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Socioeconomic Monitoring Initiative for Velondriake Community Managed Protected Area, Madagascar

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INTRODUCTION

The marine conservation NGO Blue Ventures has been working with local communities in the region of Andavadoaka, southwest Madagascar, since 2003. Its aim is to protect the biological diversity, sustainability and productivity of the region's coral reefs and related habitats, while improving the quality of life of the local coastal communities that depends almost entirely on local marine and coastal resources for subsistence and income. Following the results of a pilot marine no take zone launched three years ago adjacent to the remote fishing village of Andavadoaka, Blue Ventures and partner organisations, the University of Toliara's Institut Halieutique et des Sciences Marines (IHSM) and WCS-Madagascar, are currently working with 23 neighbouring villages towards the development of a network of community-run marine, coastal and terrestrial protected areas in the Andavadoaka region.

The network, named the Velondriake Community Managed Protected Area (VCMPPA), spans over 700-square kilometres, incorporating coral reefs, lagoons, mangroves, beaches, sea grass beds and baobab forest, and is managed by a series of regional committees and subcommittees comprised of representatives of all villages within the protected area. The VCMPPA is an wholly locally-managed and locally-driven initiative, with access to and resource use rights within the protected area governed by local community laws

known as *Dina*. A number of special use zones have been designated within the VCMPPA envelope, including temporary and permanent marine and terrestrial no take zones (NTZs).

Supplementing the benefits of the protected areas, project leaders are working with local communities to develop and launch sustainable livelihoods – including eco-tourism and mariculture businesses – that are aimed at providing future financial alternatives to overexploitation of natural resources. Specially managed zones for pilot ecotourism and mariculture developments are contained within the VCMPPA.

Between May and June 2006 Blue Ventures conducted a preliminary socioeconomic assessment in Andavadoaka and two neighbouring villages in the region, Ampasilava and Lamboara, by implementing the SocMon WIO guidelines, with generous technical and financial support from CORDIO East Africa. The following objectives were identified for this study:

- To understand socioeconomic changes, and its drivers, within the communities;
- To identify and monitor the distribution of benefits of conservation activities in the community and MPA network;
- To understand communities' perceptions and attitudes of management initiatives already put in place and the impacts of these measures on the communities;
- To evaluate the socioeconomic impact of

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Plate 1. A Key informant interview in progress- Velonriake.

introduced management activities;

- To disseminate the monitoring results to increase awareness in government and policy circles of the socioeconomic aspects of artisan fishers, and their vulnerability;
- To train local staff and VCMPPA committee members to continue the socioeconomic monitoring.

The socioeconomic assessment provided an overview of the area including the stakeholders, demographics, infrastructure, business development and community profiles, identifying threats and problems facing traditional coastal livelihoods in the region. Marine activities affecting coastal and marine resources were also monitored to establish a reference against which future changes in use patterns could be observed, in particular those resulting from environmental management and conservation activities. The socioeconomic assessment also included data collection on awareness of rules and regulations, as well as community attitudes and perceptions on marine resource conditions and marine management initiatives. The SocMon study, the first of its kind in Madagascar, was initiated using a combination of research methods including questionnaires, key informants (Plate 1) and focus group interviews based on the SocMon WIO guidelines. Prior to monitoring on-site training was conducted, covering field data collection, interview techniques, database use, data analysis and dissemination. This study was completed



Plate 2. Drawing up boundaries for the Velon-driake community managed protected area.

just after initiation of pilot marine no take zone trials, adjacent to the three survey villages, which led to the establishment of the broader VCMPPA a short time afterwards (Plate 2).

Following expansion of regional environmental management and conservation efforts to include 23 villages within the VCMPPA initiative, the first round of SocMon sites was expanded to include a broader representative sample of the varying ethnicities and marine and coastal resource users affected by the VCMPPA. Logistical constraints prevented surveying in all 23 communities (Fig. 1), however all villages within the VCMPPA were visited to introduce the objectives of the SocMon work prior to commencing data collection. Ten villages (Ambalorao, Ampasimara, Andrananombala, Ankindranoke, Ankintanbagna, Antsatsamoroy, Befandefa, Bevato, Nosy Ve and Tampolove) were selected to represent varying levels of a number of criteria including: population size, fishery or agricultural activities, infrastructure, ethnicity, presence of an administrative centre, and geographical location, in order to produce a balanced sample from all the villages. The expanded SocMon survey was undertaken between May and August 2007.

The monitoring team consisted of multilingual staff of both local Malagasy and international research staff. Modifications were made to the questionnaire and focus group interviews to account for the nature of the newly implemented

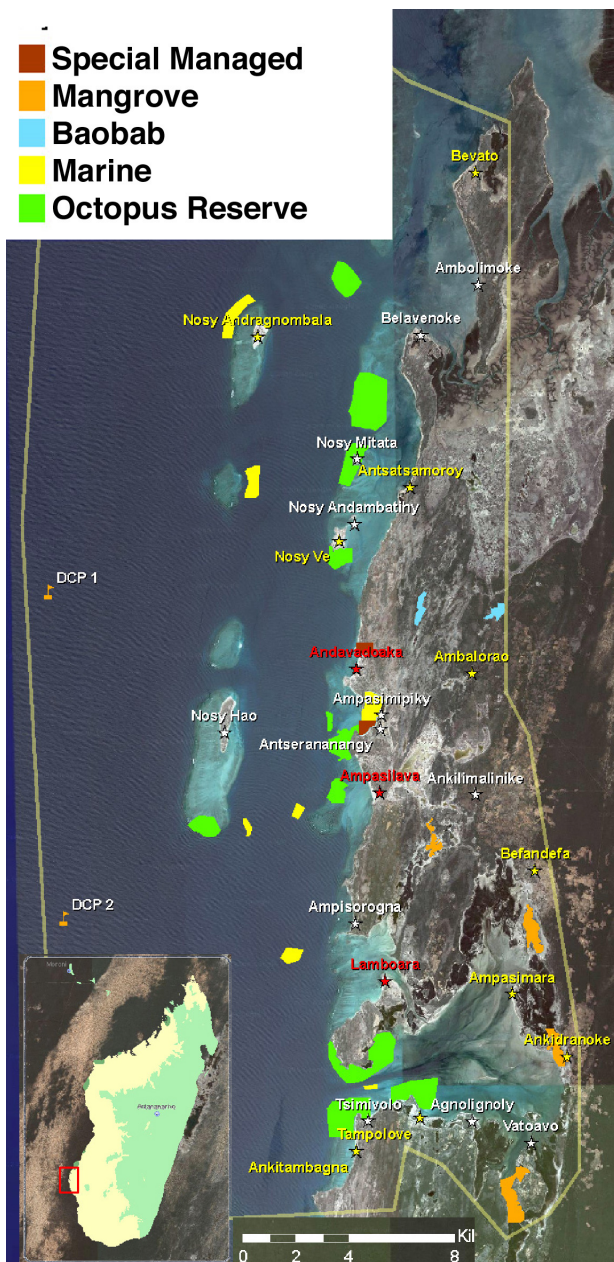


Figure 1. Map of Velondriake network of marine and coastal protected areas and villages. Villages in red participated in the first SocMon survey (2006), and in yellow added for the second SocMon survey (2007). Difference classes of protected areas are shown: special managed, mangrove, baobab forest, marine and octopus reserve.

VCMPA, in order to investigate local communities' understanding of and support for its establishment. As with the first round of surveying, a combination of data collection techniques was found to be most effective, with household surveys being reinforced through focus group and key informant interviews.

Dissemination of Results

A summary of the first round of monitoring was presented to the Velondriake management committee, regional sub-committees, and three villages surveyed prior to the commencement of the second expanded study. Upon completion, the final reports of both rounds of surveying will be distributed to local and regional government and VCMCA management committees, with the intention of providing communities, VCMCA managers and partners with information to better understand key socioeconomic and environmental issues in the region, as well as highlight priority areas for improved management of marine and coastal resources.

At a national level the implementation of socio-economic monitoring is critical to increase government understanding of the problems facing the resource-dependent Vezo people of the southwest coastal region. Few marine protected areas are currently in place in Madagascar, and the establishment of a regional community-run marine and coastal conservation initiative such as the VCMCA is unprecedented.

Feedback

To make the SocMon guidelines applicable to Madagascar, the team translated the field forms into French and again into Vezo language. It is necessary to adapt the guidelines for site specific needs such as translating into Malagasy to assist in explaining the objectives of the project among local communities. This would also be useful to assist in the expansion of the Malagasy SocMon programme to other regions within Madagascar, and to facilitate the training of new site teams.

Socioeconomic Monitoring Initiative at Rivière Banane, Rodrigues

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In response to the recent decline in fish stocks in Rodrigues, 4 marine reserves were proclaimed in the northern lagoon in April 2007. Although biological monitoring has been on-going since 2002, there was an urgent need for socio-economic monitoring to be carried out to complement this research. The main objectives of this study were therefore to formalise and add to existing knowledge on fisheries and fishers attitudes and to establish baselines for future monitoring and evaluation. SocMon surveys were undertaken at the village of Rivière Banane, in the north-east of Rodrigues, during May – July 2006 and



Plate 1. A motorised fishing boat at Rivière Banane.



Plate 2. Preparing a corn harvest at Rivière Banane.

February 2007 using a combination of household surveys, key informant and focus group interviews.

The surveys indicate that fishing (Plate 1) and planting (Plate 2) are the most important occupations in Rivière Banane, undertaken by 22% and 28% of respondents, respectively, however the majority of the community are unemployed. The community is young, with 50% aged less than 30 years and the majority have received less than 9 years of schooling. The community is Catholic with the majority of respondents speaking only Creole. Households have an



Plate 3. SocMon feedback session at Rivière Banane.

average size of 4 persons and most respondents own their houses, have an average of 4 rooms and all have access to piped water and mains electricity. Fishing is the primary source of income for 30% of households, however only 13% of respondents own their own boats, and of these only 20% have an engine. (Plate 3) Coastal and marine activities carried out in the area are: fishing for octopus using harpoons, fishing for fish using basket traps and lines, planting fruit and vegetables, raising livestock and tourist snorkelling trips. Marine products have a low – medium value and all are sold locally, as well as being used for own consumption. Three formal community organisations

were highlighted, however the majority of respondents feel that they have no involvement in coastal management decisions. Respondents highlight illegal fishing, pollution, coastal flooding and soil erosion as threats to the health of coastal resources, with the solutions being better enforcement of fishing regulations and cleaning the beaches and rivers. Major problems facing the community are poor roads/lack of public transport, lack of water and invasive plants. Respondents understand the non-use value of the coastal resources, with the majority wanting future generations to enjoy coral reefs and agreeing that fishing should be restricted in certain areas.

The results therefore highlight that fishing is important to the Rivière Banane community and the development of a no-take marine reserve in the region will have an important financial impact on a number of households. The young community suggests that the development of an alternative livelihood and re-training programme may be more suitable than a Voluntary Retirement Scheme as a means of reducing fisher numbers. Illegal fishing is seen as the main threat to the coastal resources in Rivière Banane and this is particularly relevant to the development of the new marine reserve, with better enforcement needed. The study also highlights the need for greater involvement of the fishing community in future coastal management issues in order for the management plan to be successful.

Coastal Communities Adaptation and Resiliency to Vulnerability: An Analysis of Livelihood Activities in Kenya

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ABSTRACT

A socio-economic monitoring pilot project was initiated in Eastern Africa in 2002. The goal was to develop a regional socio-economic monitoring process that contributes to improving coastal and fisheries resource management.. Findings for the Diani-Chale area in Kenya are analyzed here, focusing on community livelihood strategies for three villages studied. On average, there were 5 people per household, 1.9 of whom were actively involved in providing food or income. The most important livelihood activities at the household level were small business, farming, tourism, formal employment and casual employment, fishing, sea related tourism, fish trading and other coastal related activities such as mangrove harvesting in decreasing order. Sea-based livelihood activities were undertaken by 33% households. Extractive marine and coastal activities included fishing, mangrove harvesting and crab collection. Non-extractive activities included boat operators, beach operators, diving operators and fish traders. Fishing was the second most common livelihood activity for households in Diani-Chale (32%), while fisheries accounted for 39% of all natural resources dependent activities.

INTRODUCTION

It is acknowledged worldwide and increasingly in the WIO region that for decision makers to make decisions that will improve resource management, they need a better understanding of the people who live from coastal and marine resources. The socio-economic context in which coastal communities live changes constantly, monitoring is thus an essential tool if management is to be effective in the long run. Existing knowledge must be updated so decision makers can react and adapt to new situations. Although socioeconomic assessments are often carried out in WIO, monitoring is only at its infancy; the socio-economic monitoring pilot project (SEMPP) was the first in the Western Indian Ocean.

The aim of SEMPP was to initiate socio-economic monitoring in pilot sites. Three socio-economic aspects were identified as most important for management by sites and within the region: occupational structure, local resource use patterns, and stakeholders' perceptions and relations. Results presented here relate only to one of these, occupational structure of the communities, focused on what communities do for a living or their livelihood strategies. Following the pilot testing at Diani-Chale

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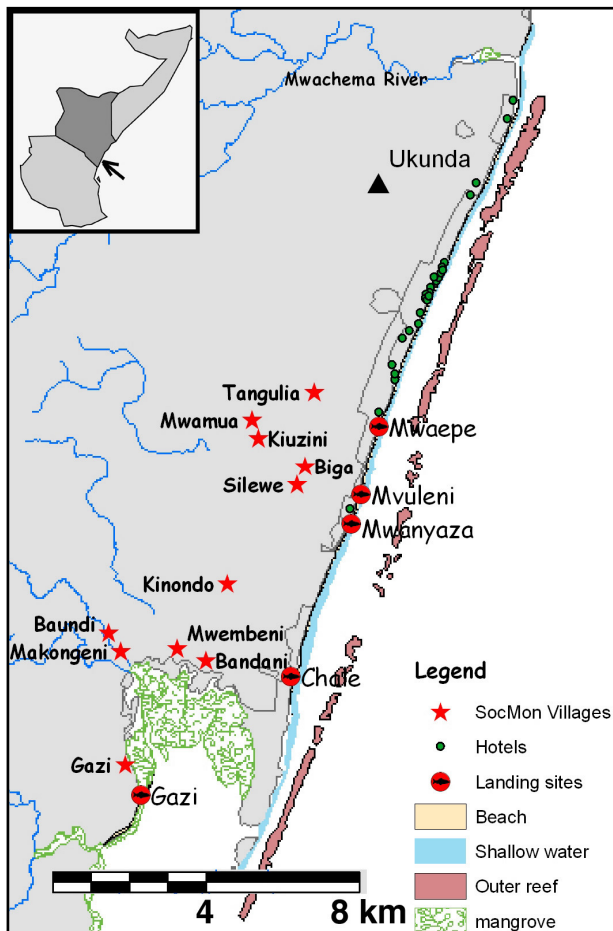


Figure 1. Map of the Kinondo-Chale reef area from Rivers Mwachema to Gazi showing the approximate locations of the villages of Gazi, Biga and the three sub-villages of Chale i.e. Kinondo, Bandani and Makongeni.

and Msambweni in Kenya, monitoring was initiated at Mtwara (Mnazi Bay Ruvuma Estuary Marine Park) and Tanga coastal zone in Tanzania, following which the full SocMon regional programme, SocMon WIO, was started in 2005.

METHODOLOGY

The Diani-Chale area is in Kinondo location, of Msambweni Division, Kwale District, approximately

25km south of Mombasa town from the Mwachema River in the north to Gazi Bay in the south. Nine villages were studied during the first round of monitoring, after which three representative villages were selected for ongoing monitoring, Biga, Chale and Gazi (Fig. 1). Chale is made up of 3 sub-villages, Makongeni, Bandani and Kinondo. The area boasts extensive beach based tourism, hotels and other related infrastructure that form a significant part of the local economy. Fishing is the most important activity done by the local community. Coral reefs and other coastal resources in Diani-Chale are considered to be heavily exploited or deteriorating. Competing use of coral reefs and coastal areas including near-shore waters between various resource users often results in conflict among various stakeholders, most notably between the tourism industry and the local community. An attempt by the government to establish marine protected area management was rejected by the community. Current management efforts have shifted focus to community-based management with designation of the area as the Diani-Chale Management Area (ICAM, 2002) and involvement of stakeholders in a participatory management process.

The monitoring project included a long preparation stage during which local leaders and committees were informed about the need for socio-economic monitoring and their support solicited. Field assistants (young men and women) from the community were trained as enumerators to carry out the monitoring in collaboration with project staff. Local community involvement in the socio-economic monitoring is essential for the sustainability of the process. Information was collected using Kiswahili language, which is widely spoken on the Kenyan coast and occasionally the local Digo language where better communication was required.

Data collection was by key informant interviews as well as focus groups. In both cases, informants were carefully selected to be from the village where the monitoring was being carried out, and with age and gender balance among informants. Key informants were asked to systematically list all households in their

Table 1. Number of households and their inhabitants in 3 Diani- Chale villages.

Village	Number of households	Total number of Inhabitants	Inhabitants per household (mean)	Income earners per household (mean)
Biga	102	578	5.70	1.5
Chale	197	1068	5.40	2.3
Gazi	165	817	5.00	1.7
Overall	464	2463	5.37	1.8

village following a mental transect through the village. The communities' occupational structure was determined through information they provided for each household, including number of household members, number of household members contributing to the households' income or food and list of activities carried out by the household for food and for income.

Data presented here is grouped at the site level (Diani-Chale) and village level (3 villages). Occupations were grouped into three categories for analysis; general occupations, natural resource based occupations and marine resource based occupations.

RESULTS

The three villages in the study area had a total of 464 households with 2463 people (Table 1). On average Biga had the highest number of inhabitants per household, 5.7 followed by Chale and Gazi 5.4 and 5.0 respectively. Chale had the highest number of

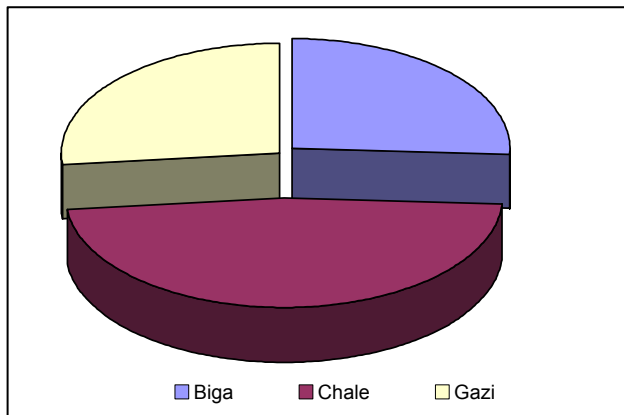


Figure 2. Households involvement in multiple livelihood activities in Diani-Chale.

active persons per household 2.3, followed by Gazi and Biga, which had 1.7 and 1.5 respectively. Most households involved in multiple livelihood activities in Diani-Chale were in Chale village. A total of 292 households in Diani-Chale area were involved in multiple livelihood activities 167 of which were in

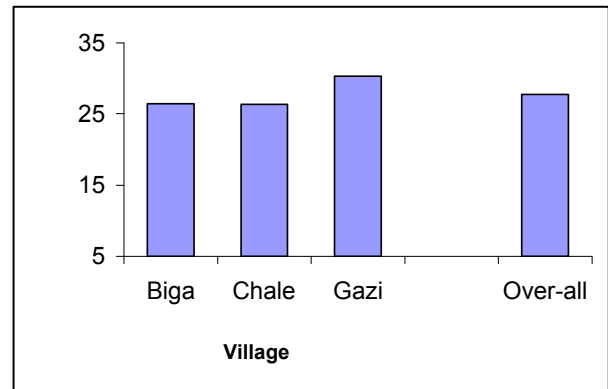


Figure 3. Proportions of Female Headed Households in Diani-Chale Area.

Chale representing 84.8% of the village while in Gazi and Biga, the proportion was 47.3 and 46.1% respectively (Fig. 2).

Females headed about 27.8% households in Diani-Chale area. The highest proportion of female-headed households were in Gazi (30.3%) while Biga and Chale were similar with about 26.5% (Fig. 3)

Thirteen broad classes of occupations were recorded during the surveys (Table 2). The largest proportion of households in the three villages, 60% depended on small business opportunities and other forms of self-employment for their livelihoods (Fig. 4). These include the sale and making of mats, food vendors, charcoal sellers. Over 30% were involved in fishing and 20% of households were also involved in

Table 2. Livelihood activities recorded in Diani-Chale.

Main Category	Groups included under category
Fishing	All fishing methods,
Fish trade	Fresh fish trader-local fish, Fresh fish trader-non local fish, Fried Fish Trade,
Fisheries	Fishing, Fish trade, Shell-Collector,
All sea	Fishing, Fisheries, Self sea tour, Employed- sea, Mangrove use.
Self sea tour	Beach-Operator, Beach-Boy, Beach-Operator, Sea Tourism,
Emp sea	Employed in Sea Tourism,
All tour	Self employed in sea tourism, Employed in sea tourism,
All emp	Employed, Employed in sea tourism,
Self bus	Small-Business, Medium-Business, Sale and making of mats, Food vendors, Charcoal sellers.
Farming	Small scale farming, Large scale farming, Farm Trader,
Others	Traditional doctor, Artisans, Casual employees,
Mangrove use	Mangrove Cutter, Mangrove seller,
Natural resource dependent	All sea, Farming

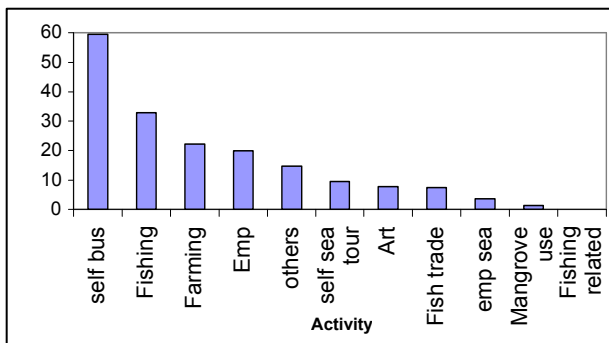


Figure 4. General occupations in Diani-Chale at site level (see Table 1 for explanation of occupation abbreviations).

farming. About 19% of households relied on various forms of paid employment including casual employment. The rest of activities were undertaken by less than 10% of households, such as fish trading, 7.3%, sea and coastal related tourism activities such as boat operators, dive assistants, coxswains and beach operators were undertaken in 9.5 % of the households.

Small businesses or self-employment was the most common livelihood activity in all three villages (Fig. 5), supporting 36% of households in Biga, 44 % in

Gazi and 84% in Chale where it was more than twice the proportion supported of any other activities. Fishing was the second most important activity for households in Biga supporting about 33% households, while it ranked third in Chale 33.5% and in Gazi, 31% after farming and employment respectively. Self-employment in sea tourism ranked third in Biga village where it supported more than 23% of households compared to the other 2 villages. Self-employment activities in tourism include boat operators and beach operators.

A minimal number of households were dependent on self-employed sea tourism in Chale and Gazi villages, 8.6% and 1.8% respectively. Similarly employment in sea related tourism activities such as dive assistants, coxswains was below 10% in all three villages, Chale was highest with 6.1%, while Biga and Gazi villages had less than 2%.

Non-sea related tourism activities such as employment in beach hotels were only encountered in about 2% of the households in Biga, non in Gazi and an insignificant percentage in Chale. Farming supported 38.6% of the households in Chale, the highest proportion among the 3 villages, even slightly

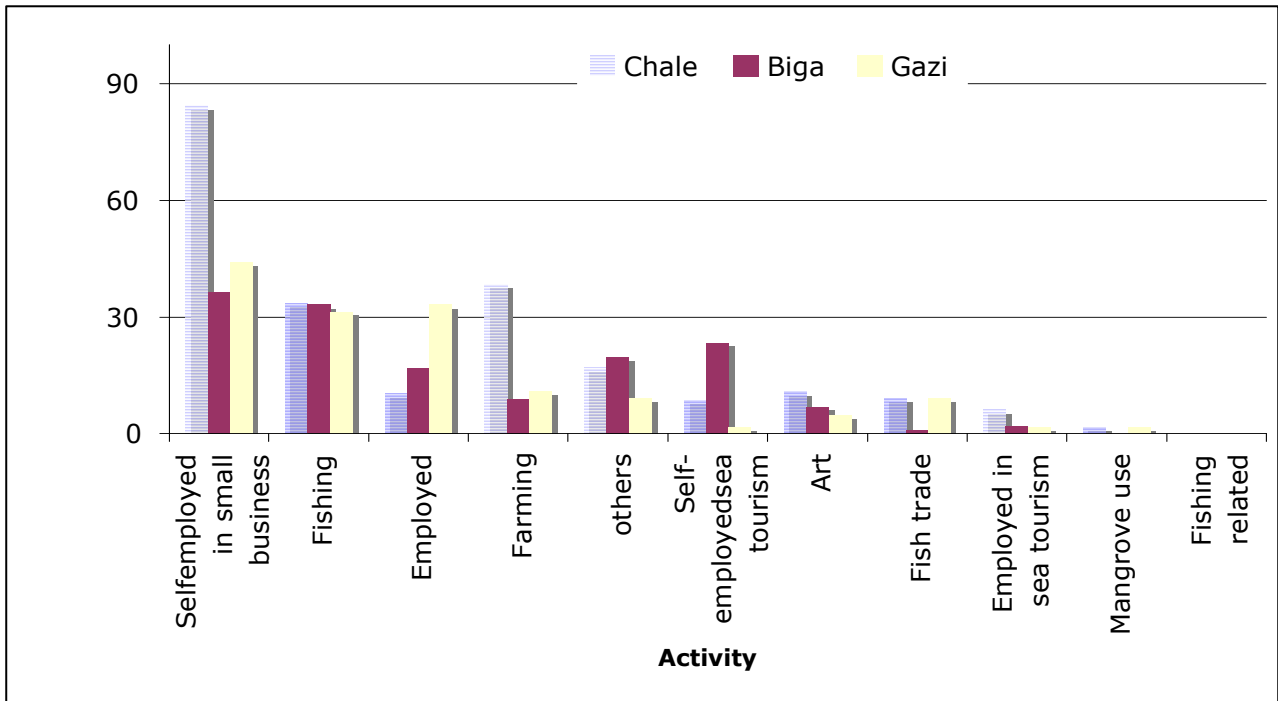


Figure 5. General Occupations in Diani Chale at Village level.

exceeding fishing in the village. In Biga and Gazi villages, farming supported much less than 11% of the households. Gazi was the only village with a high proportion of households (above 33%) in either formal employment or casual employment. Less than 17% of the households in Biga and Chale depended on formal and casual employment. The same proportion of households in Gazi and Chale, 9.1% villages, undertook fish trade and much less in Biga, 1%.

Considering only those livelihood activities that depended on natural resources in Diani-Chale area, fisheries were the most important activity (39% of all households) followed by farming (22%) and tourism activities (13%) while households depended on mangrove were only 1.3%. At the village level, fisheries were the most important activity, supporting > 34% of households, in all villages. Farming was second most important in Chale (38%) but ranked third in Biga at only 12%. Tourism was ranked second in Biga at 25.5 % while it was third in Chale (14.7%) and very low in importance in Gazi (1.4%), a

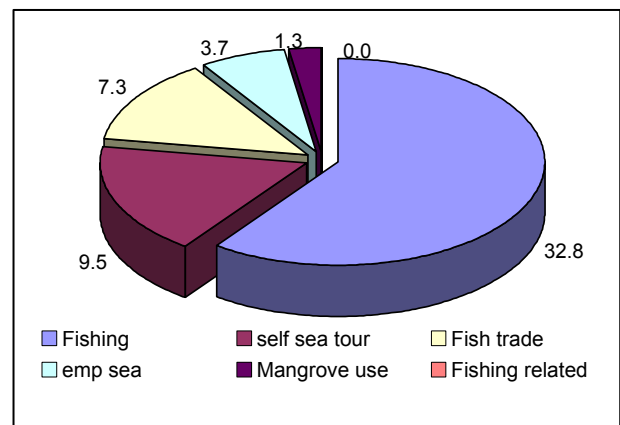


Figure 6. Marine resource based activities at site level.

proportion that was lower than mangrove use.

Among marine-based occupations in the Diani-Chale area, fishing was the most important supporting 32.8% households (Fig. 6). Self employed sea based tourism activities and fish trading were 2nd and 3rd most important although each supported less than 10% of the households, the two combined supported

much fewer households compared to fishing alone.

At the village level fishing was followed closely by self employed sea tourism in Biga (23%) while in Chale, only about 9% of the households depended on self employed sea tourism, a proportion equal to fish trade, 9%. Biga was the only village where self-employed sea tourism contributed towards the livelihoods of such a high proportion of household. Fish trading ranked 2nd in Chale where it supported just over 9% of households. Among Gazi households, fish trade supported about 8% where it was second most important among the marine activities, the rest including mangrove use supported less than 3% of the households each. Chale had the highest dependence on employment in sea-based tourism (6%) a proportion three times that of Biga village. On the contrary dependence on self-employed sea tourism activities was ranked highest in Biga among the three villages.

DISCUSSION

This monitoring exercise considered all activities that contribute food or income at the household level. Thus it includes activities that are often excluded during regular censuses, such as home-based and household enterprises such as the making of mats, vending food and vegetables, and farming for food. Such activities are often classified as unpaid family work yet they contribute significantly to the household economy and can be developed further to improve livelihoods. Further, women undertake much of this work, their contribution in the economy is very under-reported in regular censuses. This is more so considering that females headed up to 28.2% of households in Diani-Chale. The Kwale District Development Plan of 1997-2001, shows the district has high rates of unemployment. The percentage of economically active population in wage employment in Kwale district is 19.8% (CBS, 1999). 63.8% of the unpaid workers were females and 33.3% of women workers engaged in unpaid family work (CBS, 1999).

The average household size is 5.3 in Kwale district,

with 34.8% of households headed by females (CBS 1999). These figures were very similar to those obtained for Diani Chale area during from this monitoring where the average household size was 5.4 (Table 1) and 27.8% households were female-headed (Fig. 3). Gazi village had more female-headed households in the area, a pointer to their active involvement in livelihood activities. In this study the importance of an activity as a source of livelihood was considered according to how many households undertake it rather than how much income it generates. This is because some activities are less formal in nature and are meant to directly provide food to the household rather than bring income. Consequently activities carried out by women were fairly addressed.

Livelihoods in the Diani-Chale area were largely dependent on natural resources available within the area e.g. fishing and fish trading activities and farming. The close proximity of the sea has greatly influenced the activities the community undertakes (King, 2000). Fishing was the single most widely undertaken marine related activity in this area followed by fish trading. Chale and Gazi villages had the largest proportion of fish traders (Fig. 3).

Close proximity of the 3 Diani-Chale villages to tourism activities is expected to provide income opportunities for the communities (Kwale District Development plan 1997-2001). This expectation was true for Biga village, which is located closest to the active tourist beaches of the Diani-Chale area. However, monitoring shows that whereas informal tourism activities (i.e. boat operating, beach operators and dive operators) accounted for activities in more than 23% of households, formal employment in tourism was depended upon by less than 2% of the households (Fig. 5). This latter figure is a very small proportion for an area with many hotels. Previous studies indicate that one of the causes for the disappointment of the local community about the presence of tourism in the area is the lack of benefits for the community (Rubens, 1996). Tourism development has not directly benefited this

community in the form of formal employment opportunities. This may be an indicator of the lack of vocational skills, required to work in this sector at the local level. While this low level of formal employment is partially compensated for in the informal sector, resentment is felt in the local community.

Gazi village had a higher proportion of households dependent on employment, at 33% than the other villages, at about 20%. The population of Gazi has more people who have immigrated from outside the Diani-Chale area. By contrast, Chale villagers had a higher dependence on farming (33.5%), considerably higher than for Gazi and Biga villages and slightly above fishing in the same village. This is attributable to availability of large areas of undeveloped land that is easily converted to farmland. However, farming in the area is severely affected by the presence of many wild pigs and primates from the adjacent sacred "Kaya Kinondo", which raid crops.

CONCLUSIONS

Households in Diani-Chale have diverse livelihood options by having household members involved in multiple activities. This helps to subsidize fisheries, and may be a response to the decline in fisheries in the area. The most important of options to fishing were farming and tourism in Chale, beach tourism in Biga, and employment in Gazi. All 3 villages were actively involved in small business enterprises. Fisheries were the most important marine based livelihood option in Diani-Chale, hence fisheries management is critical to sustainability of livelihoods in the area. A more holistic approach to fisheries management over the current sectoral approach is needed for the area, particularly considering the other livelihood activities that households already undertake. Promoting other marine based activities but which have been under-utilized to date will maximise community benefits, including for example sustainable mangrove utilization for Gazi village, and more active involvement in formal sea tourism activities in Biga. Management

should also focus on promoting other highly ranked sources of livelihoods such as small businesses the community undertakes, to make them more profitable.

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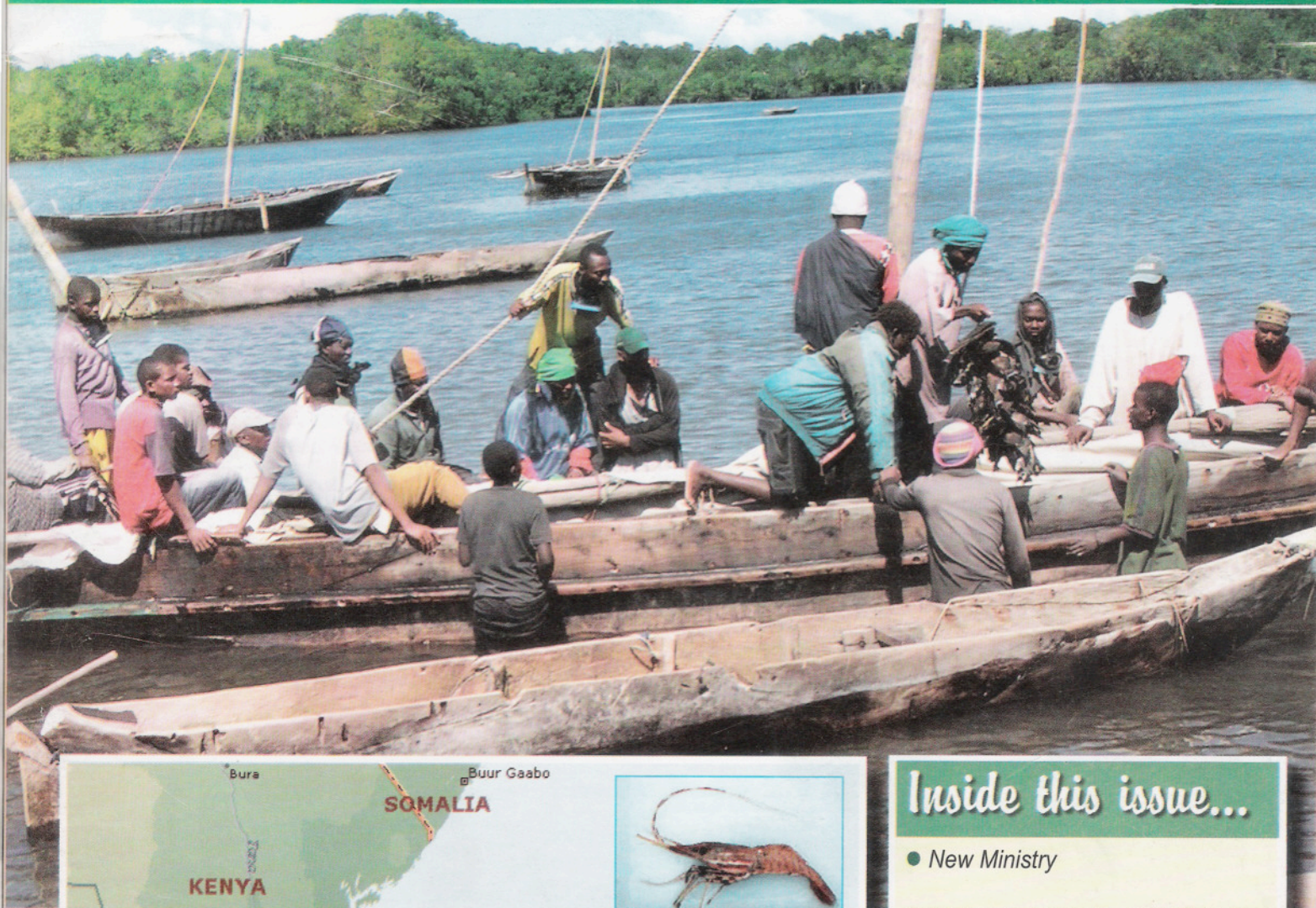
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SAMAKI NEWS

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Socio-Economic Monitoring of Fisheries Resource use Patterns and Fisher's Perceptions: Implications to the Management of Diani-Chale Artisanal Fisheries

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Socioeconomic Monitoring Programme for West Indian Ocean

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Introduction

Marine resources are increasingly threatened in many parts of the Western Indian Ocean (WIO) region. Increase in coastal population has created a high demand for marine food, leading to overexploitation of the resource; lack of employment opportunities has contributed to a steady increase in the number of fishers over the years. Increased tourism activities have led to increased tourist development in the coast. A combination of these factors has placed the marine resources under great pressure.

Marine issues across the Western Indian Ocean region are related, and the socio-economic contexts of the resource users are similar. To promote sustainability in the management and a balance between exploitation and conservation of the fisheries resources within the region, and to improve the social and economic conditions of the user communities, it is imperative that studies on the user communities are done in the region, using similar methods and parameters. It is even important that different organizations and/or institutions from different countries do the same studies for comparative purposes. In this light, Coral Reef Degradation in the Indian Ocean (CORDIO) East Africa initiated a Socio-economic Monitoring programme for the Western Indian Ocean region (SocMon-WIO) to monitor the activities of marine resources user communities so as to take note of any trends/changes over time. This initiative was implemented in partnership with other organizations/institutions and with the participation of the local communities who are the main resource users.

Socio-economic monitoring of coastal resource user communities is currently done in a total of 12 sites in 7 countries that include Kenya, Tanzania, Mozambique, Madagascar, Mauritius and Comoros. This article describes the socio-economic monitoring initiative in Diani-Chale area (CORDIO) on the Southern Coast of Kenya which was started in 2002 and 2003; the monitoring was extended to Msambweni (Fisheries Department).

Socioeconomic Monitoring in Diani-Chale in South Kenya's Coast

The first aim of monitoring the coastal communities at Chale

and Msambweni was to find out how the communities use coastal and marine resources. The Second aim was to determine the relationship among the resource users in the pursuit of exploiting the resources.

Methodology

This monitoring was participatory where different stakeholders were involved at different stages including site selection, field data collection, dissemination and reporting. The participatory approach ensured that the monitoring was acceptable to the community. Field data collection was mainly done through focus group discussions and key informant interviews. Among the key informants were village heads, elderly local people (men and women) and Beach Management Unit (BMU) chairmen from different landing sites.

Variables Studied

Three key variables were identified for monitoring: First, occupational structure of the communities indicating all the livelihood activities and the degree of dependence on marine resources. The second variable was that of resource use patterns which gives information on resource use characteristics in the area. The third variable was that of attitude and perceptions which indicated how various resource user groups are related to one another and how they perceived the management agents.

Results

Resource Use Patterns

The results established that Marine-related activities are an economic mainstay of the community in Diani-Chale. Fishing was the major livelihood and economic activity employing majority of the people either directly as fishermen or indirectly as fish traders. Result of this study revealed that fishing was dominated by men except for juvenile prawns fishing, which was carried out by women only. Although both men and women participate in fish marketing and distribution, women specialise in fish frying and selling in the local villages while the men marketed fresh fish both locally and to neighbouring towns.

The Local communities (*Digos*) were the main users of marine resources in Diani-Chale area. However, there were visiting fishers from neighbouring villages while others were from within and outside the country especially from Pemba. Immigrant fishers were always found in the area, but their numbers increased mainly during the *kaskazi* (North East monsoon) season. The numbers of immigrants from the neighbouring villages decreased during the *kusi* (South East monsoon) season (Fig.1).

The local and immigrant fishers were using different types of gears in the two fishing seasons. It is mainly during the Northeast monsoon that immigrants used hand -lines and ring-nets. While the local fishermen mainly used ring-net and spear-gun fishing. Overall, the most preferred fishing gear by the locals was the spear-gun in both seasons. The women fished juvenile prawns using mosquito net especially during South East monsoon season.

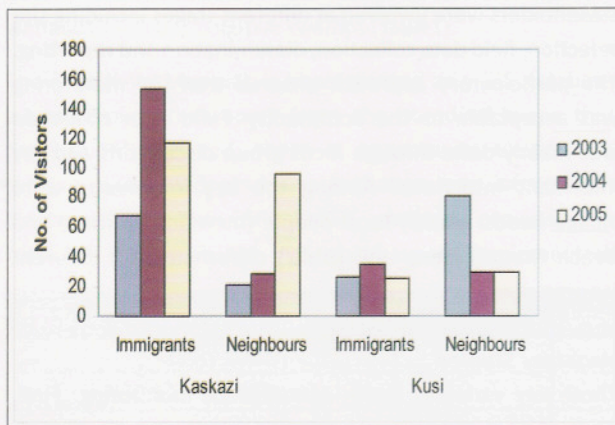


Figure 1: Number of migrant fishermen during the Northeast (*kaskazi*) and South East monsoon (*kusi*) at Diani-Chale.

Fishers using different gear preferred different fishing sites. The most preferred and most exploited substrate types in the areas were coral, sea grass and sand respectively. Hand lines and spear guns were mostly used on coral areas; spear guns and traps were commonly used on sea grass and sandy areas. Corals and sea grass are however fragile ecosystems that provide good breeding habitats and provide shelter for juvenile fish.

Relations and Conflicts

Sharing of fishing grounds by fishers using diverse gears is a recipe for marine resource use conflicts and constrained relations among them. The resultant is unsustainable use of the resources, which in most cases threatens the common resources and may cause conflicts and negative relations.

Negative relations within the stakeholders and regulators of fisheries resources can be put into three broad categories: (i) fishers based on gears (ii) tourist boat operators and (iii)

regulators. Negative relations identified between the fishers and fish traders were due to over prices, selective selling, and failure to pay back money advanced to them. Negative relations pitting fishers and traders versus Fisheries Department (FD) were mainly over fishing and/ or trading licences.

Attitude and Perception

Kenya's marine resources are mostly open access to all, therefore, everybody have the right to exploit the resources. However, local people feel that they should have exclusive right to marine resources adjacent to their coastal area. They claim that the neighbours and immigrant fishers use destructive fishing gears; they don't care and have no long term interest on the sustainability of the resource.

Conservation and management implications

Fishing seems to be taking place just within the shoreline, around sea grass and coral areas. The most commonly used fishing gears were set gill nets and gill nets, while among the most destructive gears and fishing method is poison fishing. Immigrant fishers are perceived to be using destructive fishing gears and also sharing the same fishing grounds with local hence escalating the conflicts and management issues. In view of a fore-mentioned, there is need to promote conflict resolution by establishing conflict resolution mechanism at village and local levels.

The use of destructive gears and competition for fishing sites are major sources of conflicts. Resource users should, therefore, be encouraged to use gears that are socially accepted and that do not cause any ecological damage. There is need to educate resource users on the importance of using non-destructive gears and gears that cannot cause damage to the substrate in fragile ecosystems. Zonation of fishing sites can be done on trial basis (this was suggested in a separate monitoring programme by fishers in Msambweni). Different fishing gears would be assigned different areas or substrate types and gears which are friendly to specific habitat. Zonation if accepted, well executed and enforced, will remarkably reduce resource use conflicts and promote healthy ecosystems and sustainability of the fishery resource.

Local managements such as BMUs can be involved directly to implement zonation. Allowing communities to control and exploit their own resources will most likely promote positive attitude towards sustainable use and management of the resources and conflict minimization. The factors that are driving women to carry out juvenile prawn fishing should be investigated further with a view to diversifying fisheries and livelihoods. The development of schemes that encourage fisheries resource users to seek for alternative livelihoods that are not marine-based will go a long way to ease pressure on the resources and at the same time curb resource use conflicts.



Western Indian Ocean

The Western Indian Ocean (WIO) region includes the countries of East Africa, including Somalia, Kenya, Tanzania, Mozambique, and South Africa, as well as the island nations of the Western Indian Ocean, including Seychelles, Comoros, Mauritius, and Madagascar. The dependent territories of La Reunion and Rodrigues are also included in this region. The WIO region, home to over 100 million people, is linguistically diverse. SocMon and other regional trainings are carried out in English, but French, Portuguese, Creole, and Kiswahili are commonly spoken in the WIO countries in addition to local and tribal dialects. Of the SocMon regions, the WIO region has the highest proportion of its population living on less than US\$1.00 per day and the highest proportion living below national poverty lines. Approximately one-third of the coast of Eastern Africa is bordered by coral reefs, while reefs surround much of the island nations (Whittingham et al 2003).

Where has socioeconomic monitoring occurred?

SocMon WIO, coordinated by CORDIO East Africa, is an ongoing monitoring program that was initiated with the aim of expanding socioeconomic monitoring throughout the WIO and to establish a regional network. The approach of the project has been to build on existing local-level monitoring systems at sites and emphasize participation by community members. SocMon is implemented by local partners, including local MPAs, local area management authorities, fisheries officers or community groups. Methods were developed from existing socio-economic programs and integrated with the Global SocMon Initiative. SocMon WIO is active in 12 sites in 7 countries; refer to Figure 7 for a complete listing and map.

SocMon assessments have been carried out at very diverse sites in the region, from small islands developing states to more developed island countries to sites on mainland East Africa. Sites chosen are often in remote areas that are facing resource degradation issues.

What issues have commonly motivated socioeconomic monitoring?

Habitat destruction, overexploitation of resources, and establishment or evaluation of MPAs have been common issues motivating the set of socioeconomic monitoring, especially in instances where it was recognized that current management is not effective, such as in Comoros, Madagascar, and Kenya. Goals of SocMon studies have included gaining an understanding of the resource users to better grasp needs and potential management interventions. Additionally, improving understanding and thus communication between different stakeholders has been one of the main motivation for the Kenya Fisheries Department which has used SocMon to

establish a platform to improve communication with marine resource users.

In other areas, such as Mozambique, Madagascar, Rodrigues, and Tanzania, assessments have been conducted to establish a baseline to investigate impacts of management actions such as MPA development and awareness programs.

In the WIO, SocMon was set up to be used both by local NGO partners as well as by local and national governments. In Kenya, CORDIO works hand in hand with the National Fisheries Department, which has now institutionalized the SocMon process. Projects headed by external organizations have integrated the process, such as WWF in Mozambique, Blue Ventures in Madagascar, Shoals in Rodrigues, which have also institutionalized the SocMon process. However, strong input and collaboration with CORDIO is needed.

In other areas, basic assessments have often been done by external consultants and the

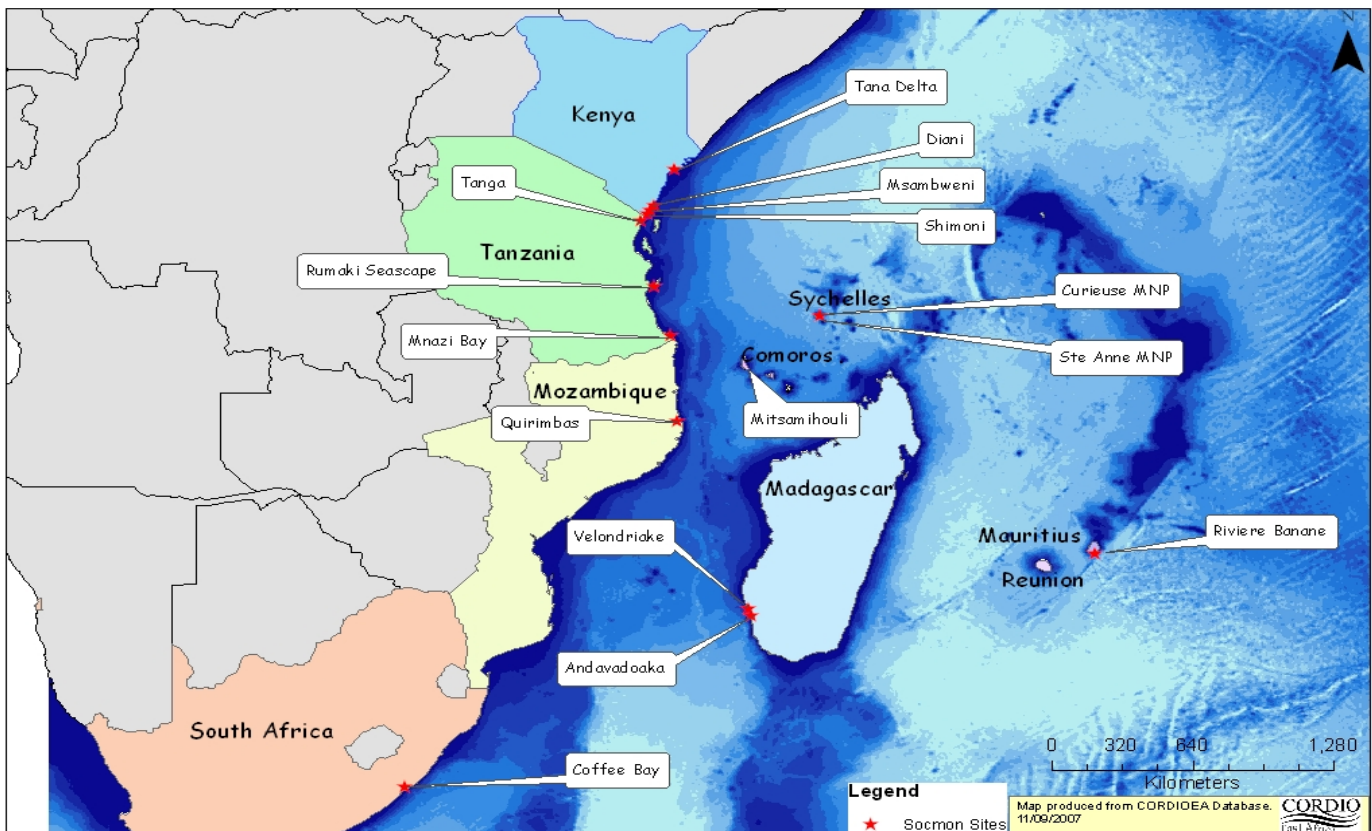


Figure 7: Western Indian Ocean Regional Map of SocMon Sites. Map created at CORDIO East Africa 2007.



Trap fisher on dhow boat in Pemba, Tanzania. Photo courtesy of Innocent Wanyonyi.

recipient organizations struggle to integrate a socioeconomic monitoring process. Although SocMon has been active since 2005, capacity building and the development of tailored adapted monitoring programs for the different kinds of organizations has been slow. Sites have articulated the importance of increasing managers' ability to use socioeconomic monitoring information to make decisions.

What common trends are we seeing in socioeconomic factors?

Most assessments have focused on coastal activities, occupations, variables related to the use of marine resources (from gear to markets), perceptions of resource conditions, problems and solutions, perceived level of impacts of activities, compliance, enforcement, awareness of rules and regulations. A few sites have also investigated material style of life. The focus has strongly been on fishers, some sites have expressed the need for them to extend monitoring to other stakeholders, especially those who influence fishers' activities such as fish buyers and exporters.

% of residents involved in fishing

There are marked differences in the dependence of SocMon WIO sites on fishing.

The highest dependence is found in Quirimbas, Mozambique and Adavadoaka, Madagascar, where over 80% of households in each community depend on fishing. These are also the two most remote sites, with limited infrastructure and tourism activities, and few opportunities for other resource based activities to be carried out, such as farming.

For other WIO sites where main source of income and main occupation have been asked through household surveys, about of a third of households depend on fishing (fully or partly for their livelihood). If fish trading and other fisheries related activities are included this increases to 35% (for the sites where this was investigated) and if all marine dependant activities are considered (this was done in 3 sites) then the percentage increases to 40%. Most commonly, households depend on a variety of activities for income.

% of residents involved in tourism industry

For most of the SocMon WIO sites, tourism is not yet a significant economic contributor; however tourism is considered as a potential alternative livelihood option. Although tourism has been developed at a number of the WIO sites, community employment in tourism has not always been clearly investigated. One exception

Case study: Alternative livelihood development at Riviere Banane, Rodrigues, Mauritius

By Sydney Perrine, Shoals Rodrigues



Focus group conducted in Riviere Banane Community, Rodrigues.
Photo courtesy of Sydney Perrine.

In response to the recent decline in fish stocks in Rodrigues, four marine reserves will be created in the northern lagoon, the first of which is at Riviere Banane (see map). Shoals Rodrigues, a local NGO, recognized an urgent need for socioeconomic monitoring to complement biological monitoring, which was ongoing since 2002. In 2006, Shoals Rodrigues, with technical assistance from CORDIO East Africa, completed a socioeconomic assessment using the SocMon methodology in Riviere Banane. The main objectives of this study were to formalize and add to existing knowledge on fishers' attitudes and to establish baselines for future monitoring activities.

Recommendations for management

The results confirmed that fishing is very important within the Riviere Banane community and the establishment of a no-take marine reserve in the region will have an important financial impact on a number of households. The need for alternative livelihoods was identified as a priority. The community is concerned that tourists spend little time in their village. The recommendations were as follows:

- Develop an alternative employment scheme for fishers displaced from the marine reserve, including new training opportunities
- Develop tourism in the area to provide greater benefits to the local community
- Better enforce fisheries regulations to prevent illegal fishing activities
- These recommendations were presented to local decision makers, regional/national decision makers, local community members, and the media.

Management results

Shoals Rodrigues together with the fishing community of Riviere Banane have worked together to develop two alternative livelihoods projects for fishers. These are: (1) an eco-tourism project taking tourists out on a glass bottom boat and (2) a small-scale animal husbandry project. In response to concerns over enforcement identified in the SocMon assessment, local government has decided to post a 24-hour patrol over at Riviere Banane Marine Reserve.

The local government is being very supportive in helping the fisher community in land leasing and giving them support in term of providing the animals. As such, it was easy for Shoals Rodrigues and the fisher community to successfully secure funds for the project. Informing people about the results of the surveys helped the decision-making process by the local assembly. Future plans include conducting a follow-up SocMon study to evaluate the impacts of these projects on the fishing community.



Tandilo fishing in Mnazi Bay, Tanzania. Photo courtesy of Innocent Wanyonyi

is Diani, Kenya, where 23% of households are involved in tourism related activities, such as working as beach operators or boat operators.

Perceptions of resource conditions
 Perception of resource conditions has been investigated by sites at the household or community level. Of the four sites that have investigated perception of coral conditions, results are available only for two. Respondents in Rodrigues have indicated that their coral reefs are medium to good while Comoros respondents feel their coral reefs are in medium to low condition.

Others have investigated the change in fisheries resources in general terms. These are perceived as being in a poor or average state (in some instances having declined despite the establishment of an MPA). Two sites have investigated perception of conditions in relation before and after MPA establishment. In both cases, fishers' perceptions are that resources are either the same or have worsened since implementation of the MPA. Only in very specific villages within each site has there been a feeling that resources have improved in conditions. This may be due to fishers having had to shift fishing efforts to a location that is less productive.

In both sites, people have modified their behavior and gear use to comply with regulations but have not seen yet the benefits in terms of catch. In Mohéli, Comoros, for example, women have stopped fishing. But in most of these communities there is a lack of alternatives to fishing as sources of income.

Perceived threats to marine and coastal resources

Threats to coastal resources have been investigated through surveys and focus groups and the most commonly mentioned threats are illegal fishing, including poor enforcement of fishing regulations and poaching. Pollution and poor waste management are also major threats, especially for islands. Additionally, certain species such as turtles and dugong are perceived as threatened.

Support for marine protected areas

Community support for MPAs was investigated in three sites where MPAs are in varying stages of management and development, so regional conclusions cannot be drawn. In Comoros, despite resentment against the park and its lack of enforcement there is recognition that some positive aspects emerged from its establishment, especially in terms of empowering local communities to

Case study: Creation of Velondriake Community Protected Area, Madagascar

By Gildas Andriamalala, Blue Ventures Conservation, <http://www.livewiththesea.org>

Coastal communities in the remote region of Andavadoaka, southwest Madagascar, are entirely dependent on marine resources for subsistence and income, and have close cultural ties to the region's coral reefs, mangroves and related ecosystems. Following the success of a series of trial fisheries no take zones developed in the region since 2004, 23 villages in the area are now working together to create Velondriake, a locally-managed marine and coastal protected area covering over 800 square kilometers of marine and coastal habitats. Baseline socioeconomic data are critical to the process of creating, zoning, monitoring and managing Velondriake, and a SocMon program has been developed to support the creation of the protected area. This program was initially carried out in nine Velondriake villages.

The SocMon study has made the following recommendations and conclusions, which were presented to decision makers at local, regional, and national levels, as well as to local community members, scientific and NGO partners, and the media:

- Management should focus first on high-value resources, such as octopus, sharks, sea cucumbers
- Alternative livelihoods need to be explored through partnerships with NGOs
- Management efforts should be focused at the village level, as environmental and socioeconomic conditions vary among villages
- The government should engage the community more to increase understanding of and compliance with fishing regulations
- Local and regional communication and information dissemination will be crucial to Velondriake's success

Management impacts from SocMon project:

- Communities are more involved in the monitoring of their resources, including habitats and fisheries, as a result of introduction of an extensive multi-disciplinary participative monitoring

program, developed by partner NGO Blue Ventures.

- In response to the alternative livelihood recommendations, NGO partners and the local managers successfully obtained funding for a sea cucumber farm which will be managed by local communities, with hatcheries being built in four Velondriake villages.
- Environmental education and awareness has increased; local managers now work closely with NGO partners and newly-created local youth environmental clubs to raise awareness in all villages within the Velondriake area.
- Compliance with legislation governing resource use has increased; local managers and the regional fisheries controllers are working together to raise awareness about local and national fisheries laws and regulations.
- Baseline SocMon data have been used for to advise improvement of management effectiveness and compliance with the local laws implemented to govern resource use within Velondriake.
- SocMon results were included in the proposal needed for the government's approval of formal creation of the Velondriake protected area. Velondriake's status as the first community-managed marine protected area of its kind in Madagascar has greatly increased the government's attention to Velondriake, as well as the national and international profile of the project.

Future Plans

Future plans include expansion of socioeconomic assessments to all remaining villages within the Velondriake area in 2009, and continuation of assessments in the long term to measure changes over time. Recommendations have been made for translation of the SocMon WIO Guidelines into Malagasy to facilitate community training in socioeconomic monitoring.

make management decisions in relation to fisheries management. However, since external funding has stopped, the park has regressed to a paper park and is not enforced. There is a feeling that conditions improved when the park was established due to development of alternative livelihoods and training but has declined since its inactivity. In Quirimbas, five years established WWF established an MPA, an average of 45% indicated a medium level of satisfaction with the establishment of MPA establishment, while only 32% of respondents are happy with the MPA.

How has socioeconomic information been used for management?

In the WIO region, SocMon data is commonly used for management due to the design of the local projects, which include participation from the local site authorities. For example, in 2005, in Mkunguni in Msambweni, Kenya, CORDIO East Africa teamed up with the Kenya Fisheries Ministry to conduct a socioeconomic assessment to assess the impacts of various fishing methods on incomes and educate fishermen on need for conservation based resource use. As a result, the recommendations on gear use and organization of artisanal fishermen are now being incorporated in the draft policy and the Fisheries Act which guide the management of the fisheries resource in Kenya. The Fisheries ministry supports the initiative of SocMon as a monitoring tool. Fishermen need to be involved in making policies based on practical issues derived from data on the ground. Additional examples of use of SocMon data can be found in the two case studies in this chapter.

What are the common management recommendations?

Common management recommendations coming from SocMon WIO sites are:

- Increase stakeholder participation in management and empowerment—stakeholders are looking for more effective ways to engage.
- Increase awareness, education and target awareness raising strategies. Despite strong knowledge among fishers

about marine ecological processes, connections between users' actions and resource conditions are not always made. Awareness of rules and regulations should be targeted as well.

- Develop alternative livelihoods and strengthen tourism as a viable livelihood opportunity. However, SocMon data indicate key factors to consider when looking at potential livelihoods (infrastructure, culture, existing activities).
- Increase focus on enforcement by working with stakeholders.
- Strengthen and build upon traditional systems for decision-making and management at the community level to be more effective when there are opportunities, such as in Comoros and Madagascar.
- Build capacity at community level to monitor and take action.

What factors facilitate use of information for management?

For effective uptake of the information, it is essential that SocMon results provide information relevant to national research priorities identified by a national body (e.g. Tanzania's National Environment Management Council). In the WIO, access to information at national level is most important because it has relevance beyond the site level. Harmonising the information at the national level will create access to anyone who needs socioeconomic information at national policy making levels (e.g., state of the coast reports).

Seeking partnerships between the different governance levels is also important to ensure that various levels receive information that is directly relevant to them, from local site level (e.g. beach management unit, village environment committee), to project site level (e.g. district, province) to national level.

Engagement in SocMon needs to be at all levels for mainstreaming of SocMon. Socioeconomic data should be available at the sub national level to feed into District Integrated Coastal Zone Management Action Plans. There needs to be more consultation between the site

monitoring team and its relevant District Environmental Officers.

What factors hinder use of information for management?

Socio-economic information is now available in the WIO region; however, issues hindering use of socio-economic information for management and decision making include:

- Sectoral data collection and ownership does not allow access to existing information.
- Decision makers are often biologists rather than social scientists, which creates a lack of awareness on the need for socioeconomic information, especially among top management
- Coverage of the SocMon WIO network does not enable use of SocMon data at the national level (there are too few Socmon sites to make a general statement about the whole coastline in each country.
- Lack of sustainable funding at some sites means monitoring may stop and resumes only when funded through the SocMon WIO coordination
- Institutional frameworks are not set up for adaptive management, so the results and recommendations from socioeconomic monitoring take time to be implemented.
- Lack of capacity in data entry, management, analysis; CORDIO had assumed the each site team had basic computer knowledge, at some sites this was very limited and has resulted in delayed submission of monitoring results and use of these results in management.
- Lack of capacity to produce required reporting and outputs at some sites; sites require consistent facilitation and technical assistance to produce all outputs to target feedback to communities and for project/ institutional reporting and management.

Regional Summary

Of the six SocMon regions, the WIO region has the strongest coordination at the regional level due to a strong commitment by CORDIO to socioeconomic monitoring. However, limited capacity and expertise using computers at the site level has delayed reporting of results from SocMon data collected since 2005. Results for several of the sites are now available and indicate a strong dependence on fishing by coastal communities. Overall, evidence from the sites indicates that resource conditions are worsening in the WIO region, particularly with respect to fishery resources. The most commonly perceived threat to coastal and fishery resources in the WIO is illegal fishing and lack of enforcement. For sites with MPAs, satisfaction with MPAs is generally much lower than in other regions and MPAs are not perceived to have improved fishery resources, which may be due to a lack of compliance with and enforcement of MPA regulations, limiting the effectiveness of MPAs in increasing fishery resources.



Spear fisherman in Western Indian Ocean region.
Photo courtesy of Innocent Wanyonyi.