endangered turtle and dugongs, global warming, and the El Niño phenomenon (Mwaluma 2003). The state of the world report by MacDonald and Nierenberg (2003) cited Kiunga as an example of the ways in which people are transforming Earth's natural systems by intensifying their use of resources in an effort to meet their needs.

Management of the Reserves in the area is the responsibility of Kenya Wildlife Service (KWS), a parastatal organization, with technical assistance provided by WWF. District level authorities in the area include the Fisheries and Forestry departments. Several non-governmental institutions operate in the area in collaboration with the national institutions, such as the Coastal Ocean Research and Development in the Indian Ocean (CORDIO) programme, and recently (2004) a community-based organisation, the Kibodo Trust, was established.

Despite the number of institutions and programmes in Kiunga region, having run separately or in collaboration for over 10 years, the socio-economic status of the local people has apparently not improved significantly, and may even be declining (pers.obs., Weru pers. comm.). Fisheries remain unsustainable (Olendo and Weru 2006). WWF (2001) identified issues such as inadequate capacity to enforce rules and regulations, lack of development policies in conservation objectives, lack of institutional coordination, conflicting interest and market failures as contributing to difficulties in managing marine resources. In addition, access rights to coastal land and sea as well as conflict between users, notably private tourism operators, government and local communities, is said to have become an issue (pers.obs.). Population growth and rising local and international demand for marine and terrestrial products, combined with decreasing stocks elsewhere in Kenya, are together taking their toll on the unique resources in KMNR that have supported local communities for centuries, putting a time limit on their traditional ways of life (Weru in prep.).

1.3 Study objectives

This study set out to examine resource use and development issues in Kiunga, in order to understand what constrains sustainable development in the area. The study asked local communities for their perceptions on these issues to provide a first hand community view on the importance of marine resources in their lives, what they perceive the problems are, and how they would like to engage in addressing them. Existing information on the link between coastal peoples' livelihoods and marine resource management was compiled, with a particular focus on fisheries, and past work on livelihood enhancement and associated capacity building, empowerment and participatory approaches to marine resource management in the area was analysed.

Special attention was paid to the semi-commercial invertebrate fisheries associated with this area, particularly lobster and crab, as well as shark, mollusc and sea cucumber fisheries. Attention was also paid to the level and extent of involvement of the local community in the management of their marine resources and whether there are any user conflicts, particularly in relation to marine resource access.

2. Methods

The study was conducted in February 2008 covering seven coastal villages: Mkokoni, Mvundeni, Rubu, Kiunga and Ishakani on the mainland, and Kiwayu cha ndani and Kiwayu cha nje villages on Kiwayu Island. Mwambore village on the mainland has been completely abandoned due to banditry attacks in the 1970s. Residents sought refuge in Kiunga village and have never returned to Mwambore. The isolated and sparsely populated Ishakani, Rubu and Mvundeni villages were also abandoned following similar attacks but villagers have slowly returned since the early 1990s following improvement in security.

The study employed three methods: i) a literature review of recent publications and reports; ii) meetings with managers and key government officials, including village heads, KWS, Fisheries Department, WWF, and a tourism operator (Appendix 1); and iii) a mix of focus group discussions and individual key informant interviews with 5-6 people in each village in KMNR (Appendix 2) using a semi-structured interview with set questions. These group and individual discussions are hereafter referred to as focus group discussions (FGDs). Focus groups were divided into two: i) village community based organization (CBO) representatives and village chiefs/headmen; and ii) fishers, representing five fishery types of concern, namely lobster, shark, mangrove crab, sea cucumber and cowrie shells.

Photo: Kiunga village meeting.



The literature search and analysis and the general discussions with key managers and government officials were primarily designed to answer the following three questions:

1. What is the level of dependence of local communities on marine resources?
2. What are the benefits to local communities from conservation and management initiatives?
3. What are the key issues/problems associated with fisheries in the area?

Village focus groups comprised representatives from the fishery types being investigated as well as those engaged in conservation and management activities, brought together with facilitation from Kibodo Trust village representatives in each village. The following questions were put to the focus groups:

1. What is the current status of each fishery?
2. What is the perceived level of exploitation comparing with the past?
3. How much does a fisherman catch and earn each fishing day? How does this compare with the past?
4. Have catches increased or decreased? Why?
5. Do the earnings provide an adequate income?
6. Where are the markets for each type of fishery?
7. How are the prices dictated?
8. What can be done to improve the fishery?
9. Are you involved in the management/co-management of the fishery and/or other natural resources? What co-management activities exist in the area?
10. What benefits do you get from conservation?
11. How is the community involved in tourism?

Analyses of the information gleaned comprised assessing changes in livelihood patterns by examining changes in catch rates and market prices for the important fishery types, and making comparisons across villages in terms of community responses to questions posed. Trends in fish catch based on reports from fishers as well as published information were also analysed using Statistica 6.0 software. Both survey and analysis were framed in view of outputs and recommendations from the national coastal community lessons learning workshop held in Kilifi in December 2007 (Becha 2008, see section 3.5 below).

3. Results and Discussion

In this section we present aspects of the state of the marine resources and the natural environment of KMNR and the socio-economic status of the local people and their livelihoods, and assess how they are linked within the context of three management and development approaches employed in Kiunga: 1. Conservation and resource management programmes (e.g. protection of resources, fisheries management); 2. Co-management (e.g. participatory approaches, community empowerment and related capacity building); and 3. Alternative Income Generating activities (AIGs).

Section 3.1 contains an assessment of the state of the key fisheries based on information obtained from fisher interviews and the literature. In section 3.2 we present and discuss conservation and management programmes. While not strictly a conservation or management programme, we include here a brief synthesis of the tourism operators in Kiunga Marine National Reserve because their objectives are in line with conservation and management, and they have socio-economic impacts on local communities. This is followed by information obtained on co-management approaches in section 3.3. In section 3.4 we present information on AIGs. Section 3.5 summarises the key recommendations from the national coastal communities lessons learning workshop held in Kilifi in December 2007 (see Becha 2008).

3.1 Fisheries

Fishing by local communities in the area is subsistence, artisanal and semi-commercial, employing simple vessels and gears, and fishing within mangroves and lagoons as well as the open sea, though not usually beyond the fore-reef. Non-powered canoes, wind propelled dhows and traditional gears are in common use as the acquisition of motorised vessels and modern gear is difficult for most fishers for financial reasons. In one village, Mvundeni, all fishing is done on foot and there are no fishing vessels, thereby restricting fishing time and fishing in deeper waters.

The artisanal/subsistence fishery depends entirely on coral reef fishes such as parrot fishes, wrasses, emperors, snappers, and in some instances pelagic fish including kingfish, dorado, tunas etc. Sharks and invertebrates (lobster, crabs, sea cucumbers) form semi-commercial fisheries and are unique to this area, compared to southern Kenya where these fisheries are less developed (in some instances depleted) and fin-fish are the major part of the coastal fisheries. Despite their importance in the area, shark and invertebrate fisheries are not well documented, except for lobster, which has received reasonable attention due to its high value.

Generally it was found that majority of the population was dependent almost entirely on fishing, with 100% of the adult population dependent on fishing in Ishakani and Rubu villages (Table 1). These are among the smallest villages in the Kiunga area, with less than 50 inhabitants each. The largest village, Kiunga/Mwambore has a total population of 2,800.

Fishers are neither fully involved in fishing throughout the year, nor are they, with some exceptions, highly specialised. During the low fishing season (the rough southeast monsoon during April-August) the majority are engaged in small-scale farming. The rest of the year is spent fishing, and depending on the ability and interest of the fisher many species can be targeted using different gears. However, high specialisation was found in shell collection, which is predominantly practiced by women. Sea cucumber collection, shark and crab fishing were also found to be more specialised than lobster fishing.

The communities in the area expressed strong concern over large commercial offshore fishing vessels operating near to shore, with e.g. purse seiners reported to damage the benthic substrate, including corals, while catching fish as well as sea turtles. Dead turtles frequently wash up on the beaches. According to people interviewed the vessels come close to shore at night and attract fish using bright lights, which may also pose high risk to turtle hatchlings by disorienting them.

These fleets consist of long liners, purse seiners and trollers (District Fisheries Department, Lamu), mostly foreign vessels licensed to fish in Kenya's Exclusive Economic Zone (EEZ), although some are illegally operating without licenses, as occurs in much of Somalia's EEZ (Samoilys et al 2007a). Such commercial vessels are not allowed

Table 1. Numbers of fishers in the Kiunga area, based on village level focus group discussions, February 2008.

Village	Total pop.	Adult pop.	No. of fishers
Mkokoni	1200		100
Kiwayu cha ndani	150		15
Kiwayu cha nje	500	280	
Kiunga and Mwambore	2800		300
Ishakani	15	10	10
Rubu	40	30	30
Mvundeni	25		10

to fish within Kenya's 12nm territorial waters, but this is not enforced due to inadequate resources in the Fisheries Department, which has few effective patrol vessels, although the department claims to closely monitor the situation in collaboration with the Navy. Local communities report that vessels are still frequently present, and complain that action is rarely taken by the authorities in response to their reports. It is however also said that the American Navy have been stationed in the Kiunga area over the last 1-2 years and this has been every effective at deterring the large commercial fishing vessels.

Focus group discussion findings for each of the key fisheries addressed in this study are presented in the following sections.

The information is also summarised by fishery type and village in Tables 2 and 3. Distinct differences between villages were few but are noted.

3.1.1 Sea cucumber collection

Sea cucumber (beche de mer) trade in Kenya can be traced back to 1900 through fragmented records (Muthiga et al. 2007). Within less than a quarter of a century, there was already concern for over-fishing, and the sea cucumber fishery in Kenya is now considered under threat of over-exploitation (Muthiga and Ndirangu 2000). Sea cucumber harvesting is regulated by the Department of Fisheries and a special license is required. Collection of undersize beche de mer is prohibited under the Fisheries Act (Government of Kenya 1991), though "undersize" is not defined. Collection within marine National Parks is not allowed under the Wildlife Act (Government of Kenya 1976).

Collection is optimised at night as during the day sea cucumbers seek refuge mainly in channels, tidal pools and beneath sea grasses to avoid desiccation. Fishermen in KMNR reported current catches of between 7 and 25 pieces/fisher/day (Table 2). Muthiga and Ndirangu (2000) reported 12 to 30 pieces/fisher/day in Gazi, southern Kenya. Prices depend on the grade (species and length). According to collectors from Rubu, in the last seven years there has been an increase in price of 17 % per kilo of 1st grade sea cucumbers, while catch rates have decreased by 67%. Change in sand dynamics in the channels was cited as one of the reasons leading to decline in catches, while it was generally consented that the number of collectors has increased.

3.1.2 Shark fishery

Shark fishing through set gill nets (jarife) has been in practice for many decades. Shark catch rates have declined dramatically over the last 40 years, in the order of 85% (Table 2, Figure 2), but prices have not increased significantly, except for shark fin (Table 4).

The trade in shark fins dates back to the 1960s, or even earlier according to some fishermen interviewed. Shark fins, used in shark fin soup, are considered a delicacy in Asia, and this market has escalated in recent years. A saleable amount of shark fin, c.10kg dry weight, may take a fisher up to a year to accumulate, as it

Table 2. Fishers' perceptions of fisheries in the Kiunga area, from village focus group discussions, February 2008. Changes in catch per unit effort. A fishing event is the time a fisher goes out fishing, from departure to return to the landing site (it may exceed one day depending on the soak time of the gear, e.g. nets). Catch rates are provided from the past (years variable, as indicated) and present (2008), as reported by fishermen. Not all fisheries were represented in each village.

	Mkokoni	Kiwayu cha ndani	Mvundeni	Rubu	Mwambore/Kiunga	Ishakani
Lobster						
Past	10-15 (1998)	20-25 (2000)	3-5 (2003)	20-30 (1998)	5-20 (1995)	
Present	0.5-5 (2008)	2-3 (2008)	1-3 (2008)	0-8 (2008)	0-10 (2008)	
Shark						
Past			10-12 (2001)	10 (1980s)	20-40 (1970s)	10 (1950s)
Present			2-3 (2008)	0-2 (2008)	1-2 (2008)	1-2 (2008)
Crab						
Past		10 (1990s)	15-20 (1980s)			
Present		2-5 (2008)	0-10 (2008)			
Sea cucumber						
Past			6-17 (2004)	25-40 (2001)		
Present			7-11 (2008)	11-25 (2008)		
Cowrie shells						
Past			20-30 (1998)		200-300 (1980s)	200 (1970s)
Present			0-10 (2008)		50-100 (2008)	20 (2008)

Table 3. Fishers' perceptions of fisheries in the Kiunga area, from village focus group discussions.

Village	Mkokoni	Kiwayu cha ndani	Mvundeni	Rubu	Mwambore/ Kiunga	Ishakani
<i>Economic sustainability of fisheries</i>						
Lobster	not sustainable		a few months in a year	a few months in a year	a few months in a year	not always sustainable
Shark			not always sustainable	not sustainable	not sustainable	not sustainable
Crab		not sustainable				
Sea cucumber			not always sustainable	not always sustainable		
Cowries			not sustainable		not sustainable	not sustainable
<i>Perceived reasons for catch decline</i>						
Lobster	Tsunami		increased no. of lobster fishermen	increased no. of lobster fishermen; change in weather conditions	el Niño; tsunami; red tide; dumping*; foreign fishing vessels	el Niño; tsunami; red tide; dumping*; foreign fishing vessels; SCUBA fishers from Somalia
Shark		el Niño; red tide; foreign fishing vessels	foreign fishing vessels	el Niño; tsunami; red tide; foreign fishing vessels; fishermen from Kizingitini	el Niño; tsunami; red tide; dumping*; oil exploration	el Niño; tsunami; red tide; dumping*; oil exploration
Crab			too many crab fishermen			
Sea cucumber			increase in sand cover	increase in sand cover		
Cowries			changes in sand dynamics		sea urchin infestation; increased no. of collectors	increased sea urchin infestation
<i>Proposed solutions/responses to declining catches</i>						
Lobster	AIGs; closed areas or seasons; enforce legislation		provide fishing gear; improve transport	improve market chain, transport and communication	eliminate SCUBA fishers from Somalia; lobster aggregating devices; AIGs	provide fishing gear
Shark		provide fishing gear	provide fishing gear; AIGs		provide offshore fishing vessels	provide fishing gear, offshore vessels
Crab			coordinate fishers; rotational closures			
Sea cucumber			AIGs			
Cowries			provide market		provide market	provide market

Table 4. Price comparisons for the major fishery types in the Kiunga area in the last decade (in KES per kg, except for sea cucumber and cowries, in KES per piece).

Fishery	1998	2008
Lobster	300	700
Shark	100	120
Shark fin*	200	4,700
Mixed fish	5	40
Crab	-	250
Sea cucumber	-	2,500
Tiger cowries	0.7	1

requires fins from around 150 sharks. However, shark fins can fetch a high price depending on the grade, and ten kilogrammes of high-grade fins is worth at least KES 35,000 (approx. USD 555, Table 4). It should be noted that sharks landed are used fully, with e.g. liver oils applied to treat wooden boats and the meat often salted and dried, and shark is not fished purely for the fins.

3.1.3 Cowrie and shell collection

Cowries have been used for various reasons for millennia, including as currency as well as for decoration. A marine shell discovered in Tsavo National Park in 2003 was dated to between 1305 and 1425 years BP, concurring with the period of early development of Swahili civilisation in the Indian Ocean (Akuma 2003; Chapurukha 1999). Today, cowries are used primarily for decoration in homes, public places and for jewellery.

The collection of cowrie and other mollusc shells is an important income generating activity in Kiunga, especially for women (IUCN 2004), but e.g. lobster fishers may also collect cowries while searching for lobster. Small cowries (*Cypraea annulus*) are threaded on string as necklaces while individual tiger cowries (*Cypraea tigris*) are sold directly to dealers or tourists.

No specific license is required for shell collection, and there are no restrictions on national trade. However trade in some molluscs is banned or regulated by international law, especially the endangered giant triton, and there has been significant awareness campaigns over the last 30 years to reduce the trade. Some tourist companies have launched environmental programmes to discourage tourists from buying shells and shell products to promote responsible tourism.

In previous years when there was an open international trade in shells and stocks were abundant, collectors made a living out of it. In the last half century, a collector could collect 200 shells in a day worth c. KES 200,

Photo: Jarife fisherman and shark fins at Ishakani village.



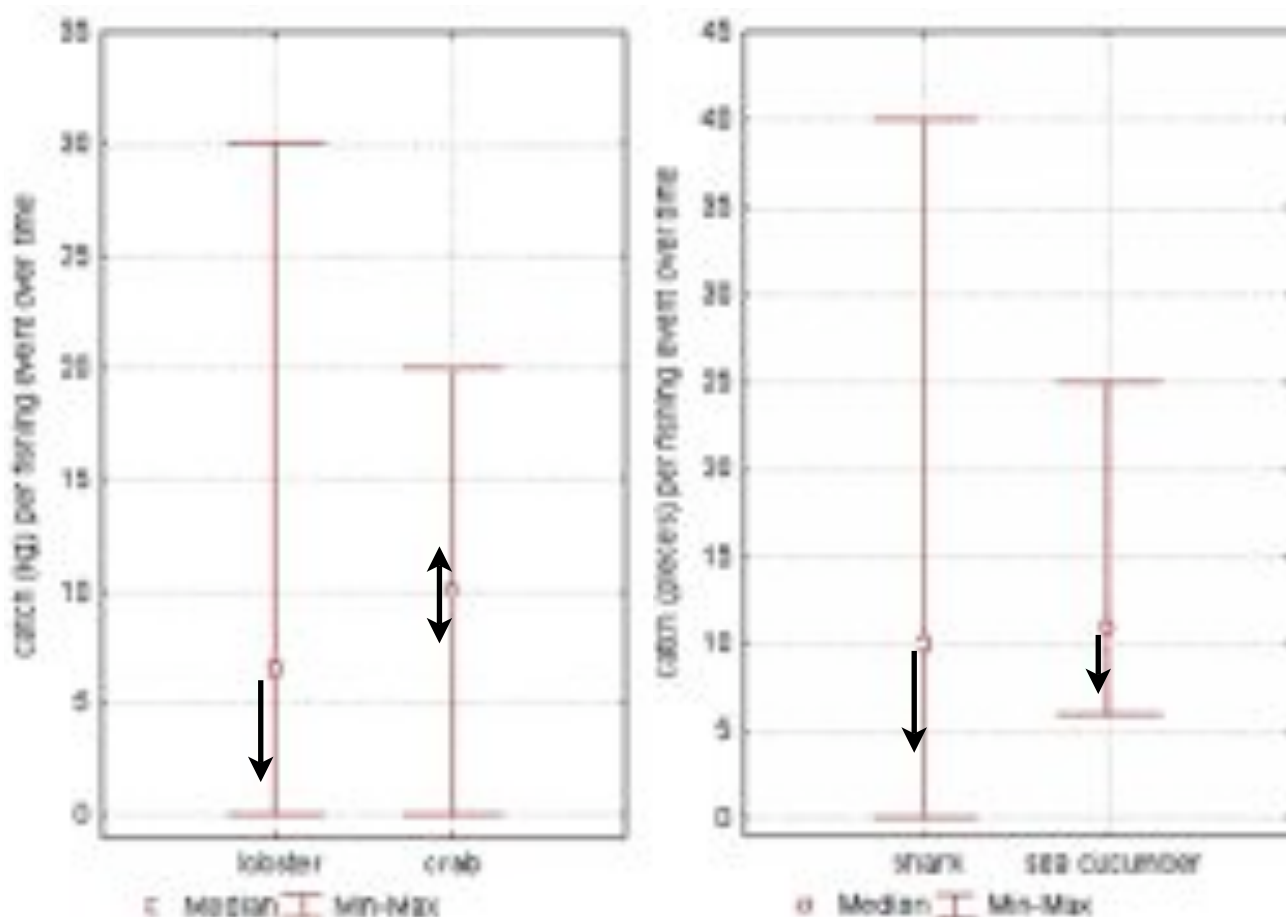


Figure 2. Range in catch per fisherman per fishing event and trend over time (indicated by arrows), for lobster (over the past 13 yrs), crab (28 yrs), and shark (68 yrs) in kg, and number of sea cucumbers (7 yrs), based on values given by fishers in focus group discussions, February 2008. The box and whisker plot illustrates the range in catch rates given for the entire period between 1960 and 2008, and the median catch. The position of the median value relative to the reported present catch rates, represented by low catches, was used as an indicator of the direction of shift in catch rate over time. Thus a median value closer to the present catch rates implies a shift from high to low catch rates. Catch rates appear to be declining, as indicated by the arrows, except for crab where data were not adequate to reveal trends. Note that fishermen may experience zero catches, except with sea cucumber.

compared to the current normal daily collection of 30 shells worth only KES 30. In 1993, 70.7 metric tons of cowrie shells were collected in Kiunga, worth only KES 85,820 (Gubelman and Kavuu 1996).

Prices of tiger cowries in KMNR have remained roughly the same over the last 15 years (Table 4). Similarly, the price of cowrie chains has not changed significantly, although this could have been expected in view of the reduction in numbers collected and in view of inflation. Additionally, due to lack of an established marketing strategy, there are few buyers and they often fail to turn up for as long as a month. This suggests that shell collection trade is the economically least viable livelihood in the fishery sector within the Kiunga area.

3.1.4 Lobster fishery

The Kiunga area is renowned for its lobster, but the fishery is generally perceived to be over-exploited. A study conducted by the Oceanographic Research Institute (ORI) in 1999 in KMNR stated that the fishery was probably fully exploited, with mean densities of lobster similar to those of other exploited tropical lobster fisheries around the world (Fielding and Everett 2000). Catch per unit effort measured during that study (1999) was on average 0.5 kg per fisher per day, which is similar to the catches reported today (Table

2), but significantly lower than catches 10 years ago as reported by fishers in focus group discussions (up to 30kg per fisher per day, 1995/8, Table 2). Information obtained in this study suggests a decline of c 50% in catch rates in the last 13 years, depending on the season (Figure 2, Table 2), and coupled with the findings of Fielding and Everett (2000) is cause for concern.

Although a special license is required for lobster fishing, and the taking of berried (females with eggs) and undersized (<0.25kg) lobsters is banned, adequate protection is lacking, mainly due to lack of reliable monitoring data, lack of compliance by the lobster fishers and inadequate enforcement. While fishermen recognise the need to protect berried females and young lobsters, irresponsible fishermen continue to catch them, undermining the fishery.

In the last 10 years, live lobster prices have increased by c. 70% (Table 4). Frozen lobster prices ten years ago were even lower at 10% of current live prices. Increased demand has led to the entry of more dealers in live lobster onto the market and, together with a decrease in stocks, contributed to the price increase. Dealers in live lobster, reported to operate from Malindi, dictate the prices at which fishers sell their catch. They often visit landing sites for two to four weeks, gathering lobsters in cages, grading them and ferrying them to distribution centres in either Malindi or Lamu.

There is no doubt that the earnings of lobster fishers in the Kiunga area have generally decreased in spite of price increases, while effort in terms of fisher number and time spent fishing has increased. While some fishers concede that the perceived decrease in catch rates is at least in part due to an increased fishing effort, most associated it with the following:

- 1998 El Niño phenomenon that resulted in coral bleaching and mass mortality, affecting lobster population dynamics;
- 2004 tsunami that destroyed both lobster habitats and breeding grounds, and led to increased turbidity;
- General change in the state of the ocean, perhaps global warming;
- Poachers from neighboring Somalia collecting lobster illegally using SCUBA;
- Coral disturbance following incursion into the fore reef by foreign commercial fishing vessels; and
- Recent oil exploration that has disturbed habitats by drilling and noise

Photo: Lobster cage and berried female at Mkokoni village.



3.1.5 Mangrove crab fishery

Mangrove crab fishing is an important livelihood along the Kenyan coast, especially in Kiunga where the highest density of mangroves is found. However, data on the fishery is scarce. The crab market is not well established compared to that of lobsters, and fishers sell their catch mainly to nearby tourist resorts as buyers from Lamu are unreliable and transport is difficult.

Fishermen reported decreased catch rates of around 50% over the last 20 years (Table 2, Figure 2), with a price increase of 86%. However, prices have remained almost unchanged in the last two years, while catch rates have continued to decline. Fishers cited having to travel longer distances to find crabs as an example. Consequently, in the last 10 years, earnings have dropped by half (from KES 1000 to KES 500 per day) and zero catches are now common (Table 2, 3 and 4).

Focus group discussions largely attributed this decline to increased numbers of fishers (Table 2), but also mismanagement. Crab fishing requires a special license from the Fisheries Department, and fishing of <0.5kg and berried crabs is not allowed. Unfortunately, adequate monitoring and documentation is lacking. Those interviewed seemed to be aware of these regulations, even the ones operating without a license. In view of the high number of crab fishers in KMNR, fishers suggested a closed rotational system of management. This would require strong cooperation among fishers, which would in turn require strong coordination by the Fisheries Department and Kenya Wildlife Service.

3.1.6 Summary findings from fisher interviews

Both catch rates and income from the targeted resources of lobsters, sharks, crabs and shells were reported to be on the decrease. In the case of sea cucumbers an increased price compensates somewhat for reduced catch rates, making it an economically viable fishery, although not throughout the year. Consequently sea cucumbers are collected in most villages. A dramatic increase in lobster prices in the last five years has been accompanied by increased fishing effort and reduced catch rates, and the fishery now seems over-exploited. Shell collection, once an important income earner especially for women, is now the least viable livelihood option in the fishery sector in the Kiunga area.

Fishers reported varied reasons for the dwindling stocks for each of the fisheries, the primary ones being increased fishing effort (fisher and vessel numbers), degradation related to the 1998 El Niño phenomenon, a red tide in 2003 and the 2004 tsunami, as well as increasingly rough sea conditions.

Fishers perceived fishery declines were largely beyond their control and they would prefer to either venture further out to sea to target different fishery resources, or shift to other income generating ventures. There were some calls for improved management, particularly enforcement of Fisheries Regulations by the Fisheries Department, but on the whole this was not a major recommendation, and due to declining earnings, fishers called for intervention in alternative livelihood activities. This suggests fishers in KMNR do not perceive KWS and Fisheries Department interventions as a crucial way of ensuring their fisheries are managed sustainably.

Notably, fishers in the KMNR did not report conflict over resource use. They did state that fishers from further south, particularly Kizingitini on Pate Island, were the main reason for the increase in fishing pressure in KMNR in the last decade. However, they did not imply that these fishers had no right to fish in the KMNR. In fact, fishers from the whole Lamu archipelago have traditionally fished in the KMNR for centuries (Ali Mwachui, pers. comm.), and Kizingitini is renowned as a large centre of fishers in the region.

3.2 Conservation and management programmes

WWF's KMNR Conservation and Development Project is the largest programme in the area, having been active in Kiunga since 1995 through a wide range of marine conservation initiatives. The project focuses on

“establishing institutional and regulatory frameworks for effective management of KMNR, strengthening management operations, collecting and analysing information on ecological, economic and social trends to inform management, ensuring all community stakeholders fully participate in conserving marine resources, and facilitating government agencies to support communities’ sustainable use of KMNR resources as well as exploring livelihood improvement options” (Weru 2007).

On-going initiatives that impact on marine resources in Kiunga, mainly focusing on conservation, research, health, capacity building, education and general community development are presented below. Their role and impact on local communities is also discussed.

3.2.1 Education and awareness

The education and awareness programme of WWF covers environment and conservation, in partnership with CORDIO, Wildlife Clubs of Kenya, Watamu Turtle Watch, Ministry of Education and KWS. Students, pupils and the local community have been involved in various environmental awareness and education activities. Nine environmental clubs have been established in schools around KNMR that deal with, among other things, tree planting and waste management (Adam 2007). In 2006 WWF supported the participation of ten students in a two week eco-holiday activity training programme, which included turtle nest monitoring and patrols, underwater surveys, mangrove identification, ecosystem walks and beach clean ups (Adam 2007). During the same year, teachers from Kiunga region were involved in a provincial coastal training programme facilitated by CORDIO where teachers were trained in environmental education and teaching methodologies. In 2007, 23 students benefited from a 50% fee subsidy by WWF’s scholarship programme that targets the top two students from each village. WWF also assisted in printing and distribution of education material to over 1,534 students within the KNMR (Weru 2007). The community continues to benefit through training on natural resource management, delivered as a package that includes health and other issues of concern.

Despite considerable support to education, especially among the youth, it is still not clear to the community who is the beneficiary (Max 2002). There was no doubt that some village members interviewed during the current study fully appreciated the school education support by WWF, yet others did not cite them at all. Max (2002) further pointed out that fishers’ perceptions of the WWF initiatives in general are not well documented and need further review. Assessing the impacts of education programmes associated with environmental conservation, and inputs to school curricula is not easy (Mzava et al 2007) and requires standardised monitoring to assess change in peoples’ behaviour in the long term, which is often beyond the scope of conservation programmes.

Photo: Ishakani village near the Somali border.



3.2.2 Sea turtle conservation initiative

The sea turtle conservation programme was initiated in February 1997 by WWF involving local communities, visitors, government departments and international institutions, following continued extraction of turtles by the local communities (Church and Palin 2003). The programme is a member of the Kenya Sea Turtle Conservation Committee (KESCOM) and its focus is on conservation of the critically endangered turtles and community education. A carefully selected youth team is responsible for monitoring and patrols. However, the initiative is faced with many challenges such as inadequate funding and lack of an enabling institutional and policy framework for youth patrols and monitoring.

Turtle protection was first encouraged through compensatory fees. Initially, a fee of KES 500 was given for sighting a nesting turtle, and KES 20 for nursing the eggs and hatchlings. WWF sent field patrols to verify the reports before paying the fees. The intention was that once community support for turtle protection was well established the fees would be gradually reduced and then removed. By 2004 fees had been reduced to KES 200 and KES 5 respectively, a move some villagers are not happy about. However, incentive payments are planned to be withdrawn completely through a community youth turtle ecotourism initiative implemented jointly by WWF and KWS.

The sustainability of compensatory conservation initiatives is always problematic, though may be the only solution to start with in such impoverished communities, and when linked to other income generating initiatives as in this case, can be very successful. WWF cite an increase in the number of brooding turtle sightings reported by the villagers in the year 2007. Many of the interviewed villagers expressed commitment to turtle conservation even if no compensation is available. One fisherman mentioned that turtle trapping for consumption no longer takes place, and when asked for his priority recommendation he requested a clean marine environment to avoid turtles eating plastic rubbish. Several villagers expressed concern over the by-catch of turtles by offshore foreign fishing vessels (purse seiners), stating that their turtle conservation efforts were being undone and the Fisheries Department were not acting to keep these vessels out of Kenya's territorial waters.

3.2.3 Coral reef, fish, lobster and invertebrate monitoring programme

Following mass bleaching of coral reefs in the Indian Ocean in 1998, a collaborative environmental and resource status monitoring project was initiated in KMNR in 1999 by WWF, KWS and CORDIO (Church and Obura 2004). WWF also commissioned ORI of South Africa to assess lobster populations, fishery status and to train a local team to monitor the fishery. Indicators were agreed and monitoring is still ongoing, carried out by scientific staff, project and government officers and fishers, in collaboration with the Department of Fisheries.

Community involvement in research activities by WWF, CORDIO and KWS has on the whole been limited because of the scientific nature of the work, and because much of the survey work is conducted on SCUBA, both of which require significant training. However, several fishers have remained involved in the programme since the inception. Some fishers mentioned one of the key lessons from their participation in the coral reef monitoring programme was learning about coral cover changes and the broader implications of coral bleaching.

Despite this long term research programme and the information it provides, effective management of marine resources in the KMNR is hampered by a lack of clearly defined reserve regulations and limited management activity on the ground (Church and Obura 2004).

3.2.4 Gear exchange programme

A fishing gear exchange programme was initiated in 2003 by WWF, in collaboration with the Fisheries Department and with funding through the Vodaphone Group Foundation. Fishermen were given gill nets (jarife) on loan after surrendering illegal gears, primarily beach seines (juya) and mosquito nets (Weru 2007, Weru pers. comm.). The programme focussed mainly on communities south of the Reserve in Kizingitini,

Faza and Pate, because most fishers using illegal gears are from these islands. About 290 fishermen benefited from the programme.

However, there have been several challenges. Fishermen report illegal gears are still being used and several have not paid back their loans received in association with gear exchanges. In addition, complaints were heard from some villages, especially Kiunga/Mwambore and Kiwayu cha nje about being excluded or given the wrong gears. These results are not surprising considering gear exchange programmes are invariably fraught with problems and difficult to manage, their impact is difficult to measure, and they are rarely successful as a fisheries management initiative (Samoilys et al 2007b).

3.2.5 Kibodo Trust

Kibodo Trust was established in 2004 and seeks to help conserve the Kiunga Marine National Reserve, Boni Forest Reserve and Dodori National Reserve, while improving the standard of living of the people in the area. Activities focus on capacity building and initiation of alternative livelihoods strategies for the Boni and Bajuni communities currently dependent on natural resources. Kibodo has the potential to fill a vacuum in the area of social, support and advocacy services that will be particularly important as the area opens up to development.

The Trust works in collaboration with KWS, CORDIO and WWF and has recently run village elections to appoint community representatives throughout the region. Kibodo is now installing a radio transmitter for use within the region, in response to poor communication infrastructure. Villagers are expecting to use the facility to enhance marketing of their products, among other benefits.

3.2.6 Private tourism operators

There are two main resorts in KMNR, Kiwayu Safari Village (KSV) near Mkokoni and Munira on Kiwayu Island. KSV was established in 1974 and has a bed capacity of 60 beds, Munira in 1992 with a bed capacity of 25. There are no other substantial tourist lodges in the region, though there is a small lodge in Kiwayu village (3-4 bed capacity) and a small eco-lodge in Mkokoni village (8 beds) owned and run by one of the villagers.

The resorts provide casual employment to local people, a market for lobsters, crabs and fish, and also emergency transport and health service, especially during illness and rescue operations of capsized or distressed boats. Munira has assisted in classroom construction in Kiwayu cha ndani village, where only lower primary school education is available. Plans are underway to construct a water-harvesting tank (jabia) in the village.

Public relations of the tourist operators are not always good, and years of antagonism between KSV and Mkokoni villagers was reported, though it was stated that this has now disappeared under the new management of the lodge. Kiwayu cha ndani villagers indicated that they wanted more benefits, especially in securing jobs, pointing out that all the skilled jobs went to outsiders who then rented houses in their village. They did however recognise that their inadequate education and skills for hotel work was an issue. Notably, none of the villagers interviewed in Kiwayu cha ndani mentioned Munira's contribution to building the classroom or the jabia.

3.2.7 Conclusions on management and conservation programmes

Many villagers, but not all, appreciated the benefits they received from WWF's various community programmes such as improvements in their education and health. There was no mention that WWF's or KWS's conservation and natural resource management programmes have improved the status of the fishery resources, and very few villagers stated that they had benefited from the presence of WWF and KWS in terms of improvements in their fisheries, even though these are their primary source of income. The only stakeholder who clearly stated a benefit in this regard was the tourism operator at Munira, who said that the presence of KWS had greatly improved the state of the marine resources and this was of great benefit to

Table 5. Village perceptions of comanagement.

	Mkokoni	Kiwayu cha ndani	Kiwayu cha nje	Mvundeni	Rubu	Mwambore/Kiunga	Ishakani
Co-management activity	WWF turtle conservation KWS tour to Malindi and Shimoni	WWF turtle conservation	WWF turtle conservation	WWF turtle conservation	WWF turtle conservation	KWS tour to Malindi and Shimoni	no active involvement
Benefits from conservation initiatives	cleaner beach	no benefits	WWF school fee subsidy program	cleaner beach	cleaner beach	no tangible benefits	no benefits
Community involvement in tourism	20 casual workers at tourist lodge	one person involved in tour guiding at tourist lodge	14 casual workers at two tourist lodges; tour guiding during peak season	no tourist activity	no tourist activity	occasional tourist visits	no tourist activity

tourism. This finding indicates that local communities appear to view conservation efforts as somewhat separate to their primary livelihoods of fisheries and not directly benefiting them, except through side programmes such as education and health. Direct benefits to the community from the participatory environmental and resource monitoring programmes were considered minimal, though there was a perception that the work was important for the management of the area.

Community support for turtle conservation was very high, even without incentives, indicating the programme has been very successful as a conservation measure, and suggesting villagers do now view turtles an important resource to be protected. This is now being built on further through developing turtle watching eco-tourism. However, this success is likely to be diminished if the by-catch of turtles from offshore foreign fishing vessels is not addressed as a matter of priority by the Fisheries Department, in partnership with KWS.

3.3 Comanagement

Collaborative management in Kiunga region has met with many challenges that still remain today. The key issue is that the communities living within the Reserve are highly dependent on marine resources, yet largely living at or below the poverty line. They therefore see themselves as marginalised by government and without authority, especially since natural resource management in Kenya has a history of top-down approaches. Communities tend therefore to be suspicious of the relatively recent co-management initiatives. No tangible benefits specifically associated with co-management initiatives were reported, and most villagers cited the conservation programmes as the beneficiaries (Table 5, see also section 3.2).

3.3.1 Natural resource management policy

Over the last decade there has been a shift in policy both within government (KWS and Fisheries Department) and within large conservation agencies such as WWF, towards a much more participatory approach to conservation and management. The recent Fisheries legislation on locally established Beach Management Units (Government of Kenya, 2007) is an example of this.

The Environmental Management and Coordination Act (Sec 42, Part v, Government of Kenya 1999), while providing for special guidelines for access to and exploitation of living and non-living resources in the continental shelf, territorial sea and the Exclusive Economic Zone, emphasises that the interests of the people surrounding these resources shall be safeguarded. The draft Wildlife policy (Government of Kenya 2007b), although largely limited to protected areas including no-take zones, recognises the need to establish collaborative management arrangements and joint ventures that enhance local community and private sector involvement in management. Currently there is no policy or concession requiring contribution of any kind from parks and reserves revenue to the neighbourhood.

In response to these shifts in policy KWS has formed a co-management team in KMNR, comprising of three representatives from each village in the Reserve, and representation from WWF, tourism operators and the Kibodo Trust. Team members have been taken for a learning tour to Malindi, Shimoni and Baringo National Parks and Reserves. However, villagers felt it was not clear how the community will benefit from this initiative and lamented that no specific criteria were followed to elect the representatives, insisting prior consultation before further arrangements were put in place.

3.3.2 Beach Management Units

The Beach Management Unit (BMU) concept was borrowed from Lake Victoria fisheries management with the aim of improving fisheries resource management by incorporating the prime stakeholders into a management unit comprising of an assembly, executive committee and a sub-committee (Oluoch 2006). The subsidiary regulations were passed in 2007 after much consultation. The objectives of the BMUs are many, but include effective fisheries management including compliance with regulations, alleviation of poverty, and sustainable development of the fishery sector.

The Fisheries Department oversees the running of the units by approving management plans as a means of broadening stakeholder participation in fisheries management. The Department is also, though with limited financial and technical capacity, providing training to BMU members. Among the stipulated responsibilities of BMUs are resolving user conflicts, field patrols, ensuring a healthy fishing and landing environment, data collection, enumerating by-laws, ensuring safety in the ocean, control of illegal gears and fishing, protection of breeding sites and maintenance of high fish quality standards.

Photo: Focus group discussion.



One of the problems with the BMUs as currently defined in the legislation, reflecting their design for lake fisheries rather than marine fisheries, is that a BMU is meant to be established for each landing station, although there is provision for one BMU to be established for two or more landing sites. This small spatial scale focus at the landing site, which usually equates with a village, is problematic since fishing grounds are open access and fishers from several neighbouring villages may fish the same resources in the same fishing grounds. There is therefore great potential for conflict between different BMUs trying to manage the same area and the same resources. This was clearly illustrated in a long-running fisheries management project in Tanga, Tanzania, which chose to steer away from a village level approach to fisheries management in favor of “Collaborative Management Areas” (CMAs) comprising the “home fishing grounds” shared by a group of fishers (Wells et al 2007, a,b). Already, fishermen around Kiunga Marine National Reserve are under pressure from relatively well-off fishermen from Kizingitini who also fish in the Reserve. It will be essential that BMUs established in the Kiunga area cover several landing sites and involve as members residents from nearby villages who fish in the area covered by the BMU. Another approach might be to establish BMUs by fishery rather than by landing site, but coordination mechanisms between bodies would need to be sound.

The Fisheries Department-led process of establishing BMUs in the Kiunga area has not been smooth. The Department has tried to encourage fisher support through donations of out-board engines, disbursed to Kiunga, Kizingitini, Faza and Lamu with the assumption that fishermen will fit them onto their vessels for use. The Fisheries Department is also calling for assistance from private and non-governmental institutions to help in BMU establishment and management, and WWF has initiated a five-year programme in partnership with the Department.

The focus group discussions revealed that the community still perceives the BMUs as being another arm of government administration, and they are suspicious. Training and further consultation is ongoing to instill a sense of ownership, with the main focus on the formation of by-laws harmonised across different areas to see to common interests and reduce sources of conflict. Other challenges such as sustainability are being looked into. Eventually, when BMUs are fully instituted, management of marine resources is expected to improve significantly.

3.3.3 Land access

Villagers in the KMNR still do not own the land they live on in spite of promises from the government to address this. The government initiated a land programme in the early 1990s to give villagers title deeds, but to date this has not eventuated. There is also a lack of recognition of territorial user rights by the government of Kenya. As much as fishers would want to control resource extraction within their area, fishing is still an open access activity, and considered thus by the government – the well-known “tragedy of the commons”. Thus 'poor' fishers still remain vulnerable to exploitation by the 'richer' ones, and all have little incentive to manage their fishery resources properly. It is hoped that the BMU concept can be adapted to address this significant issue in the artisanal fisheries of Kiunga.

3.4 Alternative Income Generating Activities

In recognition of the increasing human pressure on limited marine resources, some alternative income generating (AIG) activities have been carried out in the Kiunga area, and more are being initiated. For example, in 2007 KWS donated a commuter ferry to Mkokoni Women’s Group to aid its welfare activities. The ferry is now making regular trips from Mkokoni to Lamu, though not daily due to the low number of commuting passengers. However, to date there are few AIGs in the Kiunga area that have made a substantial impact on the village communities.

Projects presently under discussion will venture into eco-tourism, horticulture and mariculture. The senior chief of Mkokoni village has already successfully approached the National Agriculture and Livestock Extension Programme (NALEP), Ministry of Agriculture and Livestock Development, to train people in semi-arid horticulture. Through the chief and other collaborators, a proposal has been submitted to a donor,

which, if successful, will establish agribusiness, and mariculture as well as eco-tourism projects such as prawn and butterfly farms, game drives and mangrove boardwalks. In addition, CORDIO, in partnership with Kibodo Trust is developing a proposal to test the feasibility of aquaculture in the region, and Kibodo Trust has recently started a community development programme.

3.4.1 Eco-Friendly handicraft project

The Eco-friendly handicrafts project was started by WWF in 1997, with funding from the Integrated Conservation and Development Project. The project focuses on gender sensitive conservation; habitat, environmental health and waste management; and fisheries management (Flintan 2002). Flip-flops washed up on beaches are collected by youth and women and transformed into creative artefacts such as key rings, necklaces, bracelets, curtains, cushions and mosaic pictures. Several artists, both women and men, are involved, operating from their homes on Kiwayu Island and in Mkokoni village. Products are sold locally, regionally and internationally, through various channels including private companies (e.g. UniquEco Designs Ltd) and WWF and its partners such as the Kenya Gatsby Trust.

The project is one of the few alternative livelihood projects that appears to be successful from a business perspective, and has genuinely brought additional income to participants, notably women, in two villages. Many of the villagers cited this as a positive introduction from WWF and villages currently not involved expressed a wish to engage. However, some marketing and market access constraints remain.

3.5 National coastal community lessons learning workshop

A national coastal community lessons learning workshop was held in Kilifi, Kenya, between 17 and 19 December 2007 (Becha 2008). The workshop brought together 26 participants from 24 community-based organisations in Kenya, representing a diversity of interests including resource user groups, advocacy and lobby groups, women's groups, conservation and resource management groups as well as alternative livelihood and income generating initiatives.

Photo: Flip-flop handicraft in Kiwayu cha ndani.



The workshop sought to develop a vision and strategies for a sustainable future, by putting forward concrete recommendations on improving marine resource management and enhancing the environmental and financial sustainability of livelihoods. Key recommendations are summarised below (Becha 2008):

1. The government should institute a review of all laws and policies with a bearing on marine and coastal resources in order to harmonise them and minimise contradictions, conflicts and overlapping institutional mandates.
2. Laws and policies should be written and disseminated in Kiswahili, a language a majority of the fisherfolk and local communities can read and comprehend.
3. All encroachment and illegally acquired fish landing sites and public beach land should be repossessed, surveyed, gazetted and placed under the title of the Fisheries Department for public utility.
4. Mechanisms should be established to ensure local communities play a significant role in management of Marine Protected Areas. At the same time the economic benefits of these protected areas should be ploughed back into local communities.
5. Emerging community managed marine areas should be recognised and given appropriate legal mandate.
6. Capacity building in community-based marine tourism via training and skills development should be made available through a government development fund.
7. The community should be actively involved in policy formulation through functional grassroots and national fisherfolk networks like the Kenya Marine Forum.
8. The annual budget allocation for the Ministry of Livestock and Fisheries should be increased and equitably shared between the Livestock and Fisheries sectors.
9. Studies should be commissioned as a matter of priority to demonstrate that good fisheries legislation and management is economically linked to poverty alleviation and improvement in coastal peoples' livelihood.

Only one representative from the Kiunga area (from Kiwayu cha nje) was present throughout the workshop, and therefore some of the issues in that area may have not been captured well in the national workshop. Nevertheless, the issues leading to the nine recommendations above were touched on in the focus group discussions conducted in the Kiunga area, and we conclude that the communities from Kiunga would support these recommendations. Those that were not discussed in any detail and therefore could not be assigned as representative of issues in Kiunga are 1, 7 and 8.

4. Conclusions and Recommendations

Management and conservation interventions by different institutions in KMNR have impacted positively on the lives of the people living in Kiunga, primarily through providing health, education and transport services. However, the socioeconomic status of the people has improved little. The reasons for this are manifold, including the remoteness of the area, very moderate infrastructural development over the past two decades, and the low connectivity with external markets this entails.

With little development in the region the people living in KMNR are still highly dependent on natural resources for their livelihoods, predominantly fishing: 95-100% dependency in terms of income was recorded. However, fisher catch rates and earnings are declining, apparently due to a deteriorating resource status caused by a number of stresses, both local, such as increasing human populations, overfishing and destructive fishing, and external, such as climate change related effects. Existing management initiatives in the area have in spite of many successes failed to turn the negative trend in resource status and income from fisheries. Co-management initiatives are still relatively recent and have yet to reap tangible benefits in terms of improved fisheries management and improved livelihoods.

It is clear that the links between natural resource health and local livelihoods, income and indeed overall quality of life are very direct. However, it is also clear that both the people in the Kiunga area and its

environment, as well as the relationship between them, are highly impacted by processes on national and global levels. This includes e.g. mechanized ships fishing illegally in near shore areas, changes in markets and commodity prices, legal and policy developments, as well as a changing climate. Solutions to the problems facing the people in the Kiunga area thus need to be sought locally as well as nationally and regionally.

Considering the high levels of poverty and dependence on natural resources, alternative income generating activities now need to be vigorously pursued as a development strategy. The area has enormous wealth in terms of eco-tourism as it has very high aesthetic value due to the minimal development and highly diverse ecosystems. Existing tourism ventures are undertaken by private investors who provide casual jobs and other crucial services, but community based eco-tourism has not yet become established. This is an area that requires input and support, including empowering the local population e.g. through addressing land tenure, as well as providing necessary capacity building and access to financing schemes.

The Kiunga region sustains some important and valuable fisheries, notably the lobster and mangrove crab. With strong regulatory control, better participatory management through effective BMUs that target these fisheries and effort reduction, the fisheries could be both sustainable and productive in the long term. This would ensure that fisheries also in the future would constitute an important source of income to the region, and traditional livelihoods would be maintained. Efforts already underway seek to address this, but will require consistent input and facilitation, and must operate in conjunction with e.g. the type of AIG schemes mentioned above.

Lastly, in order to make possible significant gains to the local population while improving environmental sustainability of livelihoods, connectivity between the Kiunga area and outside markets, whether national in the case of much of the marine produce, or international in the case of tourism and handicrafts, must be strengthened. This involves facilitating market access and promoting business linkages, as well as improving communication infrastructure, including telecommunication. The unique natural and cultural characteristics of the area will remain its greatest strength also in a “new” economy, and stand to benefit its people in the long term through higher socioeconomic development and higher environmental sustainability.

Photo: Beach at Kiunga village.



5. References

- Adam Z. M. 2007. Kiunga Conservation and Development Project. Environmental Education and Awareness Report, July-June, 2007. WWF-EARPO, Nairobi.
- Akuma N. 2003. Kenya. Survey, excavation and preliminary analysis of Pastoral Neolithic sites, Tsavo, Kenya. University of Illinois, Chicago, USA.
- Becha H. 2008. National workshop for building capacity and strengthening policies for coastal communities to sustainably manage marine resources in Kenya; Titanic hotel, Kilifi, 17th-19th December 2007. Workshop report; IUCN/CORDIO/EAWLS 23pp.
- Chapurukha K.M. 1999. The Rise and Fall of Swahili States. Walnut Creek, CA: AltaMira Press.
- Church J. and Obura D.O. 2004. Sustaining Coral Reef Ecosystems and their Fisheries in the Kiunga Marine National Reserve, Lamu, Kenya. 10th International Coral Reef Symposium, Okinawa (Japan).
- Church J. and Obura, D. O. 2005. Management recommendations for the Kiunga Marine National Reserve, based on coral reef and fisheries catch surveys, 1998 - 2003. Report, WWF-EARPO, Nairobi.
- Church J. and Palin O. 2003. The Sea Turtle Conservation Initiative in Kiunga Marine National Reserve, Lamu Kenya, from February 1997 to June 2003. Report, WWF-EARPO, Nairobi.
- Fielding, P.J. & Everett, B.I. 2000. The spiny lobster fishery in the Kiunga Marine Reserve, northern Kenya. Oceanographic Research Institute, Durban: 43pp.
- Flintan F. 2002. Flip-flops and Turtles-Women's participation in the Kiunga National Marine Reserve. Working Paper No. 5 for the Engendering Eden Project. The International Famine Centre, University College Cork, Ireland.
- Government of Kenya 2007b. National Wildlife Policy Steering Committee and Secretariat. 2007. Final Draft of Wildlife Policy. Republic of Kenya. National Wildlife Policy Steering Committee and Secretariat., Ministry of Tourism and Wildlife, Nairobi, 2007..
- Government of Kenya Kenya Government 197691. Wildlife (Conservation and Management) Act 1976. Laws of Kenya, CAP 376.
- Government of Kenya Kenya Government 1999. The Environmental Management and Co-ordination ACT, No 8 of 1999.
- Government of Kenya Kenya Government 2007. The Fisheries (Beach Management Unit) Regulations, 2007. Subsidiary Regulations to Cap. 378.
- Gubelman E. and Kavu B. 1996. Traditional utilization of natural resources within and around Kiunga Marine and Dodori National Reserves, Kenya: Results of Participatory Rural Appraisal and Recommendations for Integration of local communities into Management Planning for KM&DNRs. WWF-EARPO, Nairobi.
- Harrison, P. (2005). A socio-economic assessment of sustainable livelihood opportunities for communities of Kuruwitu and Vipingo, Kilifi District, Kenya. The East African Wild Life Society/ IUCN Eastern Africa Regional Programme, Nairobi, Kenya. 41pp + appendices.
- Ireland, C., Malleret, D. & Baker, L. (2004). Alternative sustainable livelihoods for coastal communities. A review of experience and guide to best practice. IUCN Eastern Africa Regional Programme, Nairobi, Kenya. I-viii +48pp
- IUCN 2004. Managing Marine Protected Areas: A TOOLKIT for the Western Indian Ocean. IUCN Eastern African Regional Programme, Nairobi, Kenya. xii+172pp.
- Kenya Government of Kenya 1991. The Fisheries Act. Laws of Kenya, CAP 378.
- MacDonald M. and Nierenberg D. 2003. Linking Population, Women, and Biodiversity, in: State of the World 2003. P. 42. Ch. 3. Worldwatch Institute. New York.
- Max L.M. 2002. Institutional Review of Kiunga Marine National Reserve (KMNR)/World Wide Fund for Nature (WWF) Fisheries Management Program and Overall KMNR/WWF Project. Report, WWF-EARPO, Nairobi
- Muthiga N. and Ndirangu S. 2000. Village based laviculture and stock enhancement of sea cucumber (Echinodermata: Holothuroidea) on the Kenya coast. Final Technical Report, Biodiversity Support Fund.
- Muthiga N., Ochiewo J. and Kawaka J. 2007. Sea Cucumbers in Kenya. In: Conad C. and Muthiga N. (eds.) Commercial sea cucumbers: A review for the Western Indian Ocean. WIOMSA Book Series No. 5, Pp9-22.

- Mwaluma G. N. 2003. Assessment of Management Effectiveness, Kiunga Marine National Reserve. Report, IUCN-EARO, Nairobi.
- Mzava, E., Mbura M., Bwindiki J., Urono G., van Ingen T and Wells S. 2007. Capacity development. In: Wells, S, Makoloweka, S, and Samoilys M. (eds.) Putting Adaptive Management Into Practice: Collaborative Coastal Management in Tanga, northern Tanzania. IUCN Eastern Africa Regional Office. pp: 124-149.
- Obura, D. (2005) East Africa – Summary. Pp. 25-31 In: Status Report, Coral Reef Degradation in the Indian Ocean. CORDIO/IUCN/SIDA.
- Oluoch J. S. 2006. The Fisheries Beach Management Units (BMU) Regulations and the Capacity of Fisherfolk for their Implementation in Diani Chale, Southern Kenya. Research Paper, Premise Africa Development Institute, Nairobi.
- Samoilys M and Kanyange W 2008. Natural resource dependence, livelihoods and development: Perceptions from Tanga, Tanzania. IUCN Eastern and Southern Africa Regional Office, Nairobi, Kenya, 2008.
- Samoilys M, Wells S, Anderson J, Horrill, C, Kalombo H, and Verheij, E. 2007 b. Fisheries and their management in Tanga Region. In: Wells, S, Makoloweka, S, and Samoilys M. (eds.) Putting Adaptive Management Into Practice: Collaborative Coastal Management in Tanga, northern Tanzania. IUCN Eastern Africa Regional Office. pp: 46-76.
- Samoilys, M, Domingue, G, Kariuki, J, Payet, R, Hersi, A and A Mohammed. (2007a.) Application of the PROFISH Global List of irresponsible fishing vessels as a tool to combat Illegal Unregulated and Unreported Fishing in Eastern Africa. IUCN EARO, 21 pp. + appendices.
- Samoilys, M.A and Church, J.(eds) 2004. Conservation of coastal and marine biodiversity in the Western Indian Ocean: Progress in the development of a partnership Programme for Implementing the Jakarta Mandate. IUCN Eastern Africa Regional Programme, Nairobi, Nairobi, Kenya. 40pp.
- Samoilys, MA 1988. Abundance and species richness of coral reef fish on the Kenyan coast: the effects of protective management and fishing. Proc. 6th Int. Coral Reef Symp. 2: 261-266.
- Wells S, Samoilys MA, Anderson J, Kalombo H, and Makoloweka S. (2007b). Collaborative Fisheries Management in Tanga, Northern Tanzania. In: McClanahan TR and J.C. Castilla (eds) Fisheries Management: Progress towards sustainability. Blackwell. pp. 139-165.
- Wells, S, Makoloweka, S, and Samoilys M. (eds.) (2007a). Putting Adaptive Management Into Practice: Collaborative Coastal Management in Tanga, northern Tanzania. IUCN Eastern Africa Regional Office, x +197pp.
- Weru S. 2007. KMNRR Conservation and Development Project, Technical progress report; 2006-2007. 12 pp. WWF-EARPO, Nairobi.
- Weru, S. In prep. Kiunga Success Stories. WWF – EARPO Report, in prep. (2008). WWF-EARPO, Nairobi.
- WWF. 2001. Ecoregion conservation strategy. Report prepared by WWF on behalf of the stakeholders of East African Marine Ecoregion conservation process, WWF-EARPO, Nairobi.

Appendix 1.

Focus group discussion representatives by village

Ishakani

Mwalimu Tajiri
Athman Mmadi
Mohamed Athman
Ahmed Athman
Nyashee Abdalla
Mwanahalima Mwanaheri
Juba Mohamed (Kibodo rep)

Kiunga

Bahero Lali
Mahadhi Omari
Fakii Shelali
Lali Bakupi
Yusuf Mahadhei
Somor Juma
Lali Kombo (Kibodo rep)

Kiwayu cha ndani

Athman Bakari
Hamisi Malau
Mzee Athman
Dulo Bashola
Haji Mohamed (Headman)
Mwanahawa Bwanafae (Kibodo rep)
Hadija Mohamed

Kiwayu cha nje

Shally Shee (Headman)
Mohamed Kombo
Haroun Juma
Abdul Mohamed
Tima Bunu
Halma Mohamed
Mwanabule
Umi Mohamed
Ali Shali

Mkokoni

Bwana Athmani
Bakari Bwana
Sale Mohamed
Mohamed Sabiri (Kibodo rep)
Mohamed Hassan
Mohamed Aboud (Snr. Chief Mkokoni)

Mvundeni

Salim Mohamed
Abudi Athmani
Bwana Ibahero
Bashore Lacho
Asha Omari
Ali Fumo (Kibodo rep)

Mwambore

About Harun
Kassim Athman
Ali Mohamed
F. Ali
Issa Titi
Hidaya Amin
Shebana Bwanakombo
Muhasham Famau (Kibodo rep)

Rubu

Mohamed Obo
Mohamed Faru
Aroi Kale
Ahamed S. Kombo
Shebana Bwanakombo
Swadiki Athman (Kibodo rep)

Appendix 2.

Key stakeholders and government officials consulted

- Mr. Sam Weru, Kiunga Project Executant and Marine Coordinator, WWF, Nairobi
- Mr. Simon Komu, District Fisheries Officer, Lamu
- Mr. Ali Mwachui, Assistant Manager, WWF
- Mr. Sugow Ali, Deputy Senior Warden, Lamu
- Mr. Mike Kennedy, Director, Munira resort, Kiwayu

IUCN, International Union for Conservation of Nature

Founded in 1948, IUCN brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 1000 members in all, spread across some 140 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

IUCN builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.



International Union for Conservation of Nature

IUCN Eastern and Southern Africa
Regional Office
PO Box 68200
00200 Nairobi, Kenya
Tel:+254-20-890605/12
Fax:+254-20-890615
www.iucn.org/esaro



IUCN Eastern and Southern Africa Regional Office 2008

