

MOBILE PHONE TECHNOLOGY FOR ENHANCING SMALL-SCALE FISHING SECTOR IN TANZANIA. A CASE OF NYASA DISTRICT

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ABSTRACT

Information and communications technology is a catalyst to the development of socio-economic sectors in Tanzania including the fishing sector. However, despite the contribution made by mobile phone technologies as one of the ICT modern gears in the development of fishing industry, most small-scale fishers are poor, and their working environment is of great risks due to various challenges. This being the case, the current study investigated the extent to which small-scale fishermen use mobile phone technology for enhancing safety and increase of fishery production through the access to reliable market information. The study employed interviews, focus group discussion, documents review, and observation in collecting data. Purposive and snowball sampling techniques were used to obtain 70 respondents from Nyasa District Council which is found in Ruvuma Region, Tanzania. Content analysis technique was employed in data analysis. The findings indicate that although mobile phone technology is used by small-scale fishermen such as marketing of fishery products and sharing information about where to get big catches, to a great extent, mobile phone technologies do not help them to improve safeties due to various challenges such as poor cell phone network, high costs of purchasing airtime and low quality of mobile handset which in turn hindering an effective communication. It was further observed that drowning, poor knowledge on weather forecast, poor fishing equipment, sexual transmitted diseases, stressful life, and family separation are key challenges that affect the lives of small-scale fishing practitioners in Lake Nyasa. This study contributes knowledge to the already existing literature on the role of mobile phone technology in the development of small-scale fishing sector in Tanzania and it lays down basis for development mobile virtual platform for improving safety and increase fishing productivity of the target users

Keywords: mobile phones technologies, small-scale fishing sector, small-scale fishermen.

INTRODUCTION

Background Information

Fishing industry is one of the most important sectors in the world economy contributing nearly 1% of the global Gross Domestic Product (GDP) (Mallalieu, 2015; Yusuf, Daninga, Xiaoyun, Kirui, & Khan, 2015). Across the global, it is approximated that the livelihood of 100 to 200 million people worldwide, depend on fishing industry (Opemo, 2018). In the recent years, the sector has revealed a tremendous growth especially in the developing countries as half of the global fish exports originates from those countries wherein small-scale fishing is done (Elkington, 2020; FAO, 2012). In Tanzania, the report issued by the Ministry of Livestock and Fisheries Development Sector in 2010 (MLFDS) indicated that, the sector contributes about 1.4% to the country's Gross Domestic Product (GDP) (URT, 2010). The sector employs more than 177,527 people who work directly in the fishing industry, and approximately 4,000,000 people engage in fisheries related activities like fish processing, marketing, trade in fishing, boat building and maintenance (MLFD, 2011). However, despite the contribution made by the small-scale fishing sector in the economic development of Tanzania, the majority of small-scale fishermen (SSF) are poor since what they produce does not satisfy their demands, and their working environment is of great risks due to several fatalities caused by many factors including drowning, diseases, lack of safety fishing equipment, poor communication facilities and so many others (Jiddawi & Ohman, 2017; Mwaipopo, 2017; Pando, et al., 2018). For example, Pando (2018) reported that the rate of deaths caused by drowning among fishing communities of Lake Victoria was estimated to be 231 per 100,000 people.

This is approximately thirty times greater than the estimated drowning mortality rate in the African continent. Things are the same in other big lakes found in Tanzania such as Lake Tanganyika and Nyasa where drowning and other risks cause many deaths to SSF in every year (The Citizens, 2018). Indeed, these challenges make the development of SSFS in Tanzania more problematic, and therefore, needs for an immediate study to address those challenges.

It should be noted that the development of ICT is an important catalyst to the development all economic sectors including the fishing industry (Omar & Chhachhar, 2012; Schaape, 2019). ICT is considered as a variety of electronic technologies used in facilitating communication (Mallalieu, 2015). It is also referred to set of tools that assist in capturing, storing, processing, transmitting, and display of information using electronic technologies such as radio, mobile phone, television, telephone, fax, and other tools (Omar & Chhachhar, 2012). So far, research has vividly evident that the use of mobile phone technology (MPT) plays a great role in stimulating marketing of fishery products by linking directly between fishermen and markets (Aphunu & Atoma, 2011; Fujita, et al., 2018). Along with the marketing of fishery products, MPT saves other functions to those engaging in fishing activities such as keeping fishing records, literacy promotion and monitoring of fishing activities (Hassan, Shaffril, D'Silva, Omar, & Bolong, 2011).

Tanzania as one of the countries in Africa, is of great privilege of natural resources including sufficient water bodies which support small-scale fishing activities (URT, 2016; URT, 2010). In Africa, Tanzania is ranked among top ten countries in fish cash (Glaser, et al., 2018). In the country, the development of fishing industry is clearly articulated by the National Fisheries Sector Policy (NFSP) of 1997 and the Tanzania Development Vision (TDV) 2025. Collectively, these documents seriously insist on the promotion, conservation, development, and sustainable management of fisheries resources for the benefit of present and future generation (URT, 1997; URT, 2020). Additionally, the Tanzania Development Vision 2025 recognizes that ICT is an essential tool for the development of each economic sector including the fishing industry which is a sub-set of agricultural sectors in Tanzania. According to the TDV (2025), ICT should play a pivotal role to competitive social economic transformation, major driving force for the realisation of vision, and benefit all social groups with a view to enabling the meeting of basic needs of the people, increasing productivity, and promoting competitiveness (URT, 2020).

Statement of the Problem

Small-scale fishing sector is of great importance for the national economic development in Tanzania. Research in fishing sector indicates that fishery products under the small-scale fishing sector is poor, and some of SSF work in the environment of great risk associated with drowning, lack of safe fishing equipment and other challenges which collectively cause many deaths of SSF every year (Jiddawi & Ohman, 2017; Mwaipopo, 2017; Onyango & Jentoft, 2010; Pando, et al., 2018). On the other side, little is known about how MPT as one of the ICT modern tools is effectively used to minimise the number of reported cases of drowning among SSF and increase of fishery products under the implementation of SSFS in Tanzania. Some of the recent studies done in Tanzania about the development of SSFS do not address the theme related to mobile MPT for the safety and increase of fishery products as investigated by this study. For example, Benard, Dulle, & Lamtane (2017), assessed the use of ICTs in sharing agricultural information among fish farmers in the Southern Highlands of Tanzania, Jiddawi & Ohman, 2003 reported about the situation of the marine in Tanzania, and Onyango & Jentoft, (2010) assessed poverty in small-scale fisheries in Lake Victoria, Tanzania. Therefore, the current study intends to cover the gap in literature by investigating the extent to which SSF use MPT for the safety and increase of fishery products in Tanzania.

Rationale of the Study

The current study is contributing to already existing literature on the role of MPT in fishing industry specifically for SSFS in Tanzania. The findings of the study will bring about insights to the government and other development stakeholders on how MPT is being used in various economic sectors including the small-scale fishing industry.

Objectives of the Study

The general objective of the current study is to investigate the extent to which Small-Scale Fishing practices use mobile phone technologies for the safety and increase of fishery products in Nyasa, Tanzania. The goal can be made more accurate by presenting three specific objectives as follows:

- To explore safety related challenges facing SSF in Nyasa, Tanzania,

- To investigate the extent to which SSF use MPT for improving safety and increasing of fishing products in Nyasa, Tanzania, and
- To identify various strategies of improving MPT usage for safety and increase of fishing products in Nyasa.

Our study contributes to practical body of knowledge showing how to enhance fishing and improve safety of fisheries through the use of mobile technology. Also, the study contributes to a new setting for integrating an interdisciplinary tactic in tackling fisheries' problems such as the use of mobile technology.

LITERATURE REVIEW

The concept of SSF and general characteristics of SSFS

SSF are people who involve themselves in traditional fishing activities often using relatively small amount of capital and energy, small fishing vessels, making short fishing trips, close to shore and mainly for local consumption (FAO, 2016). According to Salia, Nsowah-Nuamah, F, & Steel, 2011, SSF are also referred to an artisanal fisherman. Although the definitions of small-scale fishing tend to vary from one country to another, there are some common features.

Most of small-scale fishing practitioners are not satisfied with what they earn from fishing. As a result, they depend on other activities for survival due to distinct seasonal cycles of abundance or availability of fishery products. Based on this reason, there are those working as Part Time Small Scale-Fishers (PTSSF) and Full-Time Small Scale-Fishers (FTSSF). For those committed as FTSSF spend almost 90% of their time for fishing activities while 30% of the time is spend by PTSSF (FAO, 2012).

Again, small scale-fishing is a source of employment to many people in both urban and rural areas. The employment is provided through harvesting, processing, and trading of fishery products (VanderKnaap, 2013). In many countries small-scale fishing is not static rather it has been growing and expanding by adapting new technologies such as innovative fishing gear, echo sounders, satellite positioning systems, VHF radios and safety-at-sea equipment (Bergman & Vieweg, 2012).

However, the question of infrastructure such as availability of modern fishing equipment to support fishing is a big challenge in the development of small-scale fishing in many countries. As a result, fishing is still facing several difficulties since it is not given a priority because of lacking reliable data and understanding on real trends and socio-economic impact (FAO, 2016). In most cases, unlike the large-scale fishing activities, the small-scale fishing is done under low running costs because they tend to optimise human power and reduce fuel costs by using more passive gear and practices such as handlining, longlining, gillnets, fish traps and low-intensity light attraction. Therefore, even the production can be for subsistence or commercial purposes, providing for local consumption or export (FAO, 2016).

The role of mobile phone technology in the promotion of SSFS

Experience forms in the global and local context indicates that MPT plays a great role in the development of SSFS. In Malaysia for instance, Omar & Chhachhar (2012) conducted a library research to assess the role of ICT equipment including mobile phones, GPS, sonar, radio, television, and internet in the development of fishers in their daily routine. The study found that ICT equipment were very helpful to fishers in accessing markets to sell their products and getting up to date information about weather and emergency. In addition to that, fishers felt themselves very close to their families, safe and more secured while implementing their daily routine. Hence, the study recommended that the government and non-governmental organizations should provide trainings on the use of different ICT equipment in promoting the fishing industry.

Another similar study on the importance of MPT in the development of fishing industry was done in Ghana by Salia, et al. (2011). It was the study aimed at assessing the effects of the mobile phone usage on the artisanal fishing industry in Effutu Municipality of Ghana. With the aid of interviews with fishers and other supply chain actors, the findings indicated that the use of mobile phones has enhanced the efficiency of input and output markets for artisanal fishing and improved their business. Therefore, the author had recommended on the expansion of network coverage beyond 20-25 km at sea, and the reduction of mobile phone price to allow many fishers to buy and use phones for fishing activities.

In Kenya, Abila, et al. (2014) presented the findings rooted from a pilot study conducted in Lake Victoria from June 2009 to 2011 and then up scaled to cover the whole country. This was the project named as Enhanced Fish Market Information Service (EFMIS) whose aim was to empower the fishing community with useful fish market information to improve their bargaining position and increase incomes from fish trade. Some of the identified achievements of the project through the integration of ICT in fishing industry were increasing several fisheries organizations and markets participating in the project and providing data on a regular basis, database established and fed regularly with market data and information and queries for market information made to the database.

In Tanzania, Benard, et al. (2017) conducted the study to assess how ICT equipment is used in sharing agricultural information among fish farmers in the Southern Highlands of Tanzania (Mbeya, Ruvuma, and Iringa). It was a mixed approach employed questionnaires, focus group discussion, interview, observation, and document review to study 240 respondents who were selected randomly. The findings of the study indicated that mobile phones, radio, and television were most used by the fish farmers in sharing agricultural information while the internet was rarely used. The author further recommended that the government should support fish farmers with ICT equipment by providing them with some subsidies to facilitate buying and using ICT equipment.

Another similar study was done by Benard, et al. (2017) to assess the application of ICT in communicating information and knowledge to artisan fisher’s communities in Unguja district in Zanzibar. It was the study that used document review, questionnaires, focus group discussion and observation in data collection. The findings indicated that mobile phones and radio are the most ICT tools used by artisan fishers. In addition to that the study observed that there are several challenges limiting fishers communicating through ICT tools such as limited funds, poor network connectivity, lack of training and seminars on the use of ICT tools in accessing information. Based on the observed challenges, the study recommended that the government should support artisanal fishers in acquiring fishing gears and ICT tools through subsidizing them.

Based on the above reviewed literature, one would notice that the use of MPT is of great importance in the development of SSFS in the world, Tanzania in particular. However, there is paucity in information about how MPT as one of the ICT modern tools is effectively used by SSF for the safety and increase of fishery products in Tanzania. Therefore, this is the gap to be filled in by the current study.

Theoretical underpinning of the study

The current study employed the Effective Communication Theory (ECT) advocated by Phillips, (1995) to investigate the extent to which SSF use MPT for the safety and increase of fishery products in Tanzania. The theory has been popularly used by researchers to investigate the role of effective communication in implementing various aspects of human development. A key argument to the ECT is that lack of access to accurate information or asymmetries in the availability of information, is a key source to the failure of various activities of human development. In relation to the development of SSFS in Tanzania, when there are limited sources of accessing various information on the safety of SSF, and techniques of increasing fishery products, the sector cannot advance. It is, therefore, the role of MPT as one of ICT modern equipment to enable SSF in transforming livelihood challenges by increasing fisheries products and rescue themselves against various risks and hazards such as drowning, abrasions, wounds, musculoskeletal problems, dangerous animals and so forth. In general, ECT is more relevant to the current study as it tries to link between the use of MPT and development of SSFS by addressing the importance of effective communication in the development of various human economic sectors. See figure 1.



Figure 1: A framework for understanding the Use of Mobile Phone Technologies for Small-Scale Fishing development in Tanzania.

RESEARCH METHODOLOGY

The current study was done in Nyasa district focusing on different SSF communities along the Lake Nyasa shore. Nyasa was chosen because the habitants of the study area depend much on fishing activities and thriving their business there. In the study, seven fishing stations (*Forodha*) from five different villages within three wards were visited for data collection. The area was strategically selected because lake Nyasa is among three big lakes in Tanzania with many SSF.

This study employed a qualitative research approach to investigate the extent to which SSF uses mobile phone technology for enhancing safeties and improve fishing productivity in Nyasa, Tanzania. Data were collected through interviews, focus group discussion (FGD), documents review and observation.

The study involved 70 SSF of which 49 men and 21 women. Simple random, purposive and snowball sampling techniques were used in the study. While simple random sampling helped researchers to select seven different fishing stations occupied by SSF along the Lake Nyasa. Purposive and snowball sampling helped researchers to focus on SSF owning mobile phones and engaging in fishing activities.

The collected primary data were analysed using conventional qualitative content analysis in which data were organised into categories and themes (Hisrich & Shannon, 2005). Content analysis is an approach to the analysis of documents and text that seeks to quantify the contents in terms of pre-determined categories (Bryman, 2012).

Results

The results of this study were derived from focus group discussion, face-to-face interview with fishers on the contribution of mobile technology for enhancing safety and increasing fish productivity among small scale fisheries.

Demographic characteristics

General characteristics of the sample in terms of age, education, and experience in fishing, experience in the usage of mobile technology, and types of fishing gears is presented in Table 1. Seventy (70) respondents volunteered to participate in focus group discussion and five key informants participated in the in-depth face-to-face interview during data collection process. The participants were 49 (70%) men and 21 (30%) women. All SSF were selected based on various activities they were doing in relation to fishing. The study found that the majority of SSF had primary education 34 (48.6%) men and 15 (21.4) women. The participants were 18-35 years old whereby 60 out of 70, had completed primary education (49 out of 70), engaged in fishing and processing (41 out of 70), majority had more than one year experience in mobile phone usage and use local fishing gear (canoe) (35 out of 70). The characteristics were important in our study as they provided information about background of the respondents that could determine their decision to engage in fishing and how they use mobile technology to enhance safety and increase productivity.

Table 1: Distribution of respondents by Demographic Characteristics

Demographic characteristics		Number of participants (%)	
		Men	Women
Age	18 – 35 years	43(61.4%)	20(28.6%)
	36 – 50 years	5(7.1%)	1(1.4%)
	50 and above years	1(1.4)	-
Level of education	Tertiary	-	1(1.4%)
	Secondary	5(7.1%)	2(2.9%)
	Primary	34(48.6)	15(21.4%)
	No formal education	10(14.3%)	3(4.3)
Activities done by SSF	Fish catching	41(58.6)	-
	Fish processing activities	4(5.7)	21(30%)
	Mixed activities	7(10%)	-
Experience in fishing activities	Below 1 year	-	6(8.6%)
	1-5 years	18(27.7%)	5(7.1%)
	5 and above years	31(44.3)	10 (14.3%)

Experience in using Mobile phone technology	Below 1 year	3(4.3%)	5(7.1%)
	1-5 years	35(50%)	14(20%)
	5+ years	3(4.3%)	2(2.8%)
Fishing gears used in fishing	Engine vessels	11(15.7)	-
	Local vessels (canoes)	35(50%)	-
	Mixed	4(5.7)	-

Source: Field data 2020

Mobile phone technology usage for the safety and increase in fish products

To address the research question, *'to what extent small scale fishing sector uses mobile phones for improving safety and increase of fishing products, in Nyasa, Tanzania?* We analysed focus group discussions and in-depth face-to-face interview data. The analysis shows that mobile phone technology has been used by SSF to communicate with friends' information related to safety during fishing session. They use Message, WhatsApp (for those few who have phones which support androids), voice call and Facebook for sharing different information. SSF use mobile phones to seek for a sudden help especially when experiencing the dangerous situation while fishing in the lake. One of the informants asserted, *'we use our phones to make a call seeking for a sudden help from the shore or from any person with an engine boat to rescue our lives. This has been of great help rescuing our lives while we are in hard time'*.

Again, our study found that, mobile phone technology is used to communicate information related to sickness or any harmful event in the family level. For example, when a fisherman or one of his family members gets sick, a motor bike driver commonly known as *"Bodaboda"*, can be informed to take him or her to hospital. One of the informants emphasised *...we are living far away from the hospital; every person here has a phone number of a "bodaboda" who can take him or his family members to hospital when he/she gets sick.*

In addition, mobile phone is used to communicate about the location of fishes along the lake in a particular day. Since fishes are always in movements from one place to another in water, while there are no specific equipment to guide SSF about the location of fishes, SSF use mobile phones to share information with other fishermen about where to get big catches. One of the informants highlighted, *'here is not our home fishing station but we are here because we were informed by our fellow SSF that small fishes are available in this location.*

Also, mobile phone is used to communicate marketing information of fish products about where to sell and types of fish needed by the customers. SSF use mobile phone to communicate with customers about the market demand promptly. For example, one of respondent during focus group discussion asserted that *'Unlike the previous days, recently, a customer can communicate directly with us about the prices of fishes and also we can negotiate about the prices'*.

Furthermore, our study found that, the mobile phone technology has added the value of fish products since the customer directly communicate with SSF about what kind of fish processing styles are demanded at the market. One of the informants affirmed that *'while I'm here, I phone or get a call from my customer at Songea market about how to prepare my small fishes depending on the market demands. Thus, I choice the best way of processing my small fishes to carter the need of my customers'*.

The challenges facing small scale fishers

To address the research question related to *what are the unique challenges facing small scale fishers in Nyasa District?* We analysed focus group discussions and in-depth face-to-face interview data. The analysis shows that SSF faces the challenge of drowning. The in-depth interviews with key informants revealed that drowning is one of the main challenges that affect the lives of SSF along lake Nyasa as well as productivity of fishing activity. Drowning is associated with the bad climatic weather along the lake resulting into dangerous lake breezes which blow powerfully either westward or eastward. For example, one participant in the focus group discussion session asserted,

We have been facing two main types of the lake breezes which blow annually and have been killing a lot of people in our village. Here we have two types of breeze, the first one is westward breezes traditionally known as Mbelu. This

type of breezes starts from March up to December. The second type is the eastward breezes. Which habitually, is known as Lulenga which start from December up to March.

Then, our study revealed that drowning cause low productivity of fishing. The majority of SSF use poor fishing gear (canoe) which cannot resist during strong breezes and there are more risks to the users. One of the respondents affirmed that *these canoes we are using in fishing especially during strong breeze are very dangerous to our lives, for example last year in August, my friend died in the water due to drowning caused by strong northward winds.* Thus, a strong breeze causes a lot of problems to the fishermen along lake Nyasa.

Furthermore, our study revealed that transmitted diseases such as syphilis, gonorrhoea and HIV have been affecting the lives of SSF along lake Nyasa. It was further observed that the main source of the spread of VD is due to the nature of fishing activities in which SSF are sometimes forced to stay away from their families searching for fishes. One respondent during focus group discussion said that

As a perfect man you cannot tolerate for several days without having a lady to spend with while your wife is not there with you. On my side, I know many people who have been affected by HIV epidemic because of their bad habit of engaging in unsafe sexual practice. The spread of these diseases causes loss of manpower in fishing industry as well as decrease in fishing productivity.

Another challenge revealed in our study is stressful and family separation caused by low fishing. When fishing products drops, most of SSF live in the stressful life with their families because fishing is a key source of income and food. For instance, during the interview, one of the key informants identified that *fishing is everything for me, I depend on fishing to run my life at home. I do not cultivate food crops as farmers do, the money I get from fishing activities I use for buying family food and other necessities*". Thus, decrease in fishing activities causes a lot of stress and conflicts to lives of SSF. Another respondent asserted that *I decided to divorce my wife because I had no money to give her as she was not able to live the life I was living without money. Indeed, it was a stressful life for me.*

To address research question *what are the challenges that small-scale fishers face when using mobile phone technology for improving safety and increasing fishing productivity?* We analysed focus group discussions and in-depth face-to-face interview data. The analysis shows that mobile phone usage faces challenge of high costs of purchasing airtime. The study revealed that SSF spent thousands per month on purchases of airtime at the average of Tanzania shillings (Tshs) 10,000 (USD 5). It was observed that some of SSF cannot afford to purchase airtime for their cellular phones especially when the catches are low. During the interview, one of the informants said that *despite having my phone, it can take me even a week without purchasing airtime especially during low season fishing.*

In addition, the results indicates that costs of purchasing handset of high quality is very expensive and thus, hinders SSF to buy mobile phones of high quality. Mobile phone with low quality has a problem of accessing network especially when you move away from network pole. For example, during focus group discussion one of respondents asserted that *my phone cannot effectively access the network in this area as other phones do because of its poor quality.*

Most of the respondents (55 out of 70) mentioned absence or poor cell phone network as being a big problem they face when using mobile phone, particularly as they move away from the centre outwards. This was evident as one of the SSF testified that *we have only one mobile phone subscriber network in this area which is provided by Halotel. In addition, the network is not strong enough to cover the whole fishing area.*

Transformation strategies

To address research question *'what are various strategies of improving MPT usage for safety and increase of fishing products in Nyasa?'* Data analysis revealed several strategies to leverage safeties and enhance fishing activity.

First, we looked at the *role of government and non-governmental actors' interventions.* The majority of respondent were of the view that, intervention by government and non-governmental actors were of paramount importance by providing SSF with modern fishing gears which could enable them to fish in all seasons regardless of bad climatic conditions. This is of great importance for SSF in increasing safeties and productivity. One of the key informants argued that *if SSF will be provided with modern fishing gears, we expect production to increase and reduces water accident.*

Second, we looked at creation of self-awareness about hazardous situations through training to be important. The study found that training is important to SSF to create awareness about hazardous situation caused by bad climatic conditions on how to save their lives. In addition, provision of safety equipment (safety jackets) to SSF is very important to prevent them from storms and strong wind. During face-to-face interview one of the respondents amplified that *on my side, I suggest that it is a high time for our bosses to offer us with water safety jackets.*

Discussion of Results

The research set out to find what are the role of mobile phone technology for enhancing fishing sector in Nyasa, Tanzania. Participants in this study included respondents from different age groups, education levels and experience in the use of mobile technology. We have realised that these demographic variables have an implication for the participants to use mobile technology for enhancing fishing safety and productivity. Our sample on age cohort of 18-35 dominated the population of the study, since at that age participants are shouldered with family responsibility and they engage in fishing activities as a source of income. Of the respondents in our sample 44.3% had experience of more than five years in fishing activities and 50% had experience of more than five years using mobile phone technology. According to our findings, strong blowing winds affect the lives of fishers since they use poor fishing gears and lack effective communication for alerting on bad climatic conditions which might affect their lives. Availability of modern fishing equipment could enhance safeties of fishers by resisting from strong blowing winds and improve fishing production (Mwaipopo, 2017). Bergman & Vieweg (2012) asserted that, due to poor technology of fishing, most of SSF are still poor and faced by many risks in Tanzania compared to large scale fishing activities. For better improvements of SSF activities, a deliberate effort is needed by the government and all development stake holders to intervene those risks faced by people engaging in small-scale fishing sector.

The study also affirmed that small scale fishers are affected by transmitted diseases such as HIV since they tend to move away from their families for a long time. It was observed that a good number of fishers are suffering from various communication diseases as it was witnessed by the participants of the study that they engage in sexual relations because they spend a long time for fishing activities away from their homes.

With regards to the challenges facing fishers when using mobile phone technology for improving safeties, the study affirmed that cost of purchasing airtime is too high which is estimated to be more than 5USD compared to what they get out of fishing. Mpogole, Usanga, & Tedre,(2008) asserted in their study that the pricing of a mobile call is more expensive compared to the benefits of using mobile phones which seems to be the case for the participants of the study. Our study concurs with the findings of (Kapinga, Suero Montero, & Mbise, 2017) which showed that the price of mobile phone use in Tanzania with several mobile phones service providers existing, still absence of well-established dealings for filling complaints to the government and mobile phone subscribers on the high charge of airtime.

Furthermore, mobile phone usage faces the challenges of poor cell network which is not widely spread and stable. The failure of network prohibits the effective communication among fishers especially when they are in hard time caused by bad weather. Also, poor network restricts communication of knowing places where there is more fish at day by not being informed from their colleagues. The study by Mtenzi, Chachage , & Ngumbuke, (2008), mobile phone customers complain on slow and low-quality of network. Our study suggest that low quality network affect the usage of mobile phone for enhancing fishers' safeties and productivity. Availability of effective networks is well-thought-out to be important to the mobile phone users for supporting fishing activities.

With regards to the extent to which SSF uses mobile phones for enhancing safety and fishing products, through focus group discussion it was revealed that to the great extent mobile phone does not help to improve safeties, given the fact that cell network is poor in the study area. Mobile phone users do not access cellular network hence limits effective communication to different users using cellular phones. However, to a certain extent it helps to communicate about their safety especially those with reliable networks.

CONCLUSIONS AND RECOMMENDATION

Preceding research has a certain degree of maintaining the argument that mobile phone usage helps to increase safeties of fishers (Omar & Chhachhar, 2012). However, the findings in this study have shown that mobile phone usage does not help SSF to enhance safeties and increase fishing products, instead they face the challenges of poor cell networks

which hinder an effective communication. In addition, they face the challenge of fishing gear and strong blowing winds which they cannot predict because their phones are not connected to forecast weather stations.

Basing on the results of our field study the followings are the recommendations:

- Awareness and training programs are required to educate fishers on how to make use of mobile phone technology for communicating bad climatic weather in simple ways, such as messages. Creation of awareness to fishers on the use of mobile phone in fishing activity is important for them to enhance safeties.
- Government support is needed to provide them with a modern fishing gears which could resist from bad climatic conditions and improve safeties to fishers. Our study revealed that, the fishing gears used by fishers are of low quality and can resist to a strong blowing winds and hence increases chances of accident and death to fishers.
- Building of more telephone tower by different subscribers is paramount important to make mobile network available ubiquitously. Availability of mobile networks will enable smooth communication especially during the crisis caused by strong blowing winds.

In spite of these limitations, the study set a baseline for future research opportunities. In addition, further study may want to explore additional variables that exert a fundamental influence on fisheries' business development. Also based on the familiarity acquired here, further studies are undergoing on the user requirements of the user-friendly mobile phone application for enhancing safeties and increase productivity by accessing market information.

In conclusion, this study endeavour to widen the understanding of fishing activities by exploring the role of mobile phone technology in enhancing productivity and safeties of fisheries in Nyssa District, Tanzania.

With the proliferation of technologies in the developing economies, there is an opportunity to employ them in fishing sector as a means of enhancing fishing productivity and safety of fisheries. In particular, this study put forward an intervention to address the challenges of small-scale fisheries through developing mobile phone application to enable improving fishing productivity and their safety.

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