

Living on the edge

The relation between livelihood practises and the
national reserves resources

A Rocha Kenya
Conservation & Science Report

by

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Marine life is under threat due to the intensive use of the Watamu Marine Park, Marine Reserve, Mida Creek and Arabuko Sokoko Forest. Therefore, research has been done to unravel ambiguities regarding in what extend coastal communities use the reserves and to gain a clear view on the livelihood practises of the study area. This study was carried out in four villages around Mida Creek in the district of Kilifi. These villages are Dabaso, Kirepwe, Mida-Majaoni, and Uyombo. It focusses on the livelihood practises of the villagers, the relation between these livelihood practises and the utilization of the natural resources in the reserves surrounding them. In addition, their attitude towards these reserves, and the awareness among these reserves. In this research data collection is done by semi-structured interviews, key informant interviews, observations, resource mapping, seasonal calendars, and ranking. In order to analyse the findings the program Excel is used to draw graphs and in addition the program Word is used for writing the results down and drawing tables.

This study discovered that the most important livelihood practises in the study area are tourism, selling products, and casual labour. Almost every participant is collecting firewood from Mida Creek or, in lesser extend, from Arabuko Sokoko Forest. The largest pressure lay on Mida Creek since the reserve is used by all villages for the utilization of fishing, collection of firewood, and collection of poles.

The majority is aware of the status 'reserves' from Mida Creek and Arabuko Sokoko Forest, but it has been found that the awareness towards any threats is very low. Compared with the other three villages, it has become clear that Uyombo needs special attention since the villagers are fishing in WMP which is forbidden and the majority is collecting poles and firewood without being in the possession of a permit. Moreover, the attitude towards conservation is negative and conservation activities are not found at all in the village. This report ends in recommendations for the commissioner A Rocha Kenya (ARK), and other organisations working in cooperation with ARK, which might attribute to a (marine) community conservation program.

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List of acronyms	
ASF	Arabuko Sokoke Forest
KFS	Kenyan Forest Service
KWS	Kenyan Wildlife Service
MC	Mida Creek
MCCC	Mida Creek Conservation Community group
PRA	Participatory Rural Appraisal
WMP	Watamu Marine Park
WMR	Watamu Marine Reserve
WTW	Watamu Turtle Watch
WMA	Watamu Marine Association

List of Swahili words	
Askari	Guard
Dhow	A general name for several vessels
Chapati	Pancake made of salt, sucker, water and wheat flour
Makuti	Palm leaf roof cover
Mandazi	Fried bread made from coconut oil and flower
Mnazi	Palm wine
Mzee	Respectful name for a old man
Mzungu	A general name for white people (plural: Wazungu)
Ndomo	Wooden stick with hook to catch big crabs
Shamba	Farming plot
Ugali	Heavy dough made of water and maize flour. Main meal for homesteads

1. Introduction

This research report is written on behalf of Martine Koemans, student of Regional Development and Innovation of Van Hall Larenstein, University of Applied Sciences in order to do a social research in the villages around Mida Creek, Kenya. This research is commissioned by A Rocha Kenya (ARK) and scheduled to be undertaken in the period February-June 2014. The outline of the research is as follows. In the section with Background Information the reason for the research is explained with subjects like research problem, research objective and research question which gives focus to the research. More information about the researched subject is provided in the section on the Literature Review. Methods undertaken are explained in the section on the Methodology, followed by the Results. A discussion is written to find a relation between the literature review and the results. The second last part of this report is a conclusion wherein an answer is given on the main research question and the sub questions. Finishing with Recommendations to A Rocha Kenya, the commissioner of this research.

1.1 Background Information

There has been done much scientific research in the last couple of years in the marine field by A Rocha according to Benjamin Cowburn (Interview, 09-02-2014) and findings shows that the marine life is under threat due to the intensive use of the Watamu Marine Park, Marine Reserve, Mida Creek and Arabuko Sokoko Forest. Although ARK did much quantitative research (Cowburn, 2014), there is a lack of knowledge about livelihood practises and in what way as well as in what extent the coastal communities make use of Watamu Marine Reserve (WMR) and Mida Creek regarding the natural resources. To gain this particular knowledge, ARK asked me to investigate, document, and gain knowledge in de villages surrounding Mida Creek by interviewing inhabitants in this area and report the findings.

This leads to the importance of having a good understanding about the livelihoods practises of the coastal communities and their impact on both Watamu Marine Park, Marine Reserve, Mida Creek, Arabuko Sokoke Forest. If there is knowledge about these impacts there could be developed a program strategies to address potential threats or the other way around to support more existing, sustainable practises.

The research area is located at the North coast of Kenya between Malindi and Kilifi (see figure 1). Mida Creek (MC) is a body of water covering 32km² bordered by three tidal flats and surrounded by mangroves. The bed of the creek is covered with eleven different species of sea grass and it is an important habitat for migratory birds and breeding ground for fish and turtles (Carter 2012). Mida Creek is part of Watamu Marine Reserve(WMR). This is a reserve in the North Coast of Kenya between Malindi and Mombasa. Watamu Marine Park (WMP) is part of a complex of marine and tidal habitats along the Kenya's north coast. It is enclosed by the Malindi Marine National Reserve. Habitats include intertidal rock, sand and mud, fringing reefs and coral gardens, coral cliffs, sandy beaches and the Mida Creek mangrove forest. Marine life attractions include fish, turtles, dugongs and crabs (Kenya Wildlife Service, 2013). Arabuko Sokoko Forest (ASF) is the biggest dry forest in Eastern Africa. The forest is important for 'the conservation and improvement of water supplies, the prevention of soil erosion' (Hoorweg et al, 2000) and an important provider in wood fuel, building pools for the communities.

MALINDI-WATAMU COAST

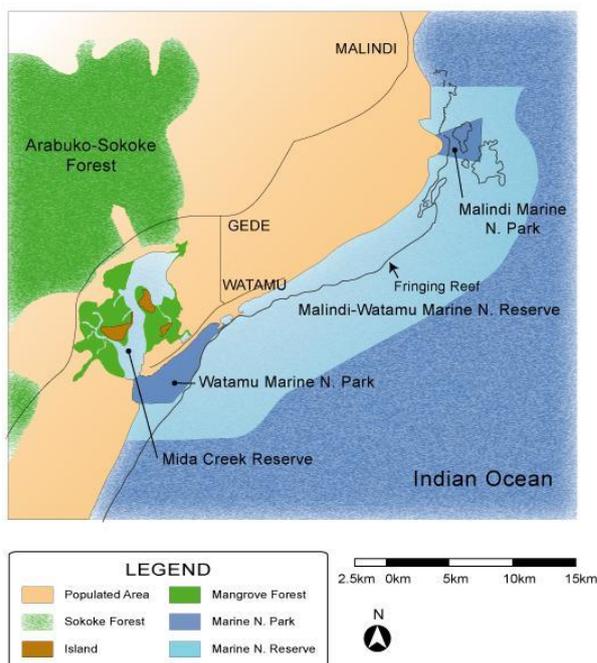


Figure 1: Malindi-Watamu coast and MPA's (ARK, 2013)

1.2 Problem definition

Today, the natural resources are under threat due to the intensive use of the WMP, WMR, MC and ASF by the coastal communities. Currently, there is a limited knowledge by ARK and other local organisations about the livelihood practises, the way and in what extent the coastal communities make use of natural resources.

1.3 Research objectives

The objectives of this research is to investigate the local livelihood practises in four villages surrounding Mida Creek by interviewing locals and applying Participatory Rural Appraisal (PRA) tools. Furthermore, this research report will provide input for a (marine) community conservation program.

1.4 Main question

How do coastal communities benefit from natural resources in the Mida Creek area?

1.5 Sub questions

1. What natural resources are coastal communities using to live?
2. What are the livelihood practises of the coastal communities?
3. What is the perception of the coastal communities regarding the reserves?

2. Literature review

The purpose of this literature review is to find out what the livelihood practises are from either coastal communities in the world as well more refined in Kenyan coastal areas. Starting with different concepts on livelihood, followed by a broader view on livelihood practises including other aspects under the umbrella livelihood in coastal areas, continuing with refining the literature to the research area and finishing this literature review with a framework.

Concepts on livelihoods

To get a more comprehensive view of what the concept is of livelihood practises, a research is conducted. Livelihood is commonly defined as from an economic perspective as a livelihood practise or another way of income generating activity. Allison and Ellis (2001) claims that the concept of 'a livelihood' seeks to bring together the critical factors that affect the vulnerability or strength of individual or family survival strategies. These are thought to comprise, chiefly, the assets possessed by people, the activities in which they engage in order to generate an adequate standard of living and to satisfy other goals such as risk reduction, and the factors that facilitate or inhibit different people from gaining access to assets and activities. These considerations result in the following definition of a livelihood:

A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household. (Allison&Ellis,2001)

Therefore, the concept of livelihood includes thus not only the way of earning income, but it is an umbrella concept which includes moreover the vulnerability context and the ability to cope with the vulnerability of risks, stresses and seasonality influences.

Chambers & Conway (1991) agrees with Allison and Ellis and state: "A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A livelihood which is sustainable can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term (In Carter, 2012)."

Poverty related to the concept

According to the definitions defined above, livelihood is an umbrella concept and therefore this research investigated also the more hidden part of this concept like the social values and the socioeconomic factors.

It seems quite often that there is a relation between communities who are relying on natural resources and being poor. The question is if the literature is emphasizing this too? Freitag (2011) claims that there are four reasons why it seems that these communities are poor. The first is that their economic structure tends to be focused on one extractive resource, often governed by a single company. Which makes the communities vulnerable to natural fluctuations of the natural resources. The second reason is that the natural resource may be poor, third, the production of natural resources has shifted from many independent producers to a concentrated ownership of land and capital, increasing inequality in the community and lastly, the production of natural resources is more industrialized which results in elimination of employees.

Similarly, it could be romanticized that natural resource-dependent communities are closely connected with nature, but more often are these communities misrepresented and generalized as uneducated, underdeveloped and backward while these communities could be rich of indigenous knowledge and rich of experiences (WWF, 2014). It is true that poor communities are still more reliant on natural resources and therefore more affected by declining of natural resources and hence less resilient for natural disasters. However, is this the reasoning to state that natural resources-dependent communities are poor?

Ochiewo (2012) found out that with an estimated number of 62% of the coastal communities in Kenya are living under the poverty line; over-exploitation of natural resources has become a massive problem. This will worsen poverty levels more and more to affect on long term urban migration and population growth. For the purpose of increasing the living conditions, the government's Integrated Coastal Zone Management Scheme provides alternative generating income activities which could reduce the over- exploitation of the coastal areas in Kenya (Ochiewo, 2012). WWF (2014) point out that looking after natural resources makes poorer communities more resilient. Forests, for example, can protect agricultural land and villages from soil erosion and flooding. Mangrove swamps provide protection from storm surges and coastal erosion. Sustainable management of agricultural land provides food for people to eat and sell.

Comparatively with Ochiewo (2012), Radnaweera and Edirisinghe (2010) state that due to the over-exploitation of resources, tourism with mass scale pollution resulting in damaging coral gardens and critical habitats and conflicts in the aquaculture are leading to alternative livelihood practises of traditional fisher families in India and Sri Lanka. This is a process what is not easy for the fisher families since fishery means everything for a small scale fisher living in a fishery community. This includes social processes, power structures, values and beliefs (Radnaweera& Edirisinghe, 2010).

Gender related to the concept

Another example of an important part of the particular research concept are gender divisions and gender roles in livelihood practises. Nowadays natural resources are under threat due to several factors mentioned above. What does this knowledge do with, for instance, disruption of gender relations or hierarchal links when women tries to empower themselves or find alternative livelihood practises in order to survive? Gender roles divers from woman to woman and sometimes even parallel on that from men. Mainly are gender division in labour based on (heavy) physical labour force. For instance in the fishery sector, the women plays a minor role since it is a male dominant activity, although more and more women are getting involved in fishing activities, crustaceans, octopus, fish and sea cucumbers (Ochiewo, 2012). While in beekeeping activities both genders are involves since there are different stages involved like processing and marketing although it still remains a male dominated sector. Traditionally are the men the ones who are harvesting the honey and the women carrying the honey to the villages (Lalika& Machangu, n.d.).

Mitullah (2000) explains that due to Arabic and Islamic influences the gender equality in coastal areas is more unbalanced than in other parts of Kenya (In Hoorweg et al, 2000). The strict Arabic-Islamic values are restricting the behaviour of women. Women are mainly involved with taking care of the household including feeding the children, doing dish washes, cooking and other the domestic chores like shelling, pounding, and grinding grain (Mitullah, 2000). Nowadays, the economical activities of women in coastal areas are broader and includes agriculture, production of crafts, handy craft and midwifery (Hoorweg et al, 2000) while men are clearing the land, harvesting and cash crop farming. In a study done by Maas (1991) women were also found in activities as bakeries, water kiosks, shops, and financial credits institutions (In Hoorweg et al, 2000). Due to the migration of men and the highly rate of divorces, women are forced to both feed their children and generate income by livelihood activities. Since the issue of poverty is high in this area in combination to the high literacy rates and low educational background, bridging the gender gap seems quite impossible. Unfortunately, the women would be always the least priority to invest in regarding education.

Economical sectors related to the concept

Looking to the more economical part of the research at coastal areas different sectors can be qualified.

Fishery sector is the most well known sector at the coastal areas and plays a huge role in employment, trade, and economics (McClanahan& Cinner, 2012). For decades, fishing is one of the major income generating activities. According to Ochiewo et al (2012) the fishery sector in Kenya employs 10,000 people and supply's 95% of the total marine catch and besides of that an estimated number of 60,000 residents depend on the sector. Bush (2013) state that not only fishing, but also

tourism is the main livelihood occupations in the region. The coastal areas of Kenya receive 6% of all the international tourist arrivals of Africa (Ochiewo et al, 2012).

A not very well-known activity in this field is mariculture. Mariculture is established by coastal community-based initiatives and includes finfish-, crab-, and prawn farming. It is a developing field in the Kenyan economy (Ochiewo, 2012, Hoorweg et al, 2000). Although it seems that it is a sustainable livelihood practice, it has environmental concerns too, in particular the crab farming since the crabs are harvested from the wild with a little regard for wild resources and mangrove forests are cleared for the development of prawn farming. Environmental issues on finfish farming are not noticed yet (Ochiewo et al, 2012). Apart from these negative points mariculture has a great potential according to Hoorweg et al (2000) namely, to provide employment for the local communities, produce a luxury product for export purposes, and to exploit a food source.

Not directly the first sector to think about linked to the coast is the agricultural sector. Agricultural activities in coastal areas are important since they provide food and non-food products for both living and commercial purposes. The products produced in Kenyan coastal areas are cashew nuts, bixa, sisal, fruits and vegetables. All being produced for export purposes (Ochiewo et al, 2012).

Another coastal economical sector is coastal mining. Coastal mining is not a dominant sector in the Kenyan economy although 50% of the salt is obtained from the ocean (Peninah, 2000); however the environmental issues as erosion from salt and coral mining could cause problems in the nearby future. Additionally, it seems that the large mining companies around Mombasa are providing both in fulltime employment and in community development which includes refurbishment school buildings and an educational program (Ochiewo et al, 2012). This could be a beneficial development for the coastal communities.

Not only marine ecosystems on the coast are under threat, also forest loss and fragmentation are a widely spread issue in coastal forests. The continued forest loss is a combination of imbalance between human needs and natural capacity. This is no exception in the Lindi coastal region in Tanzania. In this region beekeeping is an alternative livelihood activity explored by the community. Apart from the fact that beekeeping increases the income of the households since people use honey as food, medicines and for sale, it ensures moreover biodiversity conservation (Lalika&Machangu, n.d.).

Seaweeds and sea grasses are another marine resource with a rich potential regarding livelihood practices. Peninah (2000) did a study on the usage of seaweeds and sea grasses and found out that 'along the Kenyan coast, seaweeds can be cultivated for commercial purposes. Some of the suitable farming areas include the shallow bays of Mida, Mtwapa, and Gazi (In Hoorweg et al, 2000). Seaweed is one of the oldest resources from the sea used for products such as, food, fodder, medicines, fertilizer, and mattresses. Studies show that the Kenyan coast has great potential of seaweed production (Wakibiya& Oyieke, 1992, In Hoorweg, 2000).

Background to study area

Refining the research more to the study area namely the surroundings of Mida Creek, Kenya. As already mentioned in the literature above is that mangrove forests offer opportunities and benefits to the coastal communities in terms of food and beverage, fishing materials, building materials, household items, but also services in terms of provision, protection, and maintenance. To emphasize this theory even more, mangrove forests are important ecosystems to even reduce poverty. (Sarker, et al. 2010).

There is an important Swahili saying in East Africa that goes 'Maji ni maisha' which is loosely translated to "water is life" in English. (Coas, n.d.)

As Coas (n.d.) already claims with its Swahili saying is that water is life, the coastal ecosystems are important for the livelihood since they provide a wealth of goods and services that have underpinned human activity for millennia (Topopova et al. 2010 in Carter, 2012). These ecosystems are made up of

a diverse range of habitats, including coral reefs, mangrove forests and sea grass beds, providing habitats for a vast array of marine life. Coral reefs and mangrove forests are critical fish breeding sites and provide protection against coastal erosion and storm surges (Wilson et al, 2008, in Mc Clanahan & Cinner, 2012).

Carter (2012) did a more anthropological study on Mida Creek and says that Mida Creek is a body of water covering 32km² bordered by three tidal flats and surrounded by mangroves. The bed of the creek is covered with eleven different species of sea grass and it is an important habitat for migratory birds and breeding ground for fish and turtles (In Bush 2013). It was designated as a marine reserve in 1968 alongside the neighbouring Watamu Marine Park. Fishing is allowed in the reserve and Kenya Wildlife Service is responsible for enforcing fishing regulations. There are 11 villages with landing sites bordering the creek, with an estimated population of over 9000 in 2011. The people living near the creek are mostly Giriama, a subdivision of the Mijikenda (Giriama, Kauma, Digo, Duruma, Rabai, Ribe, Kambe, Jibana, Chonyi) and until the 1950s rarely engaged with fishing. Moreover, natural resources like the mangrove forests are decimated in the process they are stripped for fuel wood or timber or burnt to make way for more crops. Soil depletion, species extinction and poverty and hunger are the typical consequences (Carter 2012).

Near the Creek is Arabuko Sokoke Forest (ASF) located. This forest is the largest coastal dry forest remaining in the East African Lowlands (Hoorweg et al, 2000, KWS, n.d.) which originally stretched out from Mozambique to Somalia (ARK, n.d.). The forest is important for 'the conservation and improvement of water supplies, the prevention of soil erosion' (Hoorweg et al, 2000) and an important provider in wood fuel, building poles and buildings for the communities. Besides of the benefits for the local communities, ASF is rich to many endemic and rare species. Nowadays, the forest is under threat by illegal logging, land clearance and poaching (ARK, n.d.). Traditionally, communities were dependent from resources of the forest to survive, but due to strict limitations on the resources the communities felt alienated from the forest. If both, habitat and communities, want to survive it is important that 'local people must benefit from the conservation' (ARK, n.d.).

Unfortunately, there is no data available in what extent the coastal communities use the reserves around the Creek and limited data available what the livelihood practises are of the local communities. There are some ideas and assumptions about the livelihood practises like, according to Alemayehu (2013) the communities in Watamu-Mida creek area generate their income directly or indirectly from tourism related activities. Activities which provide revenue are direct employment from hotels and private residents, self employment such as boat operation, curio vending, and safari selling. Fishing also plays a major role in generating direct income for these communities. In addition, the livelihood practises related to the Creek and Reserve in the coastal communities, according to Jackson Mamube, chairman of MCCC in an interview at 20 February 2014, are mainly fishing activities, bee keeping for the honey, (eco) tourism and firewood collections from the wood.

Conclusion

The concept of livelihood includes not only the way of earning income from economical perspectives, but it is moreover an umbrella concept which includes the vulnerability context and the ability to cope with the vulnerability of risks, stresses and seasonality influences. Three main topics related to the concept of livelihood are highlighted namely, poverty, gender and economy. Poverty is still an urgent issue in the coastal areas and influences the coastal communities through antagonizing development. By taking care of the natural resources communities are more resilient and able to cope with vulnerability. Likewise the gender issue, coastal communities in Kenya are influenced by the Arabic-Islamic culture and hence, women are more restricted in their behaviour than in other parts of Kenya. While nowadays men are out-migrating and due to the high divorce rate, women have to cope with taking care of both households and generating income. Which lead to broader livelihood activities and usage of natural resources of women. The last topic is an economical topic. Several economical activities are noticed in the coastal areas which are using the natural resources.

These economical livelihood activities are among others (artisanal) fishery, (eco) tourism, mariculture, coastal mining, beekeeping, and seaweeds- sea grasses cultivation. These are comparable with the livelihood practises of the coastal communities around Mida Creek, Watamu Marine reserve and Arabuko Sokoke Forest.

Based on the literature review above, a framework is established. This framework will be used while designing the semi-structured interviews (SSIs) and choosing the appropriate PRA tools.

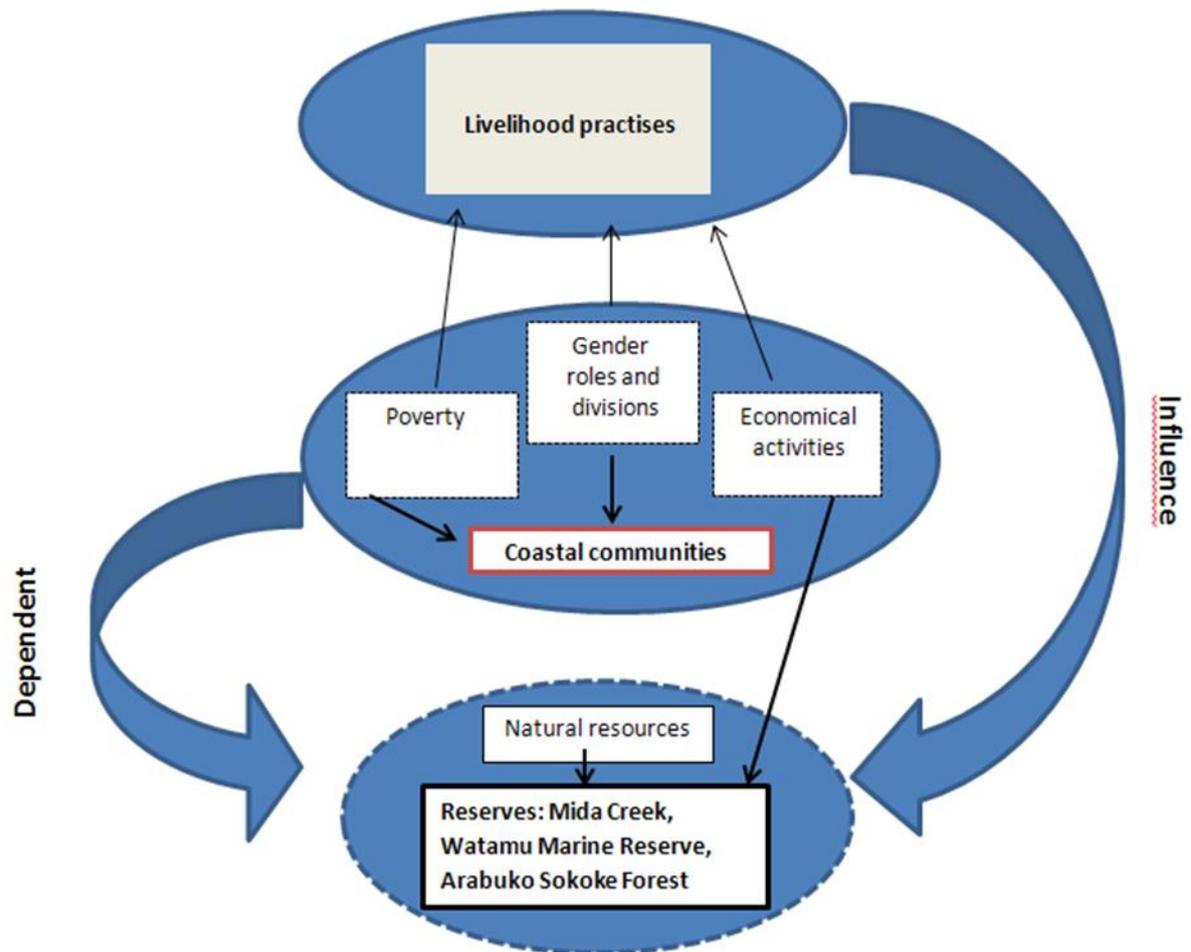


Figure 2 Livelihood practises Framework. Coastal communities are influenced by poverty, gender roles and divisions. Economical activities and livelihood practises influencing the reserves, but at the same time the coastal communities are dependent on the reserves by means of the usage of the natural resources.

3. Methodology

3.1 Research design

This qualitative research consisted of a desk research and a field research. The desk study is a study on local livelihood practises of coastal communities from either coastal communities in the world as well more refined in Kenyan coastal areas.

As part of the process, visits are made to all the villages ones, except Uyombo, before starting the field work. Reasoning was an introduction to the villagers, to gain their trust, and to map the area for the selection of the households. To use a semi-structured interview (SSI) to gain qualitative as well as quantitative data was chosen as a interview tool . SSIs enable flexibility and makes the interview setting more comfortable and relax (Carter, 2012) and moreover collecting more information while setting up the interviews. The disadvantage of using SSIs is that it is more time consuming and it is harder to analyse the data than with a more structured interview or survey. Beside SSIs, to gain more in-depth information, I implemented other Participatory Rural Appraisal (PRA) tools such as ranking, seasonal calendar, and interviewing key informants.

'PRA is a methodology of learning rural life and environment from the rural people. Chambers (1992) has defined PRA as an approach and methods for learning about rural life and conditions from, with and by rural people. He further stated that PRA extends into analysis, planning and action. PRA closely involve villagers and local officials in the process.'

The pre visits of the villages showed to be very helpful because when I came back in the villages they recognized me and started to invite me on their shambas or asking for help with pulling weeds. From these pre visits I learned to observe the shambas, which material the houses were build of, the cattle they owned, who were home at which moments of the day and more of this type of information. I used this information in conduction the SSIs.

The research was implemented in the villages Uyombo, Dabaso, Kirepwe and Mida- Majaoni and the pre-selection was made on the basis of different habitats. As can be seen in figure 3, the village Uyombo is situated near WMP, Kirepwe is an island in MC, Dabaso is situated at- and partly in the border of the mangroves and near Watamu, and Mida-Majaoni (landing site originally not on the map) is a village which is situated in the border of the mangroves and the furthest away from the reserves WMP and MC, but the nearest to ASF. It has to be mentioned that the green dots on the map are the fishing landing sites and hence it could give a slightly distorted view of the specific location of the villages.

Mida-Majaoni

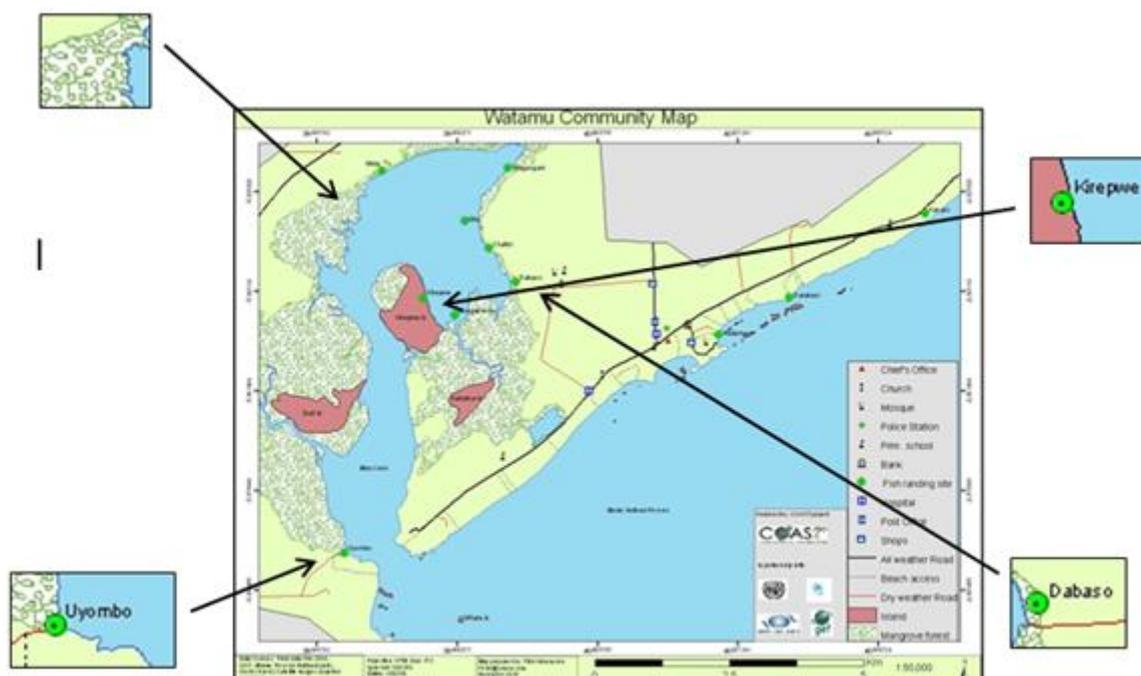


Figure 3 Location of the five coastal communities (ARK, 2013)

Assumable, these different villages in the different habitats are using the WMP, MC and ASF differently from each other. The total amount of interviewees were 40 households in total and in addition, I interviewed one key informant each village too, organised 4 resource mapping activities one in each village and applied 40 ranking activities and drew 40 seasonal calendars.

The surveys and the SSIs were prepared and conducted by myself and slightly modified after feedback of my supervisor and Kirao. We practised the interview techniques on forehand and discussed what to do with the different characters of people and when issues occurred. All the interviews are conducted per homestead therefore the unit of analysis are the homesteads. Carter (2012) defined this homestead as follows: ‘ This (the homestead) consisted of one shamba where an extended family lived together in a cluster of houses (generally close to each other and facing inwards to a central point where people cooked and ate).’

Afterwards presentations about the findings are done in the villages and for the commissioner and stakeholders. In case of presenting the findings for the villagers was important since qualitative data collection is investing in a social network. By returning to the villages it shows humanity and build a more trustworthy relationship for the organisation A Rocha. Presenting to the stakeholders is a way of sharing knowledge. Cooperation is one of the key actions in development work and sharing knowledge, involving each other in the activities will strengthen the forces and power.

Fieldwork colleague

I worked closely with my colleague fieldworker Kirao L. Kithi, a locally born and an environmental science student at the Pwani University who speaks fluent Kigiriana, Kiswahili and English. He was my interpreter and helped me with the implementation of the fieldwork. To keep the cultural gap between Kenyans and *Wazungu*¹ as small as possible we introduced ourselves as two students who wanted to learn from the participants. Moreover, that we had to experience in a practical way what we have learned in theory at our Universities. We also introduce ourselves as a team instead of me, as Mzungu, with her Kenyan assistant because I was sure that

¹ Swahili word for white persons (Singular Mzungu)

doing it this way we reduced the gap and gain easily the trust from the participants. During the research Kirao showed to be a major help not only in terms of using his social network which we often had benefit from, but also in his social skills convincing people to participate, gaining their trust and breaking the ice. Beside of these abovementioned points, Kirao indigenous knowledge helped me several times to understand and to ground my interpretations within the local context.

Ethnical considerations

Eager to follow traditional manners, research permission was gained by KWS (Kenyan Wildlife Service) and MCCC, an influential conservation organisation at Dabaso and Kirepwe, and by the village elder of Mida-Majaoni. At each homestead we introduced each other in a traditional manner by explaining who we are and the purpose of the conversation (we avoided professional jargon). Afterwards, we gave an appropriate gift of 1kg Ugali flour and 250g of sugar. Just to show our appreciation of their time and effort. Providing gifts is a subject that must be considered on forehand very carefully. Paying money or bringing gifts could encourage participants to give false information and furthermore, it could give problems in collecting further data without certain expectations (Carter, 2012). Conversely, I decided to give a small gift of the abovementioned products since it was rainy season which means planting time on the *shambas*². The villagers had to make time for us and since the SSIs lasted between 45 minutes and 1.5 hours, I decided, after discussing this issue with my colleague Kirao, to give an appreciation gift for their time and effort. We never mentioned this gifts on forehand since we did not want to obtain false information and especially we did not mention this when they asked specific for benefits or payments before agreeing on participation. In the end we were refused just ones in Dabaso by a *mzee*³ who was, assumable, afraid to be not able to give answers on the 'difficult' questions from us as students.

3.2 Data collection

The data is collected by carrying out a semi- structured interview (SSI) about the livelihood practises, the usage of natural resources of the reserves, and the personal perception of the villagers. In addition to that a ranking tool and a seasonal calendar were used to obtain more in-depth information about changes in livelihood practises during the year and the importance of the livelihood practises. Key informants from the villages gave a more broadened information in general about the topics and lastly drawing resource maps with a group of villagers obtained insight view of gender related use of natural resources and where the resources coming from.

Desk study

The data collection of the literature review was done with the use of articles on the internet, books, digital journals and magazines. Furthermore, by oral conversations with Steve Trott (WMA), Rachael Oman (WTW), Kenya Wildlife Service, and Jackson Mamube (MCCC) exchanging knowledge and experiences for more background information and as a fundamental basis for conducting the tools.

Selection of the homesteads

I made the pre-selection of the households while preparing the field study as follows. For each village I wanted to number the households in the villages and to pick blindly the numbers out of a bag. To pick some extra numbers out of the bag as reserve in case the households are not there at the moment of arrival. To avoid that I was reaching more women than men or the other way around by doing the interview on a certain moment on a day, I wanted to divide the interviews moments in morning, afternoon, and evening moments. Already before I started the implementation of the fieldwork I found out that at 7 pm the darkness is all over Kenya therefore, working in the evenings was not possible due to several reasons that most of the homesteads do not have electricity and go to bed early and for security reasons. Also, the pre-selection as I had planned was too much time consuming since when I was in the villages for a pre-visit I discovered that it was very hard to distinguish the different homesteads and to number them for the selection. I made a new plan of action because it was too time consuming to find a villager taking me around explaining every homestead and the time I planned for the pre-visits was limited therefore, I decided that it was more important to spend time with socializing with the villagers and to get to know them than to spend too much time on finding a villager who was taking me around. Thus, I decided to change the method as follows. By entering the villages we went left and took the 1st

² Shamba is a farmer plot

³ Mzee is a respectful name for an older man.

homestead on the left side, followed the other unequally numbered homestead on the left house. When nobody was at home or refused working with us we took the next homestead. When the road ended we continued with going left and if that was not possible we took the other side of the road taking the unequal numbered homesteads.

Data collecting from homesteads

While implementing the SSIs I made use of the ranking tool and the seasonal calendar tool too. The aim of drawing a seasonal calendar was to learn about changes in livelihoods over the year and to show the seasonality of how their activities change and which habitats they utilize during different seasons, and the aim of the ranking tool was to find out what in their opinion is the most important livelihood practise for their homestead. The SSIs is conducted by the way of field research in the four villages surrounding Mida creek. The art of interviewing is not easy, but we grew into this every interview better and better also as a team. With the SSIs I distinguished myself from other researchers in this area and also to include the village Uyombo in my research. Previous researchers avoided to go to Uyombo. Only one reason is known, telling that the area chief was charging to much money per homestead, but Uyombo is situated in a remote area assumable that it is to far away for travelling. The SSIs proved to be very useful for the collection of data and gave me a good inside view of what the livelihood practises are, for what purposes they used the reserves, and what their perceptions were about the reserves. This last part was a sensitive topic which could not asked directly and therefore, we asked this questions in another order such as, *would it be a problem when the access to Mida Creek (or another reserve) was forbidden? And why?* Still we had to be very alert since, for example, selling coconuts or making and selling makuti are not seen as livelihood practises, but when we asked further we found out that selling coconuts was one of the most important generated income. Observations while implementing SSIs has shown as very useful. An example of a situation: we got many times the answer *no* on the question if they were fishermen, but if I discovered a fishing net hanging in a tree and asked who was using that net then the answer was quite often: *'Ah that one? The boy goes in the weekend sometimes'*. Further probing on this shows that *the boy* goes fishing three times a weekend and in the holidays every day, fishing 2kg fish in the weekends and 4 kg fish in the holidays. Which makes a huge difference seeing the total kg of fish in the bigger picture. The ranking tool gave an overview of which livelihood practises are the most important one and the reasoning behind the choice. Since it was difficult to process al the different rankings, a group ranking will be more convenient next time. The seasonal calendar, on the contrary, showed to be very convenient since it gave a clear view on the seasonal changes in the usage of the reserves.

Resource mapping

Next to the SSIs as supportive tool, I implemented another Participatory Rural Appraisal (PRA) tool namely the natural resources mapping to find out what kind of natural resources are found in the community and how the villagers use the natural resources. I made use of natural material such as, sticks, open spaces on the ground, leaves, and stones to implement the PRA tool for two reasons namely, a budget based reasons and, in my opinion, the villagers are more familiar with this method than working with pen and paper. Although, according to my colleague Kirao, it might that the adults maybe refused this method since normally the children are the ones who are drawing on the ground. I decided that when I found out this would be the case, I would change my methods because I do not want to embarrassed or ashamed people and moreover I do not want that it influence the outcome of the tool. But while implementing this tool I found out that it was not a problem at all. The data collected by the resource maps was mainly focussed on gender and were the natural resources could be found in and around the villages. Another subject discussed by the villagers were conservation issues. We always sought a gender mixed group preferably with an even numbered amount of male and female. On forehand Kirao and me discussed if we had to split the group into two groups categorised by gender, but the cultural norms allows women to speak and express themselves in the vicinity of men. Hence, we decided to put them together in one group.

Key informant surveys

In every village we did a key informant survey. Most of the time it was an elder of the village. Sometimes we chose for the particular person on forehand and sometimes we just decided to take him as a key informant at the moment we reach his homestead. It was not on forehand decided to chose only for men instead of woman, but the guideline we set up on forehand was that it should be a person who has a broad overview about the livelihood practises of the villagers, following the quote below:

‘Key informants are purposely selected community members who are able to provide information on a particular research topic based on their knowledge, skills or experience with that subject. Because it is not possible to speak with everyone in a community, individuals with experience on the research topic are sought.’(IIRR in Methods 2, p 61)

Thus, this could be a village elder or a person who lives for a long time in the village. The data collected by these key informants was mainly focussed on the livelihood practises of the villagers, in what extent they made use of the reserves according to them and what the solution could be on any mentioned problems.

Key expert informant surveys

In order to gain more knowledge from experts in this area working with this issue, I planned to implement key expert informant surveys. This failed since many experts in the area were or not responding on my emails or did not return the surveys. Change the plan of action was considered after this problems occurred to send reminding by email and visit the organisations, but in the end it was more time consuming than valuable for the research and therefore my supervisor and I decided to leave this part out.

3.3 Data processing

Processing qualitative data is different from processing quantitative data. For some reasons analysing programs as Atlas.ti, R and SPSS were not used in this research. Despite of this I had to process the data in a different order. By counting and labelling the most common words from the elaborating notes I got an idea of, for example, which reserve was more important for which villages or which natural resource was used the most compared between the villages. By gaining not only qualitative data, but also quantitative data I could make graphs in Excel. After every three days of fieldwork I transcribed the interviews in a Word document to ‘ruminate’ figuratively the data and analysed them in how to proceed them. In the very beginning I made a template structure with numbers and every SSI was elaborate in this order. Therefore, I created more clearness for myself to analyse the data and also to ensure that I did not forget to add any part of my notes.

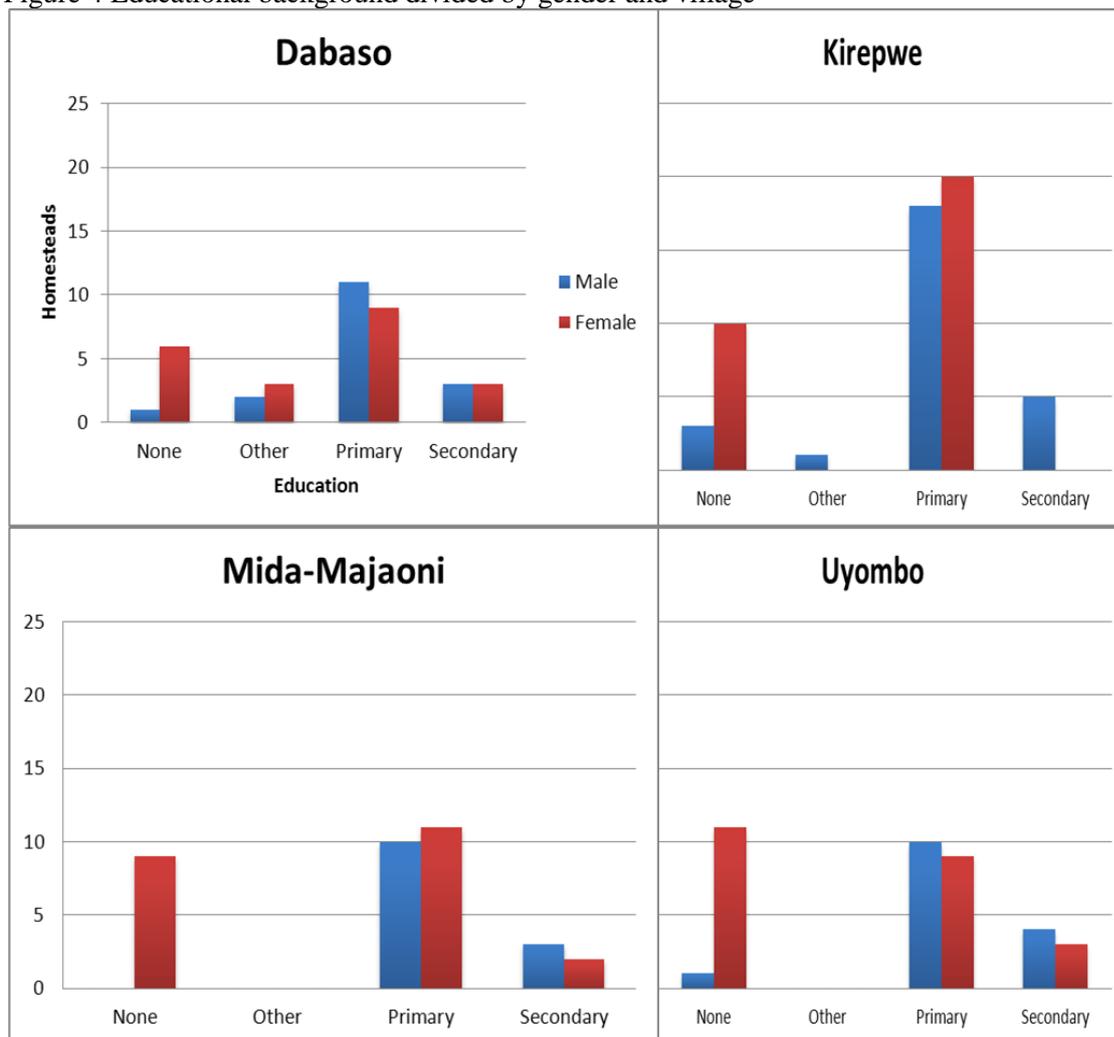
4. Results

4.1 Homestead description

I applied the SSIs, ranking tool, and seasonal calendar in 40 homesteads in four villages around Mida Creek covering 469 people. The average homestead size including children was 11,7 people. 60% of the total participants representatives themselves their ethnicity as Giriama, 12,5% as Shanya, 2,5% Duruma, 7,5% Kauma, 10% Chonyi, 5% Kambe and 2,5% Rabai.

The education background is shown in figure 4, categorised by gender and village. As could be seen is that in general women are lagging behind if it becomes to educational background since the majority of women has or no educational background or reached to primary level compared with men who have reached secondary school and even a higher level.

Figure 4 Educational background divided by gender and village



4.2 Occupations

Introduction

From the data obtained from the SSIs regarding the occupations it was possible to determine which livelihood practises there are (table 1) and which ones the most important are for generating income by using the ranking tool (table 2). Some of them are overlapping each other especially the ones of small business and tourism. To gain a good overview of all the livelihood practises they are categorized in table 1.

Table 1 Major source of income in the study area

Categories	Individual source of income
Tourism	<ul style="list-style-type: none"> • All formal employment • All self employment related to tourism
Fishing	<ul style="list-style-type: none"> • All income generated from fishing and fish trading
Selling products	<ul style="list-style-type: none"> • Coconuts, palm wine, fruits, makuti • Mandazi/chapatti⁴
Small businesses	<ul style="list-style-type: none"> • Types of small business not related to tourism • Piki piki motor taxi • Café
Casual labour	<ul style="list-style-type: none"> • All types of casual labour such as carpenter, construction worker, painter
Government jobs	<ul style="list-style-type: none"> • Jobs related to the government: • Teachers • Askari (guard) • Etc.
Other	<ul style="list-style-type: none"> • Remittance • Support from family members who are not living in the area

In Dabaso tourism is ranked as the most important income generated source. In Mida-Majaoni and Uyombo is selling products the most important one and in Kirepwe is casual labour ranked as the most important livelihood practise.

Table 2 Most important livelihood practises ranked in the study area

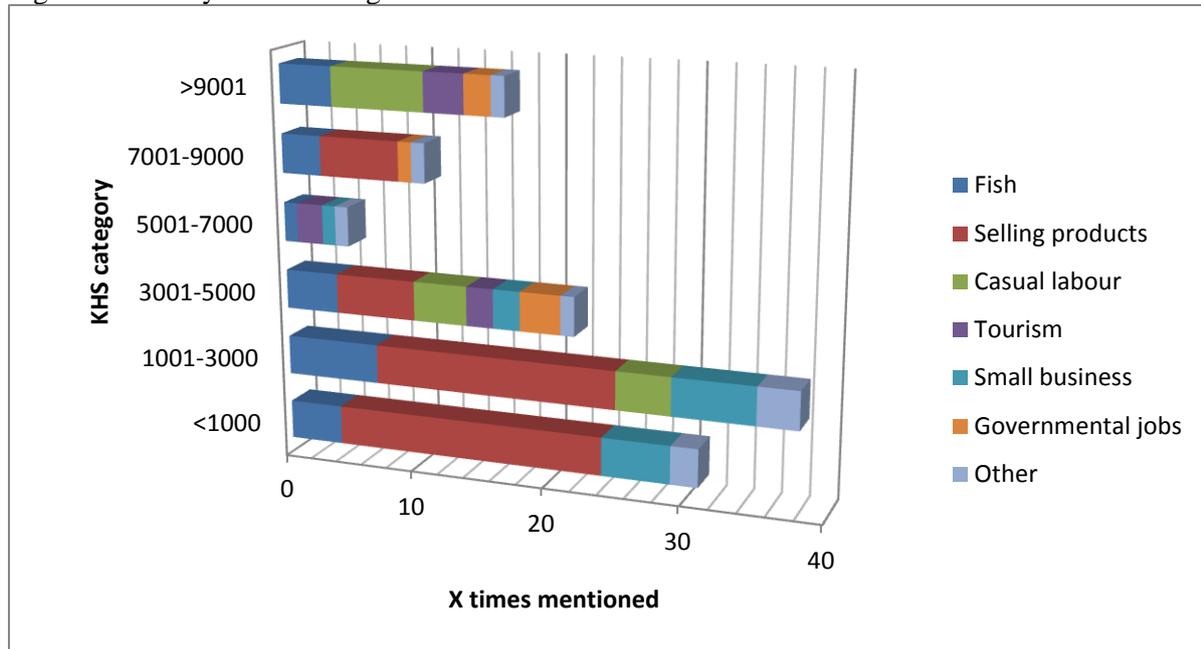
	Dabaso	Mida-Majaoni	Uyombo	Kirepwe
1	Tourism	Selling Products	Selling Products	Casual labour
2	Casual labour	Selling Products	Selling Products	Selling Products
3	Casual labour	Selling Products	Fishing	Selling Products
4	Casual labour, selling products, fishing, small business	Selling Products	Selling Products	Selling Products
5	Fishing	Selling Products	Selling Products	Selling Products
6	-	-	Others	-
7	-	-	Selling Products	-
8	-	-	Others	-

Reasons given for doing this livelihood practises vary. For selling products the participants gave mainly the reason that it can be easily combined with household activities since the products are sold at home and because the people know how to do it, learned from generation to generation. For casual labour reasons are given that it gave more consistence in generating income. Reasons for fishing and trading the fish is because the villagers are living very close to the natural resources. Lack of education was also mentioned as a reason especially for low level jobs. Almost every homestead were doing substantial farming activities such as, coconut farming, fruits farming, makuti making and selling, and

⁴ Mandazi is a sort fried bread and chapatti is a pancake made of salt, sucker, water and wheat flour

keeping livestock. The reason for farming activities are to maintain their families, learned from generation to generation.

Figure 5 Monthly income categorized on scale



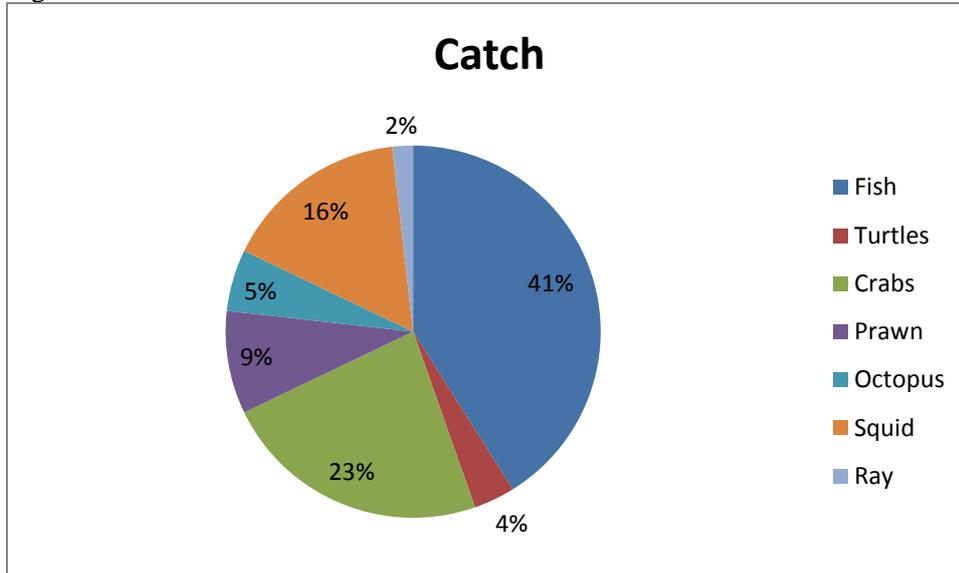
According to figure 5 monthly income for casual labour is scaled in the highest category of more than KHS 9001, earnings of fish are found in every category with a highest score in the category of KHS 1001-3000. Tourism seems also a very good livelihood practise with earnings in the third, fourth and sixth scale. Selling products are mainly scaled in the two lowest categories although, but earnings are found also in the third and fifth category.

Furthermore, the monthly income (fig. 5) is based on the amount of money earned in high season. High or low seasons vary for every livelihood practise. The outcome of the seasonal calendar gave a clear view on the seasonal changes in livelihood practises. The majority of fishermen answered that low season is from May till July during the long rains. The creek is too rough by than and the rain and wind make it too difficult for the small dhows⁵, but other fishermen are just taking this opportunity to fish more often in this period since the amount of fish increase and the amount of fishermen decrease. The low season in tourism related jobs are from February till July. In this period they even do not earn anything. The casual labour has seasonality, but it vary for every job within this category, governmental jobs are the only one who are not influenced by seasonality.

Regarding in what extend the homesteads are using the Creek (and to a lesser extend WMR) participants were asked to describe their catch and the daily kg's. Which gears they used was important to know since there were expectations of the usage of illegal gears. The outcome was as follows. The majority of the homesteads of the sample in figure 6 (n=26 of the 40 in total) were entering the creek or the landing site for either fishing or buying fish (fish intermediates). By asking what the catch was the majority of the fishermen answered that the catch consisted mainly of fish, followed by crabs and squid. Turtles and Rays are the last two in row with 4% and 2% caught. Prawns are mentioned to be caught by night mainly.

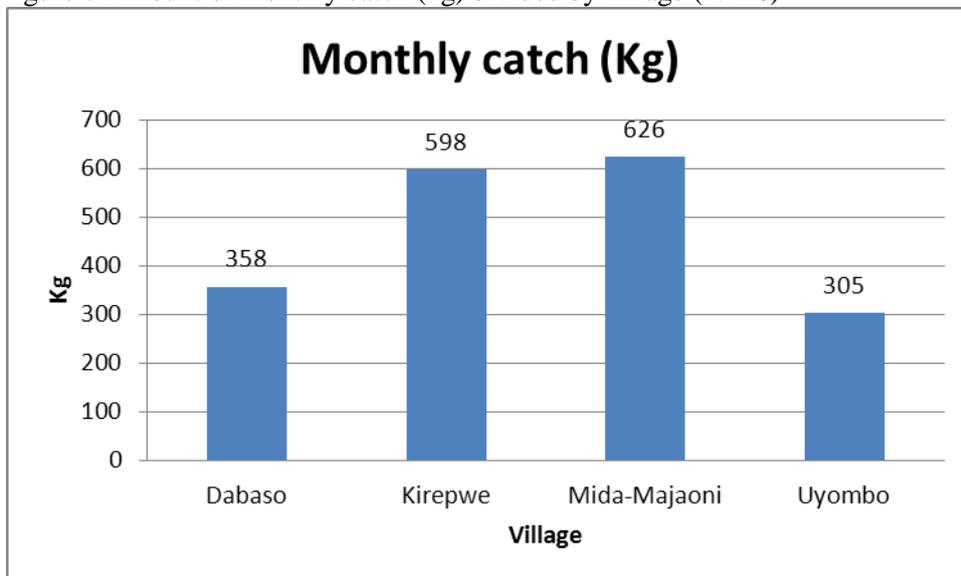
⁵ A dhow is a traditional canoe.

Figure 6 The catch of the fishermen



In addition, what the amount of the catch was, there was asked how much kg the fishermen catch from the Creek divided by the different villages. Mida- Majaoni catch the most with a monthly amount of 626 kg in total, quickly followed by Kirepwe and Uyombo with 305kg catch the least. This means that a total of 1887 kg is caught monthly and 67,4 kg is the daily catch. Besides of the total kg the question was asked which gears the fishermen were using.

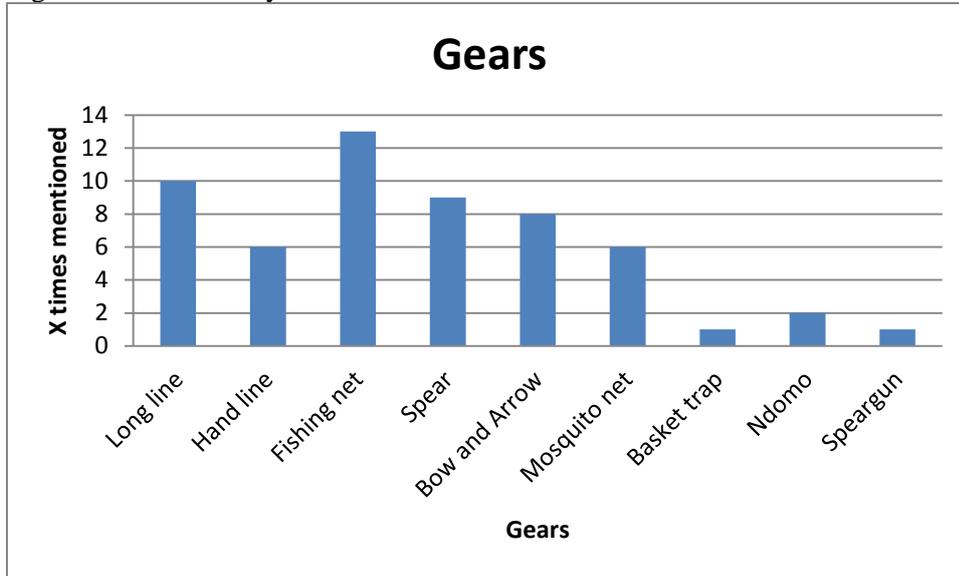
Figure 7 Amount of monthly catch (kg) divided by village (N=26)



Since the gears are related to the sort of catch (fig.8) the fishing nets are the most popular gears. The spear, bow and arrow, are used for catching squid, octopus and crab. Ndomo⁶ is also used for catching crabs. Controversial gears are the spear gun and the mosquito net. The mosquito nets are mainly used for catching prawns or very small fish (juvenile fish). The long line, spear, and bow and arrow are, after the fishing nets, the most popular used gears.

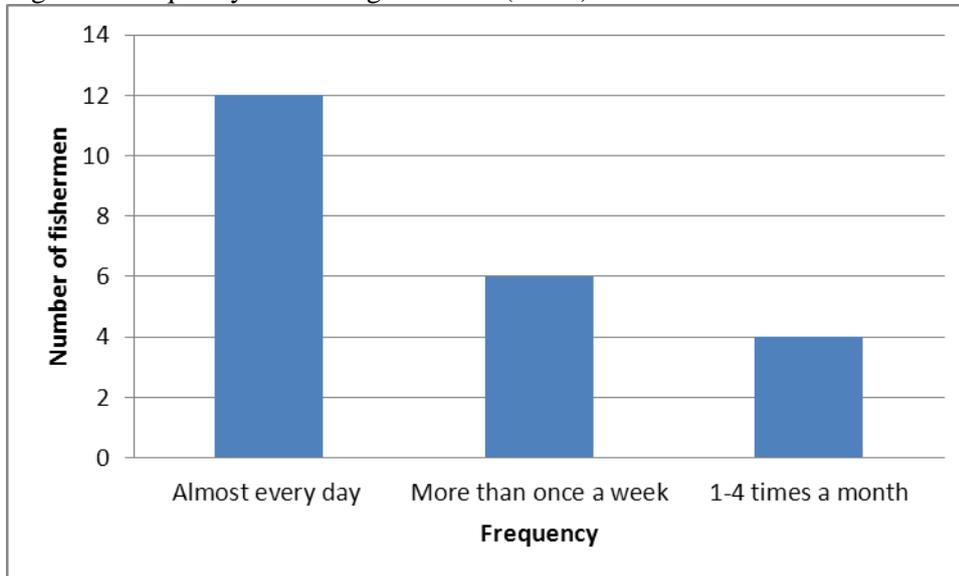
⁶ Ndomo is a traditional stick with a hook in the end.

Figure 8 Gears used by the fishermen



Most of the fishermen answered to enter the Creek almost every day concerning mainly the fulltime fishermen. The boys who goes fishing in the weekends are categorised in ‘More than ones a week’ and the participants who only goes fishing in the school holidays and when they want to eat fish that day for home use or related to seasonal change of occupation are categorised in the last part.

Figure 9 Frequency of entering the creek (N=22)



Conclusion

To conclude briefly, the number one livelihood practises ranked by the participants are selling products, tourism and casual labour. In figure 5 could be seen that selling products are mainly scaled in the two lowest categories and tourism and casual labour are found in the upper category. Earnings generated from fishing are found in every category with the focus on category two. Seasonality changes in jobs are fixed for the indicators fish and tourism, while casual labour, selling products and small jobs varies and are not that much related to weather conditions. Governmental jobs are not influenced by seasons. The catch of the fishermen consist on fish, crabs and squid mainly, followed by

octopus, ray, prawns and turtles and the total amount of this catch is 87kg daily. In relation to this catch the most used gears are fishing nets, long line, spear, and bow and arrow. 10 fishermen of the total fishermen are fishing every day, followed by 18 fishermen who fish more than ones a week.

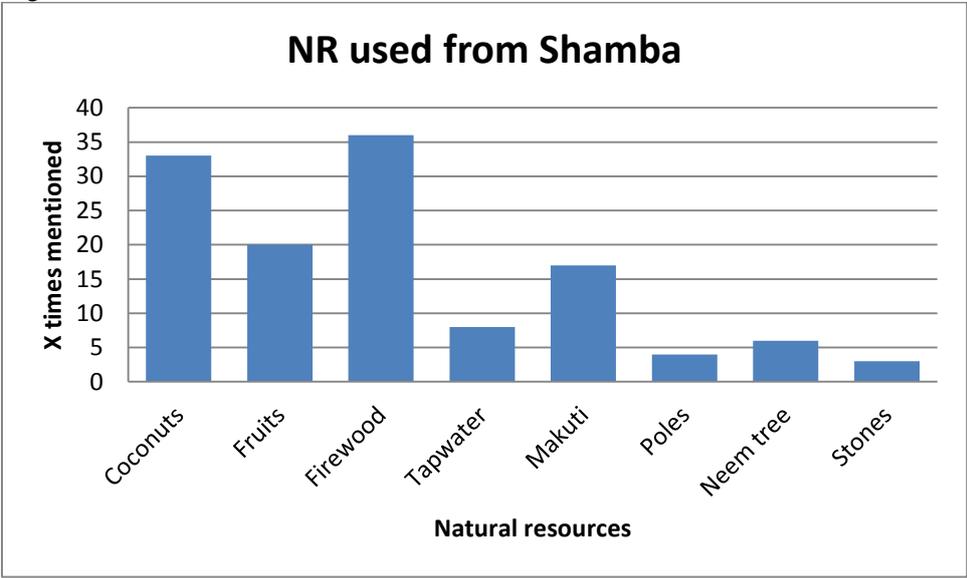
4.3 Natural resources

Introduction

To find out which nature resources are collected from the shamba and which natural resources are collected from the reserves, questions were asked in relation to this topic. Previous observations in the villages gave a clear view from what material the houses are made, and if they had tap water or using a well in the villages. Furthermore, important to know was if the usage of the natural resources were changing by seasonality.

Which natural resources are used from the shambas by the participants are ascertained in figure 10. The natural resources used from the reserves are discussed in the next subchapter (5.4) about perceptions (fig. 13).

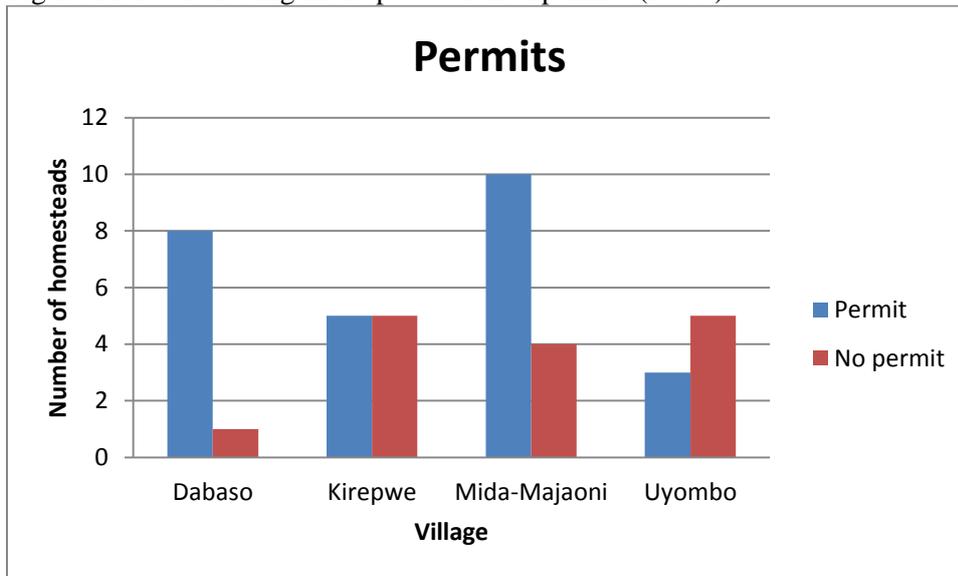
Figure 10 Natural resources used from their own shambas.



The leaves of the Neem tree is used at the shambas as medicine and the wood for firewood. The indicator coconut used in figure 8 includes more than only the coconut. The coconut tree is a versatile tree, the wood is used for firewood, the coconuts for cooking, eating and selling, the leaves for makuti roofs, and many more usages. This explains why indicator coconuts (fig. 10) is mentioned so many times. Firewood is most mentioned and includes, as abovementioned, coconut tree wood, Neem tree wood, branches, and other trees or shrubs.

57% (n=40) of the respondents indicated that they are buying tap water mainly from other fellow villagers with tap water. Water wells were only found in Uyombo and Kirepwe and 25% (n=20) are using the well for showering, washing clothes, cooking and drink water for their livestock. Beside of well water they bought tap water for drinking.

Figure 11 Total of being in the possession of permits (N=40)



One lady in Dabaso did not know if her husband had a permit or not and in Mida-Majaoni a man gave an answer that a permit was bought for poles, but no permit was bought for the firewood collected in MC. Sort of the same story from another man in the same village that a permit was bought for large poles and not for the small ones. A woman in Uyombo gave the reason that if the woman has money, permits are bought, if there was no money, firewood and poles were collected without permits. This figure shows clearly that Uyombo and Kirepwe share the first place of being not in the possession of permits. From the respondents in Mida-Majaoni were the most in the possession of a permit, followed by Dabaso.

Many of the villagers indicated that if there are seasonal changes in using the natural resources the farming activities are changing, the coconuts harvest every three months and makuti is made mainly in dry seasons, but mainly sold short before- or in rainy season. There are 13 persons who stores the firewood before the rainy season, 2 persons claim to buy the firewood in rainy season, and 4 persons are storing the poles during raining season. Furthermore, 6 persons gave the answer that there are more mushrooms and wild fruits while it is raining and therefore, they are visiting ASF more in this particular season.

Conclusion

To summarize the abovementioned figures, coconut trees have a large utilization whereby almost every part could be used. Therefore, the indicator coconut is ranked as almost the highest in figure 9. Firewood is the most used natural resource from the shamba and fruits and makuti are listed as third and fourth places. Mida-Majaoni are the twee villages who are following the rules regarding to be in the possession of a permit. Kirepwe and Uyombo are less strict on this requirement. Seasonal changes in using the natural resources are found in harvesting and selling coconuts, making and selling makuti, but not that much on collecting firewood and poles from the natural reserves. 13 persons kept in mind on forehead to store more firewood during dry season and 4 persons are storing the poles. Some of the participants went more regular to the forest to collect wild fruits and mushrooms in rainy seasons.

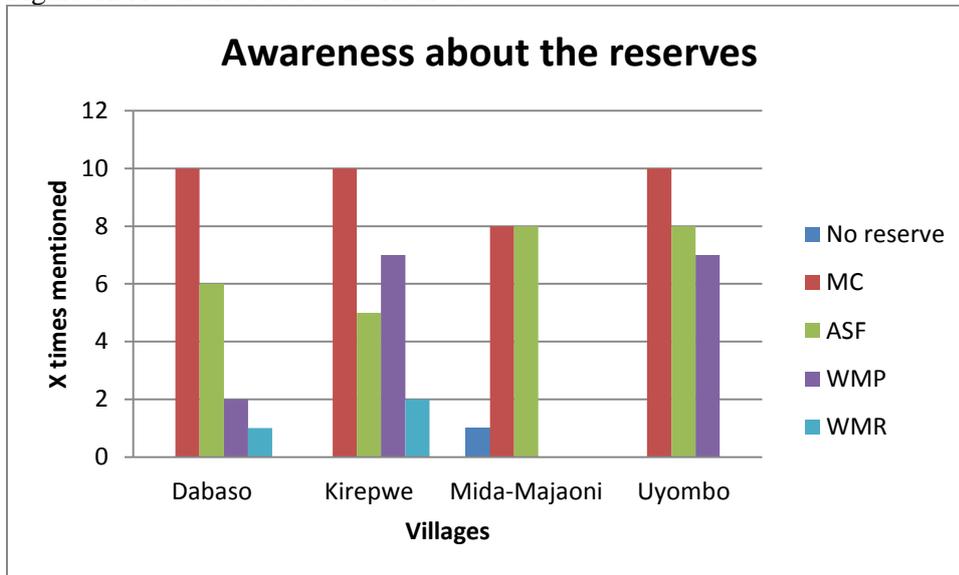
4.4 Perceptions

Introduction

A sensitive topic of this study were the personal perceptions of the participants. Questions were asked to measure the awareness on different topics (fig. 12 and fig. 16), level of comfort towards the owners of the reserves and in what way the participants are using the reserves by themselves. One point of attention: the definition of reserves in this case study includes are also the parks.

Starting with the outcome of the measurements of the awareness regarding the reserves. MC is the most known reserve, followed by ASF. The villages close to the ocean are aware of the WMP although in lesser extend of Kirepwe. Mida-Majaoni is the farthest away from the Marine Park and therefore assumable the less aware of the park. What is remarkable from the findings below is that Uyombo did not mentioned WMR, but this village is the nearest located to WMR. Only one homestead in Mida-Majaoni was answering that there were no reserves or parks found in the area.

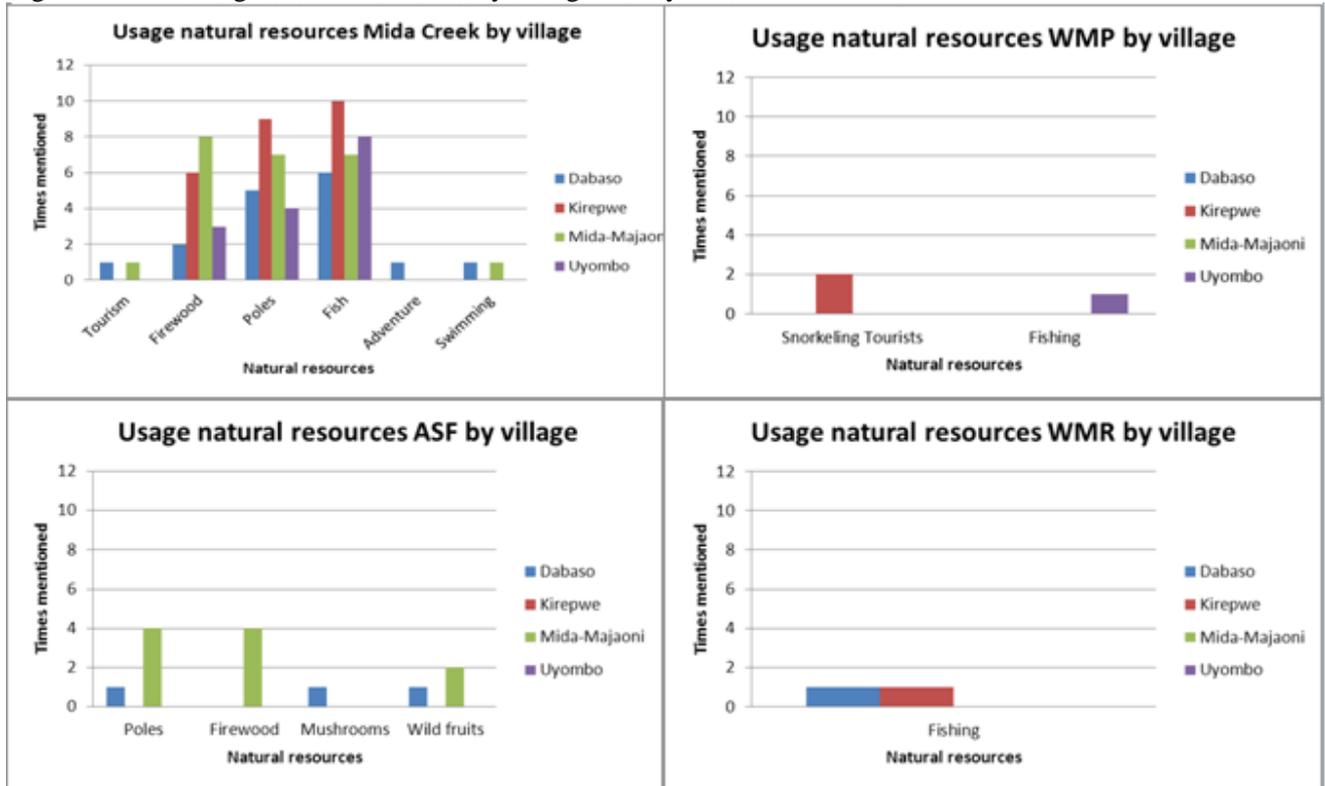
Figure 12 Awareness about the reserves



To find out if the homesteads were comfortable with the reserves in their neighbourhood 95% of the participants were answering that they are liking the reserves, 2,5% do not like the reserves, and 2,5% of the participants have no opinion of liking the reserves. Reasoning for liking and disliking are given in figure 13. From the answers was deduced what the personal attitudes were of the homesteads towards the reserves and probing on the answer was attempted to find out what the reason was.

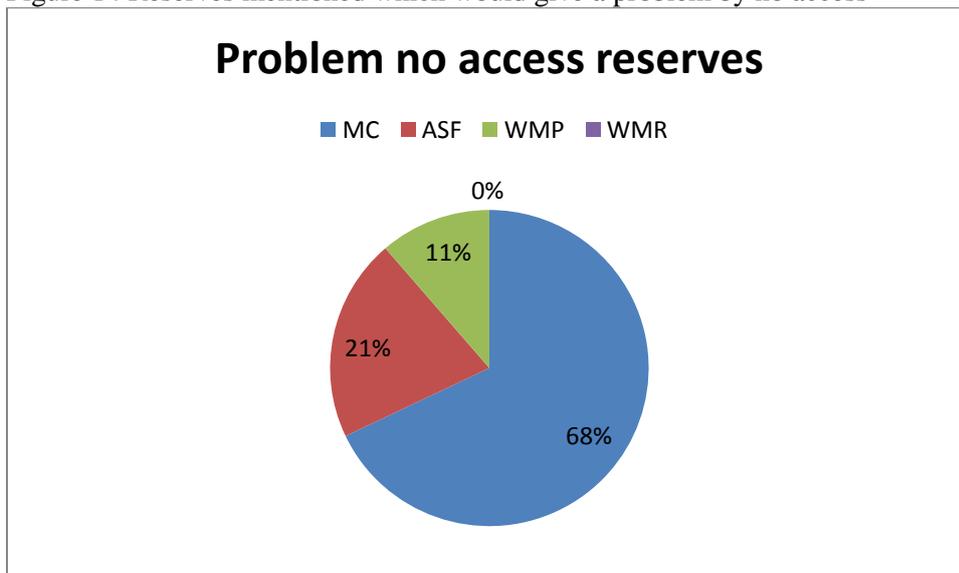
As can be seen in figure 13 Mida Creek used by all the villages in a regular demanding manner by fishing, collecting poles and collecting firewood. The other reserves are not used by all the villages. As expect Mida-Majaoni is using ASF more frequent than the other villages since it is the nearest village. Uyombo is fishing in the park which is forbidden. The answer given was that the fishermen are fishing in the nights to avoid to been caught by the security. In a very lesser extend Kirepwe and Dabaso are using the WMR for fishing.

Figure 13 A-D Usage natural resources by village and by different reserve



To measure the awareness of the participants about the value of the reserves, questions were asked if it would be a problem if the access would be forbidden to the reserves and in what manner it would cause problems. In figure 14 could be seen that Mida Creek is mentioned the most as problematic when the access would be forbidden, followed by Arabuko Sokoko Forest and Watamu Marine Park. Not even once was mentioned Watamu Marine Reserve as a problem when the access would be denied. Only five villagers mentioned that it would not be a problem at all if the access would be denied from all the reserves since these people were able to buy the products somewhere else or these people already did not use the reserves.

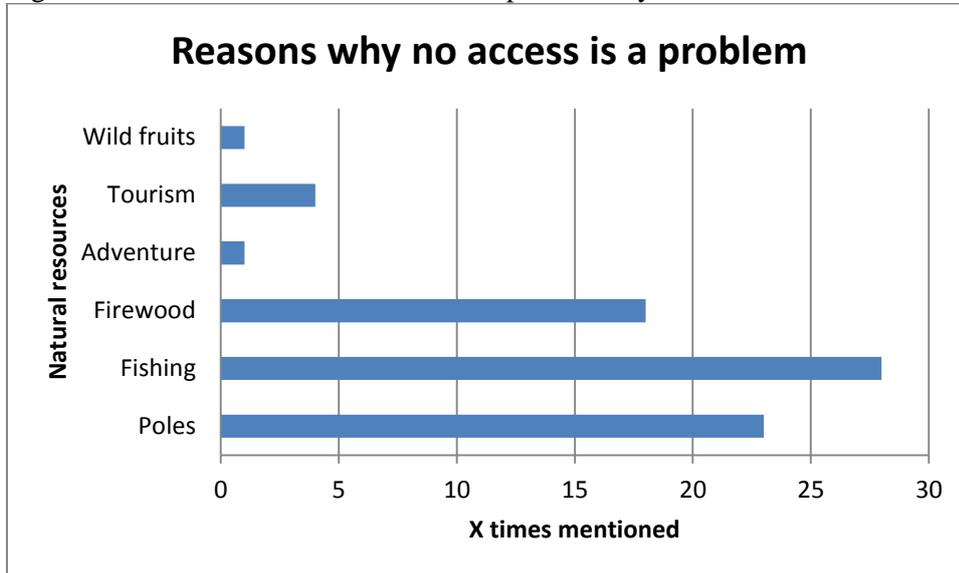
Figure 14 Reserves mentioned which would give a problem by no access



*Numbers are the times mentioned by the respondents. More answers were possible.

In figure 15 below could be seen the reasons given which kind of natural resources would cause problems with no access of the reserves. More than one answer was possible. The largest reason is fishing which includes fishing (fish, crabs, squid, octopus, turtles) and buying fish for intermediate purposes, closely followed by poles for building houses and firewood with 18 times mentioned.

Figure 15 Natural resources which causes problems by no access.



Probing to get an answer on the perceptions of who the owner was of the reserves, an answer was attempted to find out if the villagers were comfortable with the role of the owner or/ and the role of themselves.

Table 3 Ownership

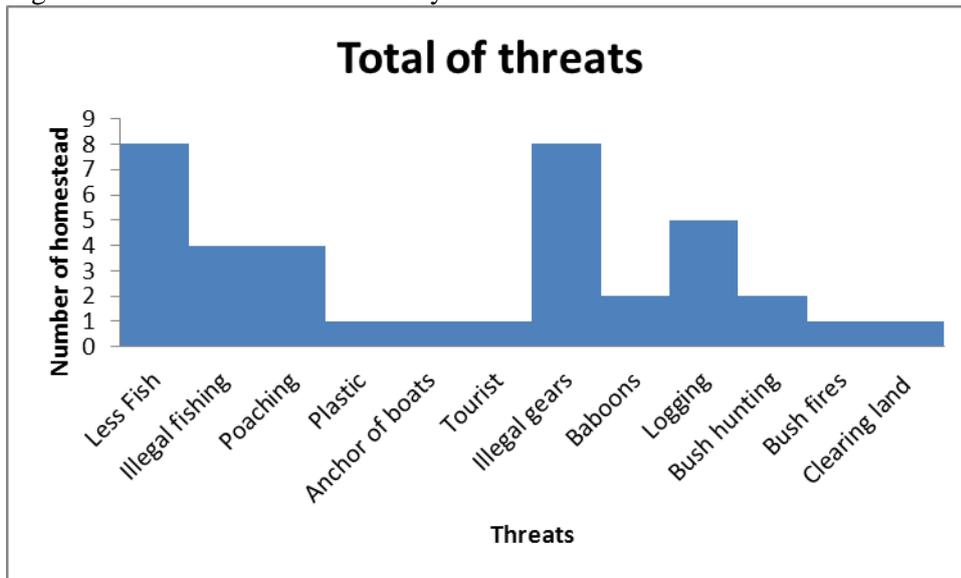
	Government	Marine people	Community	Rangers	KFS	KWS	MCCC	Don't know
%	72.5	2.5	6.25	6.25	6.25	6.25	2.5	10

Two participants gave an answer with two options, but the others offered just one option. The community is mentioned twice by these participants who gave two options in combination with the government. As could be seen in table 3 (ownership) 72,5% thinks that the government is the owner of the reserves. By asking who was meant by *the government* the participants sometimes mentioned KWS or KFS, but mainly they did not know. Including KWS and KFS into the table is done for the reason that the organisations were named directly as owner. Marine people are, assumable, KWS, but the participants could not define who was meant by *marine people*. Only 10% of the respondents was not aware of who the owner was.

Comfortable or uncomfortable

55% of the participants were comfortable with the owner, 30% was not comfortable with this mentioned ownership and the remaining percentage of 15% did not have an opinion on this issue. The main reasons to be comfortable with the named owners was that many participants had the opinion that, when the reserves were left to the responsibility of the community members, the community would overexploiting the reserves and furthermore mentioned as a reason to be comfortable is that the owners are protecting the areas for sustainability reasons. The reasons gave by the group who was not comfortable with the owners were firstly, the permits (fishing permits and cutting permits), secondly they prefer a 50-50 ownership, thirdly, more power for MCCC and lastly, some of the homesteads were uncomplaining in the fact that it will always be like this.

Figure 16 Total threats mentioned by homestead



Two participants had no idea about any threats and in total 17 participants of the total 40 participants expressed the view that there were no threats at all. Illegal fishing includes (night) fishing in the Park and night fishing on aquarium fish.

Conclusion

After all, the findings of the perception part shows clearly that the awareness in figure 12 is the highest regarding MC. This knowledge is linked to the usage of the reserves since figure 13 shows that the largest pressure lay on MC which is used by all the villages. Therefore, MC is mentioned the most when it becomes on the topic if it would be a problem if the access to the reserves is denied. More than half of the participants are comfortable with the owners of the reserves and the awareness is not quite high in the villages since almost half of the participants indicated that there were no threats at all.

4.5 Key informants interviews

A survey was conducted with four key informants in each village one. All the key informants were male living in the villages for a long time.

Farming is mentioned by all the key informants as a livelihood practise. Subsistence farming in the way of maize, cassava, fruits, makuti, cashew nuts and coconuts. The last two crops are sometimes also cultivated for economical purposes on small scale. *Mnazi*, palm wine, is also a way of farming, but not common by Christian shambas. The palm could be tapped by tappers or by the shamba owners themselves. The main livestock kept on the shambas are cows, goats, ducks and chicken. A second main livelihood practise was mentioned by all was fishing and intermediating in the local fishing industry. The most popular fish breeds are Chaa, Njana, Tembo, Kotwe, Ngagu, Korokoro, Gona, Kifudu, Thasi, and Kumbu. Besides of the fish, crabs and turtles are mentioned in line of fishing. Casual labour, working in the mining industry, construction work and selling products are mentioned by the key informants.

Table 4 Natural resources used ranked by different reserves

MC	ASF	WMP	Mining area Uyombo
Fishing (Chaa, Ngogo, Ray, Craps)	Poles	Fishing at night (mentioned in Uyombo)	Coral blocks
Honey (conservation group activity)	Firewood		
Firewood			
Poles			
Tourism (canoe riding, snorkelling, baboons living environment → hotspot)			
Nursery area for little mangrove trees			
Mukomafi (medicine)			

The natural resources the villagers use from the reserves are showed in the table 4. The pressure lays the most on Mida Creek since the villagers are using tis reserve for many purposes. ASF is only mentioned in relation to the firewood and poles. The key informant of Uyombo said that they did not paid permits for the firewood and poles to get them from Mida Creek.

According to the key informants the livelihood practises which are changing by seasonality are farming and fishing. Planting of the crops have to be done in April and harvesting is always after the rains in July. In rainy season there is more fish in the Creek since rain attracts fish and the fishermen are less. The Creek is very rough in rainy season and the weather is windy too therefore, it is more difficult to fish with the small *downs*. For the construction work is that when it is rainy season people invest more in farming and have less money to spend for building therefore, there is less work available for construction workers. Regarding making and selling *makuti*, in dry season the makuti is harvest and made and in raining season the makuti is sold. On the question if the people change their occupation according to the seasons the answer was: ‘The people do not change their occupation when they have less work, but they just stay at home’.

There are definitely seasonal changes in using natural resources, but these are caused by the seasonality of the jobs. The main reason given in Dabaso is that the people are involved in the tourism industry need a different income in low season and therefore going to fish. In Mida-Majaoni is it a source of livelihood and the key informant in Kirepwe mentioned that a lack of education is the reason for doing these livelihood practises and hence the villagers do what the natural resources around them are providing them to do as a livelihood practise. In Uyombo was mentioned :

‘30 years ago the people learned there jobs from their parents. There were just a few families, but nowadays, the population is growing and they cannot maintain their families anymore. So, to fill this gab they became fisherman, mining workers and construction workers to feed the family.’ (Key informant Uyombo)

The reserves are appreciated by the villagers because they are providing rain, when people are jobless they rely on these areas with food, firewood and fish. There are more advantages than disadvantages of these reserves and especially Mida Creek is favourite because it provide the three main resources namely, firewood, fish and poles.

All the key informants were agreeing that it would be a problem for the villagers when the access to the reserves would be denied because of they rely on it with their livelihood practises.

'What will the people do for living to earn income for maintaining their family?' (Key informant Kirepwe)

Several reasons are given by the key informants on the question what the problems and threats are of the reserves nowadays. All mentioned that the forest, both ASF and the mangrove forest are rain attraction areas. Cutting trees illegally is therefore a threat since without forests there will be less rain and less rains result in less harvests. Furthermore mentioned often is the problem of less fish in the Creek. Due to illegal methods like, guns, poison, dynamite and small nets (mosquito nets) and the increase of fishermen, day and night time, the amount of fish is decreasing in the Creek. The poison, guns and dynamite destroys not only the fish, but also the environment of the fish. The small nets are problematic since the fishermen catch the small juvenile fish which still has to grow and reproduce themselves.

Informants were asked to list up solutions for problems or threats and the key informant from Uyombo mentioned that there should be offered a higher level of education in combination with a change of attitude. If people are higher educated they do not relying that much on natural resources anymore since they have another source of income. Similarly, as what is mentioned in Uyombo the key informant of Mida-Majaoni mentioned that to educate people would be a solution, secondary education as well environmental education. The key informant of Kirepwe had a unusual solution to this question namely:

'Close the Creek for a while and provide good vessels for the fishers to fish in deep and open sea. So, the Creek can restore in time. Money is the big challenge in this case to provide good vessels.' (Key informant Kirepwe, 2014)

The key informant of Dabaso mentioned that providing jobs would be a very good solution, but by probing how and by who, no sufficient answer was given.

Conclusion

The main livelihood practises given by the key informants are substantial farming, fishing, casual labour, construction work and selling products. Regarding the usage of the natural resources the largest pressure lay on Mida Creek. Seasonality in utilization caused by the weather is not a large issue compared to seasonality of jobs. The people rely more on the natural resources when it is low season or due to not having a job at all. The homesteads rely on the reserves daily thus denying the access to the reserves would be a large problem. Education was mentioned as a key solution for capturing threats and problems for conservation.

4.6 Resource mapping

To find out in a more attractive manner which natural resources are used, who are collecting them, and how the resources are used a resource map was drew by the villagers one in each village. The outcome of this mapping activities is as follows.

Table 5 Livelihood practises divided by gender

Male	Female
Collecting water from the well: <ul style="list-style-type: none"> • Making mud for building material • Water for livestock 	Collecting water from the well: <ul style="list-style-type: none"> • Washing clothes • Showering • Mix with soil for mud (building material houses) • Water for livestock
Tapping wine from coconuts	Making and selling makuti
Selling coconuts	Coconuts home use
Timber from the coconut tree	Making brooms from the coconuts material
Selling buttons, bracelets, ear rings	Making ropes from coconuts material
Fishing	Making buttons, bracelets, ear rings
MC: Passing by to mainland	MC: Passing by to mainland
Take care of the livestock	Take care of the livestock
Planting, harvesting and cultivating land <ul style="list-style-type: none"> • Maize • Cassava • Vegetables 	Planting, harvesting and cultivating land <ul style="list-style-type: none"> • Maize • Cassava • Vegetables
Collecting poles from MC	Collecting firewood from MC, ASF, coconut tree and Neem tree
Collecting honey MC (conservation groups)	Grasses collection for livestock
Tourist guides (Ruins, canoe riding)	Butterfly farming ASF (Mida-Majaoni)
Swimming in MC (mainly students)	Swimming in MC (mainly students)
Cash crops	Cash crops
Collecting Casuarina trees timber → poles	Cultivating Morenga vegetable
Cutting mangrove trees for poles	Firewood collection illegal MC (Uyombo)
Cashew nuts cultivation+ selling	Cashew nuts cultivation+ selling
Fishing	Selling fish
Working in mining industry	Working in mining industry
Tapping wine + juice	Makuti making + selling
Collecting water from the well	Making coconut oil
Casuarina plantation cultivation	Firewood collection Coconut tree
Harvesting coconuts	Collecting water from the well
Kirepwe Ruins → guiding tourists	

Table 5 shows that the main differences appear when it become to fishing and collecting wood from MC and ASF. To emphasize what the fisherman claims that ‘God did not make a man and a woman to go out fishing both, the man should do the fishing and the woman should stay at or near the house’. (Fisherman, Mida Creek in Versleijen, 2001), woman are culturally not allowed to go fishing, but they are the ones who are buying the fish, craps, squid, prawns and octopuses from the fishermen at the landing sites to sell them to the homesteads. Collecting wood from the forest or the creek is different in case of the purpose. The women are collecting firewood for cooking and the men are collecting wood for poles which are used for making the framework of the houses. In the coconut farming for economical purposes the women are the ones who are cultivating them mainly using all material of the tree for makuti, oil, firewood, ropes, brooms, while the men are occupied with the harvesting and selling part of this process. Tapping and selling the wine of the coconut, *Mnazi*, is also done by men. All the facets of farming are done by both as well as collecting water from the well. Only the purpose

after collecting the water is different. Butterfly farming was only mentioned in Mida-Majaoni and done by women and the illegal cutting of firewood by women in MC was only mentioned in Uyombo.

Also questioned was the topic about the acknowledgement of conservation in the four villages. Kirepwe has a conservation group called Kirepwe Self Help Group and MCCC is also involved in the conservation on the island and in Dabaso. MCCC nurse and plant little mangrove trees and collect honey. In Mida-Majaoni is cultivating Casuarina trees a conservation project since these trees are adapted to the soil and climate, useful for poles and firewood purposes. Furthermore, the villagers encourage the other members of the community to plant Casuarina trees, acting to be observers of illegal activities in MC and ASF reporting these to KFS or speak to the person himself. The participants in Uyombo could not give any answer on conservation activities in the village.

Additional information gained is that guiding tourists around in the ruins in Kirepwe is mentioned as a community benefit since the guides are locals and therefore, the money stays in the community. The most popular types of fish caught are: Chaa, Raj, Unkunga, Unkizi, Vunzenge, Simin, Mgogo, Vlunga, Chuchungi, and Baracuba.

Conclusion

Briefly conclude the outcome of resource mapping in the villages, gender differences are mainly found in fishing and collecting poles and firewood due to the physical differences in gender and the purpose of the utilization of the natural resource. There are conservation groups active in the villages except in Uyombo. Most of the groups mentioned by the participants are community conservation groups.

5. Discussion

The objectives of this research was to investigate the local livelihood practises in four villages surrounding Mida Creek by interviewing locals and applying Participatory Rural Appraisal (PRA) tools. Starting this discussion with a review whether the literature used on forehand is linked to the results.

Extend of usage reserves

Like Ochiewo (2012) already said that over exploitation of natural resources has become a massive problem. With a daily catch 67,3 kg (fig. 4) of fish, crabs, squid and other marine creatures Mida Creek face a large pressure from the surrounding villages. Of course it depends how much fishermen we interviewed each village to calculate de amount of kg. Besides of the fishing pressure, all the villages of the study area are collecting firewood and poles from the mangroves around the creek. More than half of the total participants (n=25) were collecting poles and almost half of the participants (n=19) said to collect firewood in this area. Looking after these natural resources makes people more resilience (WWF, 2014) therefore, a local initiative group MCCC (Mida Creek Community Conservation) tend to initiate conservation projects such as a crab restaurant, mangrove tree nursery, collecting honey from the mangrove, tree planting activities and working closely together with KWS providing permits for the collection of poles and firewood.

Livelihood practises

Although Hoorweg et al (2000) and Ochiewo (2012) are pointing out that mariculture is a very sustainable livelihood practise and has great potential export purposes, mariculture is not found yet in this area. The same applies for beekeeping. This study showed that only MCCC was collecting honey from the mangroves and ASF and, in a lesser extend, Kipepeo butterfly farm. Fishing is a major income generating livelihood practise which is still popular, providing a good monthly income (up to more than KHS9000 fig.2). Reason why fishing is not ranked as one of the most important jobs is because it is a very seasonal influential livelihood practise compared with selling products as mandazi, chapatti and coconuts and casual labour. Tourism is also ranked as an important job and also very seasonal influential, but the earnings per month, when it is high season, are higher than average and therefore, one of the main livelihood practises in the region (Bush, 2013). Coral mining was only found in Uyombo as a regular livelihood practise mainly because the mining place is near and similarly, it seems to be a flexible job according to a young man in Uyombo: 'When I want to go, I'll go, but when I need to work on the shamba, I can just stay home without calling the boss for approval'. Seaweeds and sea grasses are another marine resource with a rich potential regarding livelihood practices. Peninah (2000) did a study on the usage of seaweeds and sea grasses and found out that 'along the Kenyan coast, seaweeds can be cultivated for commercial purposes. Some of the suitable farming areas include the shallow bays of Mida, Mtwapa, and Gazi (In Hoorweg et al, 2000). Seaweed is one of the oldest resources from the sea used for products such as, food, fodder, medicines, fertilizer, and mattresses. Studies shows that the Kenyan coast has great potential of seaweed production (Wakibiya& Oyieke, 1992, In Hoorweg, 2000). During this study there is no evidence found or information given that this manner of sustainable livelihood practise is implemented already in Mida Creek.

Gender

There are differences found in gender activities related to natural resources and livelihood practises, but in a lesser extend than was expected, although Mitullah (2000) explains that due to Arabic and Islamic influences the gender equality in coastal areas is more unbalanced than in other parts of Kenya (In Hoorweg et al, 2000). Observations and resource mapping taught that there exist a slightly inequality in gender because indeed, the household activities are more done by female than by male, but table 5 (Livelihood practises divided by gender) shows that many tasks are done by both. Reasoning for the differences are assumable the physical condition of the gender and the purpose of the usage. For instance, collecting firewood is mainly done by female since it is related to cooking and collecting poles is mainly done by male since it is related to building houses. On the trade market female and male are equal, also in collecting water and the farming activities. An explanation for the

pronunciation of Mitullah (2000) and the outcome of the results could be found in socio-economical argumentations since the majority of the coastal communities included in the research have their roots lie in the Mijikenda tribe without Islamic influences. In figure 1 could be seen that the women are still laggards compared to men if it becomes to educational level. More women has either no educational background or have a lower educational background and therefore, more dependent on natural resources since this study taught that being in the possession of money means more independence from natural resources from the reserves. Continuing with the question if there is a relation between the frequency of using natural resources and being in the possession of money. According to the results of this study the usage of natural resources is not seasonal influenced by weather conditions, but by the seasonality of the jobs. Briefly explained as: being hired for a job generate income, when there is income participant indicated to buy more products instead of collecting them from the reserves, but when they are jobless after a while or in low season there is less money to buy this products and hence they are more dependent on the natural resources. Radnaweera and Edirisinghe (2010) state that due to the over-exploitation of resources, tourism with mass scale pollution resulting in damaging coral gardens and critical habitats and conflicts in the aquaculture are leading to alternative livelihood practises of traditional fisher families in India and Sri Lanka. This could be the message for the villagers surrounding Mida Creek too.

Awareness

The forest is important for ‘the conservation and improvement of water supplies, the prevention of soil erosion’ (Hoorweg et al, 2000) and an important provider in wood fuel and building poles for the communities. According to ARK (n.d.) is the forest under threat by illegal logging, land clearance and poaching. Although A Rocha is aware of these threats, 17 participants thought that there were no threats at all and seeing this in the bigger picture of a total of 40 participants it could been said that the awareness of threats is quite low in this area. The largest threats mentioned by the other 23 participants are illegal gears, poaching, logging, and illegal fishing.

Traditionally, communities were dependent from resources of the forest to survive, but due to strict limitations on the resources the communities felt alienated from the forest. If both, habitat and communities, want to survive it is important that ‘local people must benefit from the conservation’ (ARK, n.d.). The attitude of the people towards the reserves is good although the persons who gave a negative answer on this question did not like the permits which they have to buy for collecting firewood and poles. Mapping how much people were in a possession of a permit showed that in Uyombo the majority is logging for poles and collecting firewood illegally while in Kirepwe the position is equal. Mida-Majaoni and Dabaso more persons are in the possession of a permit compared to the other two villages. This could be related to the conservation awareness and the on going conservation projects. During the implementation of drawing a resource map information was gained on the conservation awareness and conservation projects. Uyombo did not do anything to conserve or set up projects to conserve, By Kirepwe inhabitants are told that they did not have to buy a permit, but that they only need to inform MCCC since they live so close to the mangroves. The conservation group MCCC is working in Dabaso which has the aim to encourage conservation actions within the community (Bush, 2013) and to lead some conservation projects in the village. Because MCCC is focussing on Dabaso assumable, Dabaso is more aware from threats and what is going on in the reserves. Moreover, the villagers are more willing to conserve the reserves surrounded them. In Mida-Majaoni are also community conservation groups established and occupied with the cultivation of Casuarina trees to reduce logging of poles in ASF, beside of this the inhabitants keep an eye on each other in terms of illegal activities. Steve Trott, director of WMA (interview, May 2014) emphasize also on the increasing of Casuarina tree plantations since these trees are indigenous to sandy, coastal soil, rapid growing, and drought resistant (The Hindu, 2012). The trunks are used for roofing instead of the poles from the mangrove trees or from the trees of ASF. Beside of this benefit The Hindu agrees with Steve Trott by mentioning another two benefits namely that the wood is very useful for firewood and charcoal.

This study found out that Uyombo is different than the other three villages since the results shows that Uyombo has the highest rate of illegal activities such as fishing in the Marine Park at night and illegal

logging for poles and illegal collecting firewood in the mangroves. While searching for reports in the desk study phase there was no report found about research done in Uyombo. In an oral conversation with Kirao Kithi (ARK, May 2014) who had assist the research of Bush (2013) the chief of Uyombo did not allow her to do research in Uyombo only under the conditions of paying a KSH 500 each homestead. Which she refused. Fortunately, a report was provided by KWS in the end of the fieldwork showing results of a study done by Versleijen (2001) in Uyombo. Versleijen found out that Uyombo needs special attention since ‘their negative attitude towards conservation can influence their livelihoods in the long term. They are less likely to participate in any CBNRM program in case this will proposed to them.’ Despite of this acknowledgement and the recommendations given by Versleijen, no organisation challenged themselves to change anything hence, 13 years later nothing is changed.

6. Conclusion and recommendations

6.1 Conclusion

Concluding the findings of this research it became obvious that Uyombo is desperate lacking attention of all the organisations working around Watamu. It is the neglected child despite the effort and time organisations put effort into this site of Mida Creek to conserve. Uyombo is laying behind on every front both on implementing conservation of the nature as well as their attitude towards the conservation of the surrounded reserves. No organisation have taken action to this area on the other side of the creek or took the recommendations of Versleijen in consideration. Unknowing how harmful this 'negative attitude towards conservation in the long term' have been in the last 13 years.

Furthermore, from all the reserves studied on, lay the largest pressure on Mida Creek with the utilization of marine creatures, firewood and poles. The more money the villagers have the less the usage of the reserves for these material. Since there is no knowledge on how much kg fish, crabs, squids, octopus and prawns are entering the creek there could only be made an estimation whether there is a problem of over-exploitation.

Coming to the end of the report, an answer has to be given on the main question how the coastal communities benefit from natural resources in the Mida Creek area? The villagers benefit from the natural resources by mainly fishing, collecting firewood, collecting poles, using the varies manners of the coconut trees. Without having access to these areas and therefore no access to the natural resources, the communities are less resilient for job seasonality, fluctuations in income or fluctuations in weather conditions for their subsistent farming activities. The perceptions towards the reserves are mainly positive because of the benefits mentioned before. Despite of that, the awareness of the threats are very low.

6.2 Recommendations

Recommendations are made based on the conclusions above. Uyombo needs the attention of the organisations concerning nature conservation and community conservation by setting up awareness trainings, developing community based projects, visiting regularly the village to gain trust and build a network.

In general, further research is needed on the reasons why beekeeping, mariculture and the cultivation of seaweeds and sea grasses are not exploit yet while previous research showed that these activities have a great potential as sustainable community based projects. Besides, since there lay a huge pressure on Mida Creek more and broader studies needs to be done on alternative use of firewood. What could be an alternative idea is the usage of briquettes. According to Steve Trott (director WMA) more Casuarina tree plantations is advisable to decrease the usage of poles from ASF, but in particular from MC. Moreover, more extensions to the villagers about the diversification of using the Neem tree. This tree is i.a. useful as firewood, medicine in different ways, Neem oil for birth control, Neem spray as natural insecticide for farmers and mosquito repellent.

More research could be done on the basis of the information about the amount of kg daily catch caught in Mida Creek to find out how much kg of marine creatures is entering the creek to determine whether there is overexploitation already or will be the case in the future.

Since there is a link between having a job and the frequency of using the reserves it is advisable to provide education and trainings on how to apply for jobs and job interviews. To empower both men and female in this field it could increase the self confident and self esteem and gave the power to start easier small business or apply for a job elsewhere.

Which role could A Rocha Kenya play in this case? As an organisation with a slogan 'Nature conserved and people transformed' A Rocha emphasize on these two topics. This research report will provide input for a (marine) community conservation program and the role of ARK would be the

leading organisation designing this program and set up a cooperation between its stakeholders to join their strengths to capture the threats and emphasize the existing, sustainable livelihood practises such as Casuarina tree plantations and the use of the Neem tree.

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Appendix 1 Topic list Semi Structure Interview

Interviewee (s):

Date:

Time:

Duration:

Village:

Introduction

Kunautu! Jina Langu ni Martine Koemans na unatoka Uholanzi. Mimi ni mwanafunzi katika chuo kikuu nchini Holland. Hii ni mwenzangu Lennox Kirao. Yeye masomo nchini Kilifi. Sisi ni kufanya kazi kwa A Rocha nchini Watamu. Do you have time to speak with us? It takes approximately 45 minutes. We, as students, are curious about what the people here are doing for living. We are not working in regulation or enforcement and we use this information only for A Rocha Kenya. We will keep everything you say confidential. Is it ok that we continue? Asanta sana!

Icebreaker

Asking about their children or what they are doing(when the interviewee(s) is doing something like, cooking).

1. Household questions

☑Are you living here? I would like to ask you some questions about your household:

1. With how many persons (N) do they live here in this household (age, education, gender)
2. Which assets do the household members have? (N of houses, N of cattle, N of land (rented or owner), etc)
3. What language do they speak (to find out what tribe they belong to (probably Giriama, but could also be other tribes)
- 4.

2. Occupation questions

☑Now I would like to know more about the jobs or daily activities:

1. Employed/ unemployed (gender)
2. What are the occupations of the household members? (men, women, children)
3. Source of income? (..family who works in foreign countries or elsewhere.)
4. Are there changes in occupation by seasonality? And in what way?
5. Changed occupation or have been always doing this? If yes: when was the change?
6. What is the reason of doing this job? (father to son, living close to reserve, best income generating job, etc)
7. Goods and services
 - A. Fishery (fish, octopus, crab, lobster, etc)
 - B. Tourism (diving, guiding, recreational fishing, etc)
 - C. Beekeeping (honey, etc)
 - D. Etc
8. Methods
 - A. Fishery (gear, lines, traps, etc)
 - B. Tourism (boats, scuba, etc)
 - C. Beekeeping (..)
 - D. Mariculture (with wild crabs or 'domesticated' crabs)

3. Natural resources questions

Open questions like: do you buy every product you use or are you using things from the nature?
I see how the houses are build. Do you buy the material or were do you find your material to build this? ..ETC..

1. Do you buy everything from the shops or do you get resources from the reserves?
2. Which material do you build these houses/shed from?
3. Firewood, Fences, Drinking water/ irrigation, mushrooms, wild fruits, medical plants,..
4. Where do you find these materials?
5. Are there changes by seasonality (dry season (msimu wa kiangazi) and wet season (Msimu wa Mva) in using natural resources? And in what way?

4. Perceptions on the natural resources

Sensitive topic!! Ask questions like this:

1. Are there reserves here? 1..Yes? Which ones?
 - ..Are you visiting these sometimes? To do what?
 - ..If you could not go there, would that be a problem?
 - ..Did you go there in the past more often? If yes: why are you not going anymore
- 2 ..No? Are you visiting MC, ASF or WMR sometimes?
 - ..You do not need it for your live? You do not want to go there?
 - ..Why? dangerous/no need/dislike/..
2. Like or dislike the reserves?
3. Benefits do you have from the reserves?
4. If the reserves are not there or not open anymore for people? problem?
5. Ownership. To how belongs it (people or government)
6.

What we want to know, but cannot directly ask:

1. Perceptions of resource conditions
2. Perceptions of importance MD, WMR and ASF
3. Perceptions of threats (what are the three major threats)

5. Ranking

Objective: To get an overview of which NR are the most important one and which one the fewest important one. Regarding topic 3/4.

Needed: beans

6. Seasonal calendar

Objective: to get an overview of if there are changes in using the reserves regarding the seasons.

Needed: stick, open space in the sand, icons.

Asante sana for your time and effort to participation in this interview. Do you have questions or remarks?

Appendix 2 Key informant survey

Name:

Date:

Time:

Introduction

Kunautu! Jina Langu ni Martine Koemans na unatoka Uholanzi. Mimi ni mwanafunzi katika chuo kikuu nchini Holland. Hii ni mwenzangu Lennox Kirao. Yeye masomo nchini Kilifi. Sisi ni kufanya kazi kwa A Rocha nchini Watamu. Do you have time to speak with us? It takes approximately 30 minutes. We, as students, are curious about what the people here are doing for living. We are not working in regulation or enforcement. We will keep everything you say confidential. Is it ok that we continue? Asanta sana!

General questions

Question 1: In which village do you live?

Question 2: How long have you been living in this area?

Livelihood practises questions

Question 3: What are the (main) livelihood practises of the inhabitants of the village?

Question 4: How do they use the natural resources from Watamu Marine Reserve, Mida Creek and Arabuko Sokoke Forest? (For instance: firewood, wood from the mangrove forests, building material, etc.)

Question 5: Are the livelihood practises of people changing by seasons? In what way?

Question 6: What are the reasons for doing this jobs?

Perception questions

Question 7: Do you know if the people like or dislike the MC, ASF, WMR?

Question 8: Do you think people can live without the reserves?

Question 9: What are the benefits for the people of the reserves?

Question 10: Do you think that there are problems in the reserves? (less fish, etc)

Question 11: What are/is according to you the solution(s) for the threats or problems?

Other remarks or suggestions?

Asante sana for your participation, time and effort on this interview. I hope to finish this research in the end of June and come back to the village to present the findings.