ASSESSING PERFORMANCE OF DECENTRALIZED FISHERIES MANAGEMENT IN ARTISANAL MARINE WATERS OF TANZANIA: A CASE STUDY OF TANGA, COAST, DAR ES SALAAM, AND LINDI REGIONS

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ABSTRACT

This study addresses the effectiveness of decentralized fisheries management through assessing the performance of Beach Management Units (BMUs), the governance system envisaged in Tanzania to promote co management of fisheries. Qualitative and quantitative data were collected from 12 BMUs within six districts along coastal marine waters of Tanzania. Descriptive and inferential analysis were performed by using excel. The study indicated that BMUs are aware on the existing Fisheries Act, Policy and Regulations. It was revealed that actions taken by BMUs in managing the fisheries resources among others include confiscating illegal fishing gears, conducting patrols and controlling migrant fishers. Consequently, fisheries data collection was observed to be effective. However, bylaws formation on fisheries management measures and fisheries revenue collection were found not to be effective. The study revealed that the major constraints encountered by BMUs were lack of tools to conduct sea patrols and lack of budget from the Local Government Authorities (LGAs) to support BMUs fisheries conservation activities. The result suggests the need for the Central Government and LGAs to bring together the strengths of both actors in supporting the BMUs to ensure their effective performance. We find therefore the current performance of the BMU model fall short in its efforts, as the central government is much absent from their operation. That is not co management, recalling its definition in the literature. Therefore, a co-management effort as ascribed in the fisheries policies will not be realised unless both central and local levels of government bring together their capacities to collaborate in the effort to promote sustainable fisheries management on the Tanzanian coast.

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LIST OF ABBREVIATIONS

BMUs	Beach Management Units
CBFM	Community Based Fisheries Management
CBOs	Community Based Organizations
Co Management	Collaborative Fisheries Management
D by D	Decentralization by Devolution
DFOs	District Fisheries Officers
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FM	Fisheries Management
GDP	Gross Domestic Product
KIIs	Key Informant Interviews
LGA	Local Government Authority
LGRP	Local Government Reform Program
LVEMP	Lake Victoria Environmental Management Project
MACEMP	Marine and Coastal Environmental Management Project
MLFD	Ministry of Livestock and Fisheries Development
NGO	Non-Government Organization
RUMAKI	Rufiji Mafia Kilwa
SWIOFish	South Western Indian Ocean Fisheries governance
WWF	Worldwide Fund for nature
WB	World Bank

1 INTRODUCTION

The fisheries sector in Tanzania plays a major role in poverty reduction, livelihood provisions and contributes about 2.4% GDP to the national economy. Artisanal or small-scale inshore fisheries in Tanzania is a subsector of the economy that makes valuable contribution to the coastal livelihoods. The fisheries sector also contributes significantly to foreign earnings and revenues (Sobo, 2004). Small scale fisheries employ more than 200,000 full time fishers and over 4 million people are engaged in various fisheries related activities such as boat builders, fish processors, fish traders, net and engine repairers. This makes the country one of the greatest fisheries nations in Africa, ranking in the top 10 in terms of total catches and fisheries production (MLFD, 2016).

Decentralization by Devolution (D by D) means transfer of specified powers, functions, and resources from the central to the local government. Decentralization by Devolution in Tanzania aims at bringing government closer to the people. Since in a decentralized system, the local people are involved in decision making about resource allocation and services to respond to their needs (MLFD, 2015). The umbrella term for decentralized fisheries management in Tanzania is Collaborative Fisheries Management (Co management) which was introduced in marine waters of Tanzania in 2009. Co management is a management approach which relies on the active participation of the local communities on the management of the fishery resources alongside government actors (MLFD, 2009). Co management in Tanzania is applied through the organized community members around the fish landing sites known as Beach Management Units (BMUs). BMUs are community management organizations composed of stakeholders in a coastal community whose main functions are geared towards sustainable management, conservation, and protection of marine and coastal resources in collaboration with the central and local government.

1.1 **The concept of fisheries co-management**

Fisheries decision makers increasingly recognize that a fishery cannot be managed effectively without the cooperation and participation of fishers to make laws and regulations work. Most fisheries policies and programmes worldwide incorporate participation of resource users. Co management is a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or a particular natural resource (Adrianto & Hertoto, 2005). Co management systems have been taken as partnerships arrangements using the capacities and interests of the local fishers and community, complimented by the ability of the government to provide enabling legislation, enforcement and conflict resolution. Community based coastal resources management systems have become a way to activate social processes and involve resource users in resource management (Pomeroy & Berkes, 1997). Co management entails more than institutional design and participating democracy. It maintains an involvement on the part of the state in fisheries management (Jentoft, 2004).

1.2 **Fisheries in Tanzania**

Tanzania borders the Western Indian Ocean with the land area of about 945,200 km^2 and a coastline of about 1424 km. The country is endowed with fisheries resources from marine, freshwater, riverine and wetland species. The marine internal and territorial waters constitute an area of approximately 64,000 km^2. The Exclusive Economic Zone (EEZ) area is estimated at 223,000 km^2 while the current fish production is approximately 340,000 tons per year, excluding catches of the tuna and tuna like species from the EEZ (FAO, 2014).

The marine fishery of Tanzania is concentrated in inshore waters whereby fishing activities are conducted within inner sea or internal waters within 12 nautical miles (Julius, 2005). Fisheries co management in Tanzania aims to bring together resource users, civil society, research and academic institutions, private sector and government both at the local and national level in sharing responsibility and authority in resource management and conservation in order to improve livelihoods of people dependent on these resources.

The government has intensified its efforts to promote establishment of BMUs as an institutionalized fishing community organization in fisheries co management in the coastal marine fisheries. Under this arrangement, fisheries communities around the fish landing sites agree to work with the government to ensure sustainable management of the fisheries resources. Since 1994, about 174 BMUs have been established under the co management strategy along the Tanzanian coast of the Indian ocean (MLFD, 2018).

1.3 Objectives and research questions of the study

The overall objective of this study is to assess the performance of decentralized fisheries management in coastal marine waters of Tanzania. This has been implemented under the umbrella of collaborative fisheries management at the coastal community level in recent years. The study takes the case of selected districts and BMUs on the Tanzanian coast and sets out the following research questions:

- How are BMUs along the coast of the Indian Ocean performing?
- What are the challenges encountered by Local Government Authorities (LGAs) in the implementation of fisheries co management?
- How can the study provide policy recommendations to improve decentralized fisheries management?

Co management should be viewed as a fisheries management process that is adaptive to changing conditions over time. The study investigates the performance of BMUs in fisheries resources management, the challenges encountered by LGAs and the fishing communities. Therefore, the aim of the study is to contribute to improving fisheries co management by disclosing several challenges encountered by BMUs and provide policy recommendations that will lead into improving the fisheries policy. This will have major influence on the policy at national level, LGAs as well as the coastal fishing community.

1.4 Limitation of the study

The study time and resources allocated for data collection and analysis was limited thus led to focusing on BMUs and Key Informants perceptions. Other source of data like field observation in fisheries co management was not considered.

2 LITERATURE REVIEW

2.1 Historical development of fisheries management in Tanzania

2.1.1 *Pre-colonial era until 1920s*

The history of fisheries management in Tanzania can be traced back from pre-colonial era which is a period between the years 1884 and 1920s. During this time, predominant activities along the coast of Indian Ocean were farming, hunting, herding, trading, and iron working.

Fisheries was mainly at subsistence level and fishing gear was made from locally available materials, management measures were based on established cultural taboos (MLFD, 2009).

2.1.2 *Colonial ear to early independence: Trout ordinance until 1970s*

The trout ordinance, introduced by the colonial authorities, provided for management measures for protection of trout in rivers mainly safeguarded sportfishing associations (MLFD, 2009) During this era, colonialists appeared to put little emphasis on fisheries management around the coast of Indian Ocean (Katikiro, Macusi , & Deepananda, 2014).

2.1.3 *Post-independence*

During this period from 1961 after independence, the Fisheries Act no.6 of 1970 and Regulations of 1973 and 1989 empowered only government staff to manage the fisheries resources in marine and freshwater bodies. Thereafter, the National Fisheries Sector Policy and Strategy Statement of 1997 came into practice. The Policy Statement (12) entitled "Community Participation" aimed to improve the involvement of the fisher communities in the planning, development and management of fishery resources (MLFD, 2009). The fisheries policy of 1997 recognized the participation of local communities in fisheries management hence accounted for the beginning of decentralization in fisheries management in Tanzania (MLFD, 2015). The current fisheries policy of 2015 emphasizes a participatory fisheries resource management approach by involving local fishing communities in conservation activities, hence, employs a co management approach.

2.2 **General overview of decentralization of fisheries management**

As in many parts of the world, the traditional power structures in African fisheries management were entrusted to community leadership, typically a chief working with the support of a council of elders. The fishery resources were perceived as a gift from nature. Traditional management measures widely employed in African fisheries includes; forbidding of fishing in certain areas, closed days or seasons, restrictions on fishing gears or techniques and limited access (Khan, 2004). Therefore, this valuable traditional knowledge on fisheries resources conservation the fishers have, provides valuable insights when included in larger management systems.

In Tanzania, the current fisheries policy and legislation takes into considerations important regulatory aspects such as effort regulation, and technical regulation, including mesh size restrictions, gear specifications, entry limitations, permits, licenses, monitoring and surveillance, confiscation, fines etc. Despite the introduction of fisheries legislation and policy to manage the resources, there have been some challenges on applying such centralized planning and regulations. This has resulted in increased community involvement through efforts to institutionalize co management.

2.3 **Theoretical framework of fisheries co management**

Co management can be defined as a partnership arrangement whereas government agencies, local resource users (fishers), external agents (non-governmental organizations, academic and research institutions), and other stakeholders share responsibility and authority for decision making over the management of a fishery (Figure 1) (Pomeroy & Berkes, 1997).

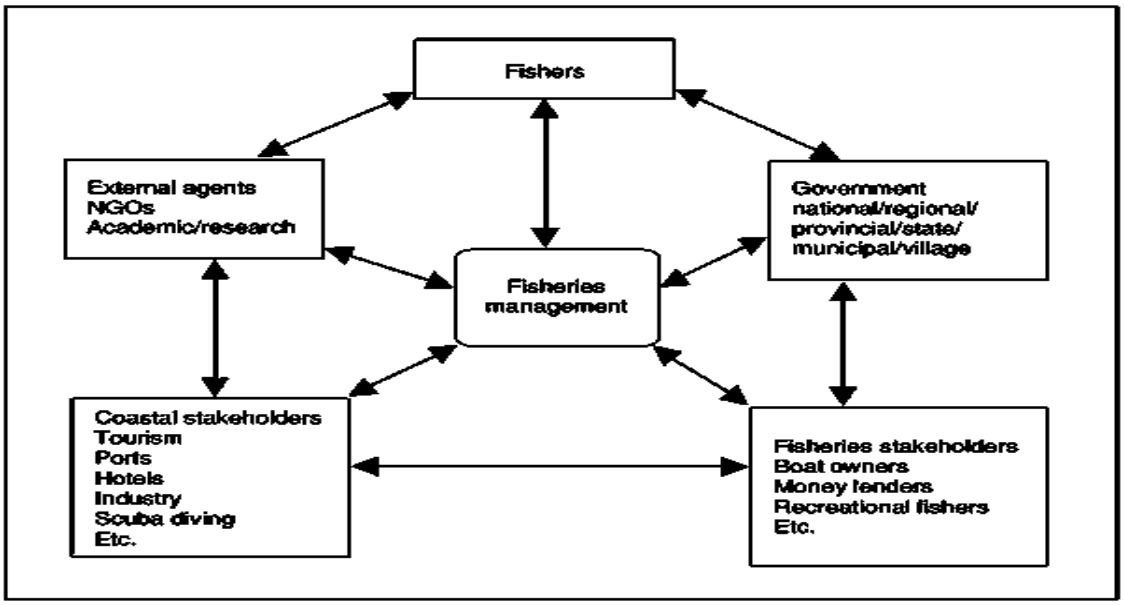

Figure 1. Key actors and their interrelations in co management (Pomeroy and Berkes, 1997)

According to Adrianto and Hertoto (2005), co management is a type of management that is characterized by the pivotal interaction between government and fisheries users, through consensus building and the sharing of different management roles and responsibilities. During the past few decades, there has been a global shift in approach to fisheries management to one that recognizes the importance of fishers participation and shared decision-making in the management of fisheries (Adrianto & Hertoto, 2005).

2.4 **Perceived Benefits of Co-management**

Co management is promoted is Sub Saharan Africa as a viable approach to sustainable fishing management. Effective co management can lead to a more transparent management process between the government and fisheries user groups and may lead to a more democratic and participatory governance of fisheries resources. In the future, it may have economic advantages over centralized management, since it reduces the administration cost and enforcement of rules and regulations that are usually the biggest cost components of centralized management. Through the involvement of the user groups, resource users become more responsible; and co-management maximizes the contribution of local knowledge and scientific information to resource management (Adrianto & Hertoto, 2005).

2.5 **Beach Management Units in Tanzania**

2.5.1 *The legality of Fisheries co management in Tanzania*

The Fisheries Act No.22 of 2003 provides a framework for Fisheries Management in Tanzania and a mandate to implement fisheries co management. The Act is widely supported by the National Fisheries Policy of 2015 and the Fisheries Regulations of 2009 (MLFD, 2015). The Tanzania Local Government Reform Program (LGRP) of 1998 led to the foundation of the new policy of D by D. Moreover, as noted by Mollel and Tollenaar, (2003) D by D is also encouraged by the Local Government Act No.7 of 1982 which delegates most government issues to the district levels. In fisheries management aspects, the fisheries policy emphasizes the importance of Decentralized fisheries management where it considers D by D as the most appropriate form of fisheries governance to enable local governments to fundamentally control local fishing by a Community Based Fisheries Management (CBFM) system (Mollel & Tollenaar, 2003).

2.5.2 *The National BMU Guideline*

The BMU Guideline in coastal marine waters of Tanzania was developed in 2009. The national government development objectives such as poverty eradication, gender equity and community engagement in decision making processes are outlined within the BMU guideline (MLFD, 2015). The guideline provides an understanding on the structure and functions of BMUs as well as mechanism for establishing and operating fisheries co management on inland and marine waters of Tanzania. Furthermore, the guideline lists the main stakeholders in its implementation such as BMUs, village government, Local Governments, Central Government, Private Sector and other development agencies such as Non-Government Organizations (NGOs), Community Based Organizations (CBOs) etc. (MLFD, 2009). The guideline explains in detail the responsibilities of each main stakeholder towards effective management of the fisheries resources.

2.5.3 *The BMU Structure, Functions and Membership*

It is noted that successful fisheries co management requires an appropriate institutional and organizational framework for common pool resource governance (Baland & Platteau, 1996). In Tanzania a BMU is made up of the assembly and committee (Figure 2). The assembly includes all persons engaged in fisheries activities at beach level. The members include boat owners, crew members, artisanal fish processors and traders, fishing gear and equipment dealers/repairers and boat makers operating at the beach. The committee consists of 15 elected officials who are responsible for the day to day running of the BMUs. The committee has a chairperson, deputy chairperson, secretary, treasurer, and any man/woman who is influential in the community and has long experience in fishing activities.

In addition, roles of BMUs among others includes enforcement of respective legislation, relating to fisheries, forestry, beekeeping, land use, and environmental issues, etc. Preparation of bylaws that supplement the implementation of the national laws, ensure beach sanitation and hygiene, collecting fisheries data and information, educate other stakeholders on negative impact of illegal fishing practices and undertake monitoring, control and surveillance (MLFD, 2009).

The membership of the BMU is clearly stipulated in the BMU guideline of 2009 whereas a member should be a Tanzanian, ardent conservator of the fishery resources, a fisher, fish trader/fish monger, fish processor, boat owner or gear repairer. Members should be honest, trustworthy, self-motivated, team players ready to work in a group. They should be ready to work on voluntary basis since there is no renumeration and leaders should know how to communicate (read and write). Members should be residents of the coastal village or fish landing site at least for one year. This characteristic excludes the involvement of migrant fishers in BMUs. Normally migrant fishers locally known as '*wavuvi wa dago'* migrate from their home to a coastal village/landing site and stay for an average of three months before leaving to another landing site with potential fishing grounds. The migrant fishers need to report to a BMU with an introduction letter where the district fisheries officer can accept them or reject them based on law compliance.

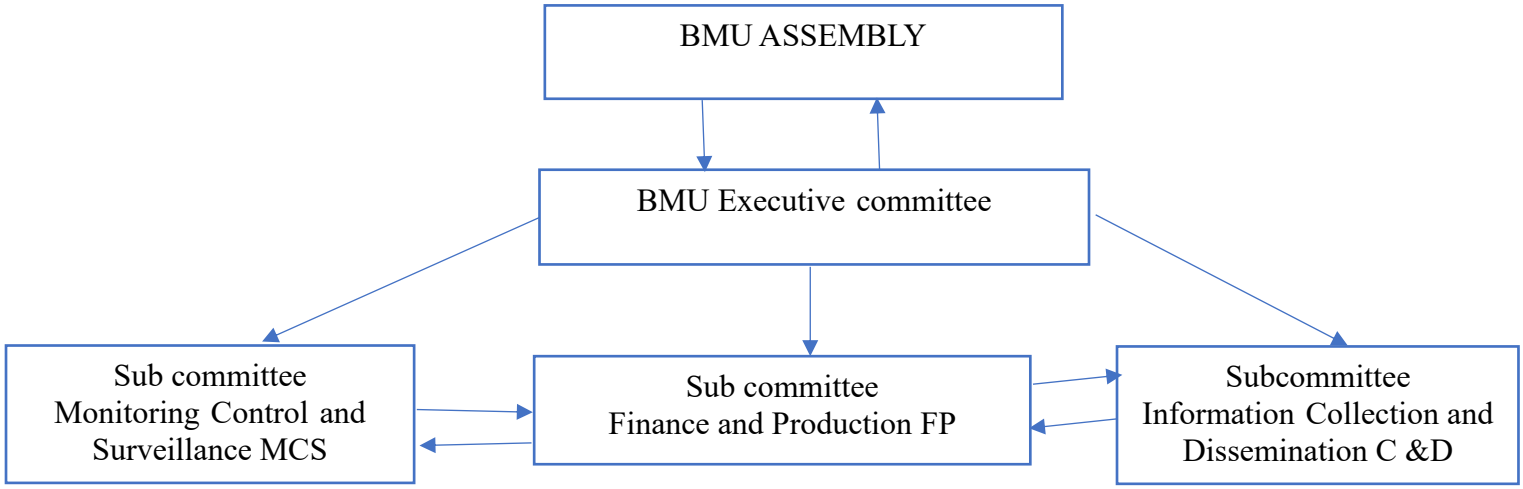

Figure 2. The structure of Tanzanian BMU (MLFD, 2009)

2.5.4 *Performance of Fisheries Co management in Tanzania*

Co management is essentially about cooperation between actors at different level towards a joint objective. Therefore, central government should play a key and desirable role and ideally should be engaged in a co management arrangement as a partner rather than as an institution that delegates authorities. Moreover ,the successful exercise of rights on one level depends on the exercise of rights at higher and lower levels including communities right to participate in data collection and setting policy agendas at the highest level (Pinkerton, 2003).

Co management in Tanzania was initiated by the government in the late 1990s under the Lake Victoria Environmental Management Project (LVEMP). To implement this, initially a committee of five fishers from each landing site, named BMUs, were formed at Mwanza Gulf. By the year 2000, this was extended to other landing sites in all riparian districts (Hoza & Mahatane, 2001). A study recently done in Kenyan shores of Lake Victoria shows that BMUs are required to make their own rules in form of bylaws to govern their internal operations. For example, restricting certain fishing gears or establishing a fisheries closure (Obiero, et al., 2015). The same applies in Tanzania, where BMUs are guided by the BMU guideline document which gives opportunity for bylaws formulation. In artisanal marine waters of Tanzania, fisheries co management began in 1994 in the northern part of the Indian ocean particularly in Tanga region, under the Tanga Coastal Zone Conservation Development Project (1994-2007).

Since then, the formation of BMUs has increased rapidly through collaboration of the government and different stakeholders. In the 2000s the Worldwide Fund for Nature initiated formation of BMUs in RUMAKI (Rufiji Mafia and Kilwa) sea scape area. Other BMUs were formed from 2005-2011 along the coast through Marine and Coastal Environmental Management Project (MACEMP) in collaboration with the fisheries division and the local government authorities. By the year 2018, there were 174 BMUs participating in various activities towards sustainable conservation and management of the marine and coastal resources (MLFD, 2018). Among other activities, BMUs along the marine coast took part in; marine control and surveillance, fisheries data collection, bylaw formulation, management plans formulation all these leading to conservation, and protection and management of marine and coastal resources. Some studies report that BMUs in Tanzania have been effective in the elimination of illegal fishing methods, collection of revenues on behalf of the local government and have actively participated in the fisheries decision making processes (Hoza & Mahatane, 2001).

However, not all the established BMUs in Tanzania have been found to perform as expected in terms of fisheries resources management. Some scholars emphasize that if fisheries co management initiatives are to be successful, basic issues of government action to establish supportive legislation, policies, rights and authority structures must be addressed (Pomeroy, Katon, & Harkes, 2001). Addressing legal and institutional arrangements alone is not enough more efforts need to be done by the government. In Tanzania establishment of BMUs around marine coast waters was successful implemented. Through established BMUs awareness creation on effects of illegal fishing practices to the coastal fishing community was done. The major challenges facing the formed BMUs are lack of continuous support from LGAs in terms of technical support and financial support to ensure daily implementation of BMUs responsibilities and functions as stipulated in the national BMU guideline. The lack of support from the local government has weakened efforts played earlier by the government itself, community members and other developing agents especially in early stage of forming BMUs.

According to Pomeroy et al (2001), effective performance of fisheries co management at the local level depends on the passage of complimentary ordinances and the integration of sustainable resource management in local policies and plans. Most BMUs in marine coastal waters of Tanzania lack bylaws and management plans as the major instruments in fisheries law enforcement. In addition, for a successful co management, there must be training and education to build and develop leadership skills among community members. Furthermore, some studies have shown that co management requires financial resources to support the process. Funds need to be available to support various operations and facilities related to planning, implementation, coordination, monitoring and enforcement among others (Pomeroy, Katon, & Harkes, 2001). Contrarily, the LGAs which have the mandate to provide all these under the Local Government Act of 1982 on behalf of the CG have not done enough initiatives for this. Also, those BMUs which have been supported by the CG through different development agents such as World Bank (WB), World Wide Fund for nature (WWF) and Sea sense still do not possess important legal instruments mentioned above for some years despite being implementing co management programs. This leads to underperformance of the BMUs.

2 METHODOLOGY

2.6 **Research design**

The research design for this study was a case study. Case studies usually consists of identifying and exploring in details critical cases which enable knowledge build up on certain social phenomenon in a context sensitive way (Flyvberg, 2001). The study used both primary and secondary data.

2.7 **Description of the study area and justification**

This study was conducted in six districts among eighteen districts along the coast of Indian Ocean. These are Pangani, Bagamoyo, Tangacity, Lindi urban, Kilwa and Kinondoni districts (Figure 3). In each district two BMUs were selected as the study sites. Stratified Random Sampling was used in selection of the study sites. This was mainly influenced by the experience of BMUs in fisheries management, location of BMUs, fully or partially project supported BMUs by WB project, South West Indian Ocean Fisheries Governance (SWIOFish) and WWF as well as non-project supported BMUs along the marine waters**.**

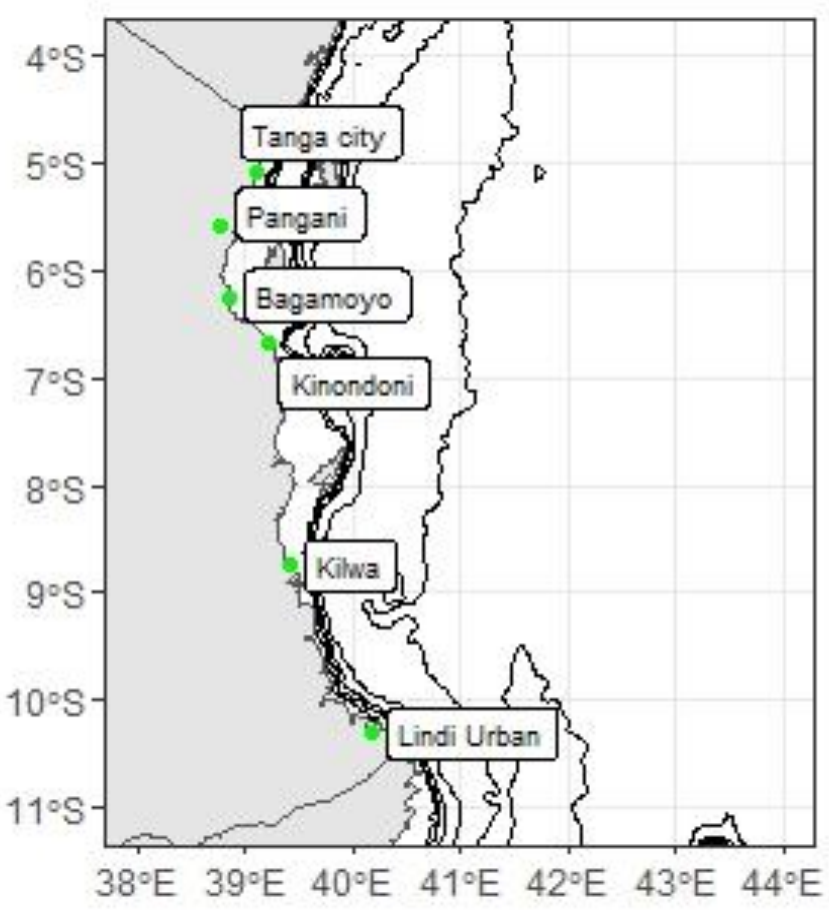

Figure 3. Map showing sampled districts along the Coast of Indian Ocean (MLFD, 2018)

2.8 **Sampling Strategy**

Researchers obtain stratified samples by dividing the population into groups (called strata) according to some characteristic that is important to the study, then sampling from each group (Bluman, 2009). Samples within the strata should be randomly selected. Stratified random sampling method was employed to select BMUs i.e. BMUs supported by the World Bank (WB) project (within World Bank pilot districts) and those not supported by the project assessed in this study. There are 18 coastal districts in marine coastal area of Tanzania and each of these districts there are established and functioning BMUs. Some of these BMUs are fully supported by the WB project while some are not supported by WB project. For this study, 6 coastal districts roughly (33%) were selected out of 18 districts in marine coastal waters of Tanzania. BMUs i.e. those supported by the project six and other six those not supported by the project were randomly selected for further analysis in this study, as shown in Table 1.

2.9 **Study tools and data collection**

The specific tools for data collection in this study included structured questionnaires and Key Informant Interviews (KIIs). Random sampling method was used to select 84 individuals from the selected BMUs for interviews. A set of 84 structured questionnaires were used to collect quantitative data. Structured questionnaires were administered to individual fishers, boat owners, fish processors, fish mongers, gear/boat repairers and fish traders from the selected 12 BMUs. Also, a total of 6 open ended questionnaire were employed to 6 Key informants i.e. District Fisheries officers in the study areas. The KIIs were employed to fisheries experts

purposely to confirm and complement the information obtained from BMUs in the structured questionnaires. The fisheries officers were involved in data collection at the field level. In addition, secondary data was collected through relevant information from various sources such as books, journals, articles, reports from both published and unpublished documents related to this study.

Table 1. BMUs for field data collection

S/N	District	BMU within WB pilot project	BMU without WB pilot project
1.	Pangani	2	-
2.	Bagamoyo	2	-
3.	Tanga city	2	-
4.	Kinondoni	-	2
5.	Kilwa	-	2
6.	Lindi Urban	-	2
	Total BMUs	**6**	**6**

2.10 Data analysis and presentation

Data cleaning was done to the completed questionnaires from the field. These were checked against the codes and recorded in excel sheet. Quantitative data were combined and analysed using Microsoft Excel. The content analysis method was used to analyse qualitative information. The results were presented in tabular form and charts.

3 RESULTS AND DISCUSSION

3.1 Respondents demographic characteristics

3.1.1 *BMUs members and their occupations*

The concept of the stakeholder does not extend merely to those directly involved in the exploitation of a resource but extends to all those deriving some form of benefit from the resource or the area in which it is found. In the case of marine resources, the BMUs members can include fishers, all those involved in the processing and sale of fish, fish consumers, boat owners, gear repairers, fish mongers and people involved in forestry in mangrove areas. The sample respondents occupation was investigated to understand the type of stakeholders forming BMUs. The majority of the respondents were fishers 45% followed by fishmongers and fish processors 18% and 12% respectively where as gear repairers had the least respondents approximately 1% as shown in Table 2. These results indicates that fishers are the most dominant stakeholders forming the BMU in the studied area.

3.1.2 *Education level*

Literacy is critical to economic development as well as individual community well being. In this study, the rate of literacy of respondents was examined. It was noted that the majority of respondents for six different categories of occupation were scholars at the level of primary school, representing 72%. This was followed by secondary school level, at 12%. Only 0.5% of the population were found to have not attended school at all. In Tanzania, primary education is compulsory for children aged 7 to 14 (Nuffic, 2015). Therefore, the above results indicate that

the fishing community has in general educational level at primary level and some at secondary level.

Table 2. Percentage of BMU members and level of education per occupation

Respondents	No of Respondents	Percentage per occupation (%)	No Schooling (%)	Primary (%)	Secondary (%)	Others (%)
Fishers	38	45	3	76	11	0
Fish processors	10	12	0	60	0	0
Gear repairer	1	1	0	100	0	0
Boat owner	9	11	0	78	22	0
Fish mongers	15	18	0	60	13	0
Others	11	13	0	55	27	0
			0.5	**72**	**12**	**0**

3.1.3 *Gender ratio*

The comparison between gender within the respondents indicated that males had a higher percentage compared to females as shown in Figure 5 below. This indicates that few women participate in fisheries activities at the rate of 26% when compared to men who participate at the rate of 74%. Therefore, the fisheries activities in artisanal marine waters of Tanzania are male-dominated. In most cases, women are not classified as fishers as they work as part time fishers, subsistence fishers, or because they partake in nearshore invertebrate collection. They also take part in post harvest activities such as processing and marketing that typically provide income for women (Bradford & Katikiro, 2019).

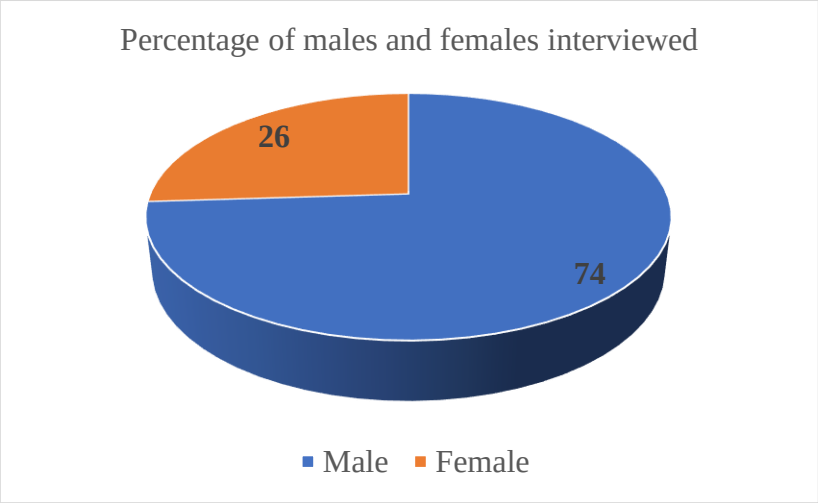

Figure 4. Percentage of males and female interviewed

3.1.4 *Respondents experience in Fisheries activities*

The results from the study show that majority of the BMU members have been in fisheries activities for an average of 5-10 years (24%) and above 20 years (24%) while the least population have experience in fisheries activities for about 15-20 years (10%) as shown in Figure 6. This indicates that recently there is new entry in the fisheries activities. 5-10 years as well as more experienced people are still engaged in fisheries activities (i.e above 20 years). A high percentage of more people entering the fisheries activities shows the increase in fishing

efforts and higher dependency on fisheries resources as income generating activity as well as source of nutrition.

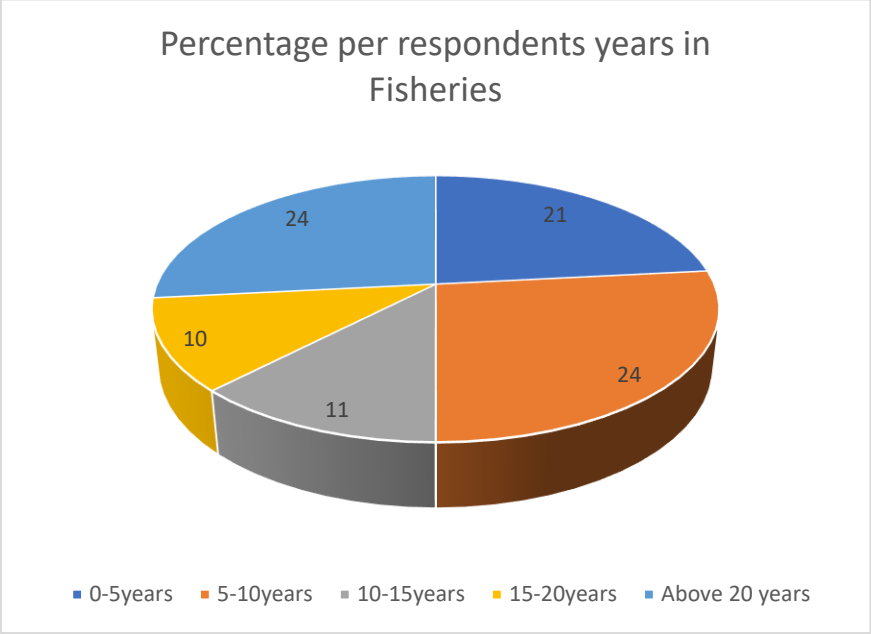

Figure 5. Percentage of respondent's experience in fisheries

3.2 **Assessment of BMU performance**

3.2.1 *BMUs with management plans*

A BMU management plan is one of the requirements for effective performance of BMUs. The national BMU guideline stipulates the importance of forming the BMU management plans to all BMUs as the checklist to activities which need to be undertaken for management of fisheries resources. This study reveals that BMUs from Lindi Municipal (100%) and Kilwa (100%) do not have any BMU management plans. While two districts Kinondoni and Pangani BMUs, all have BMU management plans. Bagamoyo district only 42% of the BMU have management plans and Tangacity only 78% of the BMUs have the management plans, as shown in Figure 7. Management plans according to BMU guideline gives the opportunity for BMUs to outline conservation and development activities. Lack of BMU management plans indicates poor performance of a particular BMU as there is no checklist on the performed activities.

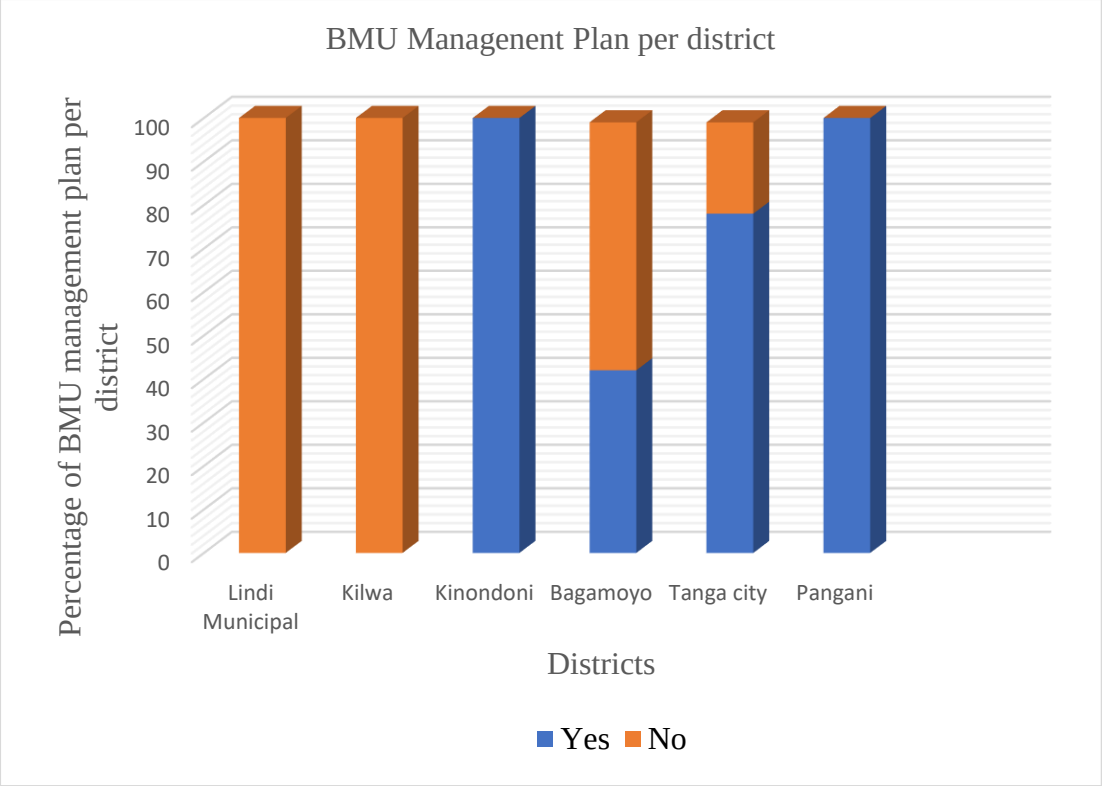

Figure 6. BMU management plans per district sampled

3.2.2 *BMU with bylaws per district and reasoning behind bylaw formulation*

Fisheries bylaws are rules that have been prepared in accordance with relevant provisions of the national fisheries legislation and are accorded legal recognition in the court of laws (Faasili & Kelekolio, 1999). BMUs in Tanzania have the mandate to formulate bylaws under the national BMU guideline for enforcement of the Fisheries Act and regulations. The study shows that almost all districts around the artisanal marine waters of Tanzania (100%) have not issued bylaws. This indicates under-performance of BMUs, as they do not possess vital legal instruments in their day to day responsibilities. Only one district, Tanga city BMUs, have formulated bylaws at the rate of 50%, which is insignificant compared to the number of BMUs found within the coast of Tanzania.

Further investigation on why BMUs have formulated bylaws indicated that the main reason was to promote fisheries sustainability and protect the breeding and young fish as shown in Figure 8 below. Other reasons included reduction of conflict among fishers. In addition, the communities through the guidance of the village councils are more active and committed when the rules belong to them. These reasons indicates that BMUs which formulated bylwas are aware of their importance as they provide measures to conserve, manage and protect the coastal and marine resources. The study investigated reasons why most coastal districts have not developed BMUs bylaws. The most common reason given was lack of funds from the government to facilitate the process of bylaws formulation.

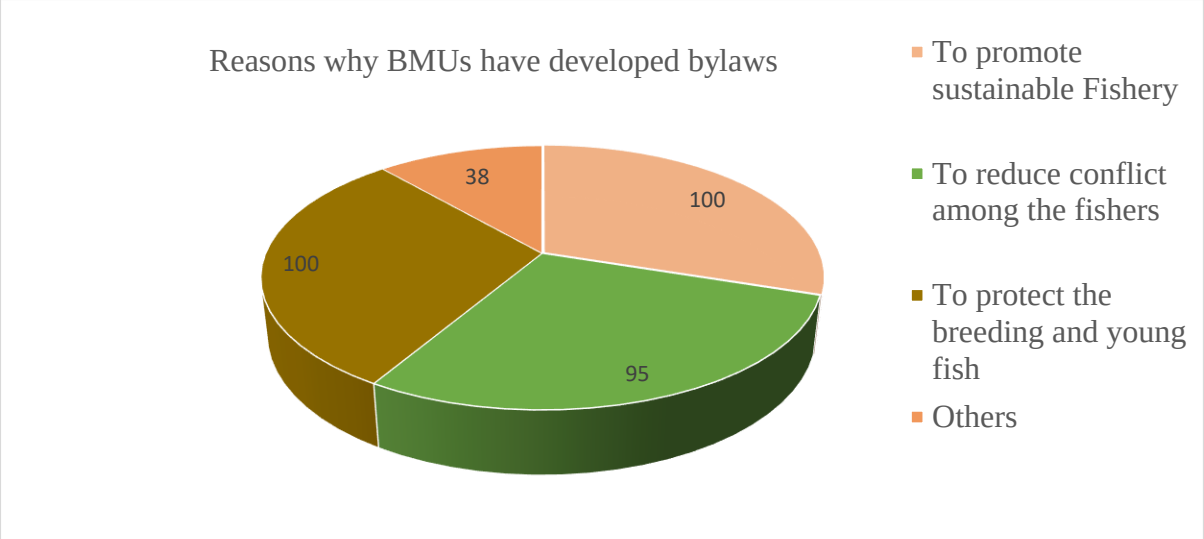

Figure 7. Reasons why BMUs have developed bylaws in Tangacity district

3.2.3 *Source of income for BMUs and support from local government*

The study investigated the sources of income for BMUs. Their income is mainly from collecting fisheries revenues (through an auction levy) on behalf of the district councils. However, the returned amount to BMUs is used as incentives for BMU members who collect the revenues. No fund is available for supporting fisheries conservation activities such as patrolling, beach cleaning, data collection etc. thus contributing to the underperformance of the BMUs because most of the responsibilities and functions require funds. The results below show more than 70% of the BMUs receive funds from local government as part of collected revenues, but not for fisheries resources conservation activities. Only one district (Kilwa) indicated that the resumed funds monthly approximately USD 220 are directed towards BMUs activities.

Further investigation was done to understand if there is any district council which allocates monthly or annual budget for supporting BMUs to implement their responsibilities. The results demonstrate that no districts allocate budget to support BMUs. This indicates that despite the concept of decentralized fisheries management which expects the local government authority to take initiatives in fisheries management on behalf of the central government, in contrally, this is not done. However, LGAs collect significant revenues from the fisheries resources as one of the main sources of revenue, but the collected amount does not support the fisheries sector within the LGAs.

Likewise, no BMUs which have initiated income generating projects on its own to provide alternative source of income. Also, BMUs have not established savings and credit services. According to Key Informants, this has been constrained by lack of skills and expertise among BMUs as well as little or no knowledge in financial management and record keeping.

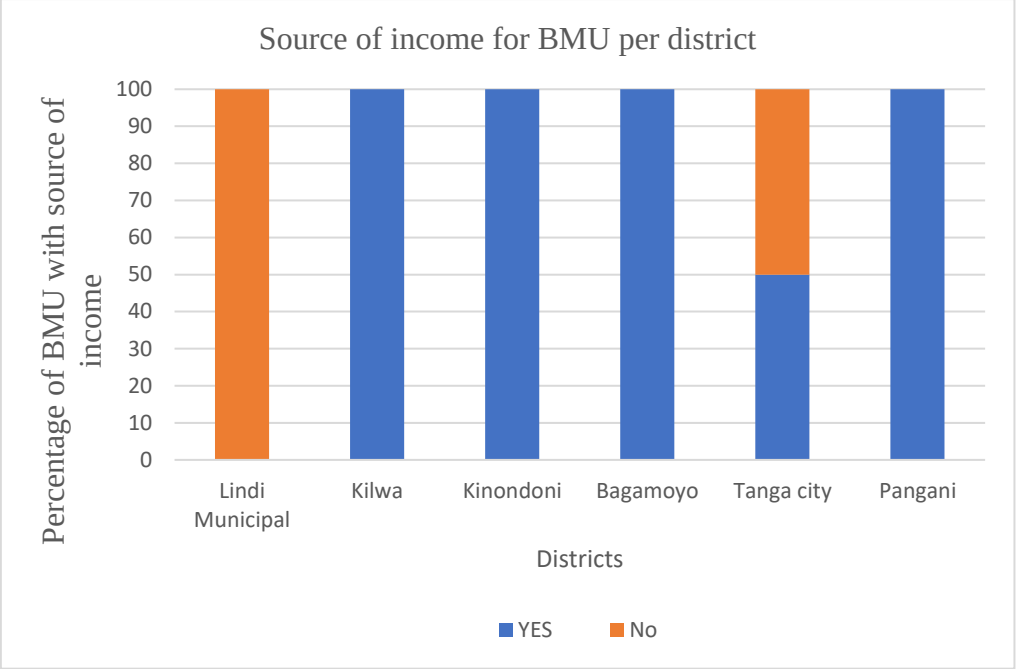

Figure 8. Source of income for BMU per district

3.2.4 *Participation of BMU in fisheries revenue collection within districts*

The Local Government Act of 1982 gives provisions for district councils to formulate bylaws and collect revenues from different sources. Fisheries revenues is among the main sources of income to all LGAs in Tanzania under this Act. The study investigated the participation of BMUs in fisheries revenue collection within the district councils. It was disclosed that half of the BMUs have been awarded tenders by the LGAs to collect fisheries revenues on behalf of the government (district councils) those include Kinondoni, Kilwa and Pangani as shown in table 3 below. The other half of the BMUs in the study area were not participating in fisheries revenue collection. On average, each BMU collects USD 1,300 per month. However, further inquiry explored how this revenues benefits the BMUs. It was noted that the average of 10% of the collected fisheries revenues returned to BMUs as part of their monthly collection was not meant for BMU activities. Instead, the resumed amount was for paying those BMU members collecting revenues as part of their incentives.

On the other hand, the government is responsible to promote and support awareness creation on fisheries co management according to the national Fisheries policy of 2015. Under this, the LGAs responsible to strengthen capacity to implement D by D in the fisheries sector (MLFD, 2015). Therefore, it is the responsibility of the LGAs to ensure supporting of the existing BMUs interms of training and financial support.

Table 3. Percentage of BMU participation in fisheries revenue collection

Districts	**% of BMU collecting fisheries revenue**	**% of BMU not collecting fisheries revenue**
Kinondoni	100	0
Kilwa	100	0
Pangani	100	0
Bagamoyo	0	100
Lindi Municipal	0	100
Tangacity	0	100

3.2.5 *BMU perceived effectiveness as a tool for managing marine and coastal resources*

The study examined how respondents perceived BMUs as a tool for managing the marine and coastal resources. The majority of BMU members had positive views on BMU as an effective tool for managing marine and coastal resources (Figure 10 below). The main reasons given was that when the fishing community are engaged in conservation activities through fisheries co management it creates sense of fisheries resources ownership. Also, BMUs participate in curbing illegal fishing practices through reporting illegal fishing events to the District Fisheries officers for further actions. Another reason given on why BMU is an effective tool was that BMU participation in fisheries data collection around the coast of Indian Ocean. In addition, BMUs educate other coastal community members on sustainable harvesting of the coastal and marine resources. Other opinions indicated that BMU is an effective tool since it is an authority which was established and governed by the Fisheries Act no. 22 of 2003 and its regulations of 2009.

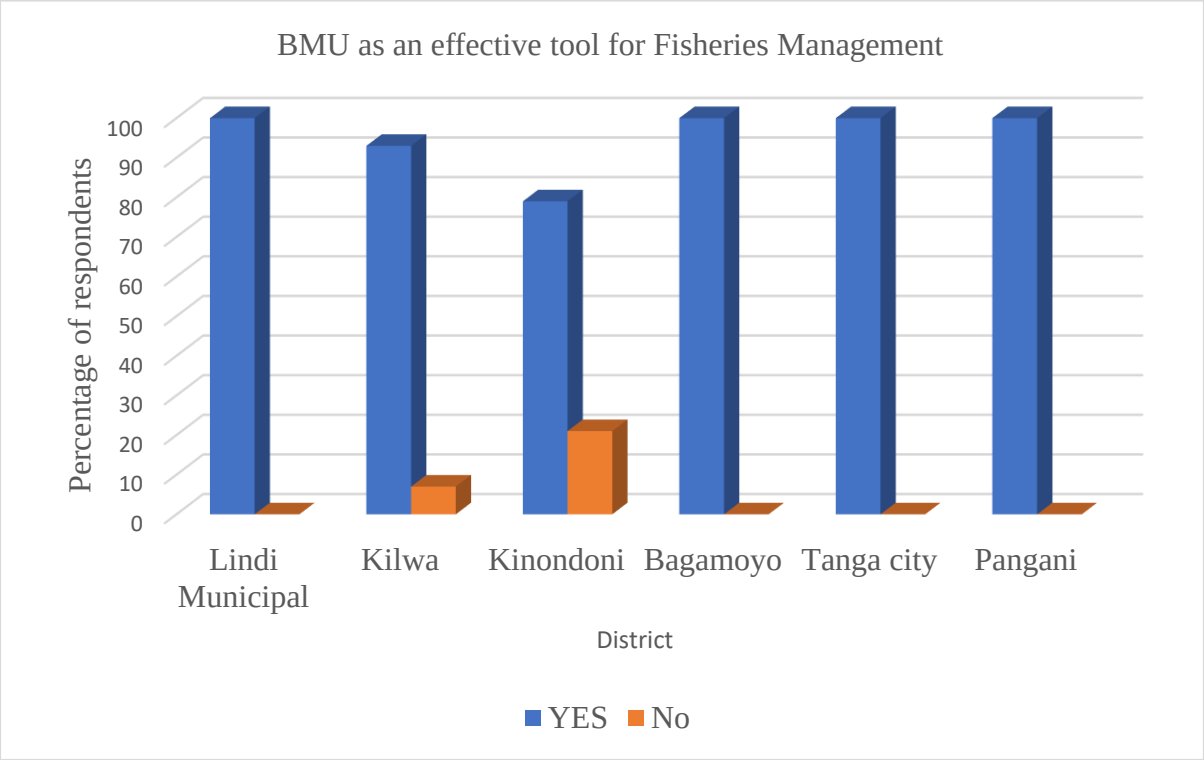

Figure 9. Percentage of respondents on BMU as effective tool for Fisheries resources management

3.2.6 *Awareness on the Fisheries Act, Policy and Regulations*

In Tanzania, fisheries resources are protected, conserved and managed under the Fisheries Act no. 22 of 2003, Fisheries Regulations of 2009 and Fisheries Policy of 2015. An understanding of institutional arrangements and boundaries of operation is crucial for effective enforcement of sustainable management practices (Mahonge, 2010). Under this study, awareness on the Fisheries Act, Policy and Regulations were examined. The majority of the respondents from five districts (100%) as indicated in Figure 11 below, were aware on the Fisheries Act, Policy and Regulations. This indicates that the fishing communities are informed on the existing fisheries legal frameworks in coastal waters of Tanzania. Additionally, responses from KIs shows that in all districts, the District Fisheries office creates awareness with stakeholders concerning the legal instruments through different meetings and seminars to BMU members. The aim is to provide with them an understanding of areas of regulatory enforcement. These

representatives of the community are responsible for educating the rest of the community. Moreover, this positive response is due to efforts made by both the Local Government and Central government in enforcing the fisheries laws.

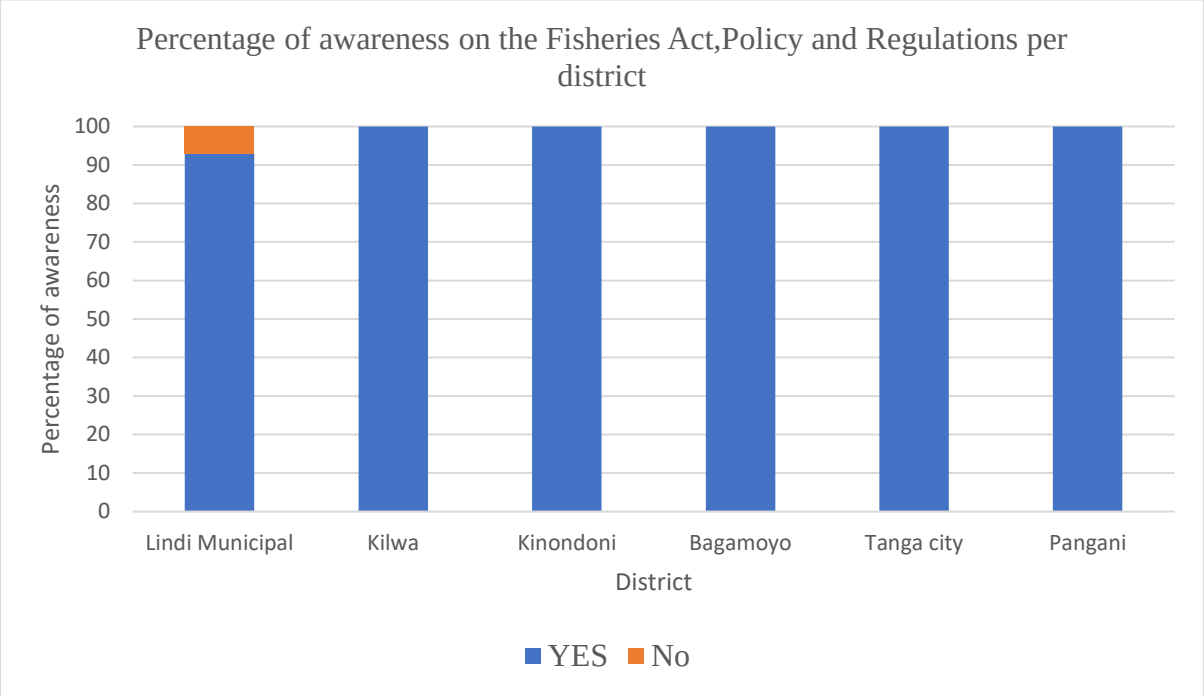

Figure 10. Percentage of BMU awareness on the Fisheries Act, Policy and Regulations

3.2.7 *Actions taken by BMU to manage the fishery*

The study further investigated actions taken by BMUs to manage the fisheries resources. It was discovered that controlling migrant fishers, confiscation of illegal fishing gears, and conducting patrols were the control actions most often taken (83%) as shown in Figure 12 below. It was observed that awareness creation with fishermen on regulation compliance (67%), participation in issuing fishing license (50%) and formation of bylaws was were other management actions (33%). The study further investigated how these activities were taken by BMUs, on the case of issuing fishing licenses BMUs participate through approving license application form 3a which is found within the Fisheries regulation of 2009. Also, they provide a pre-license form to fishers as one of the regulation requirements as a checklist to fishers whether they engage in illegal fishing practices or not. Awareness creation to fishermen on regulation compliance is done through conducting regular meetings with fishermen. BMUs perform beach or land patrols to identify people involved in illegal fishing practices which are then reported to the district fisheries officer for further actions. In addition, migrant fishers are controlled by BMUs through keeping records of all migrant fishers at the fish landing sites in ledgerbooks and reports to the district fisheries officers for further official permits.

BMUs do participate in some activities such as boat registration and licensing, patrolling activities and data collection. Despite few challenges encountered in law enforcement there is a positive sign for the fishing community being aware to comply with the laws. In the longrun this supports sustainability of the resources as there will be reduction of illegal fishing practices.

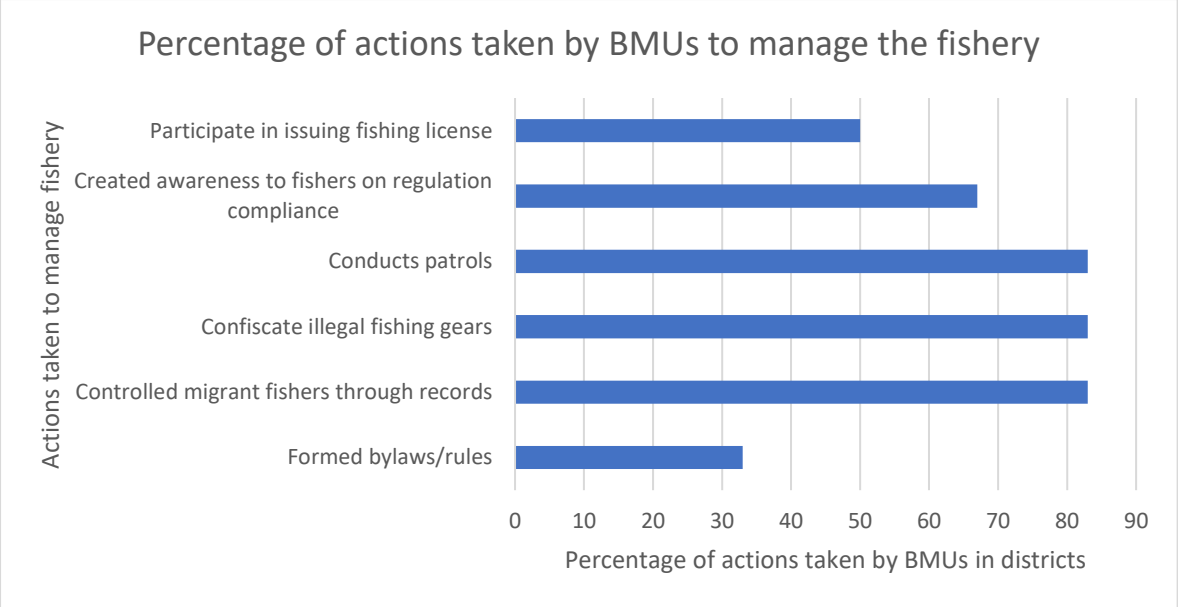

Figure 11. Percentage of actions taken by BMUs to manage the fishery

3.2.8 *Performance of BMUs in different activities*

The study assessed the performance of BMUs in different activities using Likert type scale where 5 was not effective and 1 very effective (Table 4). The findings show that fisheries data collection and reporting illegal fishing events to the District Fisheries officer were very effective compared to other activities as shown in Figure13. In addition, bylaw formulation and revenue collection were seen to be not effective where as patrolling activities were moderatly effective.These results suggests that the government have succeeded in establishing mobile fisheries data collection system along the coast.The same efforts need to be done in supporting other fisheries resources conservation activities as shown in Figure 13 below.

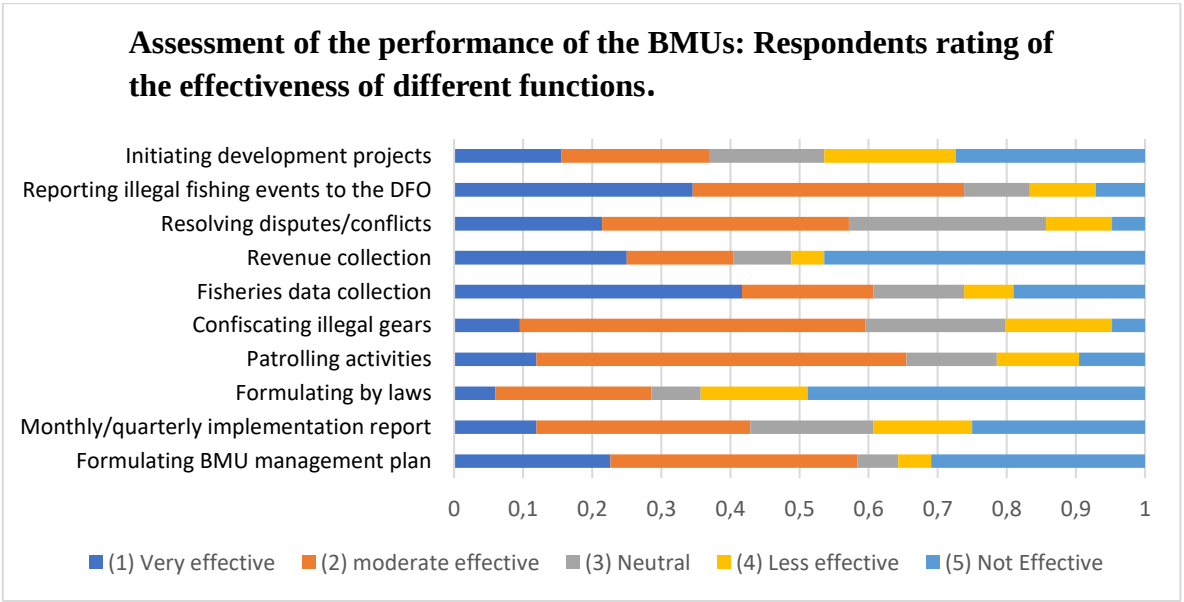

Figure 12. Assessment of the performance of BMUs using Likert type scale

Table 4. The mean value and the modal (most frequent) of responses about BMUs performance function

Function	**Mean**	**Mode**
Formulating BMU management plan	2,86	2
Monthly/quarterly implementation report	3,10	2
Formulating by laws	3,79	5
Patrolling activities	2,54	2
Confiscating illegal gears	2,56	2
Fisheries data collection	2,43	1
Revenue collection	3,32	5
Resolving disputes/conflicts	2,40	2
Reporting illegal fishing events to the DFO	2,15	2
Initiating development projects	3,21	5

Responses measured with 5-point Likert-type scales, 5=not effective to 1=very effective.

3.3 Challenges in Fisheries Co management

3.3.1 *Challenges encountered by BMU in Fisheries Management*

The study revealed that lack of tools to conduct sea patrols is a major challenge which was found to be extremely high for all BMUs. Inadequate capacity to enforce measures was found to be moderate. In addition corruption, was found to be extremely low as shown in Table 5 below.These results (Table 6) indicate that there is less performance to BMUs in terms of fisheries resources protection, especially in fighting against illegal fishing.The evidence of absence of working tools and low capacity to enforce fisheries management measures such bylaws and financial support leads to underperformance of the BMUs.

Table 5. Major challenges encountered by BMUs in fisheries resources management

Major challenges	**Extremely High (%)**	**High (%)**	**Moderate (%)**	**Low (%)**	**Extremely low (%)**
Inadequate capacity to enforce measures	27.4	15.5	42.9	9.5	4.8
Corruption	3.6	4.8	4.8	21.4	**65.5**
Lack of support from other stakeholders/government	25.0	13.1	34.5	20.2	7.1
Lack of tools to conduct sea patrols	**70.2**	10.7	2.4	1.2	15.5

Table 6. The major constraint identified by respondents for BMU in implementing management measures. The mean value and the modal (most frequent) response

Constraint in BMU	**Mean**	**Mode**
Inadequate capacity to enforce measures	2,49	3
Corruption	4,40	5
Lack of support from other stakeholders/government	2,71	3
Lack of tools to conduct sea patrols	1,81	1

The constraint was measured with 5-point Likert-type scales. 5=extremely low to 1=extremely high.

3.3.2 *Challenges of Local Government Authorities in Fisheries Co Management*

The study considered the challenges encountered by the local government authorities in implementing Fisheries Co management. The following were revealed;

- Most BMU have inadequate knowledge on sustainable conservation of marine and coastal resources despite the existence of BMUs. This is due to the fact that they lack awareness training from the government.
- Inadequate budget at the district council to support day to day fisheries activities is another major challenge. This leads into failure to implement their responsibilities and functions.
- Lack of working tools for patrols e.g speed boat and some BMUs lack office building hence difficult for them to keep official documents and attend official meetings.

3.3.3 *Views by District Fisheries Officers on how BMU performance can be improved within the district*

The study findings indicate that BMUs performance can be improved through providing training and awareness among BMUs on their responsibilities and the importance of sustainable conservation of the marine and coastal resources. Provision of funds to BMU to motivate them through various incentives will improve the BMU performance. Furthermore, it was revealed that BMUs need to have sources of income for them to be able to perform their daily activities and initiate subeconomic activities i.e alternative livelihoods activities which will enable them to depend less on only fishing activities and diversify their income sources. Moreover, district councils need to allocate special budget annually to support the implementation of BMU activities. Government officials need to do close monitoring of BMUs. This will help to do a checklist of planned activities through their management plans. Also, performing joint patrols within BMUs will help improve BMU performance.Training BMU members on financial matters and entreprenuership skills will strenghen BMUs in handling financial matters.

3.3.4 *Issues need to be addressed to ensure effective fisheries management and conservation*

The study exposed various issues that need to be addressed by the government in ensuring effective fisheries management of the fisheries resources. These include the need to provide capacity building training to all BMUs on their responsibilities and the importance of forming the BMUs as far as sustainable conservation and management of the coastal and marine resources are concerned. Similarly, provision of necessary working tools to enable BMU perform their duties, such as provision of patrol boats, which will enable partolling activities at sea to curb illegal fishing practices. Other working tools including stationary and cleaning facilities at the landing sites should also be provided.

The LGAs need to empower BMUs through awarding tenders for fisheries revenue collection as well as supporting the BMU in terms of funds. The funds can enable them in daily performance of their responsibilities, initiating economic projects, improve infrastructures within the fish landing sites such as provision of clean water, cooling facilities, toilets etc. In addition, the government needs to assist BMUs in formulation of bylaws to enable them in enforcing the Fisheries Act and Environmental Management Act for sustainability of the coastal and marine resources. There is the need for strengthening collaboration between government officials and BMUs.

4 CONCLUSIONS AND POLICY RECCOMENDATIONS

This study has examined the performance of BMUs along the Tanzanian coast that were established as a co management models for the fisheries sector. Two main research questions are put forward, namely, how the BMU have been performing and what are the challenges encountered by Local Government Authorities in the implementation of fisheries co management.

The study shows that BMUs are aware on the existing Fisheries Act, Policy and Regulations even though they lack bylaws as one of the major legal instruments to enforce the fisheries laws. In addition, the fisheries data collection was observed to be very effective in all BMUs when compared to other activities. Further this study observed that the fisheries data collection system has been greatly supported by the central government (Fisheries Division) through collaborating with other development agents such as WB and WWF. This call for the need for the CG and LGAs to collaborate and support BMUs in other fisheries resources conservation activities.

However, the district councils do not fulfil what is required of them in ensuring sustainable conservation of the fisheries resources as far as decentralized fisheries management is concerned. Even though the fisheries policy states the roles of the government to support awareness creation on Decentralization by Devolution in fisheries resources management, still this is not done accordingly. Most LGAs focus only on revenue collection in fisheries sector. The main reason is that the fisheries sector at the district level are not given high priority when compared to other sectors like education, health, engineering etc. In other words, the district councils do not recognize the value of the fisheries resources except in revenue collection thus no or little efforts are done to support other fisheries resources conservation activities under BMUs. Failure to support the BMUs have led to moderate or underperformance of the BMUs even though they are aware on their responsibilities and some have developed management plans and bylaws.

In order to promote more effective decentralized fisheries management, the following policy recommendations can be made from this study.

Firstly, the central government i.e. Ministry of Livestock and Fisheries Development and the local government authorities, as the two major levels of the fisheries resources management in Tanzania, need to bring together the strengths of both actors in supporting the BMUs to ensure their effective performance. This would truly improve the groundings for functional co management, including both government levels as other stakeholders within the BMUs.

Secondly, there is the need for the government to set legal framework for LGAs which will ensure financial support to BMUs on fisheries resources conservation activities. Since the LGAs collect revenues from fisheries at the district level it is important to make sure there is annual budget allocation for the fisheries sector. Otherwise money is simply tapped out from the fisheries sector and not reinvested in important fisheries management efforts.

Thirdly, the government need to set a close monitoring and evaluation mechanism to BMUs to ensure they perform their responsibilities and functions according to the National BMU guideline.

Lastly, achieving sustainable fisheries management is a daunting exercise in coastal Tanzania as has been proven in most sub Saharan African countries, having weak institutions and lack of resources. Co management in the form of joint effort between government actors at different levels and civil society is an attempt to bring together the capacity of these actors towards

effective management. Although this study finds many weaknesses in the current BMU approach in Tanzania, it regards co management still a viable approach to fisheries management as preferred option. But then, suggested improvements in the BMU model need to be addressed and a commitment of both central and local government actors to bring together their capacities and resources into the fisheries co management approach that requires active engagement of all actors.

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APPENDICES

ANNEX I: STRUCTURED QUESTIONNAIRE

Introduction

The Researcher is conducting a case study on examining performance of Decentralized Fisheries Management in marine waters of Tanzania through investigating the following; performance of BMU's along the marine waters, economic aspects of BMU and challenges associated in implementing co management as one of the fisheries management tools in Tanzania. Your response is critical in strengthening performance of BMUs in regulating fisheries as well as addressing challenges encountered in fisheries co management.

1.Name of landing site……Date…….

2.Occupation: (1) Fishers (2) Fish Processor (3) gear/boat repairer (4) Boat Owners (5) Fish monger (6)Others….

3.Position in BMU (Tick one)	
Leader	
Member	

Demographic Characteristics

4.Age of respondent…….

5.Gender of respondent (1) Male (2) Female

6.Marital status (1) Single (2) Married (3) Divorce/Separated (4) Widowed/er

7.What is your level of education (1) No schooling (2) Primary (3) Secondary (4) Tertiary (6) Other specify……?

8.How many years have you been involved in fishery……?

(1)0-5 years (2) 5-10 years (3)10-15 years (4)15-20 years (5) Above 20 years

Fisheries Management Measures

9.Do you have any BMU Management plan (1) Yes (2) No

10.If Yes why has the BMU developed BMU Management plan…….

……..

…….

11.Do you have any by laws in this BMUs (1) Yes (2) No

12.If Yes why has the BMU developed rules/by-laws?		**YES**	**NO**
i.	To promote sustainable Fishery		
ii.	To reduce conflict among the fishers		
iii.	To protect the breeding and young fish		
iv.	Others Specify….		

13.Are you aware on the current Fisheries Act, policy and regulations in fisheries resources management? (1) Yes (2) No

14. Do you participate in the formulation/amendment of the Fisheries Act/regulations?

(1) Yes (2) No

15.Do you think that there are more fish now because BMU has been working to curb illegal fishing? (1) Yes (2) No

16.Which of the following fishing regulation are you familiar with?

S/N	REGULATION	YES	NO	NOT SURE
i.	Illegal fishing gear ban			
ii.	Closed fishing seasons			
iii.	Boat registration and licensing			
iv.	Fishing gears mesh size			

17.Rate the performance of BMU in the following activities?

Tick appropriately

	FUNCTION	(1) Very effective	(2) moderate effective	(3) Neutral	(4) Less effective	(5) Not Effective
i.	Formulating BMU management plan					
Ii	Monthly/quarterly implementation report					
iii.	Formulating by laws					
iv.	Patrolling activities					
v.	Confiscating illegal gears					
vi.	Fisheries data collection					
vii.	Revenue collection					

viii.	Resolving disputes/conflicts					
ix.	Reporting illegal fishing events to the DFO					
x.	Initiating development projects					

18. Do you think BMU is an effective tool for managing Marine and coastal resources?		
YES	WHY	
NO	WHY	

Economic aspects of BMU

19.Do, this BMU have any source of income? (1) Yes (2) No

20. If yes mention source of income

(i)……
(ii)……
(iii)……

21.In order to conduct your responsibilities and function, do you get funds from the local governments? (1) Yes (2) No

22.Do you get any support from Development Partners such as WB SWIOFish project? YES or NO

23.If yes is the support in terms of funds, working tools or trainings?.....

24.Do you have any knowledge in financial management and record keeping (1) Yes (2) No

Challenges encountered by BMUs in Fisheries Management

25.	What do you see as a major constraint for BMU in implementing management measures?	**Extremely High**	**High**	**Moderate**	**Low**	**Extremely low**
i.	Inadequate capacity to enforce measures					
Ii	Corruption					
iii.	Lack of support from other stakeholders/government					
iv.	Lack of tools to conduct sea patrols					

26.What issues need to be addressed to ensure effective fisheries management and conservation?

……

THANK YOU

ANNEX II:KEY INFORMANT INTERVIEW

Introduction

The Researcher is conducting a case study on examining effectiveness of Decentralized Fisheries Management through investigating the following; performance of BMU's along the marine water challenges encountered by LGAs in implementing co management as the one of the fisheries management tools in Tanzania. Your response is important in identifying challenges associated for further improvement of the BMUs

1.Name of interviewee……Occupation…….

2.Date……District……

3.Is your District part of the WB Swiofish project? (1) Yes (2) No

Fisheries Management Measures

4.How many fishing vessels are found within this district……..

5.How often do you meet with BMUs in your area?

i. Daily ii. weekly iii. Monthly iv. Quarterly

6.What achievements have the BMUs had in fishery since its formation in your area

SN	**Achievement**	**(1) Very effective**	**(2) Moderate effective**	**(3) Neutral**	**(4) Less effective**	**(5) Not effective**
i.	Reduction of Illegal fishing practices					
ii.	Improved fisheries data collection					
iii.	Established savings and credit services					
iv.	Improved market for sale of fish					

v.	Improved number of registered fishing vessels					
vi.	Increased revenue collection					
vii.	Increased fishing licenses					
viii.	Improved hygiene at the landing site					
ix.	Resolved conflict among fishers					
x.	BMU By law formulation					

7.What are initiatives/support done by the council for BMU improvement? If Yes state how

SN	Initiative/Support	YES	HOW	NO
i.	Training			
ii.	Provide equipment's for hygiene at the landing site			
iii.	Logistics for patrolling activities			
iv.	Training and awareness creation on the Fisheries Act and Regulations			
v.	Others Specify			

8.Which action has the BMU taken/initiated to manage the fishery? If Yes explain How

SN	Action	YES	HOW	NO
i.	Formed by laws/rules			
ii.	Controlled Migrant fishers by keeping their records			
iii.	Confiscated illegal fishing gears			
iv.	Conducts patrols			
v.	Created awareness to fishers on regulation compliance and impact of illegal fishing practices			
vi.	Participate in issuing fishing license			
vii	Others Specify			

9.How many illegal fishing gears have been confiscated for the past two years? (2017-2019) Type of gears and how many of them were confiscated ……
……

10.Is there any NGO/Development agency except WB working to support the BMUs in your district? (1) Yes (2) No,

11. If Yes mention them……..

12.Do you think when the WB project phase out the Govt will take over their activities? (Answer if your district is within SWIOFish WB Pilot project)

(1) Yes (2) No

13.If Yes explain how……

BMU Economic aspects

14. Does your district council provide any support to BMU for implementing their responsibilities?

(1) Yes (2) No

15.If yes (above) is it given in terms of training, working tools or funds (mention)……

16.What are the main source of income for the majority of people at this village?

(1) fishing (2) farming (3) Livestock keeping (4) business (5) Others specify…….

17.What group of fisheries stakeholders in landing sites within your district have more income among the following: tick only one

(1) Fishers (2) boat owners (3) Fish processors (4) Fish mongers (5) Others specify……...

18. Does your BMUs established savings and credit services (1) Yes (2) No

19.Does the BMUs participate in fisheries revenue collection? (1) Yes (2) No

20.If Yes how much do they collect per month and how does this benefit the BMUs

……

……..

Challenges encountered by LGA in Fisheries Co Management

21.What are the major challenges in implementation of co management in your district?

…….

22. How can the BMUs performance be improved in your district

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THANK YOU