CONTRIBUTION OF MOMBASA MARINE NATIONAL PARK AND RESERVE TO THE SOCIO-ECONOMIC DEVELOPMENT OF THE NEIGHBOURING LOCAL COMMUNITIES

JULIUS MUTUA NGETI

A thesis in partial fulfillment of the requirements for the Degree of Master in Environmental Studies (Community Development) of Pwani University

June, 2016

DECLARATION

This is to certify that:

i.) This thesis comprises only my original research work towards the attainment of the Master of Degree in Environmental Studies (Community Development), except where indicated.

ii.) Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature and acknowledgement of collaborative research and discussions.

This work was done under the guidance of Dr Andrew Wamukota and Dr Bernerd Fulanda of Pwani University, Kenya.

Sign: ..... Date: 24/08/16

Julius Mutua NGETI

In my capacity as supervisor of the candidate's thesis, I certify that the above statements are true to the best of my knowledge.

Sign..... Date: 24/08/2016

Dr Andrew WAMUKOTA

Pwani University-Department of Environmental Studies (Community Development)

Sign..... Date: 24/08/2016

Dr Bernerd FULANDA

Pwani University-Department of Biological Sciences

DEDICATION

I dedicate this work to my beloved wife Elizabeth and children; Leakey and Gabi, for their moral support and cooperation throughout my studies.

ACKNOWLEDGEMENT

Firstly, I would like to thank the Almighty God for giving me strength and courage to complete this thesis. I would also like to thank my supervisors Dr. Andrew Wamukota and Dr. Bernerd Fulanda for their untiring professional guidance, constructive criticism and encouragement throughout the study period. I am also very grateful to my sponsors Kenya Coastal Development Project (KCDP) for granting me this opportunity and giving me financial support throughout the study. I am thankful to the Chairperson Department of Community Development, Dr. Annie Hilda Ong'ayo, Dean School of Environmental and Earth Sciences Dr. Maarifa Mwakumanya, staff and my fellow students in the School for their valuable input and moral support. I acknowledge the support and cooperation of the respondents. I am sincerely grateful to each person who in one way or another contributed to the success of this thesis.

ABSTRACT

Mombasa Marine National Park and Reserve (MMNP&R) in Kenya was established in 1986 but came into operation in 1991. The Marine protected Area (MPA) was established to enhance biodiversity conservation, to attract tourists and to improve the local community livelihoods. The purpose of this study was to evaluate the contribution of the MMNP&R to the social-economic development of the communities living around the MPA. The study was conducted at Bamburi 5 km to the MPA and Jumba which is 10 km away, for comparison. The study adopted a descriptive survey design that generated both qualitative and quantitative data. Simple random sampling and purposive sampling technique was then used to select the respondents from both study areas. Validity and reliability test was done to ensure the data collection tools are valid and reliable in measure. Questionnaires, Focused Group Discussion guide and observation schedule were used to obtain primary data. The enumerators were trained for 3 days on how to collect descriptive data from the field before actual data collection. Descriptive data analysis was used to describe the distribution and frequencies of income levels in the communities. The Regression model of respondents income = f (distance from MMNP&R, level of education, gender, age and occupation of the respondents) was used. The findings show that the average income from marine activities per day is higher in Bamburi (KES 1325) compared to Jumba (KES 449). This is as a result of Bamburi being near to the MPA which experiences higher spill-over of fish and get more tourist visits than Jumba which is far from the MPA. The local community perception on the existence of MMNP&R was varied. For instance, 36% of the respondents in Bamburi strongly agreed with the perception that MMNP&R contributes to the local community livelihoods contrary to 20% at Jumba. However, an average 94% of the respondents in both study areas have agreed that the revenue generated from the MPA does not infiltrate back to the local community. The findings further reveal that MMNP&R has contributed to increase in fish abundance 75% (as indicated by

respondents) thus contributing to the improved catch 38% for the local community. However, 39% of the respondents said there is no benefit from MMNP&R thus leading to negative impact (61% of the respondents) on the community livelihoods and that MMNP&R is not beneficial (46% of the respondents) for the community. Accordingly, this study recommends that Jumba resident to should adopt more conservative approach to fishing to ensure sustainability of the fish stocks. This should be done through implementation of a no-take locally management marine area (LMMA) as a conservation imitative. Moreover, the Jumba residents should focus on attracting more tourists by investing more on tourists' facilities to increase their income levels. MPA officers should build a positive rapport with the local communities by addressing their concerns including contribution of MPA to their livelihoods. The study further recommends that the revenue collected from the tourism activities in the MPA be shared with the local communities to boost socio-economic development of the local communities.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

ACRONYMS

BMU	Beach Management Unit
CBD	Convention on Biological Diversity
FGD	Focus Group Discussion
GoK	Government of Kenya
ICZM	Integrated Coastal Zone Management
IUCN	International Union for Conservation of Nature
KES	Kenya Shilling
KWS	Kenya Wildlife Service
LMMA	Locally Management Marine Area
MBOA	Mombasa Boat Operators Association
MIHARI	A Malagasy acronym that translates into ‘local marine resource management’
MMNP&R	Mombasa Marine National Park & Reserve
MPA	Marine Protected Area
OLS	Ordinary Least Squares
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
WWF	World Wide Fund for Nature

CHAPTER ONE

INTRODUCTION

1.1 Background

Throughout the world, there are efforts to regulate activities in coastal and marine areas with the aim of ensuring sustainability of livelihoods and that of marine resources (UNIDO, 2000). One of the efforts is through closing of fishing areas, commonly referred to as Marine Protected Areas (MPAs) (Drew, 2005). An MPA is an area of intertidal or sub-tidal terrain, together with its overlaying water and associated flora, fauna, historical, and cultural features, which has been reserved by law or other effective means to protect part or the entire enclosed environment (IUCN, 1988; Pomeroy and Rivera, 2006).

MPAs are an important instrument for conservation and fisheries management (Bennett and Dearden, 2014). The benefits of biodiversity conservation both in terms of quality and quantity; and fisheries management are particularly evident in “no-take” MPAs (Lester and Halpern, 2008). According to Toropova et al. (2010) there are about 6800 MPAs covering 2.86% of Exclusive Economic Zones globally in 2010. Further, Toropova et al. (2010) notes that global commitments to scale up the coverage of MPAs to 10% aerial coverage by 2020. The establishment of MPAs has been supported worldwide and the 1992 Convention on Biological Diversity (CBD) facilitated the establishment of an effectively managed system of MPAs (Wells et al., 2007).

In Kenya, The Cabinet Secretary Ministry of Environment and Natural Resources, may in consultation with the competent authority, by notice in the Gazette declare an area to be a marine protected area and publish its management plan. Kenya Wildlife Service (KWS) are mandated to managed Marine Parks and Reserves in Kenya in accordance with a management plan that complies with the requirements prescribed by the Fifth Schedule of the Wildlife Conservation and Management Act (2013).

Marine parks are no-take zones for any marine resources and all forms of extractive activities are prohibited while in the reserves human activities like fishing are allowed (Ngugi, 2001). MPAs are established with the purpose of protecting the biodiversity, provision of alternative sources of livelihood to the surrounding communities and to promote government revenue through tourism activities (Cinner et al., 2009; Tuda and Omari, 2012).

Ministry of Forestry and Wildlife (2012) stipulate that to ensure the sustainable conservation and management of wildlife and their habitats in all protected areas, The Kenyan Government must develop a Marine Protected Area Strategy in line with the national and international integrated coastal zone management (ICZM) strategy. In addition, the policy indicate that it's a responsibility of the government to protect, maintain and restore marine species, habitats and ecosystems of national and international importance, including islands within marine protected areas.

Kenya was the first African country to establish marine protected areas, the Malindi/Watamu Marine National Park and Reserve established in 1968 (Ngugi, 2001). The original motivation for their establishment was mainly the need to earn foreign exchange through tourism. Other parks and reserves in Kenya include Kiunga Marine National Reserve, Mombasa Marine National Park and Kisite/Mpunguti Marine National Park and Reserve. These parks and reserves were subsequently been set up in reaction to perceived problems such as the over-exploitation and destruction of marine habitats. All the marine parks and reserve in Kenya has its uniqueness, for instance, Kiunga national reserve conserves valuable coral reefs, sea grass meadows and extensive mangrove forests, with their attendant biodiversity and is also a refuge for sea turtles and dugongs. Mombasa Marine National Park and Reserve (MMNP&R) is unique in sergeant major fish, trigger fish, jelly fish, rapid fish, string ray, scissor fish and surgeon fish.

Fishermen have the longest history of resource use in the study area and fished in the area for at least 17 years before establishment of the MMNP&R (Munga et al., 2010). However,

McClanahan (1994) notes that a decrease in the number of fishermen was observed due to reduced fishing grounds resulting from establishment of the MMNP&R. The creation of the MPA, however, coincided with an increase of boat operators, kiosk operators, curio vendors and tourists in recent years (McClanahan, 1994).

The Mombasa Marine National Park and Reserve (MMNP&R) was gazetted in 1986 and officially began its operations in 1991 (Munga et al., 2012). The importance of the MMNP&R in Kenya includes preservation of the marine habitat, revenue generation through tourism, education and scientific research (Ngugi, 2001). Prior to the gazettement of this area to an MPA, the biodiversity and the general environment had faced considerable degradation and over-exploitation, especially from uncontrolled fishing, shell and coral collection and coastal urban development (Ngugi, 2001). According to Obura and Grimsdith (2009) the establishment of the MMNP&R has led to improvement of resource status in terms of diversity and abundance. McClanahan and Mangi (2001) noted an increase of the triggerfish (*Balistapus undulatus*) through spill overs of the fish beyond the no-take zone. In addition, a study done by Munga et al. (2012) noted a 45% increase in the coral cover. Revenue data indicates that, the Kenya Wildlife Service (KWS) has registered an improved revenue collection from tourists, from Kenya Shillings (KES) 19.1 million in the year 2012/13 to KES 20.3 million in the year 2013/14 (Government of Kenya, 2014). According to Tuda and Omari (2012), opportunities for employment, tourism, and recreation provided by the marine and coastal environment and its resources, continues to make considerable contribution to the Kenyan economy. It estimated that more than 60% of tourists visiting Kenya must pass through the coast (Tuda and Omari, 2012).

Most of the communities living adjacent to MMNP&R are the Mijikendas who spread out along the coastal strip in the 20th Century before the establishment of the MPA (Versleijen and Hoorweg, 2008). These communities are mainly fishers who heavily depend on marine resources for their livelihoods. Despite this success in conservation and revenue income, these

communities perceive that the establishment of the MMNP&R has provided little economic benefits to them yet their lives are directly linked to the marine resources (Malleret, 2000). Therefore, this study sought to evaluate the contribution of the MMNP&R to the socio-economic development of the neighbouring local communities.

1.2 Problem Statement

Establishment of most MPAs without considering socio-economic aspects of end-users has led to conflict in resource-use among already disadvantaged coastal communities (Pomeroy and Rivera, 2006). In the MMNP&R for example, non-compliance to MPA regulation was observed through communities practicing illegal fishing methods (McClanahan et al., 2005). With the increasing challenges in the management of coastal and marine resources, it is becoming clear that MPAs are crucial to the sustainability of marine resources and people's livelihoods (Ngugi, 2001). However, the establishment of the MMNP&R has not adequately benefited the local community (Ransom and Mangi, 2010). According to McClanahan and Mangi (2001) the establishment of the MPA has denied access to about 63% of the total fishing grounds resulting in decline in the catches and deterioration of fisher livelihoods. So far, there is no evidence of a study that has been done to investigate this problem in relation to the socio-economic development of the local communities. Considering studies like those of Hoorweg et al. (2009) and McClanahan and Mangi (2000) among others, the research in the MPA had focused on the ecology of the marine resources with relatively little focus on the socio-economic outcomes of establishing the MPA on the local communities.

1.3 Overall Objective

The overall objective of this study was to evaluate the contribution of the MMNP&R to the social-economic development of the neighbouring local communities.

1.4 Specific Objectives

The specific objectives were:

1. To determine income level from marine activities for the local communities living around the MMNP&R.
2. To assess the perceptions of the local communities towards the MMNP&R.
3. To evaluate the impact of the MPA on the livelihood of the local communities.

1.5 Research Questions

1. What is the income level from marine activities for the local communities living around the MMNP&R?
2. What is the perception of the local communities towards the MMNP&R?
3. What are the impacts of MPA on the livelihood of the local communities?

1.6 Significance of the Study

The findings of this study may inform policy formulation and decision making in terms of understanding and addressing perceptions and attitudes of local communities relating to marine protected areas. This may allow the local communities' interests to be included in the decisions and policies that are used in the management of the MMNP&R. In this way, it may assist the government to implement the policy when establishing more MPAs. The findings of the study may also be useful to the government in formulating and implementing policies that leads to revenue benefit sharing with the local communities. Finally, the findings of the study may be useful in contributing to the existing body of knowledge relating to the contribution of MPAs on the socio-economic development of local communities.

1.7 Scope of the Study

The study was conducted in Bamburi area 5 km to the MMNP&R and Jumba area 10 km further away from the MPA. The two study areas were selected to enable comparative analysis of economic impact of an MPA to the surrounding villages. The study focused on evaluation of contribution of the MMNP&R to the local communities in Bamburi and Jumba study areas.

The selection of Bamburi and Jumba study areas was informed by socio-economic status of the local communities around the MMNP&R where fishing and tourism occur.

1.8 Definition of Terms

Marine Park means a protected marine area where no fishing, construction work or any disturbance is allowed unless with written permission of the Director-General of Kenya Wildlife Service (Wildlife Conservation and Management Act, 2013).

Marine Protected Area (MPA) means any park or reserve covering the area of intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law, and includes any dry land found within the gazetted boundary.

Marine reserve means a marine protected area where subsistence fishing is permitted.

National park means an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

National reserve means an area of community land declared to be a national reserve under this Wildlife Conservation and Management Act (2013) or under any other applicable written law.

Protected area means a clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve long-term conservation of nature with associated ecosystem services and cultural values.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the related literature on the contribution of MPAs to the socioeconomic development of the local communities including; MPAs and community's livelihoods, income level of the community from marine activities, perceptions of the local community towards the existence of MPAs and impacts of MPAs to the community livelihoods.

2.2 Marine Protected Areas and Community's Livelihoods

Globally, coastal communities face a growing degree of insecurity as a result of poverty and high dependence upon natural resources (Pomeroy et al., 2001). MPA design and implementation should seek to understand the diversity of coastal communities, especially in relation to their livelihood strategies (Roberts, 2000). Many households in coastal communities undertake a range of activities in order to cope financially and reduce the risks associated with high economic dependency on natural resources (Bailey and Pomeroy, 1996; Allison and Ellis, 2001).

The adoption of MPA as a management approach has increased steadily in many countries. According to Wishitemi (2008) and Spalding et al. (2013), MPAs cover an area of about 13.3 million km^2 of the global land surface. For instance, the country with the largest MPA in the world is Republic of Kiribati that has protected area (Phoenix Island) of 410,500 Km^2 (Wood, 2008). Figure 2.1 illustrate the proportion of the world's oceans that has been included in a marine protected area or reserve since 1900, and how much remains unprotected.

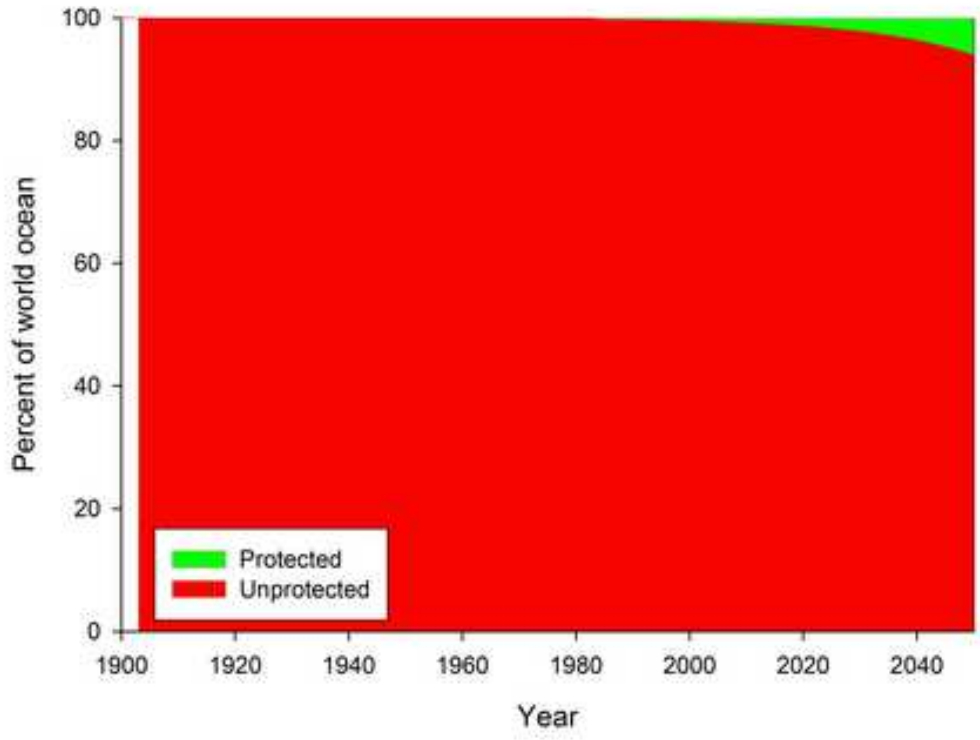

Figure 2.1: proportion of the world's oceans that has been included in a marine protected area or reserve since 1900

Source Wood (2008)

In Philippines for example, there are provisions through the government that clearly shows benefit sharing schemes between the government and the local stakeholders for nationally established MPAs (Arceo, Alino and Gonzales, 2008). On the other hand, in Australia, the government has revised its MPAs policies so that there can be mutual benefit between the government and the locals (UNEP, 2000). This scenario can be replicated in Kenya if the government can use revenue generated from the MMNP&R to bring socio-economic development for the local communities living near the marine park.

The reef in Toliara MPA in Madagascar is the third largest coral reef system in the world. The reef is made up of barrier and fringing reefs and shallow lagoons. There are more than 6,000 species of wildlife living in this reef system, including sea turtles from all over the Western Ocean and the Coelacanth, a 400 million year old species of fish. Toliara MPA in Madagascar has succeeded because of close collaboration in terms of communication and awareness between the government and the rural communities of Anakao, Beheloke, Itampolo and

Androka (WWF, 2008). This provides a clear justification that the existence of MPAs, if conceptualized with community needs and sustainability of environmental resources in the matrix, can yield positive results to all stakeholders in conservation. In this regard, the success of MPAs in Kenya largely depends on the support and willingness to participate by the local communities in the management of marine resources. This collaboration is important for the longer-term sustainability of the marine resources particularly in developing countries.

Table 2.1 shows total area covered by marine parks and reserves with their year of gazettment.

Table 2.1: Marine National Parks and Reserves in Kenya (Source: Government of Kenya, *2013*

Marine Park	**Year of gazettment**	**Park area (km^2)**	**Reserve area km^2)**
Malindi Marine National Park and Reserve	1968	6	213
Watamu Marine National Park and Reserve	1968	10	32
Kisite/Mpunguti Marine National Park and Reserve	1978	28	11
Mombasa Marine National Park and Reserve	1986	10	200
Total area	-	**54**	**456**

The MMNP&R was established in 1986 to protect the shallow fringing reef against threats arising from excessive human activities, manage the various stakeholders and derive revenues from tourist activities (Obura et al., 2004). MMNP&R also serves the purpose of fisheries management and ecosystem protection, recreation, tourism, research and education (McClanahan and Mangi, 2001). All kinds of fishing are prohibited in the park while traditional fishing (using only traditional gears) is allowed in the reserve (Ransom & Mangi, 2010).

In Kenya, when the government implemented rules for the MMNP&R, part of the result was the immediate enclosure of an area previously regarded by fishermen as containing a ‘common resource’ (Brown et al., 2008). The closure and the associated prohibitions to entry and

exploitation of the resource base have both been responsible for upsetting the previous pattern of use and exploitation and instead introduced a new system of resource management that was neither well understood nor accepted by traditional users (Ngugi, 2001).

Nevertheless, MPAs can benefit local communities through alternative sources of livelihood and it can lead to empowerment, improved governance, educational and cultural benefits (Salm et al., 2000). For example, Leisher et al. (2007) noted that MPAs can lead to poverty reduction through tourism jobs, better governance, health improvements and empowerment of women.

However, when the MMNP&R was declared protected it denied indigenous people access to fishing inside the designated areas (Wishitemi, 2008). Munga et al. (2012) reported that community displacement from protected areas has a direct impact on livelihoods. Establishments of the MMNP&R led to displacement or relocation of host communities from their fishing environment. This resulted in subsequent reductions in standard of living, competition and conflict, over-fishing in the reserve, lack of access to protected areas and conflict over the distribution of tourist revenues (Mvula, 2001). Without addressing the foregoing challenges, as well as issues relating to the socio-economic benefits accruing from the conservation initiatives and impacts on the local communities living around the MMNP&R, wildlife and other natural resources cannot in the long run be managed in a sustainable manner (McClanahan et al., 2009). Furthermore, when the economic benefits do not spill over to the local community; the very basis of tourism is put in jeopardy (Obura et al., 2004). To avert this, local communities in the neighborhoods of MPAs should see meaningful improvement in their standards of living and economic fortunes if they are to continue participating in biodiversity conservation (Ngugi, 2001).

2.3 Income Level from Marine Activities for the Local Communities Living around MPAs

Conceptualization of human development and poverty eradication can be construed from the perspective of sustainable exploitation of biodiversity in improving the social and economic

welfare of many people along the coastal regions (Obura and Grimditch, 2009). However, with the growing pertinent problem of demographic trends of population increase, the resultant effect on environment is the over exploitation of natural resources. The population increase has placed pressure on marine ecosystems and related resources threatening to deplete the world's biodiversity at ever increasing rates (Becha, 2008).

Samoilys and Kanyange (2008) observed that many of the coastal dwellers in Africa are poor and heavily rely on the marine and other natural resources for their economic and socio-cultural survival. A case in point that can illustrate this is the over fishing which has a negative outcome on the fishing industry. This indicates that broad scale degradation and depletion of the environmental resources is ongoing and impedes the productivity of both commercial and subsistence fishing in the East African region, with a negative effect on the livelihoods of the coastal communities, which is clearly manifest in the difficult economic conditions of local communities (IUCN, 2008).

The over exploitation of natural resources will definitely escalate due to lack of mitigating measures as well as formulation of defective strategies that fail to address the environmental concerns in relation to the needs of the local communities (Obura et al., 2007). According to Mirera and Samoilys (2008) many coastal people in Kenya live below the poverty line and have difficulties in improving their living standards. Coastal communities are also alienated from marine resources which they have interacted with and exploited for many generations in the past. These coastal communities in Kenya depend on marine resources such as fishing and fish vending. More recently these communities uses MPA as an alternative source of livelihoods through activities such as boat business to carry tourists to the MPA, photography business, curio selling and tube lending businesses at Jomo Kenyatta public beach and areas near the MMNP&R.

2.4 Perceptions of the Local communities towards Marine Protected Areas

Establishment of MPAs is always controversial amongst resource users because of their dependency on the resource (Adams and Hutton, 2007). This makes it important to involve them at the decision-making process so as to obtain support and compliance to the establishment of the MPAs as it will be difficult to change once the positions have been established (Hoorweg et al., 2009). Different groups of resource users and stakeholders may hold different or unexpected perceptions regarding MPAs and marine resources due to their uses of the resource, culture, family and community traditions, beliefs, expectations about the future and environmental knowledge (UNEP, 2000). Therefore, communication about the purpose and intent of an MPA must be clear and transparent and presented early in the process so that any misperceptions can be addressed (McClanahan et al., 2005).

In June 2012 Madagascar community members from locally managed marine areas (LMMA) launch a national network named MIHARI, a Malagasy acronym that translates into ‘local marine resource management (Mayol, 2013). The nascent MIHARI network is an informal network that was inspired by the success of the LMMA Network in the Indo-Pacific region. April 2015 was a month of success for the MIHARI network (MIHARI, 2015). Five community-managed Marine Protected Areas (MPAs) in the network finally got their permanent protection status, after years of waiting. These new MPAs cover areas of high importance for marine biodiversity as well as for traditional fishing communities including Velondriake and Soariake in the southwest of Madagascar, Ankarea and Ankivonjy in northwest and Ambodivahibe in the North.

These MPAs result from a decade-long process towards integrating local communities into the management of natural resources as part of the expansion of the protected areas system of Madagascar. Furthermore, they have contributed greatly to the realisation of the 2003 Durban Vision, which envisaged an increase in the area covered by protected areas for Madagascar from 1.7 million hectares to 6 million hectares (MIHARI, 2015).

Unlike “traditional” MPAs, locally managed marine protected areas are created both by, and for, the local communities that depend so heavily on the natural resources that these areas generate for their subsistence. These MPAs aim to ensure a good balance between traditional uses of resources and the protection of biodiversity, and are classified as category 5 or 6 of the IUCN (International Union for the Conservation of Nature). Obtaining permanent protected status not only creates a sense of ownership in coastal communities, but also serves as an important way to secure community rights, in that it can harmonise economic development activities in the area while at the same time limiting the activities of the industrial fishing fleet (MIHARI, 2015).

In Tanzania for example MPAs establishment, awareness of MPAs objectives and rules that govern the use of marine and coastal resources, dependency on marine and coastal-based activities, perceived fishery conditions, wealth and location variables had a significant influence on perceived attitudes towards establishment of an MPA (Sesabo et al., 2006). On the other hand Malleret (2000) found out that more than 89% of fishers in Kenya believe that the benefits they derive from government marine parks are not economically substantive to uplift their households socio-economically in improving the welfare of local communities through sustainable exploitation of marine resources. A survey of literature indicates that few studies have been conducted in the MMNP&R to document the perceptions and attitudes of the local community towards the MPAs (Mangi and Roberts, 2007).

2.5 Impacts of MPAs on the Livelihood of Communities

MPAs are important biodiversity conservation and fisheries management tools (Obura and Grimditch, 2009). According to a study done in South Africa by Sunde and Isaacs (2008) this fisheries management has embraced an ecosystem management model, which has led to 18% of the coastal areas being constituted as MPAs. Further, these MPAs in South Africa are considerate of the vulnerability, livelihood needs and structural poverty of the local communities living around the MPAs.

Plate 2.1: A local fisher in the Mombasa marine national reserve

Plate 2.2: Community boats with tourists at the Mombasa marine national park, Kenya

On the other hand, tourism is an important sector to the national development in Kenya (Ngugi, 2001). Within the MMNP&R, tourism (plate 2) has helped in the provision of alternative sources of livelihood to the communities around (Wanyonyi et al., 2008). However, operationalization of the MMNP&R has led to certain resource-use conflicts between the national conservation agency Kenya Wildlife Service (KWS) and local fishing communities (plate 1) on MPAs use restrictions. This has resulted in relatively limited income; lower satisfaction with alternative options other than fishing, reallocation of resources and wealth among social group (Ngugi, 2001).

MPA management in East Africa has been supported through several key regional initiatives during 2003-04, in addition to national initiatives. The East African Marine Ecoregion

initiative, spearheaded by the World Wide Fund (WWF) for Nature identified priority sites and seascapes for protection, including some that are currently given some protection as national MPAs (Obura et al., 2004).

2.6 Conceptual Framework

The conceptual framework of this study is as shown in Figure 2.2.

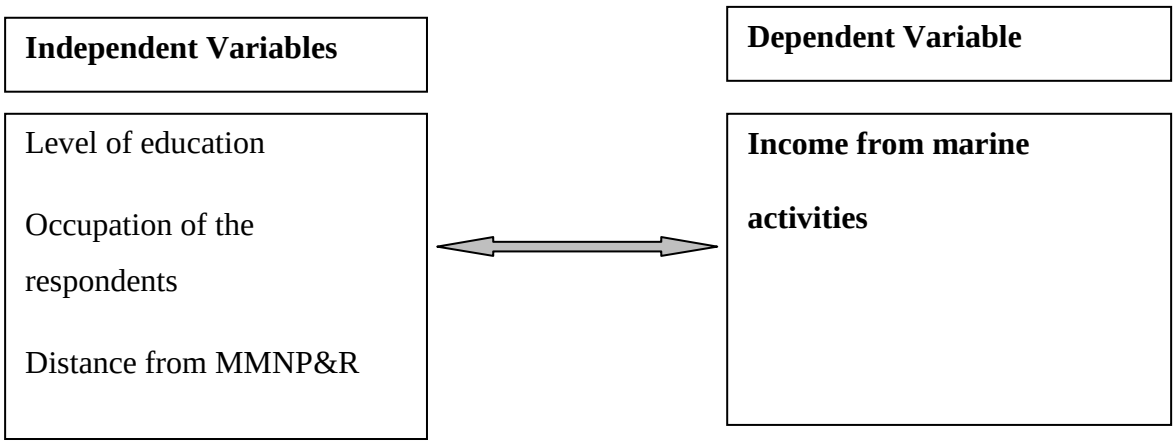

Figure 2.2: Conceptual Framework showing the relationship between independent and dependent variables

The conceptual framework shown in Figure 2.2 shows the relationship between independent and dependent variables. The independent variables include level of education, occupation of the respondents and distance of the respondents from the MMNP&R. All these variables influence the outcome (dependent variable) which is income of the respondents from marine activities. The marine activities are fishing, fish vending and income from tourism activities. However the flow from independent to dependent variables sometime is not direct.

2.7 Summary of the Gaps Identified in the Literature

From the literature, it was found out that the success of MPA depends on the close collaboration between the local communities and the Government. Therefore, every effort needs to be made to ensure community acceptance and participation in the conservation.

Local communities living around the ocean heavily depend on the marine resources for their livelihoods. The increase in human population has led to increased demand for sea foods thus

overexploitation has exceeded the rate of natural regeneration of these marine resources. However, focus now shift to alternative livelihoods generated through involvement of the communities in non-destructive activities such as business that arise from tourists who visits marine protected areas and reserves. The coastal communities now use this opportunity to diversify their livelihoods thus reducing the pressure on the natural resources.

Establishment of MPA always elicits negative perceptions by the local communities living around the coastal line. This is because the community loses their traditional fishing grounds to conservation. However this trend is now shifting as the result of the communities who are consulted even before the gazettement of these protected areas. More recently , Madagascar has launched a program, known as “Madagascar locally managed marine area” network (MIHARI) that establish locally managed MPA thereby creating sense of ownership among the community members.

The impacts of MPA, to the local communities’ livelihoods have been discussed widely by many authors, some of which point out that the MPAs are important for both biodiversity conservation and fisheries management. However, some authors have stated that MPAs have caused vulnerability livelihood needs and structural poverty among the local communities around the MPAs. On other hand some authors have illustrated benefits of the local communities arising from tourism activities in the MPAs. Notwithstanding, this study tries to fill this divergent argument among the authors through determining the impacts of MMNP&R to the local community livelihoods.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the following aspects of the study namely the study area, population of the study, research design, data collection instruments, data collection procedure, pilot study, reliability, validity of the instruments, data analysis and presentation and ethical consideration.

3.2 Research Design

The study used descriptive survey design. It describes the conditions in its natural setting as it exists (Kothari, 2004). The design was suitable for the study because it allowed for not only the collection of descriptive data but also the use of qualitative and quantitative methods in data collection. It was appropriate for the study's intention of using Focus Group Discussions (FGDs) and questionnaire to collect data. Descriptive survey design was also useful in overcoming bias by allowing for randomization which was important in increasing validity and reliability in the selection of the sample from the study population.

3.3 Study Area

The MMNP&R covers the Nyali, Bamburi, Shanzu Coastal stretch, from Nyali to the Mtwapa Creek in the North east of Mombasa County. The main socio-economic activities include tourism, fishing and trade that occur within the Jomo Kenyatta Public beach. This area has a beautiful beach that attracts many tourists in the area. The Park has an area of 10 km^2 while the reserve is 200 km^2, straddling latitudes 3°58' and 4° 04'S and longitudes 39°40' and 39°54'E (Government of Kenya, 2013). The Kenyan coast is characterized by warm tropical conditions with temperatures varying between 25°C and 31°C during the year with, stable salinity regimes and moderate nutrient levels (Government of Kenya, 2009a). The ecological biodiversity and tourist attraction in the park and reserve include corals, beaches, cliffs, lagoon, sea waters, sea grasses, and sea weeds. The park is home to a variety of marine life including crabs, sea

urchins, sea cucumbers, and Jelly fish among others. Other spectacular attractions include the sandy beaches and coral gardens (Bosire et al., 2012).

Bamburi is near the MMNP&R on the western side, while Jumba is far from the MMNP&R (Figure 3.1). The rationale for their selection was to evaluate the contribution of the MMNP&R at a site near and further from the MMNP&R.

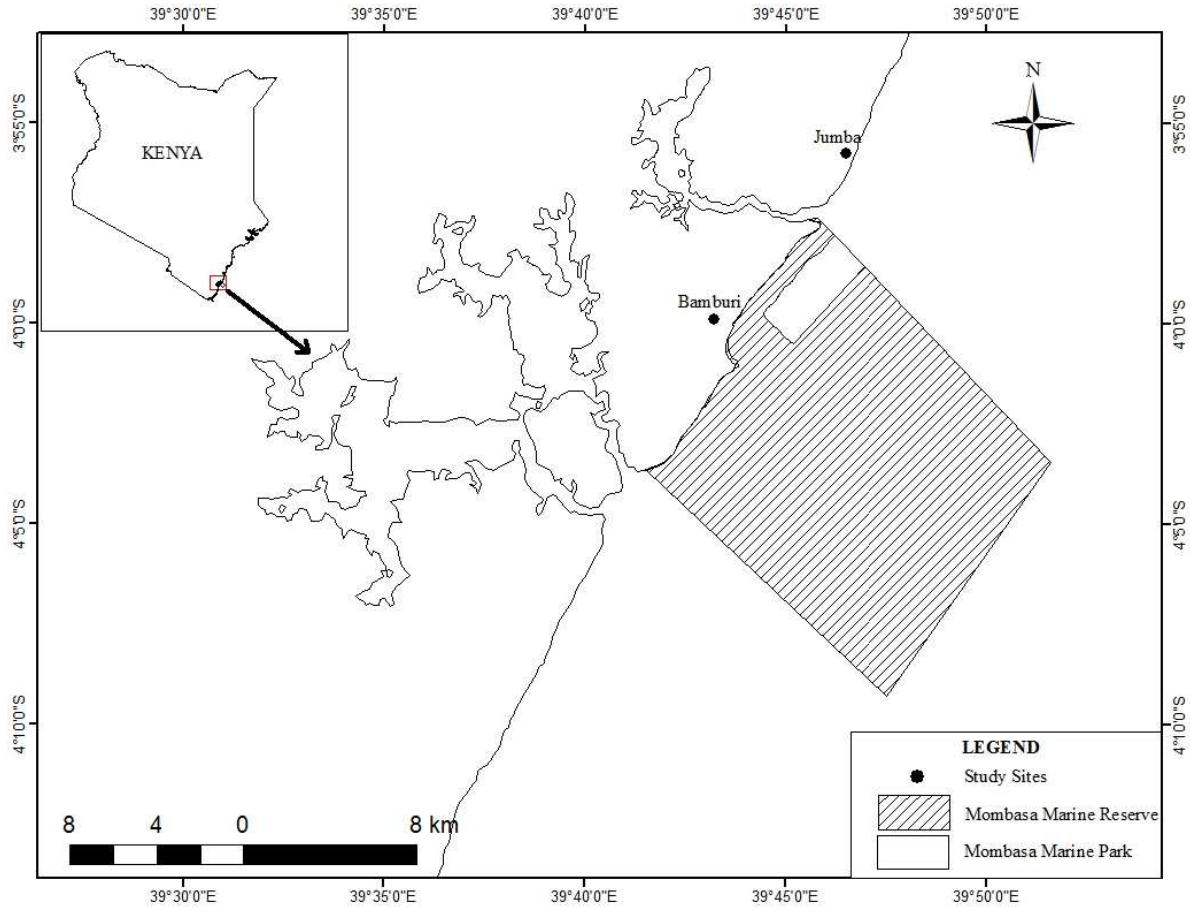

Figure 3.1: A Map of Kenya (in set) showing the location of the study sites

3.4 Target Population

The target population for this study was the households and groups of Beach Management Units (BMUs) consisting of fisher folk, curio operators, boat operators, cloth/food vendors and beach operators living in Bamburi and Jumba study areas. Population of the Bamburi and Jumba study areas comprises of a total of 1,033 as household units. This includes 533

households in Bamburi and 500 households in Jumba study areas (Government of Kenya, 2009b).

3.5 Sample Size and Sampling Techniques

A sample of 149 households in the Bamburi and Jumba study areas were interviewed. The following formula by Ross (2002) for sample size calculation was used to obtain the sample size.

$$n = \frac{NZ^2 * 0.25}{d^2 * (N-1) + (Z^2 + 0.25)}$$

Where, n= sample size
N= Target population
d= precision level expressed in terms of 0.05 (95% confidence level)
Z= number of Standard deviation (SD) units of the sampling distribution correct to desired confidence level (95%).
0.25= Constant

Sample size for Bamburi area

N= 533
d= 0.05
Z= 1.96

$$\frac{533 * 1.96^2 * 0.25}{0.05^2 * (533-1) + (1.96^2 + 0.25)}$$

=75 Household units for Bamburi area

Sample size for Jumba area

N= 500
d= 0.05
Z= 1.96

$$\frac{500*1.96^2*0.25}{0.05^2*(500-1)+(1.96^2+0.25)}$$

=74 Household units for Jumba area

Total households interviewed were 74+ 75= 149 households

The study used two main sampling techniques; purposive and simple random sampling. Bamburi and Jumba study areas were purposefully selected because of their differential proximity to the MMNP&R. Bamburi is considered as an MPA region because it is closer to the MMNP&R while Jumba is a non MPA region since it is located far away from the MMNP&R.

Simple random sampling was then used to select households in the villages in the study areas. The households in a village were assigned a random number. Random number table was used to select random sample of the households in all the villages. A sampling frame was created using this table until it exceeded the limit of the villages. A random sample was selected from this sampling frame. Since the numbers were placed in the table in a completely random fashion, the resulting sample was random. This procedure gives each household an equal probability of being selected (Kothari, 2004).

3.6 Research Instruments

3.6.1 Questionnaire Schedules

A questionnaire schedules was developed and administered to each of the selected household. Household head or any adult member of the selected households was the targeted key respondents for this study.

3.6.2 Focus Group Discussion

A Focus Group Discussion (FGD) guide was prepared for discussion with the Beach Management Units (BMUs). Two FGDs of 10 members each were conducted for each site during survey period. Though, the FGD participants were local communities from the study

areas they were not included in interview of the households. The participants were selected with the help of village elders. The discussants were in groups of 10. The meetings took between 2 - 3 hours and they were done in both study areas with the permission of the area administrator (chief). The enumerators recorded the discussion minutes which was guided by the study objectives. Focus group discussion allow deeper examination of complex issues than other forms of the survey research, because when people hear others talk, it often triggers responses or ideas that they did not think about before (Bhattacherjee, 2012).

3.6.3 Observation Schedules

One set of observation schedule was prepared and used to observe the activities in the BMU stations in Bamburi and Jumba study areas. The observation schedule as a tool for data collection helped in gaining insights and validation of information collected. This is a procedure by which the observer notes and records reality (Abbott and Bordens, 2011).

3.7 Pilot Testing

Pilot testing was done before data collection for 3 days to test the questionnaire. The pilot testing was carried out on a sample of 20 respondents who were not part of the study but had same characteristics as the study sample. The respondents were selected from the study areas, i.e. 10 respondents from Bamburi and 10 from Jumba study areas. The respondents were given the questionnaires to attempt the questions. Pilot testing results was used to detect potential problems in research design and tools. It also ensured that the measurement instruments used in the study were reliable and valid in measure (Bhattacherjee, 2012). After a successful pilot testing, the researcher then proceeded with data collection process.

3.8 Reliability

For successful data collection, internal consistency reliability of the questionnaire was confirmed before being used for data collection in the field. Reliability is needed to confirm whether a specific test is consistent over time and measures the construct that it was initially designed to measure (Bhattacherjee, 2012). Cronbach Alpha Coefficient reliability was used to

measure the internal consistency of the instruments. The following formula was used to test reliability of the tools:

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K}\sigma_{Y_i}^2}{\sigma_X^2}\right)$$

Where *K* is the number of items in the measure, the variance (square of Standard Deviation) of the observed total scores, and is the observed variance for item *i*. The standardized Cronbach's alpha can be computed using a simpler formula:

$$\alpha_{\text{standardized}} = \frac{K\bar{r}}{(1+(K-1)\bar{r})}$$

Where *K* is the number of items, is the average inter-item correlation, i.e., the mean of *K* (*K*-1)/2 coefficients in the upper triangular (or lower triangular) correlation matrix. According to Bhattacherjee (2012) the coefficient of 0.70 or more implies that there is a high degree of reliability. The results of the pilot study were calculated and from the computation the mean of inter item correlation was 0.87. This coefficient was used as the acceptance threshold.

3.9 Validity

Validity of the instruments was determined before being used for data collection in the field. This was done by experts from the Department of Community development in the School of Environmental and Earth Sciences, Pwani University, to assess the face, content and construct validity of the instrument to ensure that they measure what they were intended for from the respondents (Abbott and Bordens, 2011).

3.10 Data Collection Procedure

Data was collected through administration of questionnaires to the households. Before administering the questionnaire, enumerators were trained on data collection process for two days. The enumerators were selected from local communities and had a degree in social

sciences and other related fields. Thus, they have an understanding of local language and had a required expertise in the collection of the survey data. During the training, the researcher explained the respondent's privacy and confidentiality rights with regard to information. Interviews were then conducted with each of the identified respondent on a one-on-one arrangement. During FGDs, the researcher took notes of the discussions and ensured that critical information pertinent to the research study was recorded. Observations of issues related to the study were made continuously regardless of whether an interview was in progress or not. The data collection period for this study was three months; from December 2015 to February 2016.

3.11 Data Analysis and Presentation

The data collected was entered in to Microsoft Excel spreadsheet. Descriptive data analysis was used to show the distribution and frequencies of income levels for the communities. Qualitative analytical tools were used to organize, summarize, interpret and present research findings in relation to the study objectives. Qualitative data analysis was done using Statistical package for social sciences (SPSS) which involved organizing, accounting for and explaining the data. This is making sense of data in terms of the participants' definitions of the situation, noting patterns, themes, categories and regularities (Cohen et al., 2007). Regression analysis was used to measure relation between the dependent variable i.e. income from marine activities and corresponding values of other variables i.e. age, educational level, gender, distance from MMNP&R and occupation of the respondents. The Regression model of income from marine activities = *f*(age of the respondents, education level, gender, distance from MMNP&R and occupation of the respondents) was used. The variables such as age, occupation of the respondents and distance from MMNP&R were not normal; consequently, these variables were transformed using Log_{10} before analysis. The analysis was a simple regression based on Ordinary Least Squares (OLS).

The operationalization of key variables of the study is provided in Table 3.1.

Table 3.1: Operational definition of variables

Independent Variables	Explanation	Measurement
Age	Age of the Respondents	Years
Education level	Education Level of the Respondents	(1=None, 2=Primary, 3= Secondary, 4= College, 5= Other
Gender	Gender of the Respondents	Dummy (1=Male 2=Female)
Distance	How far are respondents to the MMNP&R	Kilometers
Occupation	Socio-economic activities of the respondents in Bamburi & Jumba study areas	Number of socio-economic activities of the respondents in Bamburi & Jumba study areas

3.12 Ethical Considerations

Ethical issues were considered with the inclusion of the informed consent form. Participants signed an informed consent form that describes their right to participate and right to withdraw, before their responses in the study were recorded (Bhattacherjee 2012). The researcher explained the purpose of the study to all participants and ensured that all respondents were 18 years and above of age. The respondents of this study were the household heads who are above the age of 22 years. All the information given by the respondents were treated with confidentiality and anonymity.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results of the analyses in line with the purpose and objective of the study. The first section presents the socio-economic characteristics of the study respondents, while the subsequent sections report on the findings of the study based on the research objectives and questions.

4.2 Socio-demographic Characteristics of the Respondents

The average age of respondents of Bamburi area was 43 years compared to Jumba area with an average of 38 years (Table 4.1). In addition, Table 4.1 shows over half (59%) of the respondents had attained primary education in Bamburi area while 19%, 20% and 2% had “Not gone to school”, “secondary education” and “tertiary” respectively. On the other hand 62% of the respondents in Jumba area had attained primary education while 24%, 14% and 0% are “Not gone to school”, “secondary school” and “tertiary” education respectively. Further Table 4.1 shows that majority of the respondents (93%) were male while only 7% were female in Bamburi area. In Jumba area 78% were male and 22% were female (Table 4.1). This implies that most of the respondents were who fishers were male. However, the fish vendors were female respondents.

The respondents were asked to state fortnightly expenditures of their household. The responses are summarized in Table 4.1. The response shows that 59% of the households in Bamburi area spent KES 5000 or more in the two weeks period while in Jumba area, only 49% of the respondents spend KES 5000 or more during the same period.

The result in Table 4.1 shows that over three quarters (76%) of the interviewed respondents are from the Mijikenda community in Bamburi area as compared to 82% in Jumba area. In Bamburi, about 75% of the respondents were involved in fishing as their main occupation

compared to 69% in Jumba area. About 15% of the respondents in Bamburi were engaged in tourism activities as their occupation compared to only 5% at Jumba.

Table 4.1: Socioeconomic characteristics of the respondents

Characteristics	Description	Bamburi area	Jumba area	Mean ±SD
Age (years)	Max	78	75	77±1.50
	Min	19	19	19±0.00
	Average	42.9	37.6	40±2.63
Gender %	Male	93	78	86
	Female	7	22	14
Level of education %	Tertiary	2	0	1
	Secondary	20	14	17
	None	19	24	21
	Primary	59	62	60
Fortnightly expenditures %	≥5000	59	49	54
	<5000	41	51	46
Occupation %	Salaried Employment	0	1	1
	Informal Economic Activities	3	14	8
	Marketing Marine Products	8	11	9
	Tourism	15	5	10
	Fishing	75	69	72
Ethnicity %	Pemba	0	1	1
	Taita	1	3	2
	Bajuni	11	6	9
	Up-country tribes	12	8	10
	Mijikenda	76	82	79

4.3 Income Levels from Marine Activities in Bamburi and Jumba Study Areas

This study compared the income from fishing activities in Bamburi area and Jumba area study areas. The Bamburi area had a higher average income for fishers at KES 1487±2.4 per fisher per day compared to Jumba area which recorded KES 577±2.3 per fisher per day. This is due to the fact that Bamburi fishers do fishing at the marine reserve hence likely to catch more fish but catches have been declining. There are improved fisheries in Bamburi fishing areas, mainly because of the “spillover phenomenon” associated with the movement of fish accumulations from the marine park into the reserve thus enhancing adjacent fisheries (Tuda and Omar, 2012;

Bennett and Dearden, 2014). Studies done by McClanahan and Mangi (2000) also found out that there is fish spillover from the park boundaries, mainly associated with fisheries protection in the park. This increases yields which provide economic benefits to fishers by increasing their total catch and income (Darling, 2014).

However, artisanal fishers contributes to the degradation of marine resources because of intensive fishing in certain areas affecting the ecological balance and result in loss of fish (Hoorweg et al., 2009). According to Versleijen and Hoorweg (2008), destructive fishing practices, such as the use of seine nets and poison, altered the environment as well as the ecological balance of the reef and the seabed.

The respondents in Bamburi earn more income from tourism activities than their counterparts in Jumba. This may be as a result of more tourist activities such as hotels and being near to the MPA. The finding is in agreement with the study done by Darling (2014) who noted that the MMNP&R provide benefits to local communities through increased tourism.

The findings of this study further shows that fish vendors in Bamburi earn more income than the fish vendors in Jumba. This can be attributed to the fact that the Bamburi fishers catch more fish than Jumba fishers. Abunge et al. (2013) acknowledges that fish vendors are located at the landing site, buy small quantities of low-value fish, which are then sold locally. A study done by Degen et al. (2010) on earnings of fish vendors in coastal Kenya asserts that fish vendors earn an average income of KES 1244 per week. The results are captured in Table 4.2.

Table 4.2: Comparison of average catch per day (Kg±SD) between Bamburi and Jumba areas

Study Areas	Sample (n)	Catch (Kg ±SD)
Bamburi	57	4.0±2.4
Jumba	51	3.1±2.3

From Table 4.3, it is clear that the respondents from Bamburi fishers earn higher income from marine activities than Jumba fishers. In Bamburi the average income of a fisher was KES 1487 while at Jumba it is KES 577 for the same. Table 4.3, also shows that respondents in Bamburi

(KES 689) earn more income from fish vending than Jumba (KES 470). This may be as a result of more fish catch in Bamburi than in Jumba. Further, in Table 4.3 the results indicate that the income from tourism activities is higher in Bamburi (KES 1800) than that of Jumba (KES 300).

Table 4.3: Average income per day (KES) from marine activities per respondents

	Average income (KES)		
Marine activities	**Bamburi**	**Jumba**	**Average (KES)**
Fishers	1487	577	1032
Fish vendors	689	470	579
Tourism	1800	300	1050
Average	1325	449	887

4.4 Perception of Local Community towards the existence of MMNP&R

The respondents were asked questions regarding their perceptions towards the MMNP&R. The findings show that the majority (92% in Bamburi and 96% in Jumba) of the respondents in both study areas strongly disagreed with the statement that MMNP&R does revenue sharing with the local community. The implication of this finding is that the respondents are not aware of any revenue sharing as a result of the benefit accrued by the MPA. This show that all the revenue collected by the MPA does not infiltrate to the local communities directly as it is transferred to the national Government. The finding of this study is in line with that of Darling (2014) who asserts that MPA in Kenya have ecological and economic benefits for fisheries and tourism, but there is no evidence that these benefits have 'spilled over' trickled down to the local communities

Results show that 56% of the respondents in Bamburi and 55% at Jumba study areas disagreed with the statement that the MPA contributes to the livelihood of the community (Table 4.4). On further probing the respondents indicated that, in fact the establishment of the MPA restricted access to the traditional fishing grounds, thus reducing their income. This may be due to the fact that establishment of the MPA caused displacement of the local fishers from their fishing grounds. The finding of this study is supported by Darling (2014) who noted that MMNP&R

had a negative impact for the local communities following the loss and displacement of fishing grounds and imposed limits on resource exploitation. According to Ngugi (2001) the displacement led to resentment by the local community who opposed the operationalization of this MPA. However, 44% of the respondents in Bamburi agreed with same statement indicating the MPA contributes to the community livelihood through fish spill-overs as compared to 35% at Jumba.

Majority of the respondents (58%) in Bamburi agreed with the statement that MMNP&R involve local community on the management of marine resources as compared to 47 % at Jumba (Table 4.4). These activities include beach clean-up which is done monthly, the collection of debris from the sea and use of legal fishing gears such as box trap, hook lining and recommended fishing nets by State Department of Fisheries. The findings of this study is supported by that of Hofmann (2007) who asserts that a bottom-up approach to resource governance that brings local users into the management process has been adapted by governments worldwide. Hofmann (ibid) goes on to posit that the necessity of bringing local users and stakeholders into the management process has thus been widely acknowledged as a more 'humanized' process of fisheries management.

According to the majority (53% in Bamburi and 38% in Jumba) of the respondents in both study areas MMNP&R officers undertook community awareness on the regulations of the MPA. This includes the use of fishing gears and restriction of fishing in the MPA (Table 4.4). The respondents have indicated that there are regular awareness meetings with the MPA officials to learn the policy regulations such as The Wildlife Conservation and Management Act, 2013. Munga et al. (2010) noted that awareness concerning MPAs and the associated legislation has a profound influence on resource users' perceptions regarding their continued existence. Further, Sesabo et al. (2006) acknowledges that the success of legislation enforcement in marine and coastal resource management depends on such awareness by the resource users.

Table 4.4: Perceptions of local community towards MMNP&R, Bamburi (Jumba)

Variables	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
	Bamburi (Jumba)	Bamburi (Jumba)	Bamburi (Jumba)	Bamburi (Jumba)	Bamburi (Jumba)
MMNP&R shares the revenue collected with the local community	0(0)	0(0)	5(3)	3(1)	92(96)
MMNP&R contributes to the local community livelihood	36(20)	8(15)	0(0)	20(27)	36(38)
MMNP&R involve the local community on the management of marine resources	35(26)	23(21)	7(9)	20(17)	15(27)
MMNP&R does community awareness on the regulations of the MPA	53(38)	12(26)	11(10)	8(24)	16(2)

4.4.1 Respondents' Perception on the Fish Population in the MPA

Table 4.5 shows the results of respondents' perception on fish population in the MPA now as compared to five years ago. The results reveal that over four fifth (83%) of the respondents indicated that there is less fish in the MPA now than five years ago both in Bamburi and Jumba areas. Local fishers cite a significant decrease in catch. The finding of this study is supported by Mbaru (2012) who noted that decrease in fish catch was perpetuated by the decline of the inshore environmental and economic resources. Mbaru (ibid) also acknowledge that there is increased number of fishers, with a majority using inappropriate nets and gears, inshore fishing areas are being destroyed, which in turn decreases productivity and the economic livelihood of local communities.

Majority (43%) of the respondents in both study areas asserted that seasonal change was the cause of lower fish population in the MPA (Table 4.5). The finding of this study is in line with that of Degen et al. (2010) who found out that artisanal fisheries are characterized by uncertainty and depend strongly on seasons. For example, Mbaru (2012) notes that along the

East African coast, fish catches are poorest from April to July, during the *kusi*[1] season. This period is characterized by heavy rainfall and rough seas. During this time, fishers go out less to sea and tend to avoid the out-of-reef areas and deep waters. In contrast, fish catches are best from August to March, during the *kaskazi*[2] season. Seas are relatively calm allowing fishers to go out more often and venture out further (Degen et al., 2010; Mbaru, 2012). Additionally, 28% of the respondents cited destructive/illegal fishing gears as the cause of reduced fish in Bamburi area as compared to Jumba with 7% who gave the same response.

Table 4.5: Respondents' perception on fish population in the MPA now compared to five years ago and reason for change

Characteristics	Description	Bamburi area (%)	Jumba area (%)	Average (%)
Population of fish in the MPA now compared to five years ago	No changes	3	1	2
	Fluctuate	4	1	2
	More fish	3	3	3
	Don't know	8	12	10
Reason for change in fish population	Less fish	83	82	83
	Decreased area	1	9	5
	Poor environment	12	5	9
	Increased # of fishers	11	14	12
	No idea	15	12	13
	Destructive Fishing gears	28	7	17
	Seasonal change	33	53	43

4.4.2 Community Involvement in Decision Making About Marine Resource Use

Community involvement in decision making about the marine resource use is very important in effective management of the marine resources. The respondents were asked of their participation on their decision making process on the use of marine resources. Their responses showed that 79% of the respondents in Bamburi and 74% in Jumba areas were actively involved in the decision making process on the use of marine resources (Figure 4.1). For

[1] when southeast monsoon winds occur
[2] when northeast monsoon winds occur

instance, the local communities are involved in the planning and implementation of beach clean-up exercise that is undertaken once per month. As members of their respective BMUs and user of the marine resources the respondents were consulted in important matters of the management of those resources. For example, the Kenya Marine and Fisheries Research Institute (KMFRI) as a research institution does research on marine related themes and hold awareness on the use of appropriate fishing gears to the fishers in the MPA. In addition, State Department of Fisheries issues fishing license to those BMUs members who are not using the illegal fishing gears that are not allowed. This was revealed during Focus Group Discussion (FGD) on the participation of local communities in the management of marine resources.

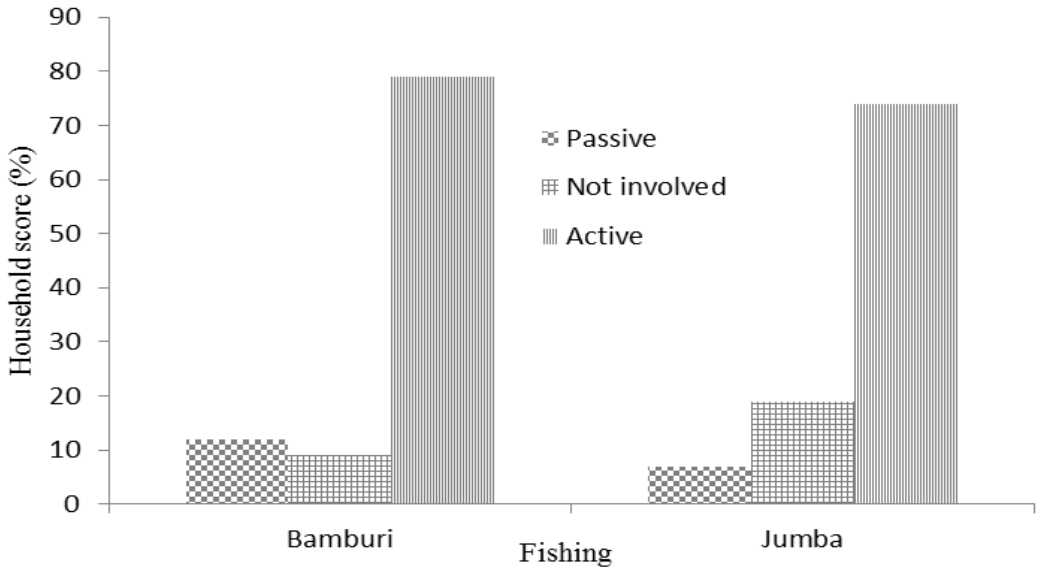

Figure 4.1: Community involvement in decision making on marine resource use in the MMNP&R

4.5 Impact of the MMNP&R on Community Livelihood

The study objective three sought to determine the impacts of the MMNP&R on the community livelihood and marine resources management. The result in Table 4.6 show that MMNP&R has a positive impact on the condition of marine resources in that 83% of the respondents in Bamburi area indicated that there is *in situ* increase in abundance of fish in the marine park as compared to Jumba area 68%. This means the MPA is able to meet its primary objective of conservation of marine resources in the area. Tuda and Omar (2012) assert that the coral cover

and fish biomass increased significantly in the first 10 years of the MPA establishment. In addition, 8% of the respondents stated that the park provides a spawning ground for fish species. The improved coral reef ecosystem has provided an important breeding ground for fish (Tuda and Omar, 2012). About 7% of the respondents in both study areas said that the park had protected habitat. However, 3% of the respondents stated that there is no change on the condition of marine resources that were brought by the establishment of the MPA.

The result in Table 4.6 also show that the MMNP&R has a negative impact (49% of the respondents) on the community livelihood in Bamburi area as compared to 54% of the respondents in Jumba area. This study is in agreement with the study done by Bennett and Dearden (2014) who demonstrated that MPAs in Philippines and Indonesia were "biological successes and social failures" through limiting participation, inequitably sharing economic benefits, and lacking in conflict resolution mechanisms. Bennett and Dearden (2014) also notes that MPA in Honduras has restricted livelihoods without providing alternatives and limited access to traditional areas that are now open to tourists. This scenario of socio-economic of local communities is replicated in the MMNP&R. However, 24% of the respondents in Bamburi area and 12% of the respondents in Jumba area stated that the park has positive impact on the community livelihood while 5% of the respondents in both study areas indicated that the park has a slightly positive impact on community livelihood.

In addition, Table 4.6 shows that 37% of the respondents indicated that MMNP&R has negative impact on the businesses of the community in Bamburi as compared to Jumba area 30%. These businesses include boat transport which carries tourists to the Mombasa Marine National Park, fish vending, photographers, curio sellers and swimming costumes vendors. According to 27% of the respondents in Bamburi area and 16% in Jumba area the park has a good impact on their businesses. The MPA is also an important recreational area and the water-sports activities concentrated around the coral reefs of the MMNP&R receive approximately 38,500 visitors per year by 2013/14 (Government of Kenya, 2014). The Mombasa Boat

Operators Association (MBOA), a community association, dominates the glass bottom boat business with 12-20 boats that earn an estimated $55 per boat per day in 2014 (Government of Kenya, 2014).

Table 4.6: Impact of the MMNP&R on the community livelihoods in Bamburi and Jumba areas

Characteristics	Description	Bamburi (%)	Jumba (%)	Average %
Impact of MMNP&R on condition of Marine resources	No change	3	3	3
	Protected habitat	7	7	7
	No benefits	3	12	7
	Provides spawning ground	5	11	8
	Increase in abundance in the park area	83	68	75
Impact on community livelihood	Slightly positive	5	4	5
	None	0	12	6
	Slightly negative	8	9	9
	Neither	13	8	11
	Very positive	24	12	18
	Very negative	49	54	52
Impact on businesses	Slightly bad	3	4	3
	None	0	9	5
	Slightly good	7	5	6
	Very good	27	16	21
	Neither	27	35	31
	Very bad	37	30	34

4.5.1 Benefits of the MMNP&R to Local Communities

The respondents were asked on the benefits they acquire from the MMNP&R. Their responses showed that about 53% of the respondents in Bamburi area and 23% in Jumba area indicated there was improved catch after the establishment of the MPA. The management and conservation benefits of MPAs can also lead to positive outcomes for local communities through spillover of fish into local fisheries (Bennett and Dearden, 2014). This has increased the fish catch in the study area of Bamburi that is adjacent to the MMNP&R. However, most of the respondents in Jumba said that there are no benefits from the park. This can be attributed to the proximity of the Jumba being relatively far from the park. However, 32% of the

respondents in Bamburi and 35% in Jumba said that there were no benefits from the park (Figure 4.2).

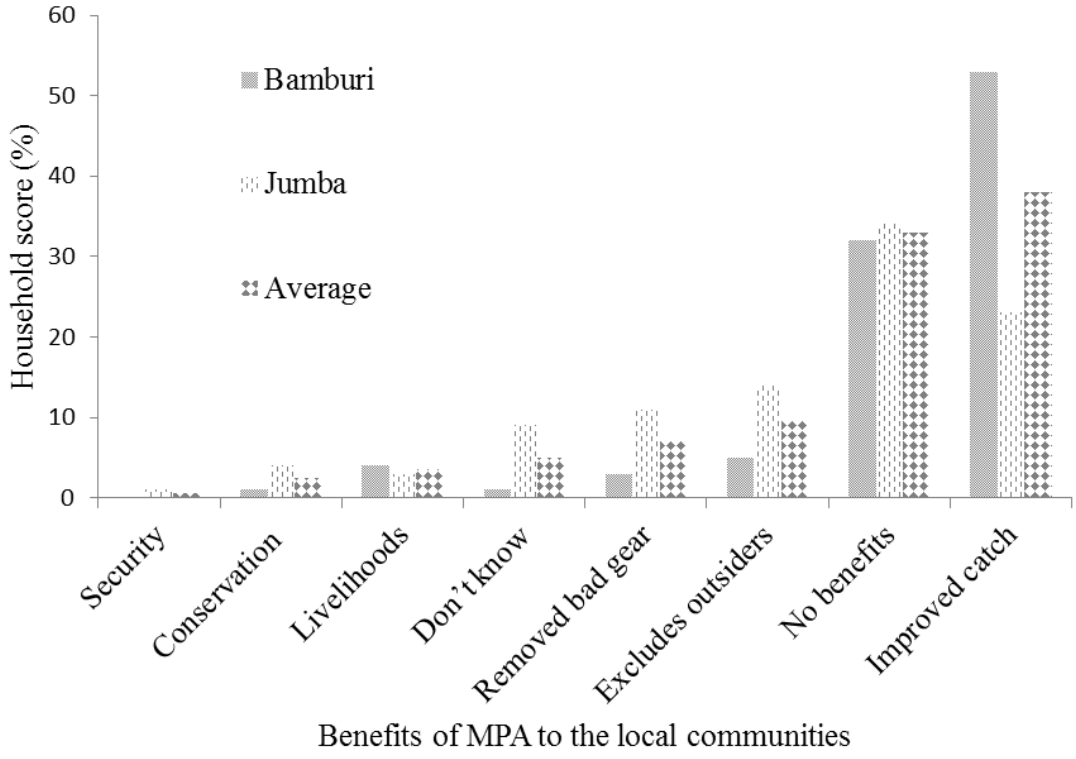

Figure 4.2: Benefits from the MMNP&R to local communities in Bamburi and Jumba areas

4.5.2 Challenges of the MMNP&R to the Local Communities

The findings of the study shows that the 59% of the respondents in Bamburi village and 51% of the respondents in Jumba village cited that there are too many regulations associated with MMNP&R and this is hindering the relationship with the local community. Muthiga (2007) notes that the fishing community opposed the establishment of the MPA and would not comply with its regulations to the extent that Kenya Wildlife Service (KWS) was unable to establish a management base near the MPA for several years. Sustained dialogue and initiatives were done targeting the local community and reducing the no-take area from 12 km^2 to 10 km^2 (Muthiga, 2007). Additionally, some respondents in Bamburi and Jumba study areas indicated that there is inequity in sharing the revenues collected from the MPA. Further an average 26% of the respondents in Bamburi and Jumba village indicated that there is inequity in sharing the revenues collected from the MPA (Figure 4.3).

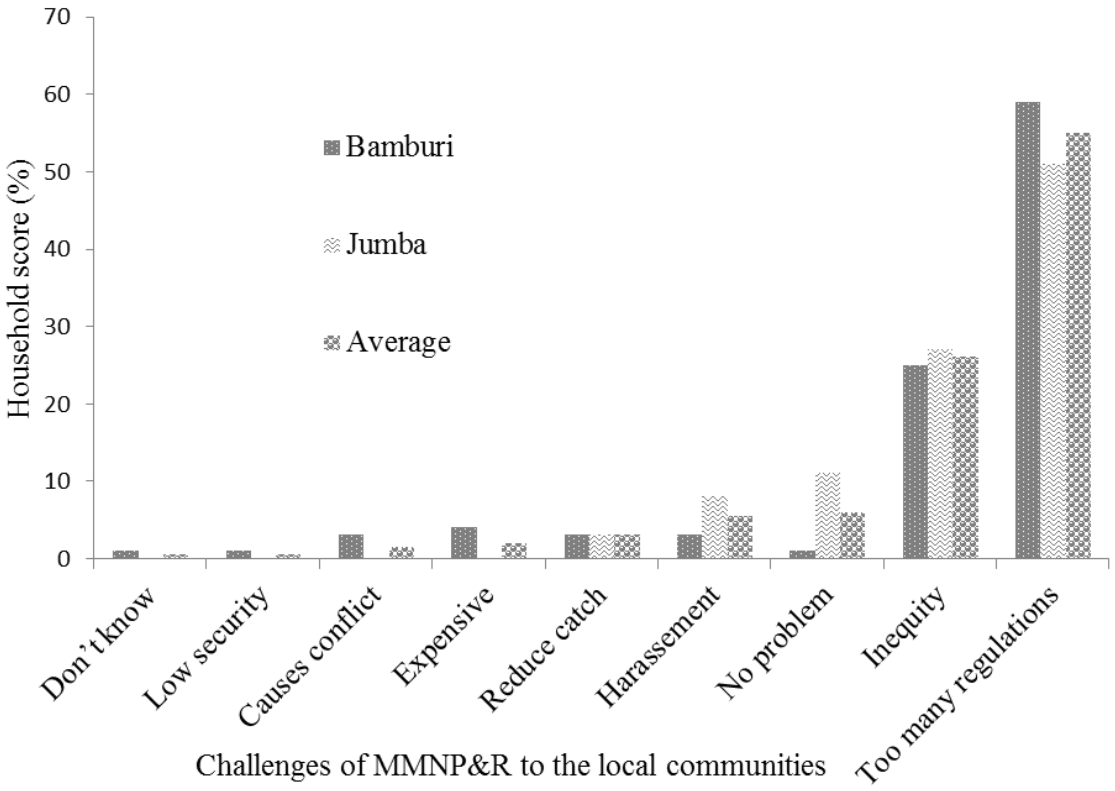

Figure 4.3: Challenges faced by local communities due to the presence of the MMNP&R

4.6 Regression Analysis Indicating Relationship between Variables

A multivariate regression analysis was used to determine the relationship between the dependent and the independent variables. The multivariate regression model was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Whereby;

Y = Income from marine activities.

X_1 = Age of the respondents

X_2 = Gender of the respondents

X_3 = Level of education of the respondents

X_4= Occupation of the respondents

X_5= Distance from the MMNP&R

ε = Error Term

β_0 = Constant Term

β_1, β_2, $\beta 3$ = Beta Co-efficient

R-squared is a coefficient of determination that shows how close the data are to the fitted regression line. It explains the variation of the dependent variable that can be explained by the independent variables. The five independent variables that were studied, explain a variation 4% of the income as represented by the R^2 (0.042) (Table 4.7). This therefore means that other factors not studied in this research contribute 96% of the income in the Bamburi and Jumba villages.

Table 4.7: Model Summary for the regression analysis of the variables

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.206	.042	.009	.61704

The Table 4.8 shows the analysis of variance. The F critical at 5% level of significance was 2.13. The results indicated that the model was not significant based on F calculated (1.265) is less than the F critical thus the model is not statistically significance in predicting how the five independent variables influence the dependent variable. This shows that the overall model was not significant.

Table 4.8: Analysis of the variance for the regression model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.408	5	.482	1.265	.282
Residual	54.445	143	.381		
Total	56.853	148			

The findings presented in Table 4.9 show that there is a positive relationship between income and age of the respondents as shown by a coefficient of 0.097 (p-value= 0.798). However, the relationship is not significant as the p-value (0.798) is greater than the level of significance (0.05). In addition, there is a negative significant relationship between income and gender of the respondents as shown by a coefficient of -0.032 (p-value=0.838). The relationship is not significant as the p-value (0.838) is greater than the level of significance (0.05). Further, the findings show that there is a non-significant positive relationship between income and level of education as shown by a coefficient of 0.134 (p-value = 0.106). The relationship is not significant as the p-value (0.106) is greater than the level of significance (0.05). The findings also show that there is positive relationship between income and occupation of the respondents as shown by a coefficient of 0.022 (p=0.955). The relationship is not significant since the p value of 0.955 is greater than 0.05. Finally, there is a positive relationship between the distance from the MMNP&R and income of the respondents as shown by the coefficient of 0.527 (0.043). The relationship is significant since the p-value of 0.043 is less than 0.05.

Table 4.9: Regression coefficients for the independent variables

Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error			Tolerance	VIF
(Constant)	2.066	.712	2.903	**.004**		
Trans-age	.097	.378	.256	.798	.941	1.063
Gender	-.032	.155	-.205	.838	.884	1.131
Level of education	.134	.082	1.629	.106	.922	1.085
Trans-occupation	.022	.394	.057	.955	.975	1.026
Trans-distance	.527	.258	2.044	**.043**	.956	1.046

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the summary of the findings, conclusion and recommendations on the contribution of the MMNP&R to the socio-economic development of the local communities.

5.2 Summary

The Mombasa Marine National Park and Reserve is the youngest MPA (gazzeted in 1986) compared to other MPAs such as Kisite/Mpunguti Marine National Park and Reserve that was gazetted in 1978 and Malindi Marine National Park and Reserve which was gazzeted in 1968 (Government of Kenya, 2013). The primary objective of the park was to conserve the biodiversity in the area and provide spawning grounds for the marine organisms (McClanahan and Mangi, 2001; Obura et al., 2004). The local communities who initially fish in the area were restricted to fish from this area. The park attracts high number of tourists and has accumulated large profits through collection of the entry fees (Government of Kenya, 2014). All the collected revenue goes to the national government and local communities benefit from the existence of the park in the area is minimal.

Bamburi area had a higher average income from fishing activities per fisher per day at KES 1487 compared to Jumba which recorded KES 577/day. Bamburi also had reported higher income in other activities such as KES 689 and KES 1800 for fish vendors and tourism respectively while for Jumba it was KES 470 (for fish vendors) and KES 300 (for tourism).

The local community perception on the existence of the MMNP&R varied. For instance, an average of 94% of the respondents in both study areas have strongly disagreed with the statement that the MMNP&R share the revenue collected with the community. In addition, 36% of the respondents in Bamburi and 20% at Jumba have strongly agreed with the statement that the MMNP&R contributes to the local community livelihoods. Further, 35% of the

respondents in Bamburi and 26% in Jumba have strongly agreed with the statement the MMNP&R involve the local community on the management of marine resources. Finally, majority of the respondents (53%) in Bamburi and 38% in Jumba have strongly agreed with the statement that the MMNP&R does community awareness on the regulations of the MPA.

The findings of the study show that the MMNP&R has a very negative (52%) impact on the community livelihood. Additionally, 9% of the respondents said that the park has a negative impact on the community livelihood.

5.3 Conclusion

The income level from marine activities is higher in Bamburi area than Jumba. This is due to Bamburi being near the MPA and the Bamburi fishers' fish at the marine reserve where there was a short-term increase in fish catches in the reserve attributed to a spillover effect from the Park but, over the years, catches have returned to lower levels (McClanahan, 1994). The Bamburi fishers also use legal fishing gears that are sustainable as does not destroy marine resources including corals, seabed and small fish. Fishing in the marine reserve is controlled by the MPA officials and illegal fishing gears are not allowed. Jumba is far from the marine park and there is no fish spillover from the MPA. Additionally, the income from fish vending was high in Bamburi than in Jumba due to the higher fish catch at Bamburi as compared to Jumba. The Bamburi respondents have more income from fish vending than Jumba because it is closer to town and have higher access to market than Jumba. The income from tourist activities was also observed higher in Bamburi than in Jumba. This may be because of Bamburi being closer to the tourist hotels and town thereby attracting more visitors than Jumba.

The local community perception on the existence of the MMNP&R varied. The participants in both study areas have perceived that MMNP&R does not contribute to the livelihoods of the local communities. Majority of the community members also agree that MMNP&R staffs do awareness on the regulations of the MPA. As a result, the community involvement in the management of marine activities was also perceived high according to the respondents.

The impact from the MMNP&R to the local community livelihoods is wide-ranging. On one hand, the respondents reported negative impact on their livelihood as a result of restricted access to the MPA denying them traditional fishing grounds. In addition, as asserted by FGD participants the revenue collected from the MPA is not absorbed into the local communities to bring socioeconomic development. However, on the other hand, some responses show that the local community have benefited from the establishment of the MPA through fish spill-over that increased their fish catch. Besides, the communities also benefit from businesses that come as a result of tourists' visits to the MPA. These businesses include boat business, curio selling and photography.

5.4 Recommendations for Practice

Although Bamburi and Jumba study areas are from the same region, only local communities in Bamburi had more income from the MPA as compared to Jumba. To address this, there is need for Jumba residents to adopt more conservative approach to fishing to ensure sustainability of the fish stocks. This should be done through implementation of a no-take locally management marine area (LMMA) as a conservation initiative. Government agencies such as KWS should assist the communities in the training and implementation of this initiative. Moreover, the Jumba residents should focus on attracting more tourists by investing more on tourists' facilities to increase their income levels.

The local community perception on the existence of the MPA is mixed. Some respondents have positive attitudes towards the MPA while others still believe that the MPA has not brought positive change to the local community. Consequently, MPA officers should build a positive rapport with the local communities by addressing their concerns including contribution of MPA to their livelihoods.

5.5 Policy Recommendations

Some respondents have indicated that the MMNP&R have benefited the local community livelihoods positively while others resented the MPA. There is need to give the local communities alternative fishing ground whenever a new MPA is established to avoid disruption of local communities' livelihoods.

The study further recommends that the revenue collected from the tourism activities in the MPA to be shared with the local communities to bring socio-economic development of the local communities.

5.6 Recommendations for Further Research

1. The study focused on the contribution of MMNP&R towards neighboring local communities, a study should be done to evaluate economic significance of the MPAs on Kenyan Economy.

2. Studies should also be carried out on the other marine protected areas in Kenya to determine their significance to the local communities.

3. The respondents of the study were local communities living adjacent to MMNP&R to come up with the impacts MPA on community livelihoods, other studies should be done to involve other stakeholders such as KWS officers, Fisheries department workers and County government officials to determine the contribution of MPAs to the local communities' livelihoods.

REFERENCES

Abbott, B. & Bordens, K. (2011). *Research Design and Methods: a Process Approach*. New York, USA, McGraw-Hill.

Abunge, C., Coulthard, S. & Daw, T. (2013). Connecting marine ecosystem services to human well-being: Insights from participatory well-being assessment in Kenya. *Ambio*, 42: 1010–1021.

Adams, W. & Hutton, J. (2007). People, Parks and Poverty: Political Ecology and Biodiversity Conservation. *Conservation and Society*, 5(2): 147-183.

Allison, E. & Ellis, F. (2001). The livelihoods approach and management of small-scale fisheries. *Marine Policy*, 25: 377–388.

Arceo, O., Alino, P. & Gonzales, R. (2008). *Where are we now with marine protected ˇ areas? In Coral Reef Information Network of the Philippines (PhilReefs) Reefs Through Time*: University of the Philippines, Diliman, Quezon City. 152 p.

Bailey, C. & Pomeroy, C. (1996). Resource dependency and development options in coastal Southeast Asia. *Society and Natural Resources*, 9: 191-199.

Becha, H. (2008). National workshop for building capacity and strengthening policies for coastal communities to sustainably manage marine resources in Kenya; Titanic hotel, Kilifi, 17th-19th December 2007. Workshop report; IUCN/CORDIO/EAWLS.

Bennett, N. & Dearden, P. (2014). Why local people do not support conservation: Community perceptions of marine protected area livelihood impacts, governance and management in Thailand. *Marine policy*, 44: 107-116.

Bhattacherjee, A. (2012*). Social Science research: Principles, Methods, and Practice. Creative commons*. Florida, U.S.A.

Bosire, J., Okemwa, G. & Ochiewo, J. (2012). Mangrove linkages to coral reef and sea grass ecosystem services in Mombasa and Takaungu, Kenya Participatory Modeling Frameworks to Understand Wellbeing Tradeoffs in Coastal Ecosystem Services: Mangrove sub-component. ESPA, 45pp.

Brown, K., Daw, T., Rosendo, S., Bunce, M. & Cherrett, N. (2008). Ecosystem Services for Poverty Alleviation: Marine & Coastal Situational Analysis. Synthesis Report.

Cinner, J., E., McClanahan, R. & Wamukota, A. (2009). Differences in livelihoods, social characteristics, and knowledge about the sea between fishers and non-fishers living near and far from marine parks on the Kenyan coast. *Marine policy*, 34(1): 22-28.

Cohen, L., Manion L. & Morrison, K. (2007). *Research Methods in Education.* London: Taylor & Francis e-Library.

Darling, E. S. (2014). Assessing the effect of marine reserves on household food security in Kenyan coral reef fishing communities. *Plos one*, 9(11): 1-20.

Degen, A., Hoorweg, J. & Wangila, B. (2010). Fish traders in artisanal fisheries on the Kenyan coast. *Enterprising Communities: People and Places in the Global Economy*, 4(4): 296-311.

Drew, J. (2005). Use of traditional ecological knowledge in marine conservation. *Conservation Biology*, 19: 1286-1293.

Hofmann, M. (2007). Local marine resource management: The role of Fijian villagers in co-managing a small-scale fishery. *MAST*, 6(1) 57-81.

Hoorweg, J., Versleijen, N., Wangila, B. & Degen, A. (2009). Income diversification and fishing practices among artisanal fishers on the Malindi-Kilifi Coast. In: Hoorweg J, Muthiga N (Eds) Advances in Coastal ecology: people, processes and ecosystem in Kenya. African studies Centre, print partners Ips Kamp BV, *Enschede*, 20: 41-59.

Hoorweg, J., Wangila, B. & Degen, A. (2009). *Artisanal fishers on the Kenyan coast: Household Livelihoods and Marine Resource Management*. Netherlands, Leiden University.

IUCN (2008). Building capacity for coastal communities to manage marine resources in Kenya – 5 Community Policy Advisories on priority issues. IUCN ESARO.

IUCN (1988). The World Conservation Union. Resolution 17.38 of the 17th General Assembly of the IUCN. Gland, Switzerland and Cambridge, UK.

Government of Kenya (2009a). *Kenya National Housing and Population Census 2009*. Kenya National Bureau of Statistics, Government Press: Nairobi.

Government of Kenya (2009b). State of the Coast Report: Towards Integrated Management of Coastal and Marine Resources in Kenya. National Environment Management Authority (NEMA), Nairobi. 88pp.

Government of Kenya (2013). Marine Parks and Reserves in Kenya. Kenya Wildlife Service 2013, Kenya.

Government of Kenya (2014). Mombasa Marine National Park and Reserve Revenue Report Kenya Wildlife Service 2014, Kenya.

Kothari, R. (2004). *Research Methodology; Methods and Technology*. 2nd Edition, New Age international Publishers, India.

Leisher, C., Beukering, L. & Scherl, E. (2007). Nature's investment bank: how marine protected areas contribute to poverty reduction. The Nature Conservancy/WWF International.

Lester, S. & Halpern, B. (2008). Biological responses in marine no-take reserves versus partially protected areas. Marine Ecology Progress Series; 367: 49–56.

Malleret, K. (2000). A food security approach to Marine Protected Area impacts on surrounding fishing communities: the case of Kisite Marine National Park in Kenya. PhD thesis, University of Warwick, Department of Biological Sciences, UK.

Mangi, C. & Roberts, M. (2007). Factors influencing fish catch levels on Kenya's coral reefs. *Fisheries Management and Ecology*, 14: 245–253.

Mbaru, E. (2012). An assessment of the Kenyan coastal artisanal fishery and implications for the introduction of fish aggregating devices. Master's thesis. Rhodes University.

McClanahan, T. (1994). Kenyan coral reef lagoon fish effects of fishing, substrate complexity and sea urchins. *Coral Reefs*, 13: 231 – 241.

McClanahan, T., Graham, A., Wilson, K. & Letourner, Y. (2009). Effects of fisheries closure size, age, and history of compliance effects on coral reef fish communities in the western Indian Ocean. *Marine Ecology Progress Series* 396: 99–109.

McClanahan, T., Mwaguni. S. & Muthiga, A. (2005). Management of the Kenyan coast. *Ocean and Coastal Management* 48:901-931.

McClanahan, T. & Mangi, S. (2001). The effect of a closed area and beach seine exclusion on coral reef fish catches. *Fisheries management and Ecology*, 8:107-121.

McClanahan, T. & Mangi, S. (2000). Spillover of exploitable fishes from a marine park and its effect on the adjacent fishery. *Ecological Applications*, 10 : 1792-1805.

Ministry of Forestry and Wildlife (2012). The National Wildlife Conservation and Management policy.

Mirera, D. & Samoilys, A. (2008). Mariculture Exchange. Community visits between Kenya and Tanzania. IUCN ESARO.

Munga, C., Mohamed, S., Obura, D. Vanreusel, A. & Dahdouh-Guebas, F. (2010). Resource Users' Perceptions on Continued Existence of the Mombasa Marine Park and Reserve, Kenya. *Western Indian Ocean Journal of Marine Science,* 9(2): 213-225.

Munga, C., Fulanda, B., Manyala, J. Kimani., E., Ohtomi, J. & Vanreusel, A. (2012). Bottom shrimp trawling impacts on species distribution and fishery dynamics; Ungwana Bay fishery Kenya before and after the 2006 trawl ban. *Fisheries science,* 78: 209-219.

Muthiga, A. (2007). The Evolution of Management and Impacts on Communities Adjacent to the Mombasa Marine Protected Area, Kenya. *Wildlife Conservation Society: Working paper number 32.*

Mvula, C. (2001). Fair trade in tourism to protected areas-A micro case study of wildlife tourism to south Luangwa National Park, Zambia. *International Journal of Tourism Research*, 3: 393-405.

Ngugi, I. (2001). *Economic impacts of marine protected areas: a case study of the Mombasa Marine Park. Marine Science Development in Tanzania and Eastern Africa*. no. 1, pp. 507-516. (WIOMSA Book Series).

Pomeroy, S. & Rivera, R. (2006). *Fishery Co-Management: a practical handbook.* CABI publishing, Cambridge, M.A.USA and international Development Research Centre.

Pomeroy, S., Katon, B. & Harkes, I. (2001). Conditions affecting the success of fisheries co-management: lessons from Asia. *Marine Policy,* 25: 197-208.

Obura, D. & Grimsdith, G. (2009). *Resilience Assessment of coral reefs: Assessment protocol for coral reefs, focusing on coral bleaching and thermal stress*. IUCN working group on Climate Change and Coral Reefs. IUCN, Gland, Switzerland.

Obura, D., Chuang, Y., Olendo, M., Amiyo, N., Church, J. & Chen, A. (2007). "Relict Siderastrea savignyana (Scleractinia: Siderastreidae) in the Kiunga marine national reserve, Kenya.". *Zoological Studies Taipei*, 46(4): 427.

Obura, D., Church, J., Daniels, C., Kalombo, H., Schleyer, M. & Suleiman, M. (2004). *Status of Coral Reefs in East Africa 2004: Kenya, Tanzania, Mozambique and South Africa. In Status of Coral Reefs of the World*: 2004(ed. Wilkinson, C.), Vol. 1.

Ransom, K. & Mangi, C. (2010). Valuing Recreational Benefits of Coral Reefs: The Case of Mombasa National Park and Reserve, Kenya. *Environmental Management*, 45(1): 145-54.

Roberts, M. (2000). Selecting marine reserve locations: Optimality versus opportunism. *Bulletin of Marine Science*, 66(3): 581–592.

Ross, K. (2002). *Sampling and Surveying Handbook. Guidelines for planning, organizing and conducting surveys.*

Samoilys, A. & Kanyange, W. (2008). Natural resource dependence, livelihoods and development: Perceptions from Kiunga, Kenya. IUCN ESARO 2008.

Salm, V., Clark. R. & Siirila, E. (2000). *Marine and coastal protected areas: a guide for Planners and managers.* Gland, Switzerland: IUCN.

Sesabo, K., Lang, H. & Tol, J. (2006). Perceived attitude and marine protected areas (MPAs) establishment: why households' characteristics matters in coastal resources conservation initiatives in Tanzania. Working Paper FNU- 99, Hamburg University and Centre for Marine and Atmospheric Sciences, Germany.

Spalding, D., Imèn, M., Amy, M., Claire, F., & Lynne, H. (2013). Protecting Marine Spaces: global targets and changing approaches, *Ocean Yearbook*, 27: 213-248.

Sunde, J. & Isaacs, M. (2008). Marine conservation and coastal communities: who carries the costs?: A study of marine protected areas and their impact on traditional small-scale fishing communities in South Africa, Chennai, India: International Collective in Support of Fish workers.

Toropova, C., Meliane, D., Laffoley, E., Matthews, E. & Spalding, M. (2010). *Global ocean protection*. Gland, Switzerland: IUCN WCPA.

Tuda, A. & Omar, M. (2012). Protection of marine areas in Kenya. *The George Wright Forum*, 29(1): 43–50.

UNEP, (2000). Progress in integrated coastal management for sustainable development of Kenya's coast. The case of Nyali-Bamburi-Shanzu area. East African Regional Seas Technical Report Series No. 6: 66 pp.

UNIDO (2000). Gulf Of Guinea: Water Pollution Control And Biodiversity Conservation (Success Story). UNIDO Media Corner.

Versleijen, N. & Hoorweg, J. (2008). From Farming to Fishing: Marine Resource Conservation and a New Generation of Fishermen. *Western Indian Ocean Journal of Marine Sciences*, 7(1): 1-14.

Wanyonyi, I., Malleret-King, D. & Obura, D. (2008). Coastal communities' adaptation and resiliency to the vulnerability: An analysis of livelihood activities in Kenya. CORDIO Status Report.

Wells, S., Burgess, N. & Ngusaru, A. Towards the 2012 Marine Protected area targets in Eastern Africa. *Ocean and Coastal Management*, 50: 67-83.

Wishitemi, B. (2008). *Community-based conservation and tourism development adjacent to protected areas in east Africa*, Volume 6, K. Zellmer, R. van der Duim, and J. Saarinen, Eds., Association for Tourism and Leisure Education, Arnhem, The Netherlands, 2: 557-585.

Wood, L. (2008). The Global Network of Marine Protected Areas: Developing Baselines and Identifying Priorities. PhD Thesis. University of British Columbia, Canada.

WWF, (2008). The Toliara Coral Reef System Conservation Project (Southwestern Madagascar).

APPENDICES

APPENDIX 1: CONSENT FORM

Program: Masters of Environmental Studies (Community Development)

Names of the Supervisors: Dr. Andrew Wamukota and Dr. Bernerd Fulanda

Researcher: Julius Mutua Ngeti

PART 1: GENERAL INFORMATION ABOUT THE STUDY

Dear participant,

You are invited to participate in research about contribution of Mombasa Marine National Park and Reserve to the socio-economic development of the neighbouring local communities. Julius Mutua Ngeti a master's student in the school of Environmental and Earth Sciences, Pwani University, will conduct the study.

Participation in this study is voluntary. If you agree to participate in this study, you will be requested to fill out questionnaires, soliciting for relevant information on the subject. Participating in this study may not benefit you directly, but the information that you provide will help us learn more about persistent challenges related to the contribution of Mombasa Marine National Park and Reserve to the social-economic development of the neighbouring local communities. You may skip any questions that you do not want to answer.

We assure you that all the information that you share with us through your participation in the study will be kept completely confidential. When the study is completed and data analyzed, any information that could link you to study will be destroyed. Study findings will be presented in summary and your name will not be used in any report.

If you have any question about this study contact:

Julius Mutua Ngeti, Tel Number 0722639636 Email ngetijulius@gmail.com

Kindly note that the proposal was reviewed and approved by Ethics Review Committee (ERC) of Pwani University, committee whose tasks is to make sure that research participants are protected from harm. If you wish to find more about the ERC, please contact the ERC secretariat Pwani University.

PART 2: CERTIFICATE OF CONSENT

I have read the foregoing information. I have had the opportunity to ask questions about it, and all my questions been answered to my satisfaction. I therefore give my consent to voluntary participate as a respondent in this research.

Name of

participant……..Signature……Date……

APPENDIX 2: FOCUSED GROUP DISCUSSION GUIDE

1. Types of business in the marine protected areas
2. What are the benefits accrued from marine resources
3. Is there socio-economic development derived from MMNP&R
4. How is the diversity of marine resources as compared before the park was established
5. Is there awareness from park management on the rules and regulations of the MPA
6. Is there frequent meetings and consultations with MPA officials on the management of marine resources
7. How is your relationship with MPA management
8. What is your perception on MPA establishment
9. From income you get from marine activities are you able to educate your children
10. What type of fishing gears do you use to fish
11. Is there BMU groups in your area
12. Is there challenges from MMNP&R
13. Does season of the weather affect your income
14. Has MMNP&R affected your livelihoods

APPENDIX 3: QUESTIONNAIRE FOR HOUSEHOLDS

Household Survey **Sheet No_____**

Date_____

Village_____

Name of Interviewee _____

SOCIOECONOMIC QUESTIONS

1. Age_____ 2.Sex_____

3. Ethnicity_____

4. What is the highest level of education you have attained? _____

5. Last fortnightly expenditures_____

I. DEMOGRAPHIC INFORMATION

6. What jobs do you and other people in your house do that bring in food or money to your house?

ACTIVITY	Check if respondent	# of People	Rank of Importance	Notes/Detail
Fishing				
Gleaning				
Mariculture				
Marketing Marine Products				
Farming				
Cash Crops				
Salaried Employment				
Tourism				
Informal Economic Activities				
Other				

Total number of occupations_____ Number of different occupations_____

II SOCIAL CAPITAL

7a. If there is a decision to be made in your community, are you involved in that decision? How?

_____

7b. Are you involved in decisions about marine resource use (fishing, shell collecting, etc.) or management? How? a) Active ☐ b) Passive ☐

8. Have you been involved in any community events outside of your family in the past 12 months (e.g. beach cleanup, celebrations, feasts, etc.)? How many? _____

9. Do you belong to any marine resource use or management groups (BMUs)?

III. PERCEPTIONS OF MARINE RESOURCES

10. I will read to you the following statements to determine your opinion on your perceptions towards the existence MMNP&R? Please I would like you to answer sincerely by ticking in the correct column in the table:

Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
MMNP&R does shares the revenue collected with the local community					
MMNP&R contributes to the local community livelihood					
MMNP&R involve the local community on the management of marine resources					
MMNP&R does community awareness on the regulations of the MPA					

11a. Is there more or less fish on the reef now compared to 5 years ago?

a) More ☐ b) Less ☐

11b. How do you know? _____

11c. Why do you think this is? _____

11d. What can be done around reef to increase the number of fish on the reef?

IV. FISHERS

12. When you or other household members go fishing, what equipment is involved?

Gear	Rank Importance	Days per week (Low)	Days per week (High)	Own or Use?	# People (house/ crew)	Areas fished	Description (net length, net gauge, etc.)
Hand line Shallow/deep							
Long line							
Trolling line							
small mesh gill net							
big mesh gill net (shark net)							
Small/beach seine net							
Purse seine net							
Hand spear							
Spear gun							
Fish trap							
Explosives/ Poison							
Gleaning							

Note: If more than one fisher in household, circle main gear of respondent above

13. What is your daily catch on a good day? How much is that worth? (for fishers)

	Bad day	Average day	Good day	For crew or individual?	Units (kgs, hrs, # traps)
Catch					
Gear					
Daily effort (hrs, traps etc)					
Kshs					

14. What is your income from fish vending per day?

15. What is your income from boat business per day?

V. IMPACTS OF MPA

16. Has Mombasa Marine National Park & Reserve [MMNP&R] had any impact on the condition of marine resources?

a) Increase abundance (in situ) ☐ b) Increase size ☐ c) Provides reproduction grounds ☐

d) Stop habitat destruction ☐ e) Bringing species back/new species ☐ f) Fish move closer ☐

Which resources?

_____

17. In your opinion, have there been any benefits from [MMNP&R]? (Be specific)

a) Improved catch ☐ b) Excludes outsider's ☐ c) Removed bad gear/practices ☐

d) Conserves resource for future generations ☐ e) Reduces conflicts ☐ f) Improves Livelihood ☐ g) Provides access/security to resources (property rights) ☐

h) Improves equity ☐ i) Other ☐

18a. Overall, how has [MMNP&R] impacted your livelihood?

a) Very negative ☐ b) Slightly negative ☐ c) Neither ☐ d) Slightly positive ☐

e) Very positive ☐

18b. Overall, do you think that [MMNP&R] has been good or bad for the community?

a) Very bad ☐ b) Slightly bad ☐ c) Neither ☐ d) Slightly good ☐ Very good ☐

18c. Overall, do you think that [MMNP&R] has been good or bad for businesses?

a) Very bad ☐ b) Slightly bad ☐ c) Neither ☐ d) Slightly good ☐ e) Very good ☐

19. In your opinion, what are some of the problems with [MMNP&R]?

a) Too many regulations ☐ b) Regulations not well enforced ☐ c) Reduce catch ☐

d) Causes ☐

Conflicts ☐ e) Disenfranchises certain people ☐ f) Erodes traditional authority ☐

g) Inequity ☐

Other_____