

Informal Fish Distribution Patterns and Food Access and Security among Low Income Earners in Dar Es Salaam, Tanzania

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<https://doi.org/10.51137/ijarbm.2024.5.1.17>

Abstract – The study explores common distribution patterns used by informal fish vendors in Tanzanian public fish market and contribution towards food access, and food security among low income earners. The study further delves deeper into comprehending challenges facing informal fish vendors have when distributing fish using their chosen distribution patterns. Researchers conducted the study in Dar es Salaam's Kivukoni Fish Market and employed qualitative approaches. Data were collected interviews, observation and document analysis. The study employed a sample of 35 participants obtained by convenient sampling technique. Content analysis was performed manually to obtain important contents and themes emanating from the collected data. Findings demonstrated that informal fish vendors have a variety of distribution patterns, and these are chosen based on vendors' financial ability, distance and the nature of consumers to whom fish is distributed. Such patterns range from bicycles, traditional rickshaws 'guta', footing among others. Despite the presence of such poor and informal patterns in fish supply, the presence of informal fish vendors has been of paramount importance to low income communities as they facilitate access to cheap fish which ensures them of their daily survival. The study recommends nurturing of informal fish vendors as they are an important component to food access and security to low income earners living in the suburbs of Dar es salaam city.

Keywords – Distribution Patterns, Informal Fish Vendors, Dar es salaam, Low-income earners, Food security

Submitted: 2024-02-27. Revised: 2024-03-05. Accepted: 2024-03-16.

1 Background Information

Fisheries products are an important source of food (Sambuo and Kirama, 2018), income and employment (United States Agency for International Development [USAID], 2015). The presence of abundant fisheries products has opened opportunities for investment, marketing and distribution of the same products locally and internationally (Food and Agricultural Organization [FAO], 2015). Studies have noted that fish products constitute a great segment of people's food in the urban settings and that majority of fish consumers reside in urban and peri-urban areas (Vasisht & Singh, 2009; USAID, 2015). With the increasing number of people residing in urban settings across the world, and especially in developing countries, there has been a horizontal expansion of urban places and with varied dimensions from the urban centres to their periphery. Harvey (2010, 2015) notes that, the current urban centres are designed in such a way that it is only the wealthy that will live at the core. This means that, a great percentage of urban dwellers (low income earners) live in the suburbs of their urban settings and that fish constitute a great part of their daily dietary intake, absence of which brings problems.

While the increase in population and spatial expansion of urban settings warrant more trade of fish and fisheries products for feeding the urban population, the pattern of distributing fish across customers, needs attention. Since fish is a great consumption component of Dar es salaam people and a means of food security to them; and because fish is a highly perishable commodity, it needs a short, feasible and quick distribution chain. Its quick distribution not only saves millions of people from starving, but it also ensures distributors of business continuity and profits. In this study, we treat distribution pattern as channels, tools and equipment used by different people to distribute fish to the intended customers (Issa, et al, 2022). In other words, distribution patterns are a collection of activities done by people in the fisheries industry aimed at ensuring that consumers are getting the necessary amount of fish with its natural minerals, proteins, and diets when eating a variety of fish (Naji, 2013). It is further described as a means of ensuring that fish is in front of the buyer at the time he/she needs it (Laraswati et al., 2016). Thus, fisheries trade is dependent on the channels and patterns of distribution that are accessible economically to preserve the viability of fish marketing and distribution to customers (Obiero et al., 2019). Distribution systems that facilitate the delivery of fish to consumers along the supply chain are necessary for informal fish vendors to play their part in the fishery trade effectively (Cheng et al., 2019).

With the spatial expansion of cities including Dar es salaam, a great segment of people lives in areas with limited amenities including markets. This has been translated as an opportunity by informal fish distributors who distribute fish to communities living in suburbs. Fish distribution is among important activities in Dar es salaam. It facilitates easy access to fish to city dwellers and contributes to food security among these communities. Although several means of distribution are reported to be used by different

formal trader, these cater for high-income earners and those living near big fish markets. This means that, distribution patterns serving communities living in the suburbs of the city have not been given utmost attention and thus, not well documented. The emergency of informal fish distributors has been witnessed in most fish markets in the city. While they have ensured availability of fish to people in the suburbs of Dar es salaam, studies do not provide clear information on the kind of distribution patterns they employ. Moreover, it is still not known how their activities have contributed to the availability of quality fish, at the right time and at a reasonable price to the targeted city dwellers. The available studies on the same issue do not provide clues on challenges to informal fish distribution patterns in the Dar es Salaam. Moreover, they do not present facts related to Tanzania thus difficult to generalize. This study intended to enlighten on the entire conceptual gaps in literature. Considering this, we intended explore the distribution patterns in informal fish vendors in Dar es Salaam, Tanzania. Specifically, the study intended to:

1. Identify types of distribution patterns used by informal fish vendors at Kivukoni fish market in Dar es salaam.
2. Explore the challenges facing informal fish vendors' used distribution patterns while distributing fish to communities in Dar es Salaam
3. Discover the contribution of contribution of Informal fish vendors' distribution pattern on food access and security to people in Dar es Salaam.

It is expected that the results of this study will help to inform decision makers and the government on the importance informal fish have in ensuring access to fish which a major food component among low-income communities in the city of Dar es salaam. Their efforts not only improve their own income status but improve access to food and food security as propagated by the United Nations through Sustainable Development Goals SDGs (UN, 2015). The study further intends to inform decision-makers and a variety of stakeholders on weaknesses prevailing in the fish distribution which may jeopardise quality and timely distribution hence calls for improvement.

2 Theoretical review

The Theory of Constraints (TOC), created by Eliyahu M. Goldratt in 1984 was employed in this study. The theory focuses on managing constraints and limitations (Goldratt, 1990). The theory strives to ensure that the organizational practices, processes and activities are effective and help in improving their profits, level of quality, and reaching a wider segment of the population using the available but limited resources (Williams, 2010; Gupta & Boyd, 2008). While every company's primary goal is to boost profits, constraints ultimately prove to be the biggest obstacles to business profitability. On the other hand, if firms could manage the constraints in their operations, they would have a continuous improvement management system and greater profitability (Simşit et al., 2014).

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In line with study, following spatial expansion of cities leading to more demand for fish, the prevalence of informal fish vendors has been observed. Vendors have tried to use various available distribution patterns to ensure that people in Dar es salaam get access to fish in the right quantity, quality, at the right time and at an affordable price on one hand and profit maximization at the other. Previous studies note that there is no consensus among scholars on the distribution patterns and facilities used. For instance, Laraswati et al. (2016) provide that the distribution pattern and tools used depend on the source of fish. While both sophisticated and rudimental patterns are used, Jaabi (2014) reports that fish is distributed through convoluted system from fishermen to big, wealthy and big store shopping consumers. It has also been reported that the use of vehicles including vans, rickshaws, and trucks have been used for the distribution of fish (Islam & Habib, 2013). About low income earners, traditional baskets are used (Ninan, 2018). Supplementing this, Naji (2013) reports that the use of cartons and buckets have been common in distributing fish to low income earners. Other scholars (Islam & Habib, 2013; Issa et al (2022) supplement that other informal traders distribute fish by using bamboo baskets, boxes, buckets and polythene bags.

Despite the reality that informal fish vendors have tried to distribute fish to low income earners spatially distributed around the city swiftly, their employed distribution patterns have been facing several challenges. These have hindered them in obtaining their intention. Once the constraints are well managed and fixed, informal fish vendors could be able to effectively choose proper distribution patterns, facilitate the access of fish to people in the periphery and there by contributing to urban food security.

3 Methodology

3.1 Research Context

We conducted this study in Dar es Salaam City at the Kivukoni fish market. The market has greater volumes of fish trade taking place than any other in the city, it has a collection of informal fish vendors who use various distribution patterns to supply fish from the centre of the city to the distant periphery of it. It is through this market that various and unique practices regarding fish trade and distribution are more visible than in any other. Therefore, this was a perfect spot for us to obtain the required data pertaining distribution patterns. Moreover, because we wanted a clear picture into the phenomenon that would easily be given through informal vendors' stories, we considered the market a perfect place where we could have encountered several informal traders, talk to them and obtain the required information.

3.2 Research Design

Because the study intended to investigate, clarify, uncover, and completely comprehend the various distribution patterns and perceived benefits among the fish vendors in Dar es Salaam, we used a qualitative case study approach (Rose et al., 2015). It was through qualitative means that we were able to obtain deep understanding, sentiments, attitudes, beliefs, and experiences of informal fish vendors regarding distribution patterns, contribution and challenges faced by this group (Astalin, 2013). Additionally, the strategy enabled us to directly interact with respondents in-person at the Kivukoni fish market before asking them questions to achieve the study's goal (Wisdom & Creswell, 2013).

3.3 Sampling and Sample Size

Considering the respondents' backgrounds and nature of their operations, it was not easy to conduct any probability sampling. Thus, we used convenient sampling to recruit participants of the study. In this technique, any informal fish vendor, customers and middlemen who was interested in participating in the study was recruited. According to (Farrokhi & Hamidabad, 2012) the technique involves recruiting any person with the required characteristics without following any format. Through this technique, 35 participants were obtained. The number of participants was determined by the principle of saturation whereby upon obtaining 26 participants, information from the following participants was not new anymore. Thus, we decided to add more 9 participants to ensure that no more new data is collected for additional participants. Although data obtained through convenient sampling are prone to bias, we used different methods in data collection to tame such weaknesses.

3.4 Data Collection

In this study, we used in-depth interview, observation and document analysis to obtain the required data. We conducted interviews with informal fish vendors, middlemen and customers at Kivukoni fish market. Interviews were held on site and lasted between 20-30 minutes. While vendors were asked about distribution patterns they use, challenges and their contribution to fish access, customers were asked on the distribution patterns used by vendors and the contribution of vendors towards access to the right quantity and quality of fish, at timely and at a reasonable price. As for middlemen, we probed them about distribution patterns used by informal fish vendors and timely fish distribution. All authors took an active role in the interview, while the first author acted as a moderator, the second voice recorded and the third recorded the proceedings in a notebook. We observed several distribution patterns used by informal vendors in distributing fish. We took pictures of some distribution patterns after being permitted by vendors and market authorities. We further reviewed literature including related research papers conducted within or out of the country. All this was done to ensure that we obtained valid data on the phenomenon. Additionally, it offered checks and

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balances on the data collected, enhancing, legitimacy, minimizing bias and boosting dependability. To ensuring that data were collected using the required and perfect tools, we shared tools among ourselves to spot weaknesses. We then shared the tools with two different food supply chain experts to check if our tools were valid and are also reliable. Before deploying them, we piloted our tools to informal vendors in Msasani fish market, spotted weaknesses and rectified them.

3.5 Data analysis

We transcribed all data obtained through interview and document analysis. Because interviews were conducted in Kiswahili, after data transcription, translation was done by a professional English translator. The translator was an independent person who knew nothing about this research project. This was done to minimize biasness and conflict of interest. We conducted content analysis manually. Following various steps, we created initial codes on distribution patterns, contribution and challenges. These codes were obtained after a thorough reading of all data several times. Through reading, statements with such information regarding patterns, contribution and challenges were highlighted for easy recognition. Codes obtained were placed in their related topics and corresponding codes were grouped together. Each author conducted an independent coding for three transcriptions and later we together agreed on the codes and sub codes. This was done to ensure reliability of findings. This was done to all three objectives of the study.

We collected data after having obtained data clearance letter from CBE and Kivukoni fish market authority. We ensured that we informed our participant the intention of the study and that participants were free to participate or withdraw from the inquiry at any time. We ensured that all the obtained data were only used for this study and not otherwise. Participants of this study remained to be confidential, and we never mentioned any of the participant by the name or designation. We clearly mentioned to participants that no financial gains should be obtained for participating in the study as this would be translated in induced data collection which sometimes results to ill intended manipulation of data and biasness.

4 Results and Discussion

4.1 Distribution patterns used by informal fish vendors at Kivukoni fish market in Dar es salaam.

This was the first objective of this study. Following a clear analysis of data, we were able to pinpoint types and segments of distribution patterns used by informal fish vendors at Kivukoni Fish Market. Following a thorough analysis, although our intention was to show distribution patterns used by informal fish vendors, in this section, we presented two types of general distribution patterns used by all fish vendors. Through our explanations, we shall

show those typically used by informal fish vendors. In general, we classified two types of distribution patterns (major and minor distribution patterns). A clear presentation of types of distribution patterns with means falling in them is presented in the subsequent paragraphs.

Major distribution patterns used by informal fish vendors

The main distribution patterns in this context include the use of motorized tools including vehicles like vans, lorries, rickshaws that are also linked with handling instruments like buckets and cartons, as well as packaging resources like boxes and plastic bags. Findings indicate that, the distribution patterns as identified are normally employed by formal fish distributors who normally obtain fish from Kivukioni fish Market to other main markets scattered around main areas of the city. Sometimes, automobiles are used by formal traders to transport fish from distant places including Bagamoyo, Kilwa and Tanga to Kivukoni Fish Market. One fish vendor said:

"Most fish traders choose automobiles and canters to transport their fish from Bagamoyo and Mafia to Kivukoni market. They typically use cars that have been created with special cool rooms and in the same way installed with electric systems that they produced with ice bars for conserving fish from getting spoiled." (Fish vendor (4), Kivukoni fish market)

While at times formal distribution means were employed, informal handling materials including buckets, trays, and cartons, baskets wooden boxes are used. Most of these were filled with ice to make sure that fish remains okay. Although such distribution patterns were used by formal fish distributors, they always lamented that they are expensive.

Based on the findings, it can be demonstrated that the use of motorized distribution patterns is a common practice across the globe and in Tanzania as well. However, due to the economic hardships informal fish vendors cannot afford using them as they are expensive and will lead to rising the price of fish. Furthermore, because vendors target low income earners, selling expensive fish to them will inhibit them of accessing fish as their financial muscles will be weak. The findings regarding the main distribution patterns are in line with those in previous studies of (Issa et al., 2022; Islam & Habib, 2013; Naji, 2013) which categorically show that fish vendors normally use motorized distribution patterns in supplying fish but use local handling materials like buckets and boxes when transporting fish across the supply chain.

Minor distribution patterns used by informal fish vendors

Findings show that minor distribution patterns are those mainly used by informal fish vendors. These include non-motorized distribution patterns. They include bicycles, carts, 'traditional made rickshaws without engine 'guta', and walking are the active distribution patterns were observed among fish vendors at Kivukoni fish market.

Findings further revealed that, traditional handling equipment created locally by fishermen who were all actively engaged in fishing activity were used in line with the identified patterns. They argued that traditional handling equipment helps them run their fish business more efficiently. For easier handling and distribution of fish to consumers, informal fish vendors may employ ice boxes, bamboo baskets, buckets, paper boxes, polythene bags,

and crates that they may have been produced locally as observed in figure 1.

During an interview, a vendor said:

"While bicycles, 'guta' or carts help us to distribute fish, sometimes we use bamboo baskets, crates or paper boxes filled with ice bars to keep fish fresh. It allows us to store and distribute fish in addition to keeping them there for a long time." (Fish vendor 6, Kivukoni fish market).



Figure 1: Tools to facilitate major and minor distribution patterns adopted by fish vendors

Further findings indicate that, the used distribution pattern in line with handling facilities depend on the distance fish is travelling. At times, informal vendors are forced to use public means of transport to some destination and then employ their intended informal distribution pattern. Distance also determine handling tools and how fish is packaged. In a situation like this, because informal vendors have no funds to purchase contemporary packaging equipment, they normally improvise the available materials. Buckets, Plastic boxes, paper boxes filled with ice have always been used to save the purpose. For instance, one respondent admits as follows:

"In this market, there aren't any contemporary fish packaging facilities that fish vendors may utilize. Should it stop us from selling fish, we use the available means." (Fish vendor 3, Kivukoni Fish Market)

While it is common to use vehicles and motorcycles to distribute products, in this study walking was one of the distribution patterns used by informal fish vendors. Surprising enough is that vendors are aware that fish is a highly perishable product that needs to be delivered in time, they use public means of transport to transport their fish but walk while carrying their baskets or bucket of fish from a house to the other looking for customers. Sometimes, they supply the fish to local butchers or fry it before selling it to the

public. While all this is done, time management is their key. Missing lunch preparation time means that fish will not be sold in time and may be spoiled. One vendor reported that; *“on top of using a bus, I walk from a hose to the other... I am forced to board a bus to catch time. I don't want to disappoint my customers.”*

It is reported that, some vendors walk from Kivukoni fish market to residential neighborhoods to sell their fish.

For carrying, delivering, and ultimately distributing fish to consumers, informal fish vendors often employ bicycles, and 'guta'. In a more profound sense, research showed that though tiring, informal fish vendors used bicycles and 'guta' to carry large amounts of fish and use the same means to distribute it to people in the suburbs of Dar es salaam. For instance, an informal fish vendor provided the following testimony;

“Because we do not have enough money, we use bicycles and guta. Even if the guta are not ours they are not expensive as cars. Through my bicycle I take fish in a box, distribute it to my customers and earn a livelihood.” (Fish vendor (9), Kivukoni fish market).

Additionally, only 19 of the respondents, or 54.3%, acknowledged that informal fish vendors work to simplify the delivery of fish to their localized shops in part because they set up market stalls 'magenge' for distribution of fish. Additionally, this pattern is controlled by purchasing fish from fishermen and reselling it to residential areas or customers who are unable to get to the major retail market or supermarket to purchase enough fish. For instance, the responders stressed that; I buy fish, fry it and display it on my stall. My customers are people from my neighborhood.

The findings demonstrate that minor distribution patterns have been widely by informal fish vendors in distributing fish mostly to people out of the city most of whom are low income earners. In order to handle fish traditional tools are used to cater for the need. These results generally agree with earlier research from a variety of publications, particularly (Txdolw et al., 2018; Hordijk & Jonkers, 2012; Lauzon, 2010; Islam & Habib, 2013). While we never expected to find an informal vendor distributing fish on foot, we were surprised to get such findings. In the same vein, the construction of stalls is considered an innovative pattern of food distribution. To great and large, the use of foot and stalls, not only support sellers' livelihoods, but they are also geared to ensuring access to and food security among city low income dwellers.

4.2 Challenges Facing Informal Fish Vendors when Distributing Fish to Communities in Dar es Salaam

This section explored challenges that informal fish vendors face in distributing fish to the public. Findings indicate that several challenges face fish vendors as described in the following paragraphs.

The irregular electric power supply is a major challenge. Findings reported that, informal fish vendor solely depend on ice cubes and bars to transport fish from the market to their intended destinations. In situations where there

is frequent power cut, it is impossible to obtain such bars. This leads to spoilage of fish once not sold in time. One vendor said, *“it is hard doing business without ice, ...you will end up in losses.”*

Distance is yet another challenge faced by informal fish vendors in their respective distribution patterns. It should be noted that Dar es salaam has widely extended spatially, and some with potential customers are far from the fish market. For those distributing fish by walking, it becomes difficult for them to have their fish distributed. Sometimes, vendors may get late to distribute fish because of the distance they have to trek looking for customers.

Poor transportation hinder fish distribution pattern. The mixing of fish handling and packing with public transportation, according to several interviewees, is a contentious aspect of the environment for conducting fish business. As a result, most of the fish gets spoiled. For instance, one respondent stated the following:

“We normally board busses (public transport) and transport fish with other passengers. Although continuous discrimination has been witnessed and being charged exorbitant prices for our baskets and boxes of fish, we have continued to do the business. This puts the activity in danger since passengers do not want fish near them.” (Fish vendor (16), Kivukoni fish market).

Inappropriate packing and handling facilities, inhibit fish distribution patterns. Traditional packaging materials like boxes and sacs occasionally rupture before reaching the customers. As a result, fish consistently gets spoiled before it reaches the customers. Such facilities are observed in Fig 2. This was confirmed by one vendor who said, ...we have limited funds and cannot buy appropriate packaging, handling and transporting fish. It is normal to have spoiled fish daily.



Figure 2: Local fish distribution materials

Another obstacle was the lack of cold-sensitive storage facilities. Findings further note that informal fish vendors in urban areas lack refrigerators, which can aid the preservation and storage of their fish if not sold on a respective day. As an illustration, one respondent described the following: *“...the majority of fish vendors lack storage equipment like secure cold storage facilities; they end up using boxes or buckets to facilitate fish storage.”*

In this regard, informal vendors cannot handle massive orders from customers because they use subsistence means, that is “buying today for selling on the same day”.

In general, findings indicate that, distance, limited equipment, limited devoted transportation facilities, irregular electric power supply have hindered informal fish vendors when distributing fish to the public. Findings are in line with those presented by Keat-Chuan, Aun-Chuan, Wong and Khoo (2017) who identify logistical challenges. In the same vein, a study by Wegerif (2014) while presenting challenges to distribution patterns of eggs in Dar es salaam where this study was conducted, transportation and distance are among great challenges in food distribution. These hinder timely deliveries of food including fish to intended customers. While this poses a challenge to consumers as access to fish is limited, it has doubling effect to vendors. They fail to sell their fish in time and sometimes their fish is spoiled because it has not been transported to the intended destination as required. In addition to this, a study by Chan et al. (2019) reveals that, as a result of several weaknesses in the fish distribution patterns mainly; underdeveloped cold chain, post-harvest losses have been so common and have caused serious losses to those involved in fish trade. This does not only pose an economic challenge to vendors themselves, it creates food insecurity among communities, as almost a quarter of the fish is spoiled before it reaches to the intended consumers (Affognon et al, 2015).

4.3 The Contribution of Informal Fish Vendors’ Distribution Pattern on Food Access and Security to People in Dar es Salaam

Fish is one among the important components of food in Dar es salaam. Access to fish is of paramount importance to people in the city centre and those in the periphery. Because fish is an escort to so many food types consumed by a reasonable number of people in Dar es salaam, its availability contributes widely to food access and security. In this objective, we wanted to discover the contribution of informal fish vendors’ distribution pattern to food access and security among communities in Dar es salaam. Following Wegerif (2014) approach, we identified four areas of interest that we examined. These include; right quantity, right quality, price affordability and timely delivery. Through the analysis conducted, summarized findings are presented in Table 1.

Table 1: The Contribution of Informal fish vendors’ distribution pattern on food access and security

N o.	Topic	Sub topic	Quotations
1.	<i>Right quantity</i>	Convenient access Door to door access	<i>...you can get any amount of fish... ...unless it is a chilly season. ...they bring it home...,</i>

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		Flexibility in selling Proximity	<i>they are from here. They do not have specific price and specific amount. ...sold nearby home... 'gengeni'</i>
2.	<i>Right quality</i>	Fresh fish Various types and quality Poor quality	You are sure of eating fresh fish <i>You will get every size and in any quality of your choice</i> <i>Poorly iced normally gets bad</i>
3.	<i>Price affordability</i>	Reasonable price Flexibility in selling Free-credit sale Minimized cost of delivery Caters for the poor	<i>A. Even the poor can afford it No exact price... Your money determines the amount of your fish... You can get fish even on credit The price is lower, no additional delivery and storage costs The only means the poor can access fish</i>
4.	<i>Timely delivery</i>	The use of public transport Morning and evening shift Waking up early	They use busses and get here in time <i>It depends on the time you need it. I am sure you can get fish in the morning and evening ...because I wake up early, I return fish before lunch preparation time.</i>

Right quality

Presence of the right amount of fish provides a chance to buyers to get access to the amount of their own interests. Findings proved that informal fish vendors have made it easy for convenient access to fish by consumers which is sometimes distributed door to door by vendors themselves. Customers were quoted saying, "...you can get any amount of fish... unless it is a chilly season". "...and sometimes they bring it home as most of them are from here" (in the same community). Moreover, it was noted that, these vendors sell their fish nearby people's homes. This saves people's time and financial resources of commuting to go to big markets for buying fish and related products. Customers mentioned that; "fish is sold nearby home... 'gengeni' where even my son can go pick it". This clarifies that informal fish

vendors have contributed to the access of the right amount of fish to customers making it easy for customers to access this type of food as required. It should be noted that access to the required food is a sign of food security. Thus, informal fish vendors contribute widely to food security among people living in the suburbs of Dar es salaam.

Right quality

While access to food is of paramount importance, consumption of the right quality of food contributes to stabilizing consumers' health. With regards to fish, findings had conflicting observations, while some informal vendors and customers had the view that they supply fish in the required quality and fresh as quoted; "You are sure of eating fresh fish because it takes a small amount of time to be supplied from the shore to your home". Other vendors mentioned that; "You will get every size and in any quality of your choice, ...it depends on your purse". While it is true that vendors sell fresh fish, it is only fresh and in the required quality if well treated. In a discussion with another vendor she mentioned that; "Poorly iced fish normally gets bad". This happens in moments when the city experiences continuous load shading. This does not only weaken informal vendors' capital it also minimizes vendors' customer base, faith and satisfaction when she unknowingly sells rotten fish to his/her customers. Despite this weakness, it has been confirmed that informal vendors ensure that consumers get access to quality fish, save for a few challenges.

Price affordability

In a situation where food is available but cannot be obtained because of exorbitant prices, people in that community are considered to have limited access to food. In this study, it should be noted that, in most cases informal food vendors sell their fish to low income earners most of whom live in the suburbs of the city. Findings on how informal vendors facilitate access to fish at an affordable price, findings indicate that informal vendors are flexible while selling their fish as one participant said: "...no exact price... Your money determines the amount of your fish..." This means that fish is sold at a reasonable price as they said; "even the poor can afford it". Further findings indicate that because vendors normally sell fish from communities they belong to, they at times provide fish to consumers at free-credit sale. This means that consumers can get fish but will pay for it later. It is further clarified that, because informal fish vendors do not use electricity for cooling fish, do not pay rent for butchers and neither do they incur costs for refrigerated cars, they will always sell their fish at a reasonable low price than it is in fish butchers. One customer remarked; "...the price is lower, no additional delivery and storage costs as compared to big butchers". It is therefore true that informal vendors cater for the needs of the poor as their services forms the only means the poor can access fish at a relatively reduced price.

Timely delivery

We measured if informal vendors, distribution patterns contribute to timely delivery of fish. Findings generated indicate that, to get fish and supply fish in time, most vendors wake up early, commute to Kivukoni Fish market, obtain fish and transport it through public means of transport to the intended destinations before embarking on their preferred distribution pattern. One

vendor said, *“before riding fish on my bicycle, I transport them from Kivukoni to Yombo, then use a bicycle or sometimes distribute them on foot”*. It was moreover noted that, fish is delivered timely based on the time one needs to use it. For instance, there are two shifts, while vendors distribute fish in the morning meant for lunch, in the evening, some of them become fish mongers, they fry their fish and display it to the public. The fried fish is normally used for supper. One vendor informed; *“It depends on the time you need it. I am sure you can get fish in the morning and evening”*. This indicates that, patterns used by informal fish vendors ensure that fish is delivered timely and in accordance with the intended use.

There is a common illusion among people in urban settings that it is only through formal means that people can access their needs. With regards to fish, it has proven to be impossible to obtain fish through formal distribution patterns. This is because as patterns become formal, they become more expensive (Wegeriff, 2014). It has been confirmed that, in the vacuum where formal distribution patterns cannot be used to satisfy the Dar es salaam community, informal fish vendors have emerged and have contributed to direct access of fish to the poor communities in Dar es salaam. In line with Brundtland (1987) and Wegeriff (2014), price is an important factor for the poor in accessing food. Thus, to meet the needs of the impoverished communities, innovative means that will minimize prices have to be used. Moreover, findings further imply that, contrary to what was expected, informal vendors through using rudimentary distributions patterns, they still supply their food in time and in the required quality. Moreover, issues of proximity and social cohesion through free-credit sale create a common understanding among people in the community and improves trust (Wiskerke, 2009). While the westernised shopping style and life has been adopted by a few wealthy families, informal means of food distribution are of greater importance to low income earners and have been used to obtain food in the right quantity, quality, price and on time (Cheng et al., 2019). Their presence has been a mechanism to food access and food security in the urban settings.

5 Conclusion and Recommendations

We investigated fish distribution pattern among informal fish vendors, explored their challenges and their contribution to food access and security among low income earners living in Dar es salaam. Through qualitative methods we discovered that, fish is distributed by various means including bicycles, ‘guta’, foot and small market stalls as opposed to using motorized patterns by formal vendors. It was further clarified that, frequent power cuts, poor handling equipment, distance and transport means hinder informal fish vendors in distributing fish to people in the suburbs of Dar es salaam city. Through this study, it was categorically revealed that, informal fish vendors provide a viable and cheap source of fish to low income earners. It directly connects vendors and fish consumers and strengthens their community relations.

The presence of informal vendors assures people access to relatively cheap fish, on the required time, right near their homes, in the required quality and quantity. This not only cater for access to fish but contributes to food security among low income earners because fish is among major foods they depend on for their survival. Informal fish vendors have proved to people that, the western shopping style characterized of supermarkets and cold facilitated vans supplying fish to communities are always expensive and are only suitable for high income earners because commodities from them are always expensive.

Following the obtained findings and conclusions made, we recommend the following:

1. The government through President's Office, Regional Administration and Local Government should consider building more markets in the suburbs of the city. This will minimize all people depending on informal vendors, as other people will source their fish from the neighbouring markets.
2. There is a need for empowering informal fish vendors financially. This can be done by commercial banks and other financial institutions. It can easily be achieved by giving them soft loans that can be used to buy handling materials, refrigeration facilities and generators. Acquisition of these equipment will not only facilitate easy storage of fish, but will reduce the number of spoiled fishes, hence improve fish vendors' income.
3. Because it has been noted that informal fish vendors cater for the needs of low-income earners by ensuring that they have access to fish (a means of food security), vendors efforts should not be underestimated. For the purpose of safeguarding low-income fish consumers, the ministry of health in collaboration with Tanzania Bureau of Standards (TBS) should provide training to fish vendors on appropriate means of handling fish that does not degrade its quality. Vendors through such training should be encouraged to handle traditional equipment in a hygienic manner hence getting rid of all possible pathogens that could lead to diseases.
4. In addition, innovative efforts used by informal fish vendors that lead to easy supply of fish to low-income consumers should be nurtured. Through these innovative strategies, urban low-income earners access fish which constitute a great segment of food used by poor people in Dar es salaam city.

While this study mainly focused on informal fish vendors from a single market, for generalization purposes, another quantitative study can be conducted to compare practices and contribution of informal fish vendors to fish access and food security in other regions where fishing takes place in greater volume.

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7 References

- Affognon, H., Mutungi, C., Sanginga, P., Borgemeister C. (2015). Unpacking postharvest losses in Sub-Saharan Africa: a meta-analysis. *World Development*, 66 (2015), pp. 49-68, [10.1016/j.worlddev.2014.08.002](https://doi.org/10.1016/j.worlddev.2014.08.002)
- Astalin, P. K. (2013). Qualitative research designs : a conceptual framework. *International Journal of Social and Interdisciplinary Research*, 2(1), 118–124.
- Brundtland, H.(1987). *Our Common Future: Report of the World Commission on Environment and Development*; United Nations: New York, NY, USA.
- Chan, C. Y., Tran, N., Pethiyagoda, S., Crissman, C. C., Sulser, T. B., & Phillips, M. J. (2019). Prospects and challenges of fish for food security in Africa. *Global Food Security*, 20, 17-25.
- Cheng, D., Zhao, X., Song, J., Sun, H., & Wang, S. (2019). Quantifying the Distribution and Diversity of Fish Species Along Elevational Gradients in the Weihe River Basin , Northwest China. *Sustainability*, 11, 6177, 16.
- FAO. (2015). National fishery sector overview. In president’s malaria initiative (issue mis 2007).
- Farrokhi, F., & Mahmoudi-Hamidabad, A. (2012). Rethinking convenience sampling: Defining quality criteria. *Theory and Practice in Language Studies*, 2(4), 784-792.
- Goldratt, E. M. (1990). *Theory of constraints* (pp. 1-159). Croton-on-Hudson: North River.
- Gupta, M. C., & Boyd, L. H. (2008). Theory of constraints: A theory for operations management. *International Journal of Operation and Production Management.*, 28(10), 991–1012. <https://doi.org/10.1108/01443570810903122>

Hayes, J. W., Leathwick, J. R., Hanchet, S. M., Hayes, J. W., Leathwick, J. R., Fish, S. M. H., & Hayes, J. W. (2010). Fish distribution patterns and their association with environmental factors in the Mokau River catchment, New Zealand. *New Zealand Journal of Marine and Freshwater Research*, 8330. <https://doi.org/10.1080/00288330.1989.9516353>

Hordijk, A., & Jonkers, I. (2012). Strategic improvement options in fishery supply chains. *Journal of Integral Theory and Practice*, 7(3), 70–91.

Islam, S. B., & Habib, M. (2013). Supply chain management in fishing industry: A case study. *International Journal of Supply Chain Management*, 2(2), 40–50.

Issa, I., Kirumirah, M., & Kisakeni, Y. (2022). The supply chain practices of Fresh fish farmers in Kola. *African Journal of Applied Research*, 8(1), 324–339.

Issa, I., Mazana, M., Mubarack, K., & Munishi, E. J. (2022). Factors impeding the role of intermediaries in urban fish and fisheries supply chain: A case of Dar es Salaam, Tanzania. *social Sciences, Humanities and Education Journal (SHE Journal)*, 3(May), 222–241. <https://doi.org/10.25273/she.v3i2.12734>

Jaabi, S. A., & Esemu, T. (2014). Fish enterprise financing and its impact on exports and research and development: The case of Uganda's fish industry. *Institutions and Economies*, 35-59.

Kassam, L., Lakoh, K., Longley, C., Phillips, M. J., & Siriwardena, S. N. (2017). Sierra Leone fish value chain with special emphasis on Tonkolili District. Working Papers, WorldFish.

Keat-Chuan, N. C., Aun-Chuan, O. P., Wong, W. L., & Khoo, G. (2017). An overview of the status, trends and challenges of freshwater fish research and conservation in Malaysia. *Journal of Survey in Fisheries Sciences*, 7-21.

Laraswati, M., Guritno, A. D., Kristanti, N. E., & Suwondo, E. (2016). Analysis of logistics cost structure of fish cold supply chain in Java Island. *Analysis of Logistics Cost Structure of Fish Cold Supply Chain in Java Island. AIP Conference Proceedings*, 130009(July). <https://doi.org/10.1063/1.4958553>

Lauzon, H. L., Margeirsson, B., Sveinsdóttir, K., Guðjónsdóttir, M., Karlsdóttir, M. G. & Martinsdóttir, E. (2010). Overview on fish quality research. Impact of fish handling, processing, storage and logistics on fish quality deterioration. In *Food Research, Innovation and Safety*. Iceland: Matis ohf

Naji, M. (2013). Enhancing small-scale fisheries value chains in the Mediterranean and Black Sea: Part 1. First Regional Symposium on Sustainable Small-Scale Fisheries in the Mediterranean and Black Sea. Rome: FAO.

NBS. (2022). National Bureau of Statistics: 2022 Population and Housing Census Population Distribution by Administrative areas. Ministry of Finance and Planning

Ninan, G. (2018). Handling and Chilled Storage of Fish and Shell Fish. ICAR-Central Institute of Fisheries Technology.

Nwabunike, M. O. (2015). Constraints of Fish Marketing in Abakaliki Metropolis. *International Journal of Fisheries and Aquatic Studies*, 2(4), 337–344.

Obiero, K., Meulenbroek, P., Drexler, S., Dagne, A., Akoll, P., Odong, R., Kaunda-arara, B., & Waidbacher, H. (2019). The Contribution of Fish to Food and Nutrition Security in Eastern Africa : Emerging Trends and Future Outlooks (pp. 1–15). MDI. <https://doi.org/10.3390/su11061636>

Oeste, M., Rechencq, M., Horacio, P., Jorge, P., & Enrique, G. (2014). Limnological Fish distribution patterns and habitat availability in lakes Moreno Este. *Limnologica*, 49, 73–83. <https://doi.org/10.1016/j.limno.2014.09.003>

Rose, S., Spinks, N., & Canhoto, A. I. (2015). Case study research design. *Management Research: Applying the Principles*, 1–11. <https://doi.org/10.1097/FCH.0b013e31822dda9e>

Sambuo, D., & Kirama, S. (2018). Fish Price Determination Around Lake Victoria , Tanzania : Analysis of Factors Affecting Fish Landing Price. *Journals-Permissions-Indiajournals-Permissions-India*, <https://doi.org/10.1177/0972150917811509>

Şimşit, Z. T., Günay, N. S., & Vayvay, Ö. (2014). Theory of Constraints: A Literature Review. *Procedia - Social and Behavioral Sciences*, 150(September), 930–936. <https://doi.org/10.1016/j.sbspro.2014.09.104>

Tran, N. Chu, L. Chan, C.Y. Genschick, S. Phillips, M.J. Kefi A.S. (2019). Fish supply and demand for food security in sub-Saharan Africa: an analysis of the Zambian fish sector *Mar. Policy*, 99 (2019): 343-350, [10.1016/j.marpol.2018.11.009](https://doi.org/10.1016/j.marpol.2018.11.009)

UN, (2015). *Transforming Our World: The 2030 Agenda for Global Action*. United Nations, New York Online available at: https://www.eda.admin.ch/content/dam/agenda2030/en/documents/recent/7603-final-draft-outcome-document-UN-Sept-Summit-w-letter-08072015_EN.pdf .

UNCTAD. (2017). *Fishery Exports and the Economic Development of Least Developed Countries* :

USAID. (2015). *The Importance of Wild Fisheries For Local Food Security: Malawi*.

Vasisht, A. K., & Singh, D. R. (2009). An analysis of capital formation in fisheries sector in India. *As. Fish.s Sci.*, 22(2):823-837. <https://doi.org/10.33997/j.afs.2009.22.2.040>

Williams, D. (2010). Theory of Constraints. *The International Journal of Research and Practice*, 14(5), 474–494.

Wisdom, J., & Creswell, J. W. (2013). Integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. In *Agency for Healthcare Research and Quality (Issues 13-0028-EF*, pp. 1–5).

Wiskerke, J. (2009). On places lost and places regained: Reflections on the alternative food geography and sustainable regional development. *International Planning Studies* 14, 369–387.