



AN ASSESSMENT OF THE POTENTIALS OF ARTISANAL FISHERIES IN SPEARHEADING THE BLUE ECONOMY TRANSFORMATION IN ZANZIBAR ISLANDS

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ABSTRACT

This article assesses the potentials of artisanal fisheries in spearheading the on-going Zanzibar blue economy transformation. It focuses on five artisanal fisheries potentials, adopted from the five livelihood assets of the Sustainable Livelihood Approach (SLA); financial, physical, natural, human and social. Data were drawn from 333 artisanal fishers in five Zanzibar villages using a cross-sectional research design. A questionnaire survey was employed to collect data and analysed using descriptive statistics of frequencies and percentages. Qualitative data were obtained through FGDs and direct observations and analysed thematically. The study results revealed that (96%) of fishers lacked access to loans to support their artisanal fisheries. Again, (54.65%) of fishers used canoe, which is one of the traditional and inefficient fishing vessels. Furthermore, (65.17%) of the fishers did not own the fishing vessels, however, majority of them (80.48%) owned fishing gears. The study also shows that there was low application of fishing technologies in artisanal fisheries. It further revealed that (79.88%) of the respondents had informal knowledge and skills which they inherited from their forefathers and (90.69%) of fishers were not attendants of any capacity building programmes organised either by governmental or non-governmental organisations, while, (58.86%) of the fishers sell their fish catches at their village market that lack modern fish preservation infrastructures. It also revealed that (77.78%) were non-members of fishers' cooperatives. The study, therefore, recommends that the potentials of artisanal fisheries have to be improved and supported by governmental, non-governmental organisations, and other fisheries stakeholders to ensure sustainable spearheading of the exiting blue economy transformation in Zanzibar Islands.

KEYWORDS: Artisanal fisheries, blue economy transformation, fishing village, potentials of artisanal fisheries, government and stake holders.

INTRODUCTION

Artisanal fishery is a strategic objective sector that significantly contributes to the livelihoods of millions of households (The Food and Agriculture Organisation (FAO), 2020a). The sector is responsible for about half of the global annual marine catches. More than 120 million people worldwide depend directly on artisanal fisheries and fisheries-related activities like trading and processing (FAO, 2020b). Despite the positive contribution of the artisanal fisheries, many artisanal fishing communities

continue to be marginalized, and their contribution is not fully realized due to poverty reduction, food security, equitable development and sustainable resource utilisation which benefits them and surrounding communities (Winfield, 2019). It is estimated that 5.8 million artisanal fishers worldwide live below the poverty line of \$1.90 a day (FAO, 2016; United Nations Conference on Trade and Development (UNCTAD), 2019) while a majority of them reside in developing countries.

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In developing countries, about 47 million people livelihoods are supported by artisanal fisheries (FAO, 2017). Artisanal fisheries are further critical components of the domestic fishery chains and livelihoods of the coastal communities. It is also estimated that, about 90% of artisanal fishers are located in Asian and Sub-Saharan African countries. These countries include; Bangladesh, Philippines, Thailand, Sri-Lanka, Vietnam, Nigeria, Senegal, Ghana, Tanzania, Madagascar and Malawi (O'Neill, 2018; Chuenpagdee & Jentoft, 2019). However, it is an established fact that, artisanal fisheries are economically, politically, socially, culturally, legally and geographically marginalised (Chuenpagdee & Jentoft, 2018). Their unfavourable status is frequently perceived to be both the cause and effect of unsustainable fishing practices, overfishing and governance failure; thus, their potential to modernise while participating in and delivering on sustainable development goals is less than optimal. Given that the majority of the world's fisheries are artisanal (Chuenpagdee & Jentoft, 2019).

Likewise, the blue economy has emerged and recognised as a mechanism for sustainable development and poverty reduction in Small Island Developing States (SIDS) and coastal countries that fully depend on blue resources (FAO, 2017; Bakshi, 2019; Smith & Basurto, 2019; UNCTAD, 2019). Artisanal fishers partly contribute to the blue economy through the use of ocean resources for generating income, improving livelihoods and reducing poverty (Cohen *et al.*, 2019). In this context, blue economy recognized economic and ecological objectives and the benefits that artisanal fisheries provide. Therefore, it is important that the interests and the rights of artisanal fishers must be recognized and represented. This is important to enable them access the blue resources for their socio-economic development and improve their household livelihoods (Cohen *et al.*, 2019). The emerging economic, ecological, political, and social equity issues raised by fisheries experts require special attention to ensure that artisanal fisheries' long-term and short-term viability in the blue economy. Therefore, the growing global blue economy imperatives must invoke in-depth research on the prospects and challenges of artisanal fisheries (Ayilu *et al.*, 2022).

The blue economy is well aligned with the United Nations Sustainable Development Goals (UNSDG) of 2030. This is reflected in its contribution to livelihoods and poverty reduction, which are among the targets of the United Nations 2030 Sustainable Development Goals (SDGs). The Sustainable Development Goals (SDG) No. 1 and 14 aimed at the conserving and sustainable use of the ocean, sea and marine resources and set targets that seeks to increase the economic benefits of Small Island Developing States (SIDS) and Least Developed Countries (LDCs) from a sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism (Spalding, 2016). The SDG No.14.B, speaks directly to artisanal fisheries, calling for a secured access to resources and markets for

artisanal fisheries sectors. Yet, many artisanal fishers suffer from severe socio-economic decline and marginalisation in developing countries (UNCTAD, 2016 and 2019).

Zanzibar has recently developed the blue economy policy to formalise blue economy development as a growth generator for the next decade in the context of poverty reduction and employment generation. This policy defines the scope of the blue economy under four key areas that include fisheries and aquaculture, marine trade, sustainable marine tourism and energy, comprising of renewable energy (RE), Oil and Gas (The Revolutionary Government of Zanzibar (RoGZ), 2020b). This focus of the blue economy, aims to develop and advance these five segments in Zanzibar. The intensification of these five segments of the blue economy affect the development of artisanal fisheries.

Zanzibar Islands integrates into the Indian Ocean cluster of Small Island Developing States economies that depends directly on blue resources. The 2020 Zanzibar Blue Economy Policy guiding framework aims at promoting and modernizing artisanal fisheries practices through identification and education, as well as exploiting relevant technology development, supporting relevant agri-businesses through diversifying financing mechanisms and collective fishers' organizations and improving nutritional security through better access to marine and fishery products (RoGZ, 2020b). The performance of the Zanzibar fisheries sector has unfortunately kept on declining since 2012 when the figure was 6.6%; down to 4.8% in 2019 (Office of Chief Government Statistion Zanzibar (OCGS), 2020; RoGZ, 2020c). However, the country is expects to be the leading centre for blue economy operations in the Western Indian Ocean region given the effective implementation of the policy. Therefore, there is a great need to assessing the potentials of artisanal fisheries in spearheading the on-going Zanzibar blue economy transformation.

Theoretical Review

Sustainable Livelihood Approach (SLA) is an integrating factor that allows policies to address development, sustainable resources management and poverty reduction simultaneously. It was developed by Chambers and Conway (1991), who compounded the idea of "sustainable livelihoods". To them, a livelihood comprises the capabilities, assets, and activities required for a means of living. A livelihood is, therefore, sustainable if it can cope with and recover from stress and shocks, and enhance its capabilities and assets by providing sustainable livelihood opportunities for the next generation and contribute to net benefits and other livelihoods at the local and global levels in the short and long-term. Sustainable Livelihood Approach (SLA) was further applied as a framework in development studies by The Department for International Development (DFID) (1999) whose main objective is poverty reduction and the encouragement of economic growth that benefits the poor (Morse *et al.*, 2009).

SLA's premise is people-centred, as it provides answers to how individuals, households, villages, or groups interact with both material and non-material worlds in the outside environment. It explores how people find the meaning of life within the environment and the social system in which they live (Krantz, 2001). SLA identifies the human, natural, financial, physical, and social capital (the so-called Pentagon of Assets) that is accessible to rural people as a foundation for the promotion of sustainable rural development (Morse & McNamara, 2013).

Allison and Ellis (2001) identify five SLA capitals for livelihood concerning fisheries, namely the *natural*:

(fishing grounds, fish species and fishing seasons); *physical*: (fishing vessels, gears and technologies); *financial*: (credits, capital and savings); *human*: (knowledge, skills and health); and *social*: (market, cooperatives and other social ties within the intended community). The five fishing potentials are required as stocks of capital. They are utilised directly or indirectly to generate the means of living for households through livelihood strategies. Livelihood strategies are, therefore, the organising practices that artisanal fishers engage in by using the five livelihood assets to make a living. Figure 1 illustrates the Sustainable Livelihoods Framework.

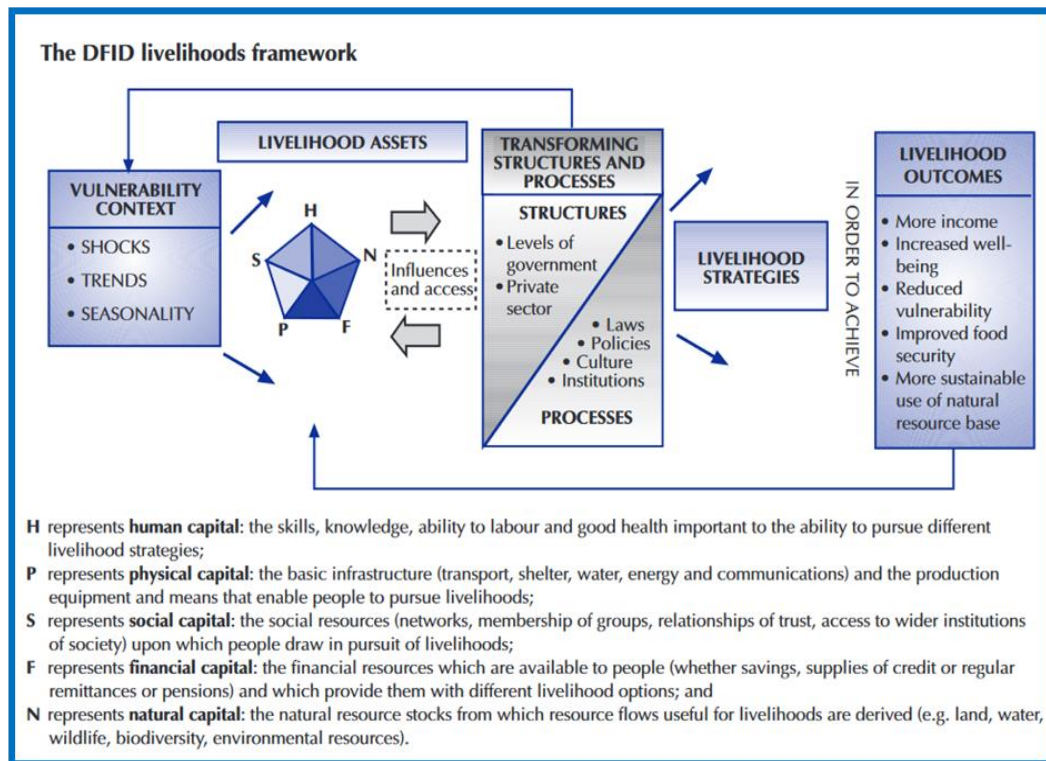


Figure 1: Sustainable Livelihood Framework

Source: DFID (1999)

Based on the strengths of the SLA to this paper, first, the SLA is an appropriate approach for rural development because it is the only 'bottom-up' approach. Further to that, it is the most successful approach for engaging with rural communities through participatory approach programmes that focus on rural poverty reduction (Kassie *et al.*, 2013). Secondly, it based on the notion of the combination of the five assets; (financial, physical, natural, human and social), referred to as the potentials of artisanal fisheries as assets for achieving livelihoods outcomes (Allison & Ellis, 2001; Sataloff *et al.*, 2013). On the other hand, the SLA has failed to develop long-term strategies for dealing with long-term shocks and stresses, especially in rural development and diversification in economic globalization (Ellis, 1999). Furthermore, it has been criticized for lacking guidelines on classifying poor individuals who lack assets to diversify their livelihood strategies. Despite all the weaknesses that SLA has, this study adopted

the theory because it directly relates with the study and it still does not have a theoretical substitute in addressing the causes and effects of livelihood attempts, vulnerability, and their interventions based on the reviewed literature as far as livelihoods and poverty reduction are concerned, whereby the mentioned weaknesses are addressed by embedding livelihood outcomes and vulnerability into the SLA approach.

METHODOLOGY

Study Location

The study was carried out in five fishing villages in Zanzibar Islands. Zanzibar is formed by two islands: Unguja and Pemba. The study involved three villages from Unguja Island, namely Kizimkazi Dimbani, Chwaka and Unguja Ukuu Kaepwani and two villages from Pemba Island, namely Tumbi Mashariki and Michenzani. The selection of these villages was based on the supremacy of artisanal

fishing and presence of official landing sites (RoGZ, 2020).

Study Design

This study used a cross-sectional research design because the study applied both qualitative and quantitative data which were generated at a single point in time (Sekaran & Bougie, 2016). The design provided a comprehensive analysis of the research problem by investigating the position of artisanal fisheries to household livelihoods in Zanzibar. Hence, it has a greater degree of accuracy and precision for conducting social science studies than other designs (Kumar, 2011). The design also allows a simultaneous investigation of multiple variables (Baryman, 2008), thus it is suitable for this study which proposes an investigation of more than one variable.

Population and Sample Size

The 333 sample size of artisanal fishers (household heads) was determined through Yamane's formula of 1967 (as cited in Sarmah *et al.*, 2013) from the total population of 1991 artisanal fishers in five fishing villages namely; Kizimkazi Dimbani, Chwaka,

Unguja Ukuu Kaepwani, Tumbe Mashariki and Michenzani in Zanzibar. Thereafter, the stratified proportional allocation method was applied to obtain an equal representation of the 333 artisanal fishers from each of the five villages (stratum) under study. The proportionate samples were: 30 Kizimkazi Dimbani, 80 Chwaka, 72 Unguja Ukuu Kaepwani, 98 Tumbe Mashariki and 53 Michenzani. This method was applied because it estimated the size of the sample with a higher degree of precision (Fayose & Adebara, 2018).

Finally, simple random sampling was applied to select 333 artisanal fishers from each of the five villages by using a lottery method whereby the artisanal fishers of each village were given numbers drawn from registration list provided by beach management unit officer and put the pieces of numbers in a box and mixed them, after that the researcher picked numbers randomly from the box to select the required representative proportionate samples of each village under study. This technique was used because it is simple and avoids bias (Cohen *et al.*, 2007). Table 1 presents the summary of the study population and sample size.

Table 1: Summary of the Study Population and Sample Size Distributions

Locations	Category of the Study Locations					Total
	Kizimkazi Dimbani	Chwaka	Unguja Ukuu Kaepwani	Tumbe Mashariki	Michenzani	
Population	180	478	430	587	316	1991
Sample	30	80	72	98	53	333
Percentage	9.1	24.0	21.6	29.4	15.9	100.0

Source: (RoGZ, 2020a) modified by authors (2022)

Data Analysis

The IBM Statistical Software Package for Social Sciences (IBM SPSS) version 25 was applied in running data regarding the potential of artisanal fisheries in this study. Then the descriptive statistics of frequencies and percentages were performed and explored the results in tables and figures to show the assessment of the potentials of artisanal fisheries in the area of study.

RESULTS AND DISCUSSIONS

Financial Potential of Artisanal Fisheries

In assessing the potentials of artisanal fisheries, the study adopted the five potentials of artisanal fisheries based on the five livelihood capitals of the Sustainable Livelihood Approach (SLA) namely: *financial*; access to loans, *physical*; fishing vessels, gears and technologies, *natural*; fishing grounds, fish species composition and time consumed in fishing, *human*; fishing knowledge and skills and social; markets and cooperatives. Financial capital includes

the financial resources that people use to achieve their livelihood objectives (DFID, 1999). In this paper, financial potential of artisanal fisheries refers to the financial resources that artisanal fishers use to achieve their livelihood objectives and it comprises the important aspect of loans accessibility.

Access to Loans for Artisanal Fisheries

Access to loans as the financial potential for fisheries activities from formal financial institutions is widely perceived as an effective strategy to increase smallholder productivity and reduce poverty (Chandio *et al.*, 2018). As per Figure 2, the study findings show that, majority of respondents (96%) in the study area did not receive any financial support from either government or non-governmental organisations. Only (4%) of respondents received loans to support their artisanal fisheries. The type of loans respondents received were fishing facilities that include fishing vessels and gear. Figure 2 presents the results on the access to loans for artisanal fisheries;

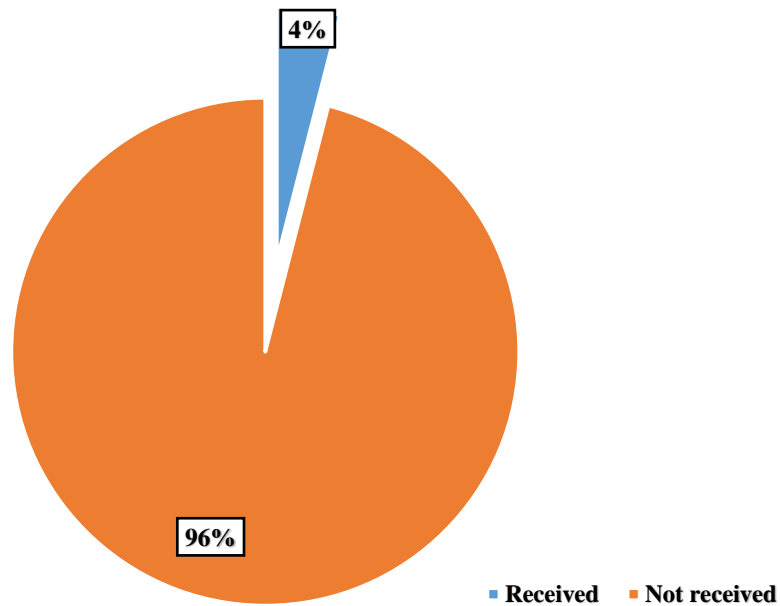


Figure 2: Access to Loans for Artisanal Fisheries

Source: Field Survey, 2022

Sources of Capital for Artisanal Fisheries

Furthermore, the study found that access to loans was insignificant to respondents. Artisanal fishers reported to use other means to initiate and support their artisanal fisheries. Figure 3 shows that, the majority of respondents (37.50%) were being empowered by fishing facilities owners i.e. vessels and gears in their artisanal fisheries activities, (21.25%) received support from both family and their own saving, (12.19%) renting, 8.44% own savings, 8.13% fellow fishers' support, (7.50%) family support

and (5.00%) from fishers' cooperatives. A study conducted by

Okyere *et al.* (2016) shows that artisanal fishers faced credit constraints due to the inaccessibility of collateral, cumbersome loan application process, high interest rates, delays in disbursement time lag, inadequate savings and other challenging factors demanded by formal financial institution. Figure 3 summarizes the means used to obtain capital for artisanal fisheries in the study area.

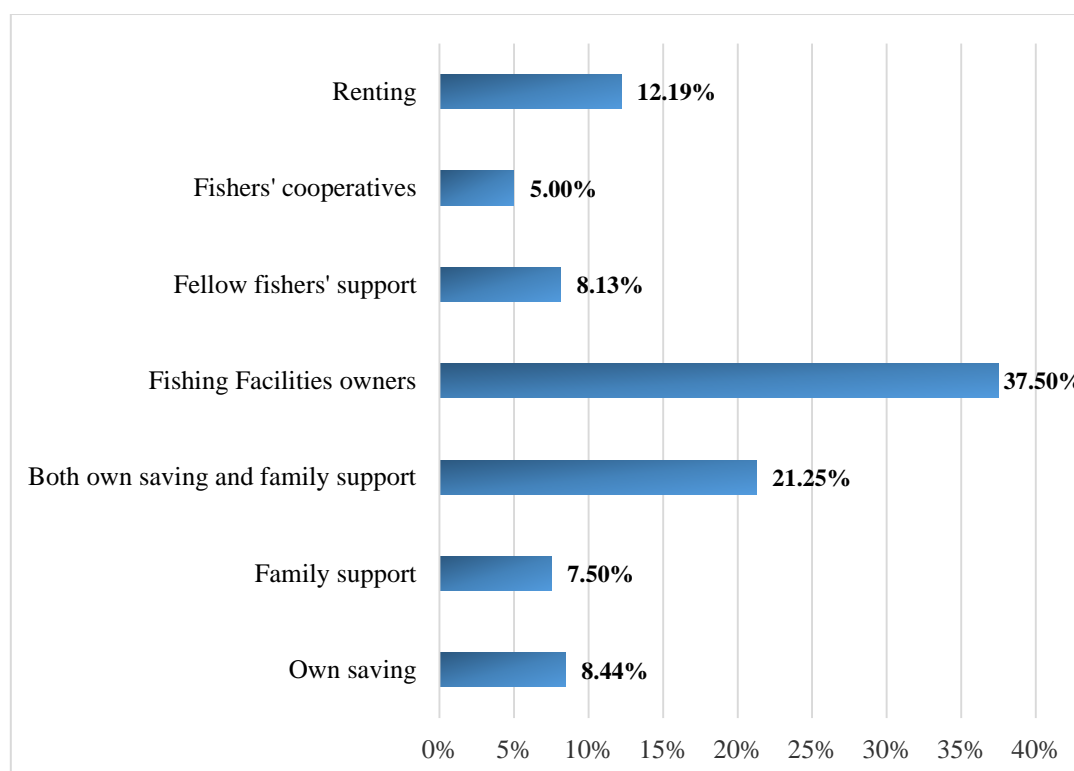


Figure 3: Means of Obtaining Capital for Artisanal Fisheries

Source: Field Survey, 2022

Twumasi *et al.* (2020) argued that credit accessibility may relax the liquidity constraints that artisanal fishers face and may also increase poor fishers' risk-coping ability; that is, abolishing less risky but inefficient strategies to adopt new and risky strategies that lead to high returns in production. Therefore, without the presence of credit, needed inputs increase in production would be tough to achieve, let alone increase output from available resources. This implies that access to initial capital is a key factor for establishing artisanal fisheries and can be either in cash or loans supported by the government or non-government organisations, or individuals.

Physical Potential of Artisanal Fisheries

Physical capital includes physical infrastructure and tools or equipment used to support livelihoods (DFID, 1999). In this study, physical potential of artisanal fisheries refers to basic infrastructure and production equipment that enable artisanal fishers to pursue livelihoods that include; fishing vessels, gears and technologies (ICTs).

Fishing Vessels applied in Artisanal Fisheries

The study findings in Table 3 show that, the most common fishing vessel used was canoe with 182(54.65%), followed by fibber boats with 98(29.13%) while 42(12.61%) of respondents argued

to use outrigger canoe in their artisanal fishing activities and only 12(3.60%) of respondents use dhow in their fishing activities. Furthermore, the study observation found that Kizimkazi Dimbani had more modern fishing vessels (fibber boats) empowered by outboard engine machines compared to the rest four villages of Chwaka, Unguja Ukuu Kaepwani, Tumbe Mashariki and Michenzani where traditional and ineffective fishing vessels including canoes and outrigger canoes dominated. This implies that the artisanal fisheries in the study area were dominated by traditional and inefficient types of fishing vessels, mostly propelled by paddle and consequently very few artisanal fishers undertake off-shore fishing. Such fishing vessels results to low fishing incomes and are not capable of controlling the rough sea during bad weather conditions resulting from monsoon circulation.

The findings reiterate those of Dzoga *et al.* (2020), who conducted a study in Ngomeni, Kipini and Ozi fishing areas of Malindi-Ungwana Bay and the Lower Tana Delta on the north coast of Kenya. These researchers found that canoes were the most common fishing craft used by artisanal fishers in the area. Table 2 describe the fishing vessels category found in the study area.

Table 2: Description of Fishing Vessels Category

Fishing Vessel	Details
Canoe	A small narrow vessel made up of a single log or a few pieces of a tree. The bottom is usually flattened for stability. No outriggers and usually propelled by human power with paddles, long poles, or rudimentary sail.
Outrigger canoe	Made up from a single log. Have outriggers which provide additional stability. Powered by both paddle and sail.
Fibber boat	Look like sailing boats with a pointed bow and square or rounded sterns. It is always propelled by an outboard petrol engine.
Dhow	Constructed out of wooden planks with a pointed bow and rounded stern, normally propelled by sailing.

Source: Modified from Jiddawi (2012) and Makame (2021)

Fishing Gears Applied in Artisanal Fisheries

The findings in this study, shows that there were use of multi-gears in artisanal fishing by respondents. Fishing in all five studied villages used multi-gears to target multiple fish species. Study findings in Table 3 show that a majority of respondents, numbering 101(30.33%) used traps, followed by nets with 95(28.53%), lines was used by 89(26.73%) and 48(14.41%) used spears. Respondents who used traps, lines and spears said that they prefer to use them because they are cheaper and some of them were self-fabricated. Generally, most of the fishing gears applied in the study area were passive and simple which are applicable for inshore waters with depths not exceeding 30m. Moreover, during the Focus Group Discussions (FGDs) some respondents reported that, there is a general concern of overfishing because of the widespread use of illegal and destructive fishing gears like small mesh sizes, dragnets and spear guns. These illegal and destructive gears destroy coral reefs and kills immature fish. They also impact the catches obtained by other gears.

Ownership of the Fishing Vessels and Gears

This study shows that, majority of fishing vessels used by the respondents across the study areas did not belong to artisanal fishers but to fishing vessels and gears owners from towns and their respective villages. Only 116(34.83%) of all respondents' fishing vessels were owned by artisanal fishers while a majority of 217(65.17%) did not belong to the fishing vessels (see Table 3). This findings depict that most of traditional, small, cost less and ineffective fishing vessels that include canoes and outriggers canoes were owned by the artisanal fishers themselves or in association with family members or their own savings, while the modern and bigger fishing vessels like fibber boats and dhow were mostly owned by middlemen (fishing vessels and gears owners) who rent their vessels to fishers or artisanal fishers became employees of fishing facilities owners which results for large portion of fishing income goes to fishing gears and vessels owners. Additionally, during Focus Group Discussions some respondents argued that; very few fibber boats were owned by artisanal fishers' cooperatives who had recently received government inputs loans through Cooperative and Rural Development Bank (CRDB).

With regard to ownership of the fishing gears, most of the fishing gears were owned by artisanal fishers themselves 268(80.48%) of the all respondents. Also, the study found that some fishing gears like traps and spears were self-fabricated by respondents. The findings imply that artisanal fishers are characterised by low physical fishing potentials. This is probably attributed to the lack of savings from the income obtained from fishing which is caused by the increasing frequency of fishing failure facing across the study sites.

Usage of ICTs in Artisanal Fisheries

Usage of fishing technologies (ICTs) in artisanal fisheries activities such as mobile phones, television, radio, GPS and fish finder can facilitating communication, increasing income, reducing production costs, increasing fishers' knowledge, and increasing safety (Suciati & Susilowati, 2022). Table 3 indicates the results of the usage of ICTs by fishers under study, a majority of respondents 195(58.56%) agreed to use ICT facilities for their artisanal fisheries activities and the rest 138 disagreed to use ICTs for their artisanal fisheries activities. Likewise, the common ICT facility used by respondents was mobile phones 192(57.66%) which is used for communication, followed by radio used by 79(23.72%) for accessing weather information and GPS (Global Positioning System) used only by 40(12.01%) respondents in their daily artisanal fisheries and television 10(3.00%) for accessing fishing information and knowledge. Although the GPS has several benefits in artisanal fisheries including locate the vessel's position, landing centre and fish locations, none of the respondents use fish finder in their artisanal fisheries activities. Hosseini *et al.* (2009) argued that fishers were facing many financial and economic challenges in the use of ICT facilities. They were found to have less interest in utilizing them. This is different from what Mittal and Mehar (2016) found, in India, that fishers mostly use GPS and sonar in obtaining various fishery information.

The above study findings imply that a majority of fishers preferred to use mobile phones in their artisanal fisheries compared to other ICT facilities due to financial constraints. These findings justify the need for financial support and awareness programs that will influence artisanal fishers on the application

of ICTs facilities in their daily artisanal fisheries activities and sustaining the ongoing transformation of the Zanzibar blue economy at large.

Motorisation of the Fishing Vessels

The study findings on motorisation of respondents' fishing vessels in all five studied villages found that only 140(42.04%) used motorised fishing vessels while non-motorised respondents fishing vessels covered a large number of 193(57.96%) (see Table 3). The non-motorised fishing vessels used by respondents are the traditional vessels that were inherited from their forefathers. They are normally

powered by sail or paddles. According to Joshua and Gopan (2021), motorisation of fishing vessels helps the artisanal fishing sector to regain its old level of production, but at a substantially higher cost. For them, motorisation of fishing vessels has also resulted in to the increased exploitation of fishery resources. These findings imply that, in order to improve the household livelihoods of artisanal fishers, motorization of their fishing vessels is important. Table 3 presents the study findings regarding the physical artisanal fisheries potentials found in the study area.

Table 3: Fishing Vessels, Gears, and Technologies

Variable	Frequency(n)	Percent (%)
Type of fishing vessel		
Canoe	182	54.65
Outrigger canoe	42	12.61
Fibber boat	98	29.13
Dhow	12	3.60
Type of fishing gears		
Nets	95	28.53
Traps	101	30.33
Lines	89	26.73
Spears	48	14.41
Ownership of fishing vessels		
Not owning	217	65.17
Owning	116	34.83
Ownership of fishing gears		
Not owning	65	19.52
Owning	268	80.48
Usage of ICTs for fisheries		
Mobile phone	192	57.66
Radio	79	23.72
Television	10	3.00
GPS	40	12.01
Motorisation of fishing vessels		
Motorised	140	42.04
Non- motorised	193	57.96

Source: Field Survey, 2022

Natural Potential of Artisanal Fisheries

Natural capital is the natural resources stocks from which benefits flow to peoples' livelihoods (DFID, 1999). In this study, natural potential of artisanal fisheries refers to natural resources stocks from which resource flows and services useful for artisanal fisheries. These include fishing grounds, fish species composition and time consumed in fishing.

Fishing Grounds and Time Consumed in Fishing

The study findings in Table 4 depict that, most of the artisanal fishing takes place in inshore waters due to the nature of the characteristics of the fishing vessels used by fishers. These include being small in size, non-motorised and cannot afford deep-sea fishing. A majority of respondents who account 278(83.48%) fish inshore fishing grounds and only 55(16.52%) tried to fish in offshore waters. The traditional fishing

vessels limited the fishers to the inshore waters and spent much time as the vessels are propelled by sail or paddles.

As for the time spent per fishing trip, all fishers stated that fishing time normally depended on the type of fishing vessel applied and fishing seasons. A majority of the respondents 189(56.76%) spent 6 -10hrs per fishing trip, followed by 103(30.93) of the fishers who spent less than 6hours

per fishing trip. Only 41(12.31%) of respondents spent above 10hours per fishing trip (see Table 4). Jiddawi (2012) found that artisanal fishers habitually depart during the morning high tide and arrival at the landing sites in the next rising tide in the afternoon. Table 4 presents the study data on the natural artisanal fisheries potentials found in the study area.

Table 4: Fishing Grounds, Fish Species and Duration in Fishing

Variable	Frequency(n)	Percent (%)
Fishing Grounds for Artisanal Fishing		
Inshore waters	278	83.48
Offshore waters	55	16.52
Time Spent per Fishing Trip		
Less than 6 hours	103	30.93
6 -10 hours	189	56.76
Above 10 hours	41	12.31

Source: Field Survey, 2022

Fish Species Composition

There is a multi-species and size of fish caught by fishers. The direct observations at the village landing sites and market areas revealed that fish catches in the studied villages differed in species type and size. At Kizimkazi Dimbani, the common fish species caught were large fish including: tuna, sailfish, trevallies, kingfish, octopus and squids. At Chwaka, most fish catches were small in size which is attributed to the occurrence of overfishing and the use of illegal fishing practices hence the Chwaka fishing ground is a bay which is a major nursery ground for fish. On the side of Unguja Ukuu Kaepwani, the study attempted to show that the kind of fish catches were medium with the species like rabbit fish, snapper or emperor, parrot fish, goatfish and Octopus. At Michenzani, common species found were medium: snappers, rabbitfish, goat fish and parrot fish. Thus, they commonly fish using basket traps. Tumbwe Mashariki has multi species with mixed sizes caught using multi fishing gears. The species found include tuna, parrot fish, snapper or emperor, rabbit fish, goat fish, trevallies, mackerel and sardines. A study done by Sekadende *et al.* (2020) found that dominant fish species in Zanzibar include large and small pelagic, coral reef fish (snapper, parrotfish, grouper and emperors), octopus, and squid and lobsters.

Human Potential of Artisanal Fisheries

Human capital refers to knowledge and skills that people use to pursue different livelihood objectives (DFID, 1999). In this study, human potential of

artisanal fisheries refers to knowledge and skills that enable artisanal fishers to achieve their artisanal fisheries objectives.

Fishing Knowledge and Skills for Artisanal Fisheries

The findings in Table 5 revealed that, the majority of the fishers 302(90.69%) had not attended any capacity building program but only 31(9.31%) of fishers agreed that they had attended non-payable capacity building programmes. Most of them attended at one time and were organised by the government through the department of fisheries. These results also approved that most fishers, numbering 266(79.88%), had no formal fishing knowledge and skills rather they had only inherited informal fishing knowledge from their forefathers. A minority of the fishers, of 67(20.12%) were taught by other means including fellow fishers and formal institutions. Thus, the fishing methods that were applied by most of the fishers were not different from those owned by their forefathers. Unfortunately, inadequate fishing knowledge and skills easily persuade new artisanal fishers to adopt illegal and destructive fishing techniques as a way to meet their immediate household income needs. Therefore, it is significant for the Zanzibar Government and non-governmental institutions to provide reliable fishing knowledge and skills to artisanal fishers on how they can access fisheries resources sustainably manner for the betterment of the household livelihoods of the present and future generations as shown in Table 5 of this study.

Table 5: Acquisition of Fishing Knowledge and Skills

Variable	Frequency(n)	Percent (%)
Fishing knowledge and skills acquisition		
Inherited	266	79.88
Other	67	20.12
Capacity Building Programs Attended		
Not attended	302	90.69
Attended	31	9.31

Source: Field Survey, 2022

Social Potential of Artisanal Fisheries

Social capital is social resource such as networks and relationships which people use to achieve livelihood

objectives (DFID, 1999). In this study social potential of artisanal fisheries refers to markets and cooperatives upon which artisanal fishers draw in seeking for their livelihood objectives.

Market Areas of Artisanal Fisheries

The study findings in Table 6 show that a large proportion of fishers 196(58.86%) sell their fish catches at the village markets, followed by 67(20.12%) of respondents who sell their daily fish catches at the landing sites in their fishing vessels. 56(16.82%) their market area for their fish catches at the town market and the remaining 14(4.20%) respondents sell their fish catches at both village and town markets depending on where the fish market price is reasonable. Overall, in studied villages, most of the fish caught are sold locally at the village markets and landing sites and mostly through auctions, however, most of the artisanal fishers do not trust the entirely process of auctions. In addition to that, data collected through direct observation was also approved by showing fish customers buying fish at the landing sites in the fishing vessels and the poor village market infrastructures.

Customers of Fish Catches of Artisanal Fisheries

The findings in Table 6 show that the majority of fishers 231(69.37%) their major customers were fishmongers, followed by 88(26.43%) fishers who sell their fish catches to both fishmongers and home consumers. 10(3.00%) of fishers sell their fish catches to home consumers only and the remain 4(1.20%) sell their fish catches to hotels. Generally, major customers of daily fish catches were fish mongers particularly women. Similarly, a study done by Stanek

(2015) in Zanzibar landing sites found that 50% of fishers sold their daily catches directly to fishmongers rather than the home consumers (and often to specific traders with whom the vessel owner or skipper had some form of agreement in place) and

40% sold to women who normally fry the fish before selling. Moreover, Jiddawi (2012) found that most artisanal fishers sold about 70% of their day total catches and 30% is for their household consumption. However, it is a well-known fact that, artisanal fishers take the smaller and less valuable fish for home consumption and sell almost 80-90% of their daily catch. Despite the high local demand for fish, there is no efficient and effective distribution of fish to consumers. Poor marketing channels and a lack of storage facilities also decrease the value of fish.

Cooperatives for Artisanal Fisheries

The study findings in Table 6 reveal that, in all five studied villages, majority of fishers 259(77.78%) were non-members of artisanal fishers' cooperatives and only 74(22.22%) of fishers were members of these cooperatives. Despite a large number of respondents being non-members of fishers' cooperatives, it is argued that cooperatives in the artisanal fisheries are a way of maximizing long-term community benefits to deal with the threats of fisheries mismanagement, livelihood insecurity and poverty-harsh realities for many of the world's artisanal fishers. Communities with successful community-based organizations are better off than those without (Onyango & Jentoft, 2010; Issacs *et al.*, 2020; Ndarathi *et al.*, 2021). Successful cooperatives are possible, feasible and desirable and play an important role in community development. Fishers' cooperatives have the potential to empower artisanal fishers against livelihoods and environmental shocks including catch shortfalls, sickness and death in their households, natural disasters and hunger, however, based on the study findings, most of these cooperatives that fishers stated as members were not registered and for the registered cooperatives, most of the members were passive in their cooperative participation. Table 6 presents the study findings regarding the social artisanal fisheries potentials observed in the study area.

Table 6: Fishing Markets and Cooperatives

Variable	Frequency(n)	Percent (%)
Market area for selling fish catches		
Village market	196	58.86
Town market	56	16.82
Both village and town market	14	4.20
At the landing site	67	20.12
Customers of fish catch		
Home consumers	10	3.00
Fishmongers	231	69.37
Both fishmongers and home consumers	88	26.43
Hotels	4	1.20
Terms of payments on selling fish catch		
Cash basis	330	99.10
Credits	0	0.00
Both cash and credits	3	0.90
Membership in fishers' cooperatives		
Non-members	259	77.78
Members	74	22.22

Source: Field Survey, 2022

CONCLUSION

This study has succeeded to show that the potentials of artisanal fisheries as the key major players for the succession of the existing blue economy transformation in Zanzibar. However, (96%) of fishers lacked loans access to support their artisanal fishing. Again, more than half of the fishers (54.65%) use canoe, which is one of the traditional and ineffective fishing vessels. Regarding, the ownership of fishing facilities, (65.17%) of the fishers did not own the fishing vessels. A majority of them (80.48%) owned only fishing gears. The study also found that there is the low application of fishing technologies for artisanal fishing. Thus, about (57.96%) of respondents use non-motorised vessels which results in the domination of inshore artisanal fishing. The study further showed that (79.88%) of the respondents had informal knowledge and skills which they inherited from their forefathers. Therefore, (90.69%) of fishers were non-attendants of any capacity building programmes conducted either by governmental or non-governmental organisations. Finally, (58.86%) of the artisanal fishers sell their fish catches at their village market and most of them were lacking in modern fish market infrastructures. Also, (77.78%) were non-members of fishers' cooperatives and minority who are members were passive.

RECOMMENDATION

It is, therefore, suggested that fisheries management decisions are taken in steps for improving the potentials of artisanal fisheries that will spearhead the existing transformation of the Zanzibar's blue economy. Hence, the productive and sustainable artisanal fisheries for blue economy transformation is inevitable in Zanzibar islands.

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