

# **From fork to farm: Understanding Kitwe's food system through the fish lens**

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## **Plagiarism declaration**

### Declaration

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Signature: Fridah Siyanga Tembo

Date: 24<sup>th</sup> February, 2017

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## **Dedication**

This thesis is dedicated to my children who have had to spend a lot of time without their mother. It is also dedicated to the low-income population who helped me keep going even when the going was tough. It was my desire to contribute to their wellbeing that caused me to embark on this journey and hold on. Through this journey I have become a much better person.

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## **Abstract**

Food production has been a constant feature of food security policies. This narrative has continued despite findings showing that food insecurity is structural, and more driven by issues of access than availability, particularly for low-income households in cities who live in a cash economy. While usually considered a rural issue, the urban poor with low and unreliable incomes also face food insecurity which manifests differently to that of their rural counterparts. Thus, this creates the need to understand how the urban poor get their food. Garneton, a low-income area in Kitwe, Zambia, was chosen as the case study area for understanding the food system that feeds the urban poor. Fish and the fish value chain were used as the lens with which to understand the food system. The primary aim of the study was to understand the flow of fish in the food system and how it gets to low-income households in Kitwe. A qualitative methodology using semi-structured in-depth interviews was used. A bottom up and systems approach which started by finding out what the low-income consumers ate, and following the fish value chain systematically up to the producers enabled the study to capture the actual food system that feeds the poor and uncovered the different issues affecting the food system. The study had three main findings. The first finding was that the low-income households bought their food from both formal and informal markets but were more highly dependent on the informal markets. The factors that drove their purchasing decisions included income, proximity and volumes of fish sold. Secondly, the study also found that informal traders bought their fish mainly through the informal markets although the imported fish was bought from the formal market. Thirdly, the study found that there were a number of factors that affected the food system. These included policy, economic and environmental factors. The pathways of fish were also found to change in accordance with the fish ban. The thesis argues that, there is greater need to have policy that addresses the needs of the urban poor. Food should also be looked at as a cross cutting issue with different food systems perceived as complementing each other to addressing the food needs, particularly of the urban poor. Finally, more attention must be paid to the informal market which plays a significant role in meeting the food security needs of the urban poor.

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## **Acronyms**

ACF/FSRP	Agricultural Consultative Forum / Food Security Research Project
CSO	Central Statics Office
EU	European Union
FAO	Food and Agriculture Organisation
KCC	Kitwe City Council
NCD	Non Communicable Diseases
NFDS	Nordenfjeldske Development Services
SADC	Southern African Development Community
SARPN	Southern African Regional Poverty Network (SARPN)
UCT	University of Cape Town
UNEP	United Nations Environment Programme
WTO	World Trade Organisation
ZANAMA	Zambia National Marketeers association
ZMW/K	Zambian Kwacha

## **Chapter 1: Introduction**

Production-based solutions have historically been viewed as an appropriate response to food insecurity and have been a dominant feature of many food security and poverty alleviation strategies in developed and developing countries. Even with huge changes in the food system, from local to a more globalised food system, the focus remains producing more food (Crush & Frayne, 2011). The global food system has been characterised by the expansion of global food supply chains sourcing their food both globally and locally. In Africa, supermarkets have rapidly expanded, first into wealthier areas and more recently into low-income areas.

In Zambia, there has been a rapid expansion of South African Supermarkets which has been facilitated by urbanisation and market liberalisation (Emongor & Kristen, 2009a). Unlike South Africa, their market share in Zambia is smaller compared to traditional or informal markets which still play an important role in meeting the food needs of urban dwellers. The urban poor particularly benefit from these markets which distribute both locally and globally sourced food and use various units of measurement (Abrahams, 2010; Bhowmik, 2005).

Even though globalisation of the food system has contributed to the food needs of the urban population, it has been criticised for many things, among these, its inability to provide the food and nutrition needs of the low-income population (Battersby & Peyton, 2014; Crush & Frayne, 2011). Proposed alternative food systems such as the local and city-region food systems which also look at sustainable diets still carry production based narratives with urban agriculture taking centre stage. In the African context, urban agriculture has been primarily articulated as a means by which to meet the food security needs of the urban poor (Beach, 2013). To a lesser extent, it has been argued to be a strategy to enhance social inclusion and community building. However, evidence suggests that it is not able to meet the needs of those extremely poor people who have little or no access to land (Satterthwaite et al., 2010). The city region food systems approach extends its focus beyond urban and peri-urban agriculture, but is still premised on a local food system being able to meet local food security needs (Dubbeling et al., 2016).

Zambia is the third most urbanised country in Sub-Saharan Africa with over 40% of its population living in urban areas (The World Bank, 2002). The urban population growth rate between 2000 and 2010 was 4.2 per cent per annum (CSO, 2012). By 2030, Zambia's population is projected to be predominantly urban. The rapid urbanisation has been accompanied by increasing urban poverty (UN-HABITAT, 2010). Zambia has recorded an

increase in urban poverty since 1991 due to a decline in its economy. However, the actual poverty levels are likely to be much higher as official statistics currently used underestimate the levels of urban poverty in Zambia (Chibuye, 2011; SARPN, 2002).

The expansion of informal settlements has been one manifestation of poverty, housing over 50% of the country's population. The poor who have no money to buy land and pay for basic services opt to live outside the city centre and put up unplanned structures. The proportion of households living in informal settlements has been on the increase since the colonial period. With projected increase in population, there is likely to be an increase in low-income households with increasing food insecurity due to low economic development. The underestimation of urban poverty calls for the need to have an approach that focuses on urban poverty (Chibuye, 2011).

Kitwe is Zambia's second largest city with a population of 517,543 (CSO, 2012). It has 21 informal settlements and also has one of the largest informal economies in the country. Its main economic activity is copper mining (Mwitwa & Ng'andwe, 2009; Banda et al., 2004) which is also Zambia's major economic activity. The copper mining industry had been a major formal employer but after the financial crisis, a lot of people lost their jobs through retrenchment. Most of these joined the informal sector. In their study, Mwitwa and Ng'andwe (2009) found that the urban poor in Kitwe spend over 50% of their incomes on food. In times when food prices go up, low-income households have resorted to reducing the quantity and quality of their meals due to low-incomes which result in limited food choices. The poor then become more food insecure depending mostly on carbohydrates (Mwitwa & Ng'andwe, 2009).

Policy responses to food insecurity in Zambia have been rural-centred, production-based and short term welfarist. Most efforts in the past have rightly been directed to alleviating rural poverty by increasing food production. However, the rise in the underestimated urban poverty (Chibuye, 2011) creates a need to understand how low-income households are accessing food in order to develop appropriate interventions. With low-incomes and little access to various assets to cushion their food needs, the urban poor have more challenges than their rural counterparts. Furthermore, more urban centred interventions are required to complement these efforts to avoid policy mismatches. With urbanization of poverty and food insecurity accompanying population growth, there is a need to shift the thinking from rural based efforts to urban based interventions.

## **1.1 Why this study is important**

In order to address food needs of the growing population, much emphasis has been placed on rural-based and production-based approaches which have neglected to address how this food is accessed. This study contributes to the growing body of knowledge on urban food security and urban food systems. It takes a systems approach to understanding food security of the urban poor. Past policies have focused on alleviating rural poverty, but with the changing demographics, there is need to redress food security to include the increasing low income population with impending rapid urbanisation. Studies have shown that expansion of supermarkets which help with distribution of food are not accessible to everyone (Battersby & Peyton, 2014). And where they have expanded into urban poor areas, their food does not include nutritious food (fresh produce) thereby falling short of meeting the food nutrition and security needs of the urban poor. The range and proportion of fresh produce to processed foods is limited in these stores. Fresh produce is also often more expensive in these supermarkets compared to those sold by informal traders. It is therefore important to understand how low-income households are accessing food, in this case fish, an important source of protein to many Zambians, more so to low-income households.

Most agricultural policies in Zambia have been focusing on the benefits of fish to the rural poor as a source of income and protein. Its significance as an important source of protein as well as other nutritional benefits has been studied (FAO, 2016). However, all the government policies and efforts towards meeting the demand for fish have not looked at addressing whether and how the urban poor are accessing fish. The researcher could not find any studies that had either been done on understanding urban food security or using a food system approach.

## **1.2 Problem statement**

Fish is an important part of the Zambian diet and a source of cheap protein (ACF/FSRP, 2009; FAO, 2006). It is also a source of micronutrients. Fish is mainly consumed by the poor, of these 30% are the urban poor (FAO, 2006). Consumption surveys conducted in Kitwe's low-income households found that fish is an important part of the diet of the urban poor contributing to their food security (Mwitwa & Ng'andwe, 2010). Any changes in the food system could affect the food security of the poor.

The high demand for fish in Zambia has led to fish imports from countries such as Mozambique and China. This demand has been attributed to an increase in population (Musumali et al., 2009). Findings from literature are that Zambia's fish policies are mostly

production-based with little emphasis on its distribution and accessed by the poor, particularly the urban poor (L'Heureux, 1985; ACF/FSRP, 2009; Musuka & Musonda, 2013). This does not translate into fish access. It is therefore important for food security to look at the system as a whole in order to understand how low-income households are accessing fish so as to make appropriate policies.

Physical and economic access are important aspects of food security particularly for the urban poor who live in a cash economy (Cohen & Garrett, 2010). Increase in urbanisation in developing countries does not correspond to economic growth which translates into fewer jobs in the formal sector in cities. Structural adjustments have also led to fewer jobs in the formal sector (Smith, 1998). Urban dwellers are forced to find jobs in the informal sector where there are low incomes (Bhowmik, 2005). This is true for Zambia, where the majority are employed in the informal sector. Although the majority of the poor in Zambia are currently in rural areas, this is likely to change with increased urbanisation accompanied by increasing urban poverty. This could impact on the food security of low-income households.

### **1.3 Research objective**

The main objective of this research was to understand the flow of fish in the food system and how it gets to low-income households in Kitwe.

*The research is based on the hypothesis that:*

Fish is an important part of the diet of low-income population and it contributes to their food security. It is therefore important to understand the flow of fish in the food system because any changes could directly affect the food security of low-income households. Also, because the value chain of food is now longer, focusing on fish production does not guarantee fish access. Furthermore, the food system has many different policy intervention areas therefore looking at the system as a whole would help to implement appropriate policies that could reduce the food insecurity vulnerability of the poor.

#### **1.3.1 Research questions**

The project has four sub-research questions that were identified in order to achieve the aim of this research:

- Where do consumers from low-income households get their fish?
- What influences low-income households' decisions on where to buy the fish and how?
- Where do informal traders get their fish from and what influences their decisions?

- What factors are affecting this food system?

In order to address these objectives, this study used a qualitative case study of a low-income area. Semi-structured in depth interviews were used to understand how fish moves along the food system and how low-income households access it.

#### **1.4 Organisation of thesis chapters**

This thesis is structured into five main parts. It begins with an introduction that gives the background of the study as well as stating the research aim and the sub-research questions. This is followed by the literature review on urban population growth, the global food system and its suggested alternatives and then narrows down to Zambia's food system using fish as a lens in understanding this food system. This is then followed by a detailed description of the methodology. This chapter also includes a discussion on the ethical considerations, limitations and the researcher's positionality. The chapter that follows presents and discusses the research findings. The final chapter is the conclusion which ties the thesis together.

## **Chapter 2. Literature review**

There is increasing evidence of food insecurity in urban areas and that policy responses to this challenge have focussed on providing urban agriculture as the solution. However, urban agriculture's ability to address urban food security has been questioned (Crush & Frayne, 2011) resulting in an emergent interest in responses that focus beyond the household scale; the urban food system. This research seeks have a better understanding of the dynamics of the food system that feeds the poor so as to help formulate appropriate policy responses.

This chapter discusses urbanisation and the food systems; the global, local and city-region food systems. This is because urbanisation has been identified as the main driver of food systems facilitating changes through globalisation and contributing to malnutrition impacting the food security of the urban poor. The chapter begins by discussing urbanisation in association with urban poverty and its role as a driver of food systems. The three food systems, (the global, local and city-region food systems) are then discussed. Responses to these food systems and their shortcomings are also discussed. Finally, the chapter discusses Zambia's food system using fish as a lens that helps to understand this food system.

### **2.1 Urbanisation**

Rapid urbanisation and increase in urban poverty have created the need for an increased research focus on urban food security. This section provides an overview of key discussions regarding urbanisation, poverty and the urbanisation of food insecurity.

The global population is increasing and it is projected to reach 9 billion by 2050. There is also a shift in the structure of the population. With the urban population increasing, cities in developing countries of Africa and Asia will be predominantly urban by 2030 (UN-HABITAT, 2010). This is a shift from the spatial distribution of population that has occurred in developing countries. According to Cohen (2006), population in developing countries in the past was more evenly distributed between rural and urban areas. In the 1960s, only a few developing countries had an urban population of 25% of the global population, but by the 1990s, most of the countries had a higher proportion of their population living in urban areas (Smith, 1998: 208). In 2008, the urban population exceeded the rural population for the first time (Satterthwaite et al., 2010). Urban population growth in countries with low economic growth and high natural increase is due to natural increase while for countries with higher economic growth and low natural increase it is due to urbanisation (Satterthwaite et al., 2010). Although Amar-Klemesu (2000) attributes urbanisation to social and economic development,

Fox (2012: 285) argues rather that urbanisation is due to “global historical process driven by population dynamics associated with technological and institutional change.”

Population growth, has been perceived as either leading to prosperity or as giving rise to a wide range of catastrophes such as famines, wars and natural resource depletion (Ehrlich & Ehrlich, 1990; Birdsall et al., 2001).

Urban growth in developing countries is proceeding much faster than economic growth leaving cities without the capacity to provide basic services for their people. The unmatched economic growth translates to few or no jobs in the formal sector. People migrating to the cities in search of employment and a better life find no jobs in the formal sector and end up being employed in the informal sector where jobs can be insecure or affected by seasonality. About 85 per cent of all new employment opportunities in the world are found in the informal economy (UN-HABITAT (2010, pg. xiv). The incomes from the informal economy can be low and unreliable which means that the urban poor may not afford to have access to basic services such as electricity, water, shelter like their rural counterparts. In addition, structural adjustment programmes which were meant to improve the livelihoods of people in developing countries, have left them without formal employment due to retrenchments. Increase in poverty and food prices have also been attributed to structural adjustments (Lloyd-Jones & Rakodi, 2014; Cohen and Garret, 2010; UN-HABITAT, 2010; Smith, 1998).

### **2.1.1 Urbanisation of poverty**

Urban growth in developing countries has been accompanied by increasing urban poverty and this has been attributed to rapid population growth, economic recession and structural adjustment policies that have reduced government spending and decreased employment opportunities. Urban dwellers living in a cash economy rely mostly on food purchases and they depend greatly on the market system (Amar-Klemesu, 2000). Their “ability to earn a cash income is a significant determinant of urban food security” (Amar-Klemesu, 2000: 102) linking the urban dwellers’ food security directly to income. But with the low and unreliable incomes, income poverty renders the poor vulnerable to food insecurity. The urban poor in Africa spend over 60% of their budgets on food (Dubbeling and Pasquini, 2010: 3) thereby reducing their purchasing power. When a household spends a disproportionate amount on food, inflation and price shocks will have a direct and significant impact on their food security (Crush & Frayne, 2011). Since buying food depends on income, the poor are affected by changes in food price, devaluation of the currency and changes in the food system (Battersby, 2011). Unlike the rural poor, the urban poor have little or no access to land for growing their

own food which can act as a buffer (Cohen & Garrett, 2010). They also have no assets that they can transform into income to help meet their needs. This makes the environmental, economic and social contexts of the urban poor different from their rural counterparts (Lloyd-Jones & Rakodi, 2014). This calls for need to pay more attention to the urban poor and requires different responses to food insecurity in urban areas.

Even though urban poverty has come to the fore in developing countries and efforts are being made to reduce it, findings have been that poverty in cities has been underestimated. Mitlin and Satterthwaite (2013) argue that the current measures of poverty being used, including the popular dollar-a-day poverty line, underestimates the current levels of urban poverty because they exclude other important factors such as housing, living conditions and the cost of non-food necessities.

### **2.1.2 Urbanisation of food insecurity**

The urban poor are increasing and income poverty is one of the characteristics accompanying urbanisation in the developing world. With the urban poor having to depend on the market system for their food, earning an income becomes a determinant of their purchasing power thereby determining their food security.

The term food security has a number of definitions and it is distinguished by referring to various scales. This means that food security can range from being a global, national, regional to household scale (Lee, 2007). Another scale of food security is the individual scale (Maxwell, 1998). Its scope can also be distinguished by referring to imports and exports or can be part of discussions that have to do with looking after livelihoods. The widely used definition of food security which is also used in this study is one that was developed by the Food and Agriculture Organisation (FAO) at the World Food Summit in 1996 (Lang & Barling, 2012). The Food and Agriculture Organisation define food security as:

*[. . .] a situation that exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life.*

*(FAO, 2009a: 8).*

This definition makes access, and not availability the centre stage of food security (Ingram, 2011). The thinking around food security goes back to the 1970s, when it was once considered a global crisis. At the time, food security was high up on the political agenda and was thought to be an issue of food availability which was resolved by producing more food.

Food insecurity then, was considered as an issue of food availability resulting from food shortages and increase in food prices (Maxwell, 1998). However, by the 1990s, food security lost its place in the political agenda and moved from being on the national agenda to being an individual and household issue. Food security affecting the urban poor became an issue of food access. For the purpose of this study, food security looks at the physical and economic access of food because this is what determines food security of the urban poor in cities.

However, food insecurity has more recently been manifesting as various Non-Communicable Diseases (NCDs) brought about by the nutrition transition. This transition has been attributed to various factors including economic growth, urbanisation, increased importation of processed foods and the availability and affordability of energy-dense and poor-nutrient food. This has seen the urban population increasing their intake of meat and processed food (Vorley et al., 2011; Kearney, 2010). Increased consumption of processed food has been attributed to change in lifestyles where city dwellers have longer working hours and less time to prepare healthy meals taking food insecurity beyond the issue of access. However, for those with low incomes in cities, processed and energy dense foods are more affordable than nutritious food which makes food insecurity more of an issue of access.

Even with increasing knowledge that food security is about food access, policy responses to food security have largely remained focused on increasing food production (Ingram, 2011; Lang & Barling, 2012). Hunger in cities, is more of a structural issue and the outcome of an inequitable distribution of available resources (UN-HABITAT, 2010; Thu, 2009) which makes urban food insecurity the inability of the poor to access food (Cohen & Garrett, 2010). Food insecurity therefore needs to be looked at systematically rather than seeing it as an experience at the household and individual scale

Food access can be determined by physical or economic factors (Crush & Frayne, 2011). Physical access means that the location of food distribution outlets mostly determined above the household scale, impacts on the food security of the urban poor. Lack of resources that can be transformed through production and trade into food, have also made it challenging for the urban poor to cushion the effects of lack of economic access to food (Maxwell & Smith, 1992). This makes policy responses that focus on food production insufficient to address inequitable distribution of food. In addition, a focus on production also takes a more linear approach assuming that the food produced will address everyone's food needs. However, looking at food security from a consumption approach, for example, reveals complex connections (Tacoli & Vorley, 2015). Also, a food production approach does not explicitly

acknowledge that food belongs to a system which interacts with biological, social and economic aspects. It is therefore important to have a systems approach towards food security.

## **2.2 Urban Food systems**

This section gives a brief overview of the changes that have occurred in the food system which has impacted on the food security of the urban poor. The section discusses the three food systems mentioned above and shows that these food systems in their current state are limited in their ability to address the food insecurity of the urban poor.

### *Implications of urbanisation on land*

Urban population growth is a concern for food security because of urban expansion which puts pressure on land that could potentially be used to grow food. This is lost to housing or other infrastructure (Newman et al., 2015; Cotula et al., 2009). Urban expansion occurs on productive agricultural land and in low and middle income countries, this happens haphazardly due to lack of either land-use plans or a strategic framework that guides land use changes (Satterthwaite et al., 2010). UNEP (2012) estimates that the loss of farmland due to city expansion will be between 1.6 - 3.3 million hectares per year between 2000 and 2030. This loss means there is less land available for peri-urban agriculture which would impact on urban food security (Magigi, 2013). In developed countries, this loss leads urban dwellers to become increasingly dependent on food supplied by the global supply chains (Satterthwaite et al., 2010). Developed countries have been dependent on the global supply chains since the colonial era. This is exemplified by the UK which imports a lot of its food and raw materials. Professor Tim Benton's statement exemplifies this well,

*“Take a relatively simple food produced in the UK like a chocolate Kit Kat – it contains cocoa from Africa, milk products from the UK, whey from New Zealand, palm oil from Asia, sugar from South America, wheat from Europe. So we simply can't look at the supply chain in terms of the UK alone. Increasingly, perturbations elsewhere in the world will feed back into the availability and price of food the UK.”* (GFS, 2012).

Food systems in the global south however, have historically been characterised by local food supply. Urban encroachment combined with global economic forces are increasingly extending food supply chains in the global south. The dependence on supply chains for food and other products makes urban dwellers vulnerable to disasters that could occur in places that supply their food (Satterthwaite et al., 2010; Brown & Halweil, 1998). This could lead to a food crisis mostly affecting the poorest of the poor leading to social unrest such as food

riots. Increase in food prices have been strongly correlated to food riots (Lagi et al., 2011). It is, therefore, important to understand these vulnerabilities resulting from urban expansion and changing food systems and their impact on the food security of the poor in cities so as to develop with appropriate strategies that address these challenges.

### **2.2.1 The Global Food system**

The global food system is increasingly feeding developing countries. It is mainly characterised by the expansion of supermarkets, large scale agricultural production of food, and processing and packaging of food. The growth of large scale industrial agriculture has led to fewer people being engaged in farming activities. In 1950 two-thirds of the world's population were primarily engaged in food production, and by the dawn of the twenty-first century, this proportion reduced to around 40%. By 2025, it is projected that the 56% of the population involved in agriculture in developing countries will decline (Thu, 2009). Food production however, has not declined but has increased and is growing faster than population increase per year (Holt-Gimenez et al., 2012) defying the Malthusian theory which predicted that population would exceed resources unless kept in check (Raleigh, 1999). However, intensification of agricultural production has been criticised for its social, environmental and economic impacts.

#### *Implications for food production*

Industrialised agriculture engages fewer people and has high upfront costs leading small scale farmers to becoming part of the increasing number of net food buyers. This shift has contributed to rural-urban migration. Therefore, past policies that focused on rural agriculture on the assumption that urban dwellers are net food consumers while rural dwellers are net food producers are no longer viable (Tacoli & Vorley, 2015). Also, policy responses to urban food security have focused on increasing food production in the form of urban agriculture (Magigi, 2013; Satterthwaite et al., 2010). However, urban agriculture does not address the food security needs of the extremely poor urban dwellers who are unable to access land (Cohen & Garrett, 2010).

Industrialised agriculture which engages only a few people in food production (and distribution) results in leaving decisions and power in the food system in the hands of the few. Cargill's (the largest privately held company in the United States) huge presence in the food system, for instance, has been variably discussed (Thu, 2009; Hendrickson & Heffernan, 2002) In the past, subsistence farming was practiced and excess production meant food

security for the society. But the current food system produces food primarily for economic benefits (Thu, 2009) and falls short of meeting the food security needs urban poor.

The global food system is also characterised by an increase in corporate concentration in the retailing and distribution of food (Thu, 2009; Ericksen, 2008) which has been seen in the form of supermarket expansion all over the world including in Africa.

In Africa, this expansion has mostly been driven by South African supermarkets. Supermarket expansion can be attributed among others, to increase in urbanisation, economic growth, trade liberalisation, positive political changes, and regional integration (Emongor & Kristen, 2009a). The expansion of supermarkets into Africa and their role in the distribution of both local and imported food has been discussed by many authors (Crush & Frayne, 2011; Tschirley et al., 2010; Emongor & Kristen, 2009). Supermarkets provide a variety of food through complex food supply chains, and in Africa, they have expanded their market share through various means including *“buying other supermarkets, franchising, and forming partnerships with other supermarket chains in host countries”* (Emongor & Kirsten, 2009: 62b).

Supermarkets which used to expand mainly into middle and high income areas are now targeting all urban consumers with their perceived good quality and cheap food (Reardon & Hopkins, 2007; Crush & Frayne, 2011). However, supermarkets are critiqued for their inability to meet the food security needs of the poor because they are physically inaccessible. Physical access to food can be an important barrier to attaining food security (Shaw, 2006) particularly for the urban poor who spend more than half of their budget spent on food (Cohen & Barrett, 2010; FAO, 2009b). Therefore, even if food is economically accessible, the distance to the supermarkets and the transport costs imply that the poor would not be able to travel to access the food.

Supermarkets that have started expanding into low-income areas do not sell nutritious food because they operate on a business model that is economically efficient but not socially efficient (Battersby & Peyton, 2014). According to Kearney (2010: 2804), supermarkets may lead to increased availability of cheap and less healthy food as they are major providers of *“processed, higher fat, added-sugar and salt-laden foods, especially in developing countries.”* Battersby and Peyton (2014) found in their study that supermarkets expanding into the low-income neighbourhoods did not stock a variety of nutritious food. Therefore, even when supermarkets become physically and economically accessible to the urban poor they will not

be able to meet the food security needs of the poor as long as they continue to largely provide access to unhealthy food.

The expansion of supermarkets also leads to the decline in traditional retailers due to their inability to match the extremely low prices offered by supermarkets. However, according to Crush and Frayne (2011) the informal economy plays an essential role in making food available to the urban poor by being physically accessible to them. Informal traders tend to position themselves in places where consumers pass, are found in low-income areas where supermarkets cannot expand into and, sell food in traditional units that are not offered by formal retailers or supermarkets. This is extremely important because low-income households may not be able to buy food in bulk or larger units sold in supermarkets due to lack of storage facilities and their low of incomes (Crush & Frayne, 2011; Bhowmik, 2005).

Informal retailers also sell indigenous food not sold by formal retailers. This food meets the food security needs of urban dwellers especially the poor (Bhowmik, 2005). This could be because supermarkets begin their expansion by first penetrating with processed food, then semi-processed food and eventually with fresh products and therefore not focusing much on traditional food (Reardon & Hopkins, 2007). Studies by Riley and Legwegoh (2013) also discuss the importance of informal retailers in helping meet the food security of the urban poor. Therefore, even though global food systems offer economic access to food they are still limited in their ability to meet the food security needs of the urban poor.

### **2.2.2 Local food system**

Of the alternative systems that have risen due to concerns around the global food system, the local food system has gained traction as a more sustainable food system. The local narrative offers a counter narrative to the global food system where local power is perceived as countering global power (DuPuis & Goodman, 2005). The local food system aims to address the issues arising from long and complex food chains of the global food system. (Feagan, 2007). These long food chains have increased the distance between the producer and the consumer with no personalised interaction between them. Food is produced further away and has to travel long distances to get to where the consumer is, a situation known as food miles. This separation of food from the place where it is grown and consumed is also referred to as “spatial and temporal independence” (O’Hara & Stagl, 2001 in Feagan, 2007).

The missing human relationship in the global food system is addressed through direct agricultural markets which aim to bring consumers closer to the where their food is produced. They also seek to bring in more direct contact between the producers and the consumers.

Environmental sustainability and social justice are associated with local food systems where local is seen as a context within which “ethical norms and values can flourish”. Ethical behaviour in the local is perceived as inherently spatial. However, DuPuis and Goodman (2005:361) argue that localism in itself is not socially just and that it can be based on a “Utopian ideal” centred on the interests of a few. They refer to this as “unreflexive politics”. In addition, Born and Purcell (2007) argue that there is nothing inherently good about the local scale and that it may actually not in itself guarantee justice or sustainability. They further argue that the outcomes of any food system are dependent “*on the actors and agendas that are empowered by the particular social relations in a given food system*” (Born & Purcell, 2007: 196).

As an example, milk was elevated to a position of “perfect food” by white middle-class reform groups, health officials and farmers when milk was a specific food, excluding the poor (DuPuis, 2002 in DuPuis & Goodman, 2005). This makes local food systems socially unjust creating the need for a local food system that is more reflexive and inclusive.

The local food system is also criticised for overlooking the relationship between the local and the global food system. The urban food system is actually made up of these two food systems which are integrated and co-exist to meet the food needs of the urban population. For instance, street vendors were found selling local food and food bought from the formal retailers which they sold outside those shops. Some small corner shops also buy some of their stock from these supermarkets. Informal traders therefore also act as distributors of food that is produced outside their country.

Like informal traders, supermarkets also act as distributors of locally produced food such as fresh fruits and vegetables as well as imported food (Tschirley et al., 2010; Kirsten & Emongor, 2006). As such, this presents a relational scale (Born & Purcell, 2007) where the local is embedded in the national scale and the national in the global scale. Furthermore, Feagan (2007) argues that the local is part of a much larger global scale within which it is nested in different ways. The focus therefore must be about appreciating both systems and looking at how they can be complemented and improved to meet the food security needs of the urban poor. Looking at local food systems, their limitations and where they need to depend on other scales would be helpful (Feagan, 2007) in developing a more sustainable food system.

Another critique about the local is that the definition of local is varied in terms of the distance between the producer and the consumer. Also, the geographical definition of local with

respect to the production also varies depending on who is defining it. Born and Purcell (2007) argue that scale is a social construct and as such it is not static.

In addition, the local food system also assumes that food production is possible at all local scales. However, some countries cannot grow their own food because of the soils, for example. A healthy ecosystem is required to grow food; some ecosystems are not functional and cannot support growing of food. Such countries resort to importing food to meet the food security needs of their people. Also, when cities expand outwards, land in peri-urban areas which would have been used to grow food is lost leaving behind limited space on which can be grown at certain local scales. Urbanisation and dietary transition have led to a demand in food that cannot be produced at the local scale. Furthermore, the desire for a wider variety of food throughout the year even in times when the food cannot be locally produced means that this food can only be accessed through imports (Satterthwaite et al., 2010; Chambers et al., 2007). Some countries' inability to produce food has been a driver of land grabs particularly for developed countries (Cotula et al., 2009). Limited availability of water, arable land and competing land use are some of the reasons why land grabs take place in Africa (Cotula et al., 2009).

Food security today cannot be discussed without referring to trade especially with the advent of liberalisation and the commodification of food which have been driven by urbanisation, this has been overlooked by proponents of the local food systems. Populations in cities are increasingly being fed by imported food. Many countries belonging to regional and international organisational bodies have adopted policies at the national scale in line with the bodies that they belong to. As an example, Thow et al. (2015) state that SADC members that also belong to the WTO have adopted "extra-regional liberalisation" measures in accordance with WTO commitments. This has facilitated importation of cheap food from various countries. Thow et al. (2015) gives other examples of how regional and international agreements have facilitated increased imports of processed food and soft drinks.

In addition to trade agreements, the expansion of supermarkets have been a means through which access to cheap processed food have been made available. Global or national policies such as export bans also affect the food security of countries that are dependent on food imports (McMichael 2009). Therefore, proponents of the local food system need to take trade as an important aspect in meeting the food needs of city dwellers and that the global food system is more extensive. They should also supplement the local food system and fight for better trade policies to help meet the food and nutritional needs of the urban poor.

Even though the global food system has its limitations, the local narrative in itself does not meet the food security needs of all urban populations. A more sustainable local focus needs to take into consideration all these factors. Focusing on the immediate and short term benefits may not be enough to accommodate the needs of the poor who benefit from cheap imported food, for example. Chambers et al. (2007). In light of the above, the local food system is not the only solution to food insecurity especially for low-income households which could be excluded in the local narrative and who may find imported food much cheaper. This study seeks to understand the food system that feeds the poor in urban areas in order to create a narrative that is inclusive.

### **2.2.3 City Region Food systems**

One idea that has come up in food systems literature is that of City-Region food systems. This food system moves away from the idea of local is better and takes the food system beyond the local scale by calling for multi-stakeholder involvement; that of local and regional governments (FAO, 2014). It also acknowledges that food is increasingly becoming an urban issue (Jennings et al., 2015). It however, does embrace local food systems and considers them as part of the solution to addressing food security in cities. This is important because as discussed in section 2.2.2 above, the local scale is not sufficient to address the food security needs of all urban dwellers.

City-region food systems are perceived as a holistic approach that integrates all aspects of food security. They are a step forward in that they acknowledge the local food system as one of the solutions and they also endeavour to strengthen the rural-urban interface. In the past, city-region food systems emphasised more on regional and local production with less emphasis on the role of the global food system in meeting the food security needs of the urban population. Even though food imports expose the urban poor to vulnerabilities of the global food system, they still address the food needs of the urban population. Emphasising on local and regional food systems assumed that these food systems are available at the local and regional scale. This may not be the case as local food systems are not available at all local scales due to various reasons (FAO, 2014). Recent developments in the city-region food systems literature have recognised that cities will always be fed by local, regional as well as global food systems (Dubbeling et al., 2016). They also acknowledge that some food products may not be able to be grown locally or within the city-region. The city-region food system should therefore be considered as a compliment of the global food system. If they are to be relevant to the poor, they must continue to acknowledge the increasingly global nature of the urban food system and also deliberately address the issue of access to food by the urban poor.

The city-region food system still carries with it the rural emphasis that other food security policies have carried, that it is beneficial for small scale farmers and eradicating poverty. With increased urbanisation, the focus should also include addressing the food security needs of the urban poor as linking the rural-urban interface does not ensure food access for the poor.

### **2.3 Zambia's food system**

Zambia's food system is similar to that of other African countries in that it has both formal and informal distribution centres. It has also seen the expansion of supermarkets (Crush & Frayne, 2011; Kirsten & Emongor, 2006) which distribute a wide range of food products with an increasing market share. For instance, the proportion of food sales for Shoprite in 2003 was 90% of the total sales (Kirsten & Emongor, 2006).

However, that there is an interaction going on between informal outlets and these supermarkets. Informal traders were found buying bread from supermarkets which they sold in their kiosks. Further findings were that Shoprite's fresh produce came from the same farmers who sold their produce to informal traders (Kirsten & Emongor, 2006).

Even though supermarkets seem to be gaining a high market share in other African countries, this is not so for Zambia which still had a vibrant informal market (Hichaambwa, 2012; Crush & Frayne, 2011, Abrahams, 2010). Studies conducted in Zambia on fresh fruit and vegetables distribution found that the informal market had the largest share in the distribution of local fresh vegetables (Hichaambwa & Tschirley, 2006). Similarly, studies on fish found that this food product is sold mostly in informal markets (L'Heureux, 1985). Studies by Hichaambwa (2012) of four cities in Zambia also found that informal markets dominated the market share for fresh fish and chicken.

Kitwe as well follows similar trends. Consumption surveys for 2007/2008 of low and medium income households found that low-income households still consumed dry fish even after the food crisis of 2007/2008 albeit in reduced quantities. Fish is mostly distributed through informal markets (L'Heureux, 1985) suggesting that fish consumed by participants in the consumption survey was purchased at informal markets. Studies by Hichaambwa (2012) found that most low-income households in Kitwe bought their fresh fish and chicken from informal markets. This study seeks to understand the nature of food system that feeds the urban poor in Kitwe by using fish as a lens.

## **2.4. Global importance of fish**

Global demand for fish is increasing and this has been attributed to urbanisation and increase in wealth (Beveridge et al., 2013). The world per capita apparent fish consumption has risen from 9.9 kg in the 1960s to an estimate of over 20 kg in 2014 and 2015, with developed countries accounting for a higher per capita consumption compared to developing countries. For instance, in 2013 the apparent per capita consumption for developed countries was 26.8 kg while in developing countries the annual per capita consumption was 18.8kgs with low-income food-deficit countries at 7.6 kg. In spite of this difference, fish has played a major role in diversifying people's diets around the world by being an important source, of high quality proteins as well as amino acids and vitamins, among others (FAO, 2016). In 2013, fish accounted for 17% of the global population intake of animal protein and 6.7% of all animal protein consumed. In addition, fish provided 3.1 billion people with almost 20% of their average per capita intake of animal protein (FAO, 2016).

The increase in fish consumption has also been attributed to an increase in production, better utilisation and reduction in wastage with international trade held responsible for providing a wider variety of fish to consumers (FAO, 2016). Even though capture fisheries production has been static since the 1980s, aquaculture accounts for a growing portion of global fish supply. Aquaculture growth has moved from supplying only 7% of the fish for human consumption in 1974 to 39% in 2004, with China playing a major role representing over 60% of world aquaculture production (FAO, 2016; 2). However, even though this is the case at global level, aquaculture is not well developed in African countries particularly in Sub-Saharan Africa. In addition, even though it helps to meet the rising demand for fish, aquaculture has the ability to change the type of fish available on the market as fish cultured is dependent on the cost and profitability of the fish (Beveridge et al., 2013).

Fish is a preferred food item particularly for the poor and is well known as a source of protein (FAO, 2016; Beveridge et al., 2013; Musuka & Musonda, 2013; FAO, 2006). It is also an important source of essential fatty acids and micronutrients whose quantity and quality are superior to other animal sources (Beveridge et al., 2013: 1078). However, the natural fish stocks have been declining and the current fish produced is insufficient to meet the food and nutritional needs of the Zambian people. In order to address this decline, the government introduced a no fishing season otherwise known as a fish ban to enable fish to breed as the ban coincides with peak breeding season commercially preferred fish. The fish ban runs from the 1<sup>st</sup> of December to the 28<sup>th</sup> of February the following year (ACF/FSRP, 2009). The

shortage of fish is further addressed by importing fish from Mozambique, Namibia, Zimbabwe and China (Musuka & Musonda, 2013). Other measures to address the low supply of fish are discussed in section 3.1.4 below. In light of fish's importance to people at the global level as well as to the Zambian people, this study used fish, an important source of nutrients, as a lens to understand the food system that addresses the food security and nutritional needs of the low-income households in Zambia.

## **2.5 Zambia view**

### **2.5.1 Demand**

Fish is an important source of protein for Zambians and it makes up about 40% of animal protein (ACF/FSRP, 2009). FAO (2006) on the other hand estimates this contribution to be as high as 55%. Most of the fish consumed in Zambia, about 90%, comes from capture or natural fisheries while 10% is from aquaculture (ACF/FSRP, 2009). Rural households account for 47% of the fish consumed followed by the urban poor with 30% (FAO, 2006). The urban population consumes more fish than their rural counterparts with those on low incomes spending a greater proportion of their income on fish (FAO, 2006). In rural areas where fish is caught, it acts as a safety net.

Between the 1970s and the 1980s the fish consumption was 12kg/person/annum (ACF/FSRP, 2009) and was as high as 17Kg/person/annum between 1971 and 1972 but reduced when the importation of fish was cut (L'Heureux, 1985). As of 1998, fish consumption per capita had decreased to 6.8Kg (Ministry of Agriculture and Co-operatives, 2004). The current consumption is 7kg/person/annum due to reduced fish stocks resulting from overfishing (ACF/FSRP (2009)).

There is high demand for fish in Zambia (ACF/FSRP, 2009; Musuka & Musonda, 2013) and this has been attributed to population growth. On the contrary, Beveridge et al. (2013) argue rather that demand for fish is due to increased urbanisation and a rise in wealth. Fish is particularly important to low-income households in urban areas who account for 30% of fish consumption. This was in agreement with Hichaambwa (2012) who found that fish consumption was dominant among poor households with a 37% share. The importance of fish in the diets of the urban poor was shown in the consumption surveys conducted in Kitwe of low and middle income households as discussed in section 2.3 above. According to FAO (2006), poorer households spend more of their incomes on fish. Therefore, the poorer a household becomes the more they spend on fish. Fish are also the preferred protein source of food from a cultural perspective, and due to their diverse forms offer a range of consumption

options. There are different types and sizes of fish consumed in Zambia and these are purchased based on a number of factors. Studies conducted on fish preference in three towns in Zambia found that people bought fish based on taste, quality, freshness and appearance. These factors were also found to affect or determine the type of fish that the traders sold at the market (Malumbe & Musuka, 2013). However, fish purchase choices for consumers with low income consumers is mostly determined by its affordability (Beveridge et al., 2013). In addition to affordability, other factors that influence fish preference and consumption by the poor include physical accessibility, affordability, easy storage and ease of sharing among family members (Longley et al., 2014). This is particularly true for small dried fish such as Kapenta and Chisense which are more likely to be consumed among poor households because of the above mentioned factors. According to Beveridge et al. (2013) Kapenta is more likely to be the fish of choice among poor households because it is affordable. Fish types are discussed further in section 3.1.2. and 3.1.3.

The current fish production from capture fisheries is about 70, 000 tonnes and about 5,000 tonnes from aquaculture. Fish demand is estimated at 120, 000 tonnes per year (ACF/FSRP, 2009).

### **2.5.2 Supply**

Zambia's local fish supply comes from natural fisheries otherwise known as capture fisheries and aquaculture. The country has 11 main fisheries four of which belong to the Congo River basin and the rest to the Zambezi River basin. The fisheries that belong to the Congo River basin include; Bangweulu, Mweru-Luapula, Mweru Wantipa and Tanganyika. The Kafue, Kariba, Upper Zambezi, Lower Zambezi, Lukanga, Itezhi-tezhi and Lusiwasi fisheries belong to the Zambezi River basin (ACF/FSRP, 2009).

Fishing is done at both industrial and artisanal scale. Industrial fishing activities which are associated with the production of Kapenta are limited to Lakes Tanganyika and Kariba (ACF/FSRP, 2009). Artisanal fishers who number about 30,000 (ACF/FSRP, 2009), dominate this sector and account for 85 percent of catches, while the less than 100 industrial producers on Lakes Tanganyika and Kariba account for 15 percent of production (ACF/FSRP, 2009). The annual fish production increased from about 47,000 tonnes in 1975 to approximately 70000 tonnes in 2004 (L'Heureux, 1985; ACF/FSRP, 2009).

The literature reviewed looks at the potential Zambia has for capture fisheries as well as placing an emphasis on fish's importance to the rural population as most of the capture fisheries are located in rural areas. It is suggested that with good management strategies in

place, capture fisheries could do much better as they still have the capacity to produce more fish. On the other hand, it has been acknowledged that the growing urban population has contributed to the increased demand of fish with the urban poor accounting for 30% of the fish consumption (ACF/FSRP, 2009).

The long distance between production and consumption areas, limited cold storage and transport facilities, has led to 65% of fish either being sun dried or smoked (L'Heureux, 1985). Kapenta, one of the popular fish, is mostly sun dried while bream, catfish and other fish are smoke-dried. Smoke and sun-dried fish are available all year round in major fish markets (L'Heureux, 1985). Other processes that fish go through include salting, freezing and filleting (FAO, 2006). Most of the fish is processed and handled by the artisanal fishers which is then sold to urban markets (FAO, 2006; Musumali et al., 2009). Frozen Bream and Kapenta, tinned Buka buka as well as dried Kapenta are distributed through formal retail outlets (Musumali et al., 2009).

### **2.5.3 Distribution and Marketing**

Most fish is processed at artisanal scale (Musumali et al., 2009) and a greater part of the fish produced is distributed by private and individual traders most of whom are women (ACF/FSRP, 2009). A lot of the fish is sold in city markets in Central, Copper Belt, Eastern and Lusaka provinces, (FAO, 2006; Malumbe & Musuka, 2013; Musumali et al., 2009) with a few, particularly the fresh fish, in supermarkets and small retail shops. The distribution of fish from the producers to the retailers involves very minimal intermediaries. Findings by L'Heureux (1985) for the distribution of Kapenta from Lakes Kariba and Tanganyika were that there was only one wholesaler between the producers and the retailers.

Although a variety of fish are sold on the market, the main fish widely accepted throughout the country include Bream (*Tilapia*), Kapenta (*Limnothrissa miodon* and *Stolothrissa tanganyicae*) and Chisense (*Angraulicypris spp.* and *Poecilothrissa moeruensis*) (FAO, 2006). Studies by Malumbe and Musuka (2013) found that some of the most common fish on the Copperbelt markets include Bream (*Tilapia*), Kapenta (*Stolothrissa spp.* and *Limnothrissa spp.*), Catfish (*Clarias spp.*), Buka-buka (*Luciolates spp.*) and Mbowa (*Auchenaglanis spp.*). They further found that bream was the most popular fish among consumers and that fresh fish was purchased the most followed by sun-dried fish. In this study affordability was not mentioned as factor of fish purchase the most important. On the contrary, Beveridge et al. (2013) mention affordability as the factor that determines the fish purchase for the poor. The urban poor are likely to buy cheaper fish. The consumption survey conducted in Kitwe's low

and middle income areas shows that these households consume dry fish. No indication of fresh fish was mentioned in the survey. It is likely that the type of fish purchased in these areas are much cheaper than the fresh fish and bream found to be popular in Malumbe and Musuka (2013)'s study. However, a study by Hichaambwa found that low-income households purchase fresh fish and this accounted for 37% of their expenditure.

It is therefore important to understand what influences the poor's fish choices and their choices on what type of fish to buy. This can help understand the importance of particular types of fish and what the effects of losing the source would be. This would help contribute to addressing future fish needs of the rising urban poor. Currently, the government supports aquaculture projects (Musuka & Musonda, 2013) for fresh fish species including *Oreochromis*. Other types of fish that address the fish needs of the poor can be considered especially if the current ones cannot do so.

The sector employs a wide range of people including women, youths and urban poor. While it is agreed that the one major factor that led to an increase in the number of people participating in this sector was the financial crisis (Haller & Merten, 2008; Musumali et al., 2009), crop failure and increase in maize prices were also factors that led to an increase in participants in the fish sector. Increase in fish prices also created an incentive for people to join as it was seen as a profitable business with low costs and high returns. For instance, (Haller & Merten, 2008: 708) finds that during the food crisis the number of households in fishing camps rose from about 60 to over 900 households in 2002 comprising mostly of single men. Change in fish policies which could not be enforced by the government due to lack of resources also led to increased participation in fish trade. Lack of policing also contributed to the decline and availability of certain fish species in capture fisheries.

#### **2.5.4 Kitwe**

Kitwe's population like others in Zambia have fish as an important part of their diet. They, particularly the urban poor, purchase most of their fish from informal markets (Hichaambwa, 2012). This is likely to be similar with dry fish as this is mostly sold and distributed through informal markets and sold in traditional units such as tins (FAO, 2006) that are not used in formal markets.

The urban food consumption patterns of Kitwe show that even though the food prices were high during the food crisis, low-income households maintained fish in their diets but reduced the quantity. Meat and chicken were eliminated as a coping strategy (Mwitwa & Ngandwe, 2010). This further shows the importance of fish to low-income households. Any changes in

the food system such as price increase will affect the poor more due to their limited food choices.

Other factors such as over exploitation of fish change the types and sizes of fish available. In their study, Haller and Merten (2008) found that red breasted bream was no longer as common and that the size of the bream also declined due to over exploitation of the fisheries. Price inflation also affects fish prices. For instance, between 1980 and 2000 high inflation rate drove the price of fish up 17 fold. This was much higher than the price of maize (Haller and Merten, 2008: 708). This acted as an incentive for people to join the fish trade as it was profitable. Such changes in fish price are likely to affect the urban poor's food and nutritional security. It is therefore important to understand what is obtaining in this system and whether there are any changes occurring that might affect the system.

### **2.5.5 Government's interventions**

The government is cognisant of the importance of fish to the Zambian people and has taken steps to put legal institutions in place. The government has rolled out some fish stocking and aquaculture projects. They have also called out for citizens to get involved in aquaculture to help meet the increasing fish demand which is currently not being met by the dwindling fish stocks. This is in addition to the fish ban or no fishing season that starts on Dec 1<sup>st</sup> and ends on the 28<sup>th</sup> of February. This was put in place to allow fish to breed particularly Tilapia, the commercially preferred breed. Monitoring and surveillance occurs during this period to enforce the ban (ACF/FSRP, 2009). However, it is not noted whether aquaculture will meet the fish needs of the poor as involvement in aquaculture is determined by costs and profitability (Beveridge et al., 2013; Musuka & Musonda, 2013).

The two species of *Oreochromis* and one of tilapia used in aquaculture may not be accessible to poor households. The fish from aquaculture is currently sold fresh and to nearby areas (Musuka & Musonda, 2013). This may exclude the increasingly urban poor. In addition, policies on fish in the past and present have mostly centred on producing more fish (Mudenda, 2009). This can also be seen from the objective of the fisheries sector which is *"To increase fish production and promote sustainable utilization of fisheries resources thereby contributing to the economy through the generation of employment, income and improved availability of fish"* (Mudenda, 2009). Fish has been high up on the agenda in Zambia but with a strong focus on fish production and availability. However, increasing fish production does not entail access.

### **2.5.6 Conceptual Framework**

In light of the literature reviewed above, two concepts were used to frame this study. The first is the food system and the second is food access. The food system is defined as a set of activities ranging from production to consumption. It is a broad concept that encompasses the food chain as well as the food economy concepts. The idea of a system itself implies that there is an underlying interconnection as is the case with food (Tansey & Worley, 2014).

According to Ericksen (2008), the food security status of any group can be considered as the primary result of food systems. Food systems are not isolated but interact with boundary conditions to produce this outcome. Provision of food security is therefore determined by the food system's interactions with boundary conditions which include: biological, economic, political and social conditions. These conditions are not static but interact together with trends and drivers across national and geographical scales (Grant, 2015). For instance, Ndebele-Murissa et al. (2011) in their studies cite climatic factors such as reduction in rainfall as the cause of Kapenta reduction in Lake Kariba. Rainfall and the right water levels are required for successful fish restocking which in turn contributes to fish availability and food security. The food system can thus be said to be a complex adaptive system (Grant, 2015). Because of its complexity, making appropriate interventions in the food system that can address the food security outcomes can be challenging without considering the system as a whole. As an example, Grant (2015) looks at an energy policy that was passed in the United States which led to increase in corn prices for humans and livestock, and combined with other factors had an impact on food security in other countries. It is therefore important to have a holistic approach that helps trace the linkages in the food system that could assist with determining the vulnerabilities or policy gaps in the system. This would help decision makers draw appropriate policies for food security (Ericksen, 2008).

The concept of value chains which has been used to trace linkages and interconnections in the food system would not be appropriate for this study as it does not consider the boundary conditions within which the food system works. It also mainly focuses on linkages in corporate food system context (Greenberg, 2010) whereas this study is mainly focused on tracing linkages in the informal market.

As discussed above, food security is an outcome of the food system and its interactions. For people living in cities to be food secure, they have to access food through the various distribution points in the food system. However, food access is determined by a number of factors and requires various resources (Crush & Frayne, 2011; Shaw, 2006). It thus requires

overcoming several economic and physical barriers. The economic barriers include low incomes, transportation cost and the price of food. Having low incomes for instance, limits and locks the poor into buying certain types, quantity and quality of food. Consumers also need to be able to have the money to travel to purchase food if the food is not found close by.

The physical barriers include the consumer being physically capable of going to source food from a retailer. In his studies on food deserts, Shaw (2006) includes the ability to travel to an allotment as something that should be met in order to be food secure. A transport system must also be present to enable consumers access food, particularly where food far from where the consumer lives. In their studies, Battersby and Peyton (2014) look at how geography can have an impact on food access. As such, the location of retail outlets also impacts on food security.

The type of food available also impacts on food security. Having access to cheap and unhealthy food does not translate to food security. People therefore need to have access to affordable healthy food and this has widely been discussed in the concept of food deserts used in the United Kingdom as well as in the United States where low income areas only have access to cheap and unhealthy food.

## **Chapter 3: Methodology**

### **3.1 Introduction**

The main objective of this research was to understand the flow of fish in the food system and how it gets to low-income households in Kitwe. This involved examining how low-income households make food purchasing decisions, what they are based on and where they actually buy the fish from. It also involved getting an understanding of how traders and fishermen make their fish purchasing and production decisions respectively. In the process of developing this understanding, linkages between different stakeholders in the food system were traced.

The specific objectives of this research are restated here as:

**Objective 1.** Where do consumers from low-income households get their fish?

**Objective 2.** What influences low-income households' decisions on where to buy the fish and how?

**Objective 3.** Where do informal traders get their fish from and what influences their decisions?

**Objective 4.** What political factors are affecting this food system?

This chapter discusses the research design, data collection methods, data analysis, ethical considerations and limitations.

#### **3.1.1 Qualitative methodology**

The project adopted a qualitative approach given the qualitative nature of the research aim. The study sought to understand aspects of social life from the actor's perspective and study their experience of the world rather than measure something (Kvale & Brinkmann, 2009 in Cheng, 2016). The study specifically sought to understand how low-income households access food (fish) and how it moves along the food system. This involved having an understanding of food purchasing decisions of low-income households and what these are based on. An understanding of decision making in the distribution system was also required in order to understand how the fish is distributed along the value chain. The qualitative approach was seen as the most appropriate approach for this study.

### **3.2 Description of study area**

Kitwe is Zambia's second largest city after Lusaka with a population of 517,543 in 2010 (CSO, 2012). Its main economic activity is copper mining (Mwitwa & Ng'andwe, 2009; Banda et al., 2004) The copper mining industry had been a major employer especially before the financial crisis (of 2008-2009 period) which coupled with liberalisation of the economy led to a lot of job losses through retrenchment. In Kitwe, a lot of people working at Nkana Mine lost their jobs and most of these joined the informal sector (Mwitwa & Ng'andwe, 2009).

This study was conducted in Itimpi, one of Kitwe's low-income settlements. It was established as a suburban township solely for expatriates. Many of its former residents engaged in market gardening supplying the mining community and the city with various farm produce ranging from fresh fruits and vegetables to pork. It was originally named Garneton and took on the name Itimpi after independence. These names are still used side by side (Kangwa, 2013). For the purpose of this study, the name Garneton is used henceforth. Most residents there are either retired government employees or those that were retrenched during privatisation of the mines.

Garneton is currently one of the seven informal settlements that was recognised by the government in Kitwe. With Kitwe's population growing faster than economic growth, it is likely that there will be a continued increase in informal settlements and their populations.

Kitwe also has one of the largest informal sectors with most businesses concentrated at Chisokone Market centrally located in Kitwe's Central Business District. The market started as a small vegetable market and is now the city's biggest market and the largest on the Copperbelt (Chabalengula, 2009; Banda et al., 2004). Chisokone market houses about 9, 000 informal traders who engage in various activities and regard trading as their livelihood that provides them with employment and income (Chabalengula, 2009).

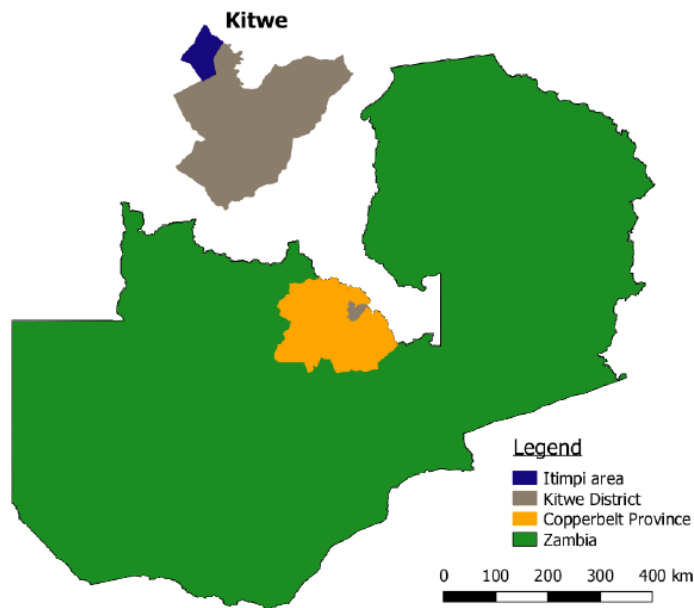


Figure 1: Map of Zambia showing the study area

### 3.3 Research design

The research design was based on the anticipated fish sources of the residents of Garneton and was partially adapted from literature. The research is illustrated in Figure 2 below.

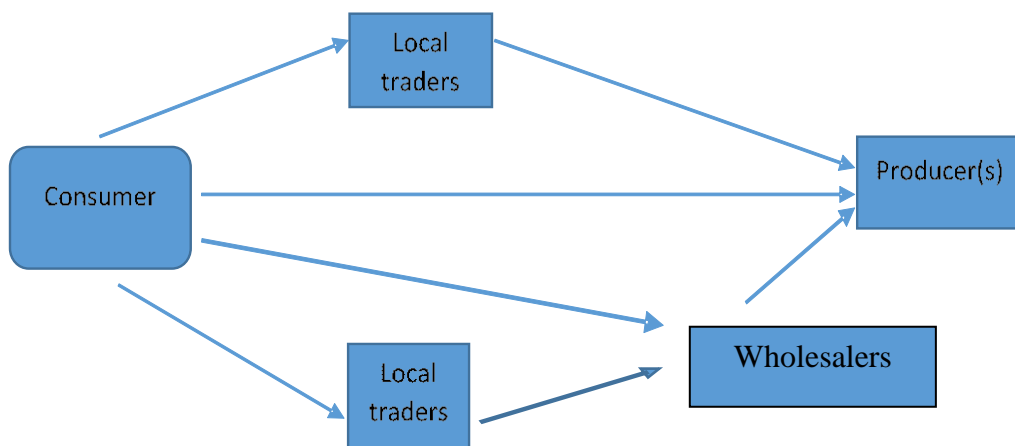


Figure 2: Anticipated fish sources for the residents of Garneton

Twenty-six interviews were conducted across the food system. These included interviews with six households, twelve informal traders (from Garneton and Chisokone markets), two large fish retail outlets (formal traders) and two fish producers (one interview with a representative from a fish producing company and the other with a fishermen). In addition,

three interviews were conducted with representatives from the department of fisheries and one with a representative of the Frozen Fish Association of Zambia. Interviews generally lasted 35 to 40 minutes although a few were longer.

Twenty-five face-to-face in-depth interviews were conducted by the researcher. The interview with the fisherman was conducted remotely by a research assistant as the interviewee was not based in Kitwe and the researcher couldn't travel due to financial and time constraints. Informed consent was obtained from all the participants.

#### Pilot interviews

Pilot interviews were conducted prior to interviews with households and traders. The aim was to test the interview questionnaire and to identify some of the key issues that the participants were facing which would help adjust and frame the interview questions. Local leaders from Garneton were informed about the study before it began. Permission was also sought from Kitwe City Council before interviews were conducted at Chisokone Market.

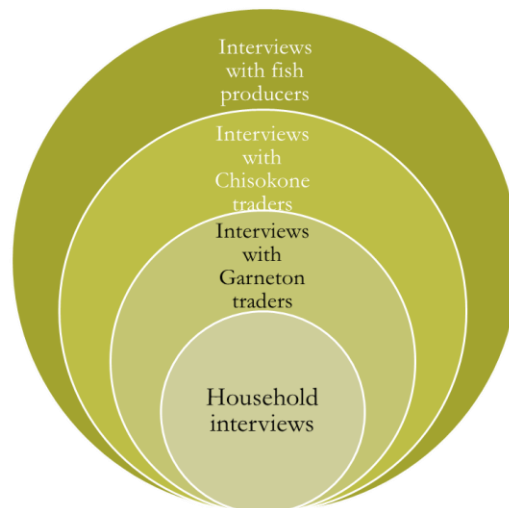
Most interviews were conducted in Bemba, a local language spoken in the study area and by the participants. This language was used to help the participants freely express themselves and make them feel part of the study. No translator was employed as the researcher was conversant with the language. All the data were collected by the researcher apart from one interview that was conducted remotely. For this, interview questions were adjusted to help the interviewer collect the data that the researcher was looking for.

### **3.4 Data collection methods**

Data collection began on the 12<sup>th</sup> of January and ended on the 29<sup>th</sup> of April 2016. The primary data were gathered via semi-structured interviews. Participants were recruited using non-probability sampling. The interviews were conducted in four phases (as depicted in figure 3 below) described below. Semi-structured interviews were the main method of collecting primary data. Four different questionnaires (see Appendix B-E) with open ended questions were developed and aimed at the four different categories of stakeholders in the food system (i.e. consumers, traders, producers and key informants from department of fisheries). The study assumed that only the informal traders and fish producers (fishermen) were part of Garneton's food system. But findings were that formal traders and producers also participated in the food system. The information that the researcher was looking for concerning decision making was similar for formal and informal traders as well as producers. Therefore, the same

questionnaires were used. Only a few questions were adjusted to make them appropriate for the formal traders and producers.

Interviews were recorded where possible and these were accompanied by field notes. Interview notes were the main data collection tool where recording was not possible.



*Figure 3: Depiction of the four main phases of the study.*

### Phase 1: Household interviews

The first phase was conducted in Garneton. This study site was chosen because it was a low-income area which provided a sample population that would help the researcher answer the research questions. It was likely that this population was homogeneous and that participants were in similar income brackets and shared similar culture and way of doing things. The market was chosen as the central location of the community. Once a starting point was identified, households were selected randomly but purposefully using homogeneous sampling.

The researcher selected households with a female adult who was knowledgeable about the economics of the household. The study started with Garneton consumers because of the need to understand how and where low-income households accessed fish in the food system. Six participants were interviewed and these were selected because they were better placed in helping the researcher with understanding the dynamics of decision making around household food purchases concerning fish. Some questions included finding out where the households

got their fish from, what influences their buying choices and whether this had changed over time (refer to Appendix B).

All household interviews were recorded and these were accompanied by handwritten notes. At the end of each interview the participants were requested to identify the traders from whom they got their fish from. Chain referral or snowball sampling, a sampling method that is used to identify hard to find populations and helps to build an exhaustive sampling frame (Bernard, 2011) was used to identify traders in Garneton and Chisokone. However, it was not possible to use this method throughout the study as some participants were hesitant while others declined to identify a participant that could be interviewed. Convenient sampling was used to identify traders and fishermen where chain referral sampling was not possible.

### *Phase 2: Interviews with informal traders in Garneton*

The second phase involved conducting interviews with fish traders in Garneton. All interviews with traders were conducted at their stands or point of sale. The interview questions sought to understand where the traders were sourcing their fish and why. Efforts were made to interview every participant that had been identified but some had either stopped selling fish or were not available for the interview. Because of limited time, the study also included traders who were not identified in the household interviews and these were selected via convenience sampling. Interviewees included five informal traders that sold dry fish and one shop owner that sold frozen fish. Literature showed that low-income households ate dry fish mostly accessed through informal traders. The research however found that most household interviewees also had access to fresh and frozen fish. In light of these findings, traders that sold frozen fish were also interviewed. Field notes were the main data collection tool where interviews could not be recorded. Traders were more difficult to recruit as some were not willing to be recruited because the study did not offer financial and in kind benefits. They were also sceptical about signing the consent forms. Therefore, only those who were willing to participate in the study without receiving any benefits and who were willing to sign the forms were recruited.

### *Phase 3: Interviews with informal traders at Chisokone market and larger formal retailers*

Phase three involved interviewing six fish traders in and around Chisokone market. Chisokone Market was selected because most household interview participants and all the dried fish traders in Garneton said they bought fish from there. It is also the largest market for informal traders in Kitwe. Interviews with traders were conducted at their stands or point of

sale. The interview questions sought to understand where the traders bought their fish from, what influenced their buying choices and what they thought about the current fish supply. The participants were selected via convenience sampling as some potential participants identified in household interviews declined to be interviewed while many of the Garneton interviewees said they either did not know the traders they bought from personally or didn't buy from a specific trader. Traders selected for this study included both wholesalers and retailers although some wholesalers sold their fish at retail as well. The study only recruited those who sold fish that was common to many Garneton households and traders.

Traders were asked to identify those who they sourced their fish from. None of the dried fish traders agreed to identify their suppliers (fishermen and wholesalers) while some advised the researcher to travel to where the fishermen are found. This could be because the traders did not trust the researcher enough to give out information about their suppliers. In addition, the period in which the study took place was during the fish ban<sup>1</sup> perhaps the traders were concerned that the study would affect their trading which was their livelihood. Only the frozen and fresh fish trader could identify where she bought her fish from. Handwritten notes were the main form of data collection where recording was not possible. Two large frozen fish retailers (formal traders) or the representatives were also interviewed. In this study, the use of the term formal traders is used to refer to those that have established trading facilities, pay tax and are thus officially recognised by the government.

#### *Phase 4: Interviews with fish producers*

Fish producers (a fish producing company and a fishermen) were interviewed in phase four. Interview questions included getting their views on fish supply and what influences their choices on what type of fish to sell, whether there had been any changes in policy and how this may have affected their trading decisions in the past five years. A representative of a fish producing company was interviewed. The company was identified by one of the frozen fish retailers that was interviewed. Handwritten notes were the main form of data collection.

Interviews with two representatives from the department of fisheries (District Fisheries Officer of Kitwe and the Provincial Fisheries Officer of the Copperbelt Province) were conducted before the study began as the interviews were based on availability of the key informants. The interviewees were identified as people most suitable to respond to the interview questions because of their positions. The key informant interviews provided more understanding and gave context to the study. The interviews aimed to get the representatives' views on fish supply and how this had changed over time. The representatives were also

asked whether there had been any changes in policy in the past 5 years and how these policy changes may have affected the distribution of fish in Kitwe with particular interest to the study area. Another representative from the Department of Fisheries (an extension officer) was interviewed after the study began in order to gain more insight into fish distribution in the study area.

A representative from the Frozen Fish Association of Zambia was also interviewed. He was identified by a key informant as someone who could be interviewed concerning frozen fish imports. The interviewee was asked about his views on the types of frozen fish that are imported into the country, how they are imported and how the fish is distributed in the country with particular interest to Kitwe. The questionnaire used for the key informants was used with this interviewee as he was initially introduced as a representative of the Department of Fisheries. The researcher only learnt during the interview that the representative only works with the Department and not employed by them. The District Fisheries Officer in Chililabombwe also assisted with answering some of the interview questions.

### **3.5 Data analysis**

Recorded interviews were transcribed using Express Scribe Transcription Software v5.85. Transcripts and the handwritten interview notes of unrecorded interviews were coded and analysed using thematic analysis.

### **3.6 Ethical Considerations**

There are a number of ethical issues in the fishing industry and these are highlighted by Garcia et al. (2005). Some of these are around poverty and the right to food. One of the ethical concerns was that this study was conducted around the period when the fish ban<sup>1</sup> was in effect in Zambia. During this period, those whose livelihoods depend on fish may be catching and selling fish illegally. Also, those who depend on fish for food might buy illegally traded fish. Challenges from this could include participants being reluctant to provide information on fish access and distribution for the study. This challenge was taken into consideration as well as the impacts that revealing sensitive information, particularly where it was found that illegal harvesting and trading of fish was taking place.

There are also ethical issues around studies that involve human subjects. In light of these, this research got ethical clearance from the University of Cape Town's Faculty of Science

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<sup>1</sup> The fish ban or no fishing season that starts on Dec 1<sup>st</sup> and ends on the 28<sup>th</sup> of February. This was put in place to allow fish to breed particularly Tilapia, the commercially preferred breed.

Research Ethics Committee and it was conducted in accordance with the University of Cape Town (UCT) Guide to Research Ethics published by the Faculty of Humanities.

Participants were recruited voluntarily and were informed about the study and what was involved. They were informed that they could withdraw from the study at any point if they so wished. Informed consent was obtained before participants could take part in the study. Those who were willing to participate in the study but could not give their consent by signing the consent form were not included in the official study. The information they gave was treated as part of an enriching experience where the researcher learnt more about food system. Participants are granted anonymity and will not be linked to this study unless where express permission was given to do so. The transcripts will be kept in a safe place and all data collected will be kept safe and confidential. The information will only be used for the purpose of this study and only the researcher will have access to it. Those who participated in the study were informed that the information would be made available to the public via publications and other means.

### **3.7 Limitations of the Study**

The study faced a number of limitations. One of these was that data collection started later than the researcher anticipated. This was because finding people to facilitate the entry into the community took time. This limited the amount of time the researcher spent in the study area. Recruiting participants was challenging for a number of reasons and was exacerbated by the late start of the research. Some people, especially traders in the study area and a fisherman, did not want to participate in the study because they felt that it did not offer any financial or benefits in kind. Others refused to participate because the study was not offering any training that would help them manage their businesses better.

Some people were willing to participate in the study until they received more information about the study. Others were sceptical about signing the consent forms and thought that their information would be used for illegal activities or that it would not be safeguarded. The researcher was not accompanied by someone they were familiar with which could have made it difficult to trust the researcher. Those who declined to participate in the study generally perceived it as being more beneficial to the researcher.

The successful interviews had a few challenges. Most areas where the informal traders were found had a lot of background noise. As a result, some of the recorded interviews were of poor quality which made transcription challenging. Handwritten notes were used to

supplement these recordings and were the main form of data collection where recording was not possible.

Time and financial constraints reduced the data collection time frame. Interviews were conducted quickly for interviewees who had to get back to work. Efforts were made to collect as much information as possible as well as ask the questions that were of greater importance to the study. Where needed, participants were later contacted to clarify some of the issues that were raised during the interview. It was also difficult to recruit participants from large or formal retailers as some of the representatives spoken to said they were not in a position to be interviewed. Getting to find the right participants took time.

Fishermen were the most difficult to recruit as they lived far away and traders spoken to did not give any contacts and advised the researcher to travel to where the fishermen are found. However, this could not be done because of time and financial constraints. A research assistant was employed to collect data from a fisherman on behalf of the researcher.

### Positionality

The study provided some challenges and opportunities due to the researcher's positionality. One of the challenges was trust. The community was conservative and a number of the people asked to take part in the study expressed suspicions particularly when it came to giving their informed consent. This could be because the researcher was not accompanied by a community member they were familiar with or could identify with. Interestingly, some people were more concerned about what direct benefits the study was offering regardless of whether the researcher was accompanied by someone they knew or not. They mentioned that they would have been more willing to sign the consent form and take part in the study if they received financial or benefits in kind. The researcher's inability to provide these direct incentives made it difficult to recruit participants, especially the traders. One fisherman found at Chisokone market also expressed similar sentiments.

A few of those that took part in the study showed concern about who and what the research was representing with some wondering whether the researcher was from the Department of Fisheries. This was mostly among the traders (both informal and formal traders). This could also be one of the reasons why some of the participants were cautious about the responses they gave during the interviews. It could also be why they did not want to identify the people they bought their fish from. It is possible that some formal traders perceived this research as a threat and thought that the researcher might give the information to a competitor.

Being local, or a Zambian conducting research from a town that was a few hours away from the researcher's home had its advantages. One is that the researcher had a general understanding of the culture and way of doing things and was therefore able to adjust by dressing appropriately, being mindful to approach people with respect and also using Bemba, the local language spoken in the study area. The community in which the research was conducted was conservative but being conversant with the language and culture made things easier. Conducting the interviews in Bemba made it easier for the participants to identify with the researcher and participate in the research. It also made it easier for the participants to express themselves which would have been more challenging had English been used. Also, challenges that come with having an interpreter such as unintentional distorting of information during the interview were minimised because the researcher was able to conduct the interview herself. Being a Zambian researcher was also looked upon favourably by some traders.

## **Chapter 4: Findings and Discussion**

This chapter presents and discusses the findings from field work and data analysis. It is informed by the research aim which was to understand the flow of fish in Kitwe's food system and how low-income households access it. The aim is broken down into research objectives, which are restated as:

**Objective 1.** Where do consumers from low-income households get their fish?

**Objective 2.** What influences low-income households' decisions about where to buy the fish and how?

**Objective 3.** Where do informal traders get their fish from and what influences their decisions?

**Objective 4.** What political factors are affecting this food system?

Based on the outlined research objectives re-stated above, the data was analysed in three parts. Part 1 looked at where low income households access their fish and factors influencing their purchasing decisions. Part 2 revealed where informal traders get their fish from and what influences their purchasing decisions. The final part looked at the political factors affecting the food system. However, because new insights such as the informal traders being directly linked to formal traders, and economic and environmental factors affecting the food system, this chapter also presents and discusses these findings. The presentation and discussion of the findings follows the three parts that were used to analyse the data.

### **4.1 Findings**

The results presented in this section are based on a case study approach. They show how fish moves along the food system and how low-income households access it. Findings were that fish follows various pathways in the food system and that low-income households source the fish mostly from informal traders. However, low-income households also have access to fish that is sourced globally by large formal retailers. The informal traders buy fish in bulk from formal traders and then low-income households in turn purchase it from them. This shows a strong interconnection between the local food system and the global food supply chain with the food and nutritional needs of the urban poor being met by both food systems. The findings also showed that availability and accessibility cannot be separated. The relationship between them is complex as traders navigate variable availability in order to ensure accessibility.

#### 4.1.1 Consumer access to fish and factors that influence their decisions

##### Reasons for fish consumption in Garneton

This section presents the findings on fish consumed among the household participants, how they were able to buy it, and why they consumed it. The findings were that all the households consumed at least one type of fish, with small and medium sized fish being the most common. Many of the interviewees consumed small and medium sized fish but over half of them expressed a strong desire to consume bigger fish. One participant said, *“There are times when you don’t have but when you have you would say let me eat something different and say let me eat the bigger fish . . . The **big** breams”* (HH#2 28/12/2016). This participant consumed bigger fish when she had more income. Another explained, *“Yes please. As I mentioned that it’s because I cannot afford that’s why we eat this type of fish. If we had money every now and then, we wouldn’t want to eat fish that has sand in it. We would also like to eat bigger fish”* (HH#3 28/01/2016). When asked what they would desire to eat if they had more income, one participant said, *“The big breams. Those really big breams”* (HH#1 28/01/2016). Income determined what type of fish the participants consumed. Those with lower incomes were forced to buy smaller fish including fish perceived to be of poor quality. More income gave some of them a wider food choice and enabled them to buy the desired big fish.

The ability to buy fish was influenced by the fact that fish is available in different sizes and units which can be sold at various prices. The different sizes of fish and units of sale are shown in figure 4 below. One respondent from the Department of Fisheries and Livestock explained, *“. . . if you are to interview most of the households like I spoke of, people of Garneton, the common species that they eat is Kapenta and any of the species but in smaller sizes . . . Because the bigger the fish, the more costly it is and I think it’s for the middle class that they tend to afford that”* (DLF#2 27/01/2016). This was confirmed by one household participant who said, *“. . . like some of us who are . . . like what I said that some of us are not able to afford much, fish is in different forms. Fish like Popa is K2 but when you go to Zambeef you won’t find meat for K2”* (HH#3 28/01/2016). The interview participant who had limited income and food choices due to the high prices was forced to buy cheaper fish. A fisherman explaining why people prefer fish to meat said, *“Yes. But also because it [fish] is available and it is the only relish available and cheaper compared to meat”* (FP#2 26/04/2016). Because of its different forms, fish was a cheaper choice compared to meat.



*Figure 4: Types and sizes of dried fish and the different units of measurements used*

#### Sources and reasons for sourcing

Fish was mainly consumed because it was available, affordable and adds variety to the diet although participants were aware of some nutritional and health benefit. Other reasons for fish consumption included taste and aroma. Most of the interviewees bought fish from informal traders in Garneton and Chisokone market. This is depicted in figure 5 below.<sup>2</sup> Only one participant bought fish from Chisokone and other formal and informal traders because she was a fish trader and bought fish in bulk. One participant bought from informal traders locally and from formal and informal retailers in town. Another participant only bought fish from Garneton traders because of his inability (financial) to buy fish quantities or volumes sold at Chisokone market. Fish was also sourced from a nearby river. One participant mentioned that she went fishing at a nearby stream during the dry season (from August to October) when the water levels were much lower.

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<sup>2</sup> Figure 5 is a weighted diagram which depicts various fish sources based on research findings. The thicker lines depict the sources that were more important to the respondents. Most of the interview participants bought fish from local traders (depicted by thicker lines) where fewer participants bought fish directly from producers and wholesalers (depicted by thin lines).

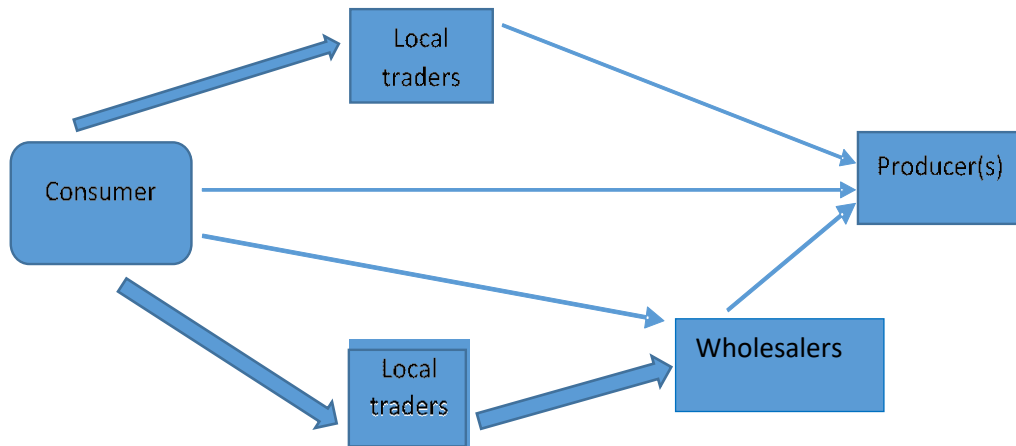


Figure 5: Fish sources and their importance to consumers based on research findings.

#### 4.1.2 Informal traders and what influences their decision making

##### 4.1.2.1 Informal traders in Garneton

###### Fish sold and reasons for selling the fish

All the dried fish traders interviewed in Garneton sold a variety of fish (more than one type of fish). The most common fish sold among them were Chisense (*Microthrissa stappersi*) and Popa<sup>3</sup> which were sold by 4 out of 5 dried fish traders followed by Ulusembe<sup>4</sup> which was sold by 3 out of the 5 dried fish traders. The frozen fish trader also sold more than one type of fish which he bought from formal traders within Kitwe. Their reasons for choosing the fish they sold were varied and can be classified as supply and demand factors. The supply factors included availability, affordability and capital while supply factors included consumer preference.

For two traders, availability determined the type of fish they decided to sell. A trader who had initially been selling larger fish started selling smaller fish because of their availability. As the trader explained, “*This is because those (larger fish) stopped being available. When you go to Chisokone most times, the small sized fish are the ones that are available. Sometimes they are not readily available. So I just started selling these because they are the ones that are available*” (GMT#1 05/02/2016).

<sup>3</sup> Popa. The common and scientific name for this fish could not be found during the course of this study.

<sup>4</sup> Ulusembe. The common and scientific name for this fish could not be found during the course of this study.

Another trader mentioned that at the time that he decided to get into the fish business, availability influenced his decision on the type of frozen fish he sold. The trader mentioned that, *“These were the types of fish available at the market from the supplier at the time the decision to sell fish was made”* (GFT#6 13/02/2016). This trader had initially been selling fresh Kapenta and stopped selling it when it was no longer available. Furthermore, when Buka, one of the other fish types he had been selling, stopped being available he replaced it with horse Mackerel, the imported fish from Namibia. The trader said, *“I used to sell frozen/fresh Kapenta but since it’s not around they stopped selling it. Buka has also not been around for a month while for Kapenta it’s been about 4-5 months since it’s been out of stock. Buka has been replaced by the new fish (Horse Mackerel)”* (GFT#6 13/02/2016). This trader’s fish choices were highly driven by what was available on the market.

Capital also determined the type of fish that some traders decided to sell. As one trader noted, *“The choice of the type of fish to sell was dependant on the amount of money I had. And this fish was also cheaper to source”* (GHT#3 13/02/2016). The amount of money one had as well as affordability influenced fish bought. Other traders considered how easy it was to access the fish.

Consumer preference also impacted traders’ decisions on what fish to sell in that they considered what fish consumers liked and sold that. Traders also considered the area they were selling the fish in and what would sell faster in such an area. As one trader mentioned, *“I chose these fish because I considered the kind of area that we live in and chose fish that would be fast moving”* (GHT#5 18/02/2016). Fast moving was used by as a measure of customer preference. Fish that could easily sell in one area may not easily sell in another because of different dynamics such as sources of income which determine what fish people can afford to buy. As one trader explained, *“. . . you just can’t go and buy the big fish, it’s expensive. Unless our colleagues who sell in Chingola, they are the ones who buy it because even if they said one big one is 50pin [Kwacha 50] people can still buy it, there is a mine there. Not here no”* (GMT#2 05/02/2016). Furthermore, one household participant noted, *“... we don’t have enough money here because the companies are very far away from where we live”* (HH#3 28/01/2016). This participant felt that his lack of money was because companies or potential employers were far away from where he lived.

Dynamics such as distance also determined the fish that consumers bought or what was fast moving (preferred fish). One trader who only sold fish that she considered was preferred by her consumers explained, *“It’s because it goes with the area [preference]. This area where we*

are found it's like we are towards the end so many people find it difficult to go to town to go and buy food that is a bit different (variety). They can go when they get paid but they can't go one up to thirty (every day of the month). Maybe they'll go just when they get paid that's when they'll go to town. What remains is maybe K5, and K5 is what you need to get to town, or K7. Now if you only have K5 and you don't have relish and you want to buy relish, you can't go to town. You can't manage" (GMT#1 05/02/2016). This trader considered the transport and income dynamics of Garneton residents. Low incomes limited Garneton residents' ability to travel to town to buy food. After their expenditures they were left with small amounts of money which only afforded them low priced fish. Garneton was far from town and at times required two buses to get there which was quite expensive.

#### Sources and reasons for sourcing (Garneton traders)

All the dried fish traders said that they bought the fish they sold from wholesalers at Chisokone Market. Only one trader mentioned that she also travels to the river to buy fish from fishermen and wholesalers. The frozen fish trader bought fish from various formal retailers within town. Their reasons for purchasing fish from Chisokone and formal traders in town were varied but can mostly be classified as supply factors.

The interviews revealed that some traders bought fish from Chisokone because it was the only or known main source of fish. One trader noted, *"That is where it is found (Chisokone). That is where we go. What can I say...it's the main town?"* (GMT#1 05/02/2016).

Chisokone was also closer or more physically accessible to Garneton traders compared to going to the source. The trader who bought fish from the source bought fish from Chisokone while preparing "herself" for the trip to the source. The trader noted, *"I buy there (Chisokone) because it's nearer. I can buy fish from there (Chisokone) to sell as I am preparing myself to go to the river"* (GHT#5 18/02/2016). She said that she needed less transport money to go to Chisokone compared to going to the source. Unlike other traders, this trader had more fish sourcing options probably because she was wealthier and could afford the transport costs.

Capital was also a factor. Those that had thought about getting fish from the source stated that insufficient capital left them in a position to only buy from Chisokone which was closer. One trader mentioned, *"Why we buy from Chisokone? Because we can't go to the river. We can't have the enough transport money to go to the river"* (GMT#2 05/02/2016). Although no specific sources were mentioned, traders knew that they could get fish from another place other than Chisokone.

Availability and affordability also determined where fish was bought particularly for the frozen fish trader who bought fish from those who had it and stopped buying from certain traders when it was not economically accessible or affordable. The frozen fish trader said, “Because they have readily available fish that we are interested in. I used to buy fish from Texaco and Mbukuli I stopped buying from them a year ago because they stopped stocking fish. I also used to buy from Great Lakes Fisheries as well but stopped in 2010 because of high prices” (GFT#6 13/02/2016). Availability and affordability were a huge driver of fish sourcing for this trader.

The trader who bought fish from the river cited affordability and higher profits as reasons why she bought fish from there. She noted, “At the river, when you prepare yourself, the profit you get from selling the fish you buy there is much bigger”. She bought it, “From the fishermen as well as from those who have already bought in advance inside and then they sell it at a favourable/cheaper/affordable price” (GHT#5 18/02/2016). The trader bought fish in large quantities (big bags) and at a cheaper price. She would resell the fish in smaller quantities. Her ability to buy fish from the source at a cheaper price and resell in smaller quantities meant she was able to get higher profits compared to buying it from Chisokone. Fish was more expensive at Chisokone and was sold in smaller quantities compared to the source. Wealthier traders were able to afford the transport costs that enabled them to buy the same fish in bulk and at cheaper prices than Chisokone. This led to making more profit. Smaller traders were locked in to buying from Chisokone at higher prices.

#### ***4.2.1.2 Informal and formal traders in Chisokone.***

##### ***Types of fish sold by Chisokone traders and reasons they were sold***

All but one trader interviewed sold a variety of fish or other food alongside the fish. The one trader sold fish at wholesale and specialised in selling one type of fish. The most common fish sold among the traders were Siavonga Kapenta or Siavonga (*Limnothrissa miodon*) and Mpulungu Kapenta or Kapenta (*Stolothrissa tanganyicae*) which were sold by three of the five dry fish traders. This was followed by Chisense (*Angraulicypris spp* and *Poecilothrissa moeruensis*) sold by two of the dry fish traders. Tilapia (from China) and Horse Mackerel (from Namibia) were the most common fish sold among the three frozen fish traders (two formal and one informal). This was followed by Buka (*Luciolates spp.*) which was sold by two of the frozen fish traders (one formal and one informal). Majority of the tilapia sold, which was of different sizes, was said to be imported from China coming into the country in 10 kg boxes while majority of the Horse Mackerel came from Namibia. The fresh tilapia

came from Lake Harvest. Some of the local and imported fish sold by the informal traders at Chisokone market are shown in figure 6 below.



*Figure 6: Visual of local (a & b) and imported fish (c & d) sold by informal traders at Chisokone market. These are a. Luangwa bream b. Chisense c. Tilapia from China and d. Mackerel from Namibia. The informal traders buy the fresh and frozen fish from formal traders and then repackage and sell in smaller units*

Chisokone traders gave various reasons why they decided to sell the fish they sell. These can be classified as supply and demand factors. Two of the traders attributed their decisions to profitability and economic access, that is, the ability to buy fish at an affordable price and make a profit. As one trader mentioned, *“They are cheaper to source I am used to selling fresh fish and it has faster profits. I have never tried selling dry fish. I started selling this because the price is fair”* (CMT#5 23/02/2016).

Some traders were influenced by either their family members or a fellow trader. One participant said that she decided to start selling the fish she was selling because that fish type is what her sister was selling. The trader said, *“Because my sister also sells the same type of*

*fish.*” Another trader who had only been selling rice decided to sell the fish that she sold after taking over the stand used by a previous trader. The previous trader sold fish from Luangwa River which the participant decided to continue selling after she decided to get into the fish business. This trader mentioned that, “. . . *this (fish) is the one people are used to here because the person who used to sell here used to sell Luangwa fish . . . Luangwa is fast moving. It moves well*” (CMT#3 23/02/2016). The trader was also influenced by customer preference. Customers that came that way were accustomed to buying the Luangwa fish from that particular stand and it was what they preferred. The interviewee also said that that was the fish she was accustomed to eating as well so this made her decide to sell it.

Another factor that affected fish choice was easy maintenance as one formal trader explained, “. . . *first of all you know the food industry is very delicate . . . Frozen fish is much better to maintain and sustain.*” The same trader also mentioned that his location affected the type of fish he sold. He noted, “. . . *secondly am in a market I mean if I start doing what all the market does the marketeers will get upset. So basically I do the frozen, they do the . . . They do the dry (fish)*” (FFT#2 19/02/2016). Being located very close to Chisokone market, the trader decided to sell something that would not cause him to be at odds with the marketeers. He decided to create his own niche by selling frozen fish.

Consumer preference also influenced the decision on the type of fish to sell. Some traders chose to sell fish that customers preferred to eat. One trader noted, “*Siavonga Kapenta doesn't have much losses and people like it a lot. It's also cheaper when the ban is lifted*” (CMT#1 19/02/2016).

#### *Sources and reasons for sourcing (Chisokone traders)*

All the informal traders at Chisokone said they bought some of the fish they sold from Chisokone while two said they also bought from Mpulungu, a town at the southern tip of Lake Tanganyika in the Northern province of Zambia. Fish from Mpulungu came from Lake Tanganyika. The specialist fish trader said they normally bought fish from Luapula. Another trader bought fish from Lusaka while the fresh and frozen fish informal trader said she bought fish from several large fish retailers close to the market. These include Olympic Milling, Kugula, Capital Fisheries, Jumbo, Great Lakes and Lake Harvest. She bought from various traders because she was in search of quality fish and good customer service. She explained that, “*Texaco doesn't treat its customers well and refuses to change the fish when returned. So we go from place to place to find out what we want. Sometimes the fish comes rotten so I*

*go elsewhere*” (CMT#5 23/02/2016). <sup>5</sup>The study found that traders sometimes returned unsold fish if they were not happy with the quality.

Both formal traders bought their fish directly from China. One of the formal traders buys fish from Namibia as well while the other buys from various suppliers within the country including fishermen, fish farmers and other fish importers and wholesalers. Imported frozen fish was found to be cheaper particularly the Chinese tilapia as it was otherwise known. As one participant noted, *“Yes the imported tilapia is actually cheaper apparently, I don’t know why? But it’s being imported but it’s actually the cheapest. Because even if you have to go to our local tilapia and compare it or compare this tilapia that our farmers are producing and compare the price with the imported one, you find that a farmer that is producing locally will have a higher price maybe because of production costs . . .”* (DLF#1, 12/01/2016).

Several factors influenced fish purchasing decisions and these can mostly be classified as supply factors. The first supply factor was capital. Two of the informal traders mentioned capital as a factor that determined their decision of where to source their fish. One trader said, *“The capital is not yet enough for us to travel to the river”* (CMT#3 23/02/2016).

Low capital meant that traders had insufficient transport money to travel and buy fish at the source and lacked money to buy the fish. Some traders thought that buying fish at the source required more money which they did not have and hence could not travel to the source. This was explained by one trader who said, *“.... they are the ones who have the capital to go and order. People who buy from there (river) buy cash.”* (CMT #4 23/02/2016). The same trader opted to buy fish from Chisokone where she was able to buy on credit and pay after selling it in small volumes. The trader noted, *“I get fish on credit which I sell and take back the money to get more fish. I only get the profit that I make. I decide on how much profit to make not the lender”* (CMT#4 23/02/2016).

As with Garneton traders, only the wealthier traders were able to source fish from places other than Chisokone. However, those who also had families living near water bodies such as lakes would have their family members buy the fish and send it to them by bus.

The specialist trader stated fish availability as a factor that determined where fish was bought. He bought fish from Luapula because that is where the fish he sold is found. However, whenever there was a short supply or insufficient fish on the market they bought fish from

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<sup>5</sup> If unsold fish that was purchased from formal traders was discovered to be rotten it was taken back. Formal traders who were negotiable and able to change the fish were preferred.

different sources including other traders within the market as well as traders from markets in other towns within the Copperbelt. Furthermore, the specialist fish trader's buying decisions were also determined by wanting to create a niche in the fish distribution system. The trader only sold fish in large volumes only catering to those who could buy fish in large volumes.

Similarly, one of the formal fish traders stated availability as a factor that influenced his decision on where to purchase fish. He sourced fish from those who had it and maintained a number of suppliers so as to ensure that he had enough fish to sell particularly for fish that was difficult to source.

The trader also cited competition as a factor that influenced his choice of where to buy fish. The competition came from the rise of many frozen and fresh fish traders who sold fish at a lower price. The trader stated, *"However, I can say that every two to three months a fish shop opens here. So like you see a small container there, his overheads e.g. [for example] are so much less than mine so he might sell the same box K10 cheaper"* (FFT#2 19/02/2016). The low fish price presented a challenge so the trader who initially bought from middlemen decided to import fish directly from China in order to keep up with the low competitive prices. The trader stated, *"What this has done for me now is that I will start importing directly from China now . . . You wanna sell it at K150 we can follow, you wanna sell it at K140 we can follow you wanna sell it at K130 we can follow. I can be in a profit margin and be competitive . . . I've reached a level now in the sense that instead of buying the fish from the suppliers locally I have gone directly to China"* (FFT#2 19/02/2016).

Another participant mentioned constant supply as a reason that determined where they bought their fish. Sourcing fish in Zambia posed a challenge to large fish traders that were set up to operate throughout the year. This was because the ban greatly reduced availability of fish on the market. They opted to buy fish from suppliers that could supplying fish throughout the year. This was expressed by one participant, *". . . nothing that we sell is seasonal. It's a business that is set up to run throughout the year. So it's not like now we can't order more fish because the rivers are closed"* (FFT#1 12/02/2016). Seasonal changes which also coincided with the fish ban did not affect trading of imported fish.

Zambian farmed fish which can be sold during the fish ban is still insufficient to meet the demand and stocks required by the fish traders. One representative from the Department of Livestock and Fisheries explained that, *". . . these farmers that we are talking about here are one, small scale most of them... I think you were hearing when we were talking about the production systems that most of them are under extensive way of production. So they are still*

*into the production for the household. Not really much on the production for sales” (DOLF#1 12/01/2016).*

The importance of large scale production and constant supply to large scale traders was explained by one participant who said, “. . . *and also places like over there, they . . . they’ve they’ve advanced in aqua you know . . . aqua . . . agro systems. So they know they’ve been in this kind of trade for a long time and they have. . . you know massive experience and massive ways of farming and also just dealing with fish business. So you wanna work with people that you know are going to have constant supply and all that” (FFT#1 12/02/2016).*

The need for a constant supply that went beyond the fish ban made traders source their fish from China where fish farming was highly developed and fish was produced in large quantities which led to reduced purchase prices. This was expressed by one participant, “. . . *And also maybe the pricing because if they produce it in higher quantities and they sell it for less why would you wanna go and import it from Australia? You get my point? So . . .” (FFT#1 12/02/2016).*

Consideration for wholesalers also influenced the choice of where fish was bought. One trader mentioned that not everyone could buy fish from fish producers and these people then bought from wholesalers. The trader noted, “. . . *I consider the wholesalers that’s why. Not everyone can buy from the producers” (CMT#2 19/02/2016).*

The findings in this section show how complex the food system is, the different paths that fish takes to get to low-income households and the various decisions involved in the food system.

#### **4.1.3. Factors affecting the food system**

The study found several factors affecting the food system. These included political, economic and climatic factors. Policy factors presented in this section include the fish ban, increase in electricity tariffs and fuel prices while the main economic factors are around currency devaluation. The climatic and human factors include rainfall, lack of adherence to the fish ban and traditional ceremonies.

##### **4.3.1.1 Policy factors**

Various policies were found to impact on the food system. These included policies that were meant for fish as well as indirect policies that were set in and for other sectors. The fish ban which was put in place to allow fish to breed has been helpful in keeping certain species of fish. Even though some fish species were found to have drastically reduced or extinct due to overfishing, the availability of fish from capture fisheries was owed to the fish ban policy as

one participant from the Department of Livestock and Fisheries explained, “*So it helps (fish ban) in that we are able to be breeding this fish in the time that it is supposed to breed. Because the fish ban is basically put in place because this is the time the fish is supposed to breed. And so, it’s not supposed to be disturbed during this period. So, if this policy (fish ban) was not there for instance, I don’t think we would still be talking about getting fish from the wild even now*” (DLF #1 12/01/2016).

However, the fish ban which coincides with the rainy season (normally from October to April) in Zambia also has negative impacts. The study found that the ban reduced availability of fish on the market which led to price increase. This was explained by one trader who said, “. . . *there’s a season when the rivers are closed . . . Like now. So when they open in March, the fish will start coming in, and those who are harvesting will also have some money. So we also reduce the price taking it back...you know what am talking about? . . . So it is coming in frequently so we reduce the price...But now there’s no fish coming in so we put the fish at a high price its K150 because I know there’s nowhere else where the fish is coming in from.*” (CMT#6 19/02/2016).

Dried fish traders in this study generally did not switch from dried fish to fresh fish (as imported frozen fish sold as fresh fish was available all year round) or fresh fish to dried fish when there was less fish on the market, they instead bought the volume of fish they could afford with the money they had or came back with nothing, particularly for informal traders in Garneton. One trader noted, “. . . *we don’t stop we, we don’t change (type of fish sold) ... we just increase (price)...*” (GMT1 05/02/2016). Another trader explained that, “. . . *we find challenges in buying fish sometimes. There are times when...you find there is nothing, it’s expensive and it’s difficult. There is even a queue. You buy, you wait. It means that the time will be a bit longer. You wait. Sometimes when it’s really difficult we just come back... without buying. It means it’s very difficult... you just go back. We don’t look at transport, if we did we wouldn’t have been going there... So like now...this period we are in from December when they close...December, January, February... that’s when it’s very difficult*” (GMT#1 05/02/2016). Another trader noted that, “. . .*Like now during the rainy season, the rivers have been closed, so we find challenges in having the right quantity of fish that we should be selling because the fish in the depots is finished*” (HH#2 28/01/2016). Closing the river was used to refer to the fish ban.

However, others temporarily stopped selling fish as explained by one trader, “*Now that there is a fish ban there are fewer fish traders because fish becomes expensive so they can’t afford*

to buy it. But when the river is open more traders come out because the price of fish goes down” (CMT#4 23/02/2016). Only those who could afford to buy fish (by cash or on credit) at the high price sold fish during the fish ban. Another noted, “No I don’t change (type of fish sold) it’s just that this year the fish is very expensive so am failing to get any profit... at the moment am not selling fish because the fish is expensive due of the fish ban” (GHT#3 13/02/2016).

Profit determined the type of fish sold, forced this trader to suspend her fish business. Those who sold other items focused on selling them when the fish they sold was not available or became expensive. The trader who temporarily suspended her fish business focused on her other business. She mentioned that, “... am waiting for the ban to be lifted so that I go to the river to go and buy fish for sale. At the moment I sell cow heads” (GHT#3 13/02/2016). She said she would usually buy smaller volumes of the fish from Chisokone in the previous years during the fish ban but the price of fish was so high this season that she could not make a profit. So she temporarily stopped selling fish and concentrated on selling cow heads during the fish ban period. She would resume her fish business once the fish ban was lifted.

The price of fish on the market fluctuated and was adjusted depending on how much wholesalers or producers sold it for. The price increase trickled down to the traders that sold it directly to the consumers as one household participant noted, “The months when it becomes expensive? The months when they close the rivers” (HH#3 28/01/2016).

Thus during the fish ban when prices were high, traders would adjust the prices upwards or and downwards when the price of fish went down. One trader explained, “... for us when it becomes expensive we just buy and then we increase the price... When it’s readily available we also reduce the price” (GMT#1 05/02/2016).

Some traders at Chisokone stock up dried fish which they sell during the fish ban at a high price. One trader noted, “Yes there are times when the fish doesn’t come. So as it is we bought the fish in advance and put it in the depot...” (CMT#6 19/02/2016). However, when the prices were hiked during the fish ban, the fish didn’t sell as much as it did when the ban was lifted.

Others thought fish was available during the fish ban period except that it was expensive. The high price of fish during the fish ban was also expressed by a respondent from the Department of Livestock and Fisheries, “So during this period when fish is left to breed especially in these

*breeding areas, the price gets higher. But as we open the fishing season, the price tends to slightly stabilise...*” (DLF#2 26/01/2016).

This also changed the distribution of fish. Garneton traders who had wholesalers they usually bought from resorted to buying fish from other traders who had fish during the fish ban regardless of who they were. This was because some of the usual traders run out of fish during this period. Traders also bought less fish and would fail to make profit due to high fish prices. Fish was also sold in smaller volumes during this time which made some traders fail to get the quantities of fish that they needed. One of the traders explained that, *“There are times you find that all the people that you usually buy from don’t have the fish and you end up buying from those who sell it at a much higher price.... There are times when you even run out of money, it becomes insufficient.... You buy maybe...they sell things to you at a high price and you find that you don’t have enough money to buy, that is running out of money.... You have enough money, they sell the food in small quantities such that when you come back to sell you don’t get your money back, that is running out of money”* (GMT#2 05/02/2016).

Fishermen whose livelihood depended on fishing resorted to illegal fishing and trading during this period. This was done even though they were fully aware that the fish ban was in place. The fisherman interviewed admitted to illegal fishing and said, *“... fishing is the main occupation here and most people have to fish to live... We depend on fish for our income so when they ban fishing we have no sources of income.... We are affected. As earlier mentioned we do not have income during fish ban... We still sneak in the lake and go fishing occasionally”* (FP#2 26/04/2016). Illegal fishing activities were also acknowledged by a participant from the Department of Livestock and Fisheries who said, *“... they will also go to there (river) because they know that this time around no one is fishing there and so there is plenty fish there. So that’s when they’ll also just go and catch this fish and find their way and you know, just try and sneak it into the market”* (DLF#1 12/02/2016).

Fish sold illegally during the fish ban is also expensive as it’s not readily available and the ramifications of fishing during this period are high and are factored into the selling price. One fisherman explained, *“Fish is rare during fish ban because we are not allowed by government to catch it. If they catch you it is an offense and you can be penalised. The risks are high so we increase the price”* (FP#2 26/04/2016). Fishermen may engage in other activities such as farming but consider fishing as their primary livelihood. The ban thus affects their income. The fisherman explained that, *“Yes, we have a farm... Whenever we are not out on the lake we go to the farm where we grow maize and groundnuts... We also use income from fishing to*

*invest in farm activities like paying people to cultivate, buying seed and fertiliser” (FP#2 26/04/2016).*

This study also revealed that fish may be caught and dried illegally so that it is sold immediately after the ban is lifted. Like one trader mentioned, *“we find it (at the source) because some people dry it in advance in secret... But they are scared of the fish being confiscated and then burned” (GHT#3 13/02/2016).* This trader goes to the source to buy fish shortly after the ban is lifted and finds the dried fish ready when she gets there.

Increase in commercial electricity tariffs also had an effect on the food system. The study found that the increase in tariffs was passed on to the customers through the price of fish. *“Am on a commercial tariff what am I going to do? Am going to increase my food stuff prices. Are you not paying for that electricity anyway as a domestic user?... You are. You know... whichever way you’ll channel you’ll end up paying (FFR#2 19/02/2016).* Increase in fuel prices was also found to impact on the price of fish as noted by one participant, *“Yes, even the fuel, it was expensive to transport” (DLF#3 23/02/2016).*

#### **4.1.3.2 Economic factors**

Currency fluctuation affected the price of fish from capture fisheries and imported fish. As one participant said, *“Production costs can be the same but due to the fluctuation of the dollar in Zambia brings challenges” (FP#1 23/02/2016).* The currency fluctuation is commonly referred to as the “dollar” which is the devaluation of the Kwacha, Zambia’s currency against the dollar had an impact on a lot of trading. Some participants attributed the increase in fish price to currency devaluation. One participant noted, *“Last time they started talking about the dollar, so I don’t know. Last time they were talking about the dollar...and...” (DLF#3 23/02/2016).* Similarly, fish importers that bought fish in US dollars found it challenging to price their fish when the Kwacha devalued. Making it affordable to their consumers, recover the cost and make a profit proved to be a big challenge. This was explained by one participant who said, *“Determining the selling price in the past 6 months hasn’t been easy... the fish... is quoted in dollars so this has been a challenge because of the instability of the Kwacha” (FP#1 23/02/2016).*

Market liberalisation also impacted the food system. Some interview participants stated that some of the fish at the market was sold to the Congolese who took it with them to Congo. One of the traders stated that, *“Yes we have heard that the Congolese take Chisense and Popa... that’s what they get they take it with them to Congo” (GMT#2 05/02/2016).* This then was

said to lead to reduced availability of fish on the market and an increase in fish prices. *“It would be nice for us when the fish is not exported to Congo. If all the fish is kept here it would make it easier for us to buy fish. But as it is we split the fish into half”* (HH#2 28/01/2016).

Similarly, another trader said, *“... we have heard that the Congolese take Chisense and Popa... it becomes less and those who remain with the products increase the price since those who remain with the products are few”* (GMT#2 05/02/2016).

The Congolese’s ability to purchase the fish in large quantities because they had more money than the local traders exacerbated the situation. This made it more challenging for the local traders making them lose out on the fish they were supposed to purchase and sell. One trader explained that, *“Because our friends have money but we Zambians don’t have. So if someone from here says am going to buy fish and when those people come with a lot of money, it means you won’t buy the ones who will buy are those people”* (HH#2 28/01/2016). And another said, *“So if its selling, we should sell half of the products. We give them what is reasonable. But they want to sell most of the products to the Congolese saying that they are not difficult. For us they could tell us that a bag of Popa is K1,000. Us the Zambians would prefer to buy it at K700 and the Congolese have a lot of money. The K1000 can be produced right there and then, and even if the fish is sold at K1,500 per bag they will buy. You see. While we don’t have that kind of money. That is what causes problems, we don’t have money while they have do”* (GMT#2 05/02/2016).

The fish traders decided to sell their fish to the highest bidder as expressed by one trader who said, *“No the owners of the fish are the ones that allow them to get since they won’t buy in dishes that us Zambians buy no, they buy in bags. So if they decide to buy the car load of Popa they just negotiate with the owner of the fish. The owner then gives them the price of fish per bag at a certain price depending on what s/he decides”* (GMT#2 05/02/2016).

The main interest of those who brought fish from the source was to sell it and go back so they sold it to whoever was able to buy the it. This was according to one trader who said, *“. . . those who kill the fish are the producers themselves who come with the fish from the river . . .Especially since they are also rushing to sell the fish so that they can go back to go*

*and get more fish*” (GMT#2 05/02/2016). The traders thought that regulating the amount of fish sold to the Congolese would be helpful.

The study also found that some of the frozen fish imported into the country from China and Namibia was also sold to Congo due to the large demand and favourable prices. The fish sold to the Congo was priced in US Dollars which made it an attractive business. This was expressed by the Frozen Fish Association President who said, “...now it has become so popular especially that the Kasumbalesa market has attracted a lot of traders to come in due to the fact that it’s being sold in US dollars” (FFTR 22/02/2016). Kasumbalesa is an area that borders Zambia and the Democratic Republic of Congo.

#### **4.1.3.3 Climatic and human factors**

Climatic factors such as the cold season and rainfall affected the price of fish as expressed by one trader, “. . . weather permitting, and coldness affects the production (of fresh Kapenta) instead of getting 2000 packets maybe the supplier will give you a 1000. You know. However also rainfall is a very important factor. It hasn’t rained well this year. The water levels have dropped drastically” (FFT#2 19/02/2016). Some respondents attributed high fish prices to low rainfall which impacted the availability of fish and drives the price of fish up. As expressed by one trader, “For Siavonga, the price increase is because it dies more when there is more water according to the white people who kill it.... So when the rains became less like a while back, that was when Siavonga became difficult. It was at K70 and they changed it to K100. It then moved from K100 to K150 and K170. That was because of the low rainfall a while back” (GMT#2 05/02/2016).

This was also expressed by one of the respondents from the Department of Livestock and Fisheries who said, “The reason why it’s so expensive is because where it is coming from the rains are not much so there’s a low water table whereby the production of Kapenta is not much. So it will continue to be expensive if the rain pattern will be just like this” (DLF#3 23/02/2016). The high prices caused some traders to suspend their trading as discussed above. For fish such as Buka, which was one of the highly preferred fish, the catches affected its availability and price. Low catches pushed prices up while higher catches push them down. This was according to one trader who said, “Buka now, I told you Buka last year was selling at K480. Today its current price now is K800.... For a 20 Kilo bag. Now this is not affiliated only to the dollar exchange rate. It’s that the catches there in Tanganyika are not good. So

*when the catch is low the prices climb. Fishermen get greedy and start slamming the prices up. When now, right now am retailing it at K40. If Mpulungu does catch like 3-400 tons, then you find that you can sell it at K17, half the price, next month”* (FFT#2 19/02/2016).

Buka is from a shared water body, Lake Tanganyika, where the fish ban does not hold. However, the catches affect its availability which lead to dramatic increase in its price when it's only available in lower quantities.

Human factors such as lack of adherence to the fish ban and using inappropriate or illegal fishing methods such as mosquito nets that caught both large and small fish were used. These also contributed to fish decline. The fisherman who was interviewed said, “... *fishing methods especially in the past were never sustainable. Some would use methods that killed fish including small ones. Others would use nets that caught every type of fish whether small or big*” (FP#2 26/04/2016).

The same fisherman however, admitted to using mosquito nets which are prohibited by the government. The fisherman stated, “*We use mosquito nets to catch fish*” (FP#2 26/04/2016).

Another interesting finding was that the low catches of fish were attributed to lack of adherence of traditional customs. One trader explained, “*The chief who is called Mwene Tafuna used to go to an island called Mbita to consult the spirits. But this ceremony ceased three years ago and the chief now encourages people to pray. People believe that the low catches of fish that they have now are because the ceremony was stopped. So they would like for the ceremony to resume*” (CMT#2 19/02/2016). The traditional leader abolished traditional customs and encouraged prayer in its place. It was thought that bringing back the custom would lead to higher catches of fish.

This section has shown the various challenges that the food system is facing, and possibly the various gaps for intervention. In view of the above findings, a different approach to the food system might be required.

## **4.2 Discussion**

### **4.2.1 Consumer access to fish and factors that influence their decisions**

The study found that low-income households consumed fish, particularly small and medium sized fish. Although fish is generally expensive, low income households were able to buy it because it comes in different sizes, sold in different units and sold at various prices. This has meant that it can be sold at low prices that other protein sources such as beef may not be found in. This is in agreement with Beveridge et al. (2013) who found that low-income

households preferred to buy smaller fish and that in Southern Africa, the cheapest fish are the smaller fresh water pelagic species such as Kapenta or *Limnothrissa sp.* Low-income consumers desired to eat big fish even though they tended to consume smaller fish. Their choice of fish and what they could eat was limited by their low incomes. These findings were in agreement with NFDS Africa (2016) who found that low-income households desired to consume large fish but were limited by the high prices which made it inaccessible.

Households sourced their fish from formal traders although most of them depended more frequently on informal traders and markets for both local and imported fish. This was in agreement with Crush and Frayne (2011) and Battersby (2011) who found that low-income households were more frequently dependent on informal traders than formal traders and markets. In addition, no large formal retailers had expanded into the low-income area. This was similar to observations made by Battersby and Peyton (2014) that the expansion of such retailers follow a business model rather than social model

#### **4.2.2. Informal traders and what influences their decision making**

Customer preference was one of the determinants of the fish type traders sold. This is in agreement with findings of Malumbe and Musuka (2013) who's study found that traders were aware of the importance of stocking fish preferred by the consumers. Decisions on the type of fish consumed were based on factors such as price, availability and taste. This is in agreement with other studies that found that taste and cost of fish determine fish consumption (NFDS Africa, 2016; Malumbe & Musuka, 2013). Many of the respondents thought an increase in fish production would lead to lower prices and make fish economically accessible, particularly local fish which was more expensive than imported fish. This is in agreement with Beveridge et al. (2013) who stated that farmed fish could become economically accessible to the low-income population when in higher quantities. However, high production could make fish available on the market but may not be physically accessible to low income households. In addition, since fish is made accessible by informal traders whose decision of what fish to buy are influenced by factors such as affordability and profit, traders may not buy fish and make it accessible to low-income households. Furthermore, low-income households may not have access to farmed fish as the decision on type of fish farmed is, driven by profit.

The study also found that most traders depended on informal traders at Chisokone market even though some local traders bought fish from the source. This is in line with L'Heureux (1985)'s findings that fish distribution in Zambia is mostly through the informal market for both local fish from capture fisheries and imported dry fish from Tanzania and Mozambique.

However, the path taken by dry fish could be long or short depending on fish availability and season. Fish was sourced within the market or through intermarket trading when it was not available. Fish distribution is very complex and can involve few to several middlemen.

Only imported frozen fish (Tilapia from China and Horse Mackerel from Namibia) and fresh fish (Tilapia) from Lake Harvest, a Zimbabwean fish producer, were distributed by formal and informal traders. The formal traders bought the fish in bulk which informal traders bought, re-packaged and sold in smaller quantities either at the market (for market traders) or their homes (house shops). This interconnection of the food system was also observed by Abrahams (2010) in whose study informal traders were found selling food that they had bought from Shoprite.

Formal traders sold more fresh and frozen fish than dried fish even though they could sell more and compete with the informal traders. They may not have done so out of consideration for informal traders leaving the dry fish business for them. Furthermore, formal traders try to maintain standards as they target low, medium and possibly high income populations. Having their outlets clean and free of the strong smell from the dry fish would be better for their consumers. It could also be that the informal traders were unable to import frozen fish due to low capital as importing fish requires large amounts of money (in US Dollars) and certification.

#### **4.2.3 Factors affecting the food system**

There are several factors that affect the food system and these include policies, economic and environmental factors. Policies that affect the food system include those made for the Department of Fisheries as well as those made in other sectors. Policies such as the fish ban help to conserve fish and ensure that it is available. This however negatively affects fishermen, traders and consumers. During the ban, fish tends to be expensive due to its low availability. The high prices make it difficult for the traders to afford the fish resulting in only few traders being able to sell fish.

The ban also has an impact on the livelihood of fishermen and traders. Because fish is an important part of people's livelihood, some fishermen and traders tend to disregard it and trade illegally during the fish ban. Although not very strongly enforced, this policy has contributed to preserving some fish species. However, in light of these findings, there is need for this policy to be reviewed.

Also, policies made in other sectors can affect food security. For instance, increase in electricity tariffs impacts on the fish traders who transfer this cost to the consumer when pricing their fish. Furthermore, increase in fuel prices may also impact on the price of fish by transferring transport costs to the consumer. Economic factors such as currency devaluation also tend to affect the price of fish. Food should therefore not be looked at in isolation but should be looked at holistically because it cuts across many sectors. This also means that the responsibility of food security should no longer be left to the households because households are impacted by policies that are beyond their control.

Climatic factors were found to affect the food system. Low rainfall was given as a reason for low catches and high fish prices, particularly for Siavonga Kapenta. Zambia has been experiencing changes in its rainfall patterns. It is predicted that Zambia, among other countries in southern Africa, may experience low rainfall in the future due to climate change. This could explain why there has been a shift in rainfall patterns as well as low rainfall in the country.

Even though Ndebele-Murisa et al. (2011)'s findings support the findings in this study, Marshall (2012) disputed these findings and stated that climate change may not be sufficient to explain low productivity. Marshall (2012) attributed the low catches to overfishing where a large portion of the breeding stock was taken out. Although the study does not find this for Kapenta, human factors were found to affect the fish availability of other fish species. Whatever the reason, it still remains that factors other than policies and economics also affect the food system. The various factors affecting the food system found in this study provide an insight into what challenges the food system is facing and how cross cutting an issue food is. A different approach might be required to address food issues from a one dimensional approach to a multisector and multi-stakeholder approach.

The government has made efforts to ensure that there is fish on the market. These include the fish ban that aims to allow fish to reproduce, discouraging use of wrong fishing gear and more recently there has been a strong focus on encouraging fish farmers to produce fish more intensively and at a large scale. This has also led to the government providing training and other incentives to enable higher production to meet the increasing demand (ACF/FSRP, 2009; Mudenda, 2009). Several of the participants felt that increasing fish production would lead to fish access. However, this cannot be ascertained as fish production alone does not ensure fish access particularly for low income households. Furthermore, increase in fish production could mean an increase in per capita consumption of fish for middle and high

income population in Zambia and not the low-income population. Because fish takes various paths, an increase in fish production might also mean that the fish is consumed elsewhere such as Congo as is currently the case for some of the locally produced and imported fish.

## 5. Conclusion

Literature on food security has shown that food security is no longer primarily a rural issue, but that it is increasingly becoming an urban issue. With the different dynamics that the urban population face, the urban poor have different challenges compared to their rural counterparts.

Responses to food security have continued to be production based, with the global food system being criticised while advocating for alternative food systems. These food systems remain production-based despite literature explaining that food insecurity is structural and more driven by food access than availability. The global food system must be seen as complementary to, and part of these alternative food systems in order to address food insecurity. Informal markets must also be seen as part of the solution, particularly in Africa where studies have found that the urban poor are highly dependent on them.

Many African cities are becoming increasingly urbanised with increasing urban poverty. Little attention has been paid to how low-income households access food. This study set out to understand and fill this knowledge gap using Kitwe and Garneton as a case study. Qualitative interviews were employed and fish was used as a lens with which to understand the food system that feeds the urban poor in Kitwe.

What can be concluded from this study firstly is that consumers from low-income households bought the fish they consumed from formal and informal markets although most of the participants were highly and more frequently dependent on the informal market.

Secondly, fish was mostly sold in its dried form and was mainly distributed by informal traders who bought their fish mainly from other informal traders or fishermen. Like consumers, fish sourcing for informal traders was dependent on various things. Wealthier traders had more sourcing options compared to those who were not. The formal traders bought their fish from either middlemen within the country or imported it directly from either China or Namibia. Thirdly, several factors were found to affect the food system and these included policy, economic and environmental factors. These led to reduced availability of fish on the market which led to food price increase making fish difficult to access.

This thesis contributes to debates around urban food security in a number of ways. Firstly, it reaffirms the findings that others have made regarding the importance of informal markets and their significant contribution to the food security of low-income households in cities. Hichaambwa (2012) found that the urban poor in Kitwe purchased their fresh fish mostly from informal markets. Riley and Legwegoh (2013) also highlighted the importance of

informal retailers in helping meet the food security of the urban poor. Therefore, despite the expansion of supermarkets and availability of other formal markets, the urban poor are still highly dependent on the informal market. Similarly, Crush and Frayne (2011) found that the informal market still remained vibrant despite the expansion of formal markets. Even though some respondents in this study got fish from formal and informal markets, most of the low-income households were heavily dependent informal markets for their food purchases. The informal traders were also physically accessible as they were found even in low-income areas making it possible for low-income households to buy fish from them as there were no major formal retail outlets found in the study area.

Secondly, local food systems that focus on the local scale overlook the interconnection between the global and the local food system. The urban food system is made up of these food systems which are integrated rather than existing independently (Feagan, 2007) to meet the food security needs of the urban poor. Literature showed that there is an interaction between informal markets and the formal markets where informal traders purchased the food they sold from formal traders (Abrahams, 2010; Kristen & Emongor, 2006). In this study, informal traders were found buying imported fish in large quantities from formal traders who then repackaged it and sold it in smaller and more accessible traditional quantities thereby contributing to the food security of urban poor. These findings demonstrate how inextricably linked the local and global food systems are with blurred lines between them. A more pragmatic approach would therefore be important.

Chapter Two of thesis looked at how food security is more of an access issue than that of production and that looking at food security from a consumption approach reveals complex connections (Tacoli & Vorley, 2015). This study's findings show that food has various pathways and that locally produced food is not always accessed by all local consumers. The urban poor had less access to larger fresh fish as it was more expensive. Consumers with higher incomes are more likely to access to this and have wider food choices than the urban poor.

In conclusion, although the study focused on one study site with a relatively small sample size and encountered some challenges, it gives an insight into how complex and interconnected Zambia's food system is. The findings show that the changes taking place in the food system are making it less responsive to the food security needs of the urban poor. With impacts of climate as well as the negative effects of direct and indirect policies on the food system, there has been little corresponding policy changes to help the urban poor adapt to the changes

taking place in the food system. Even though the urban poor are being fed by the global supply chain, their heavy dependence on the informal market means that any disruption would highly impact their food security and lead making them more food insecure. The urban poor's reliance on the informal market highly corresponds to what other studies on urban food security have found. It is highly likely that the urban poor in other parts of the country are in similar positions in terms of food access with some variations. The study findings create a platform on which other studies can be done. They also provide a strong basis for informing wider debates and advocating for policies that would enhance urban food security and food systems in an African context.

## **Recommendations**

This thesis has a number of recommendations based on the research findings. The first is that policies on fish should have a strong focus on fish access in addition to production. Fish takes different paths and producing more fish may not ensure access. Apart from having limited fish during the fish ban, findings were that fish is exported to the Democratic Republic of Congo further reducing the amount of available fish which leads to an increase in fish prices. This makes economic access to fish difficult. Although further studies are needed, it is clear that an increase in fish production may not lead to access by the urban poor.

Policies on fish production should consider how to make good quality fish accessible to urban poor, this includes ascertaining the quality and nutrition of imported fish, as their incomes limit their food choices.

More effort should go into making the fish industry more resilient. Rainfall, an important aspect of fish breeding is being affected by climate change which is affecting the availability and economic accessibility of fish.

Food should be looked at as a cross cutting issue because policies made in other sectors have an impact on the accessibility of food especially for the urban poor.

Finally, attention must be paid to the informal market and its significant role in meeting the food security needs of the urban poor. The local food system and the global supply chain must also be seen as working together to meet the food needs of the urban poor. Consideration of how the low-income population's food needs would be met should be looked into before banning fish importation

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# Appendices

## Appendix A

### Informed consent form

**Informed Consent Form for MPhil in Environment Society and Sustainability**

**Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.**

Title of Project: **FROM FORK TO FARM: UNDERSTANDING KITWE’S FOOD SYSTEM THROUGH THE PATHWAY OF FISH**

This study has been approved by the University of Cape Town Faculty of Science Research Ethics Committee (Project ID Number): **FSREC 65 – 2015**

Thank you for taking part in this research. Before you agree to take part, the person organising the research must explain the project to you.

If you have any questions arising from the explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

**Participant’s Statement**

I .....  
have heard the information that has been explained to me about this study, and understand what the study involves. I understand that there will be no forms of payment given out for participating in this research and that if I decide at any time that I no longer wish to take part in this project, I can notify the researcher involved and withdraw immediately. I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and my identity as anonymous. I agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.

Signed:

Date:

## Appendix B

### Interview questionnaire for household interview

#### Household interview questions

##### Section 1

1. How long have you lived in this area?
2. How many are you in your family?
3. What position are you in this family?
4. What relish do you eat often in your household?
5. What are the main sources of relish (in order of importance)?
6. Is fish important in your diet?
7. Why is fish important to your diet?
8. How often do you eat this fish?
  - a) How many times in a week do you eat this fish?
  - b) Do you eat fish during the month end?
  - c) Do you opt to eat fish when you have more money than usual? When does this happen?
  - d) Do you eat fish all year round?
9. Why do you eat fish?

##### Prompts

- a) Is it cheaper?
  - b) Is it tasty?
  - c) Can you easily source it?
  - d) Is it easier to prepare?
  - e) Can it easily be stored?
  - f) Does it last longer?
  - g) Does it have **nutritional** benefits?
10. What type of fish do you eat?  
Kapenta Mpulungu Kapenta Siavonga, Bream, Popa, Utubwana, Daga
11. Why do you eat this type of fish?

##### Prompts

- a) Is it easy to prepare?  
Is it cheaper?  
Is it easy to prepare?
12. Where do you get the fish from?

- a) Do you get it from the house shops/local market/main market/ from the producer/Other?
  - b) During which months is this fish available?
13. Why do you buy it from this trader/producer?
- a) Do you use less transport money to buy it from there?
  - b) Do you get along well with the seller?
  - c) Have you known this trader for a long time?
  - c) Are you able to get this fish from that/those sellers on credit?
  - d) Does the seller provide units of sale or services that are not found elsewhere?
  - e) Does this trader/producer sell the fish at a much cheaper price?
14. How much does this fish cost per small unit/per large unit?
15. How do you prepare this fish? Has the way you prepare this fish changed over time?
16. Is this fish accessible all year round?
- a) Can you get this fish in all the three seasons?
  - b) Do you have to travel to other places to get this fish during certain times of the year?
17. Which fish do you eat when the above mentioned fish is/are not accessible?
18. Where do you find/get this fish (at the market/house shops/producer/other)?
19. Why do you eat this fish (alternative fish)?
- a) Is it cheap?
  - b) Is it easy to access?
  - c) Is it tasty?
  - d) Is it easy to cook?
  - e) Is it easier to store?
  - f) Does it last longer?
20. Have you changed your fish preference in the last five years? Why has this been the case?
21. What are some of the challenges around accessing the fish that you currently eat?
- a) Is it expensive during certain times of the year?
  - b) Is it found far from where you live?
22. If you had the means (framing or phrasing to depend on why people eat the fish they eat) what **type of fish or relish** would you like to eat?
23. Why would you like to eat this relish?
- a) Does it taste better?

b) Is it easier to prepare?

24. Are there any changes (policies) that the government have introduced relative to fish that have affected your access to fish? How have these changes affected your access to fish? What do you think can be done to improve your access to fish?

25. Who do you know who sells this type of fish that you eat? Could you recommend someone that can be interviewed for this study?

**Is there anything that you would like to add as we get to the end of our interview?**

## Appendix C

### Interviews questionnaire fish traders

1. Could you tell me a bit about yourself?
2. When did you start this trade?
3. How long have you been selling fish?
4. Is there anyone that helps you with selling fish? If so, who are they and are they male or female?
5. What type of fish do you sell?
6. Why do you sell this/these type(s) of fish?
  - a) Are they cheaper to source?
  - b) Are they more profitable?
  - c) Do they have a high consumer demand?
  - d) Are they easier to store?
7. Do you sell this type of fish all year round? **Addresses issues of seasonality**
8. If not, what type(s) of fish do you sell in other seasons?
9. Do you sell other types of food or get into a different trade when this fish is not in season?
10. Which type of fish do customers prefer in this area?
11. Why do you think they prefer this type of fish?
  - a) Is it cheaper?
  - b) Is it tasty?
  - c) Is it easier to prepare?
  - d) Is it easier to store?
12. Where do you get your fish from?
13. Why do you get it from there?

#### Prompts

Do you have a good relationship with the supplier?

Have you known the supplier for a long time?

Does the supplier sell it at a cheaper price?

Does the supplier sell the fish in the units that you prefer?

Does the supplier give you this fish on credit?

14. How much do you buy the fish for?
15. Is the fish delivered to you or do you collect it yourself?
16. (If collected by the seller) How much do you spend on transport money in order to collect the fish?
17. Is your supplier a producer or wholesaler?
18. How do you decide on what price to sell your fish for?

Prompts:

Do you consider the transport costs?

Do you consider whether it is in season or out of season?

Do you consider whether It's fast moving or not?

19. Do you manage to sell all the fish you buy in good time?
20. If not, what do you do with the fish that you don't manage to sell?
21. Are there any challenges you find in selling and buying fish?
  - a) Is the fish available all year round?
  - b) Does the size of fish differ and does this affect the selling price? Does it then become difficult to sell?
  - c) Does fish come from far places in some seasons?
  - d) Is fish more expensive to source in other seasons?
  - e) Is it more expensive to transport the fish in certain seasons?
22. Are there any changes or laws introduced by the government (policies) that have affected your buying and selling of fish?
23. What do you think can be done to improve your business of buying and selling of fish? What do you think can be done to improve the fish industry?
24. Could you put me in touch with the people who supply your fish or people that supply this type of fish?

## **Appendix D**

### **Interview questionnaire for fish producers (adjusted questionnaire)**

Thank you for taking part in this study. This study being conducted by Fridah Siyanga-Tembo seeks to understand how and where people buy fish and how the fish moves from the river to where it is eaten. This study is part of a Masters study being pursued with the University of Cape Town.

#### **Section 1: Introductory questions**

1. Could you tell me a bit about yourself?
2. When did you get start fishing/catching fish?
3. How long have you been catching fish?
4. Do you sell the fish that you catch or is it for household consumption only?
5. Do you catch the fish by yourself or are there other people that help you?

#### **Prompts**

If you are helped:

how many people help you?

are the people that help you family members or do you employ people to help you?

are the people that help you male or female?

#### **Section 2: Fish catches**

6. Could you tell me a bit about how you catch the fish, the methods used and how you keep the fish until its sold.
7. What type (s) of fish do you catch?
8. Of the fish that you catch, which of these types do you sell?
9. Why do you catch and sell this/these type (s) of fish?
10. Which river (s) or lake (s) do you usually catch the fish from?
11. Why do you catch it from this/these river (s) or lake (s)?
12. Is there any other river, lake or dam where you catch the fish from?
13. Do you catch and sell this type of fish throughout the year?
14. Do you fish from the same rivers throughout the year or do you catch fish from a different river when the seasons change or when there is a fish ban?

15. If not, what do you catch and sell in other seasons? Or do you get into a different trade/job in other seasons?
16. Do you still catch the same types and sizes of fish that you use to when you just started catching fish or do you catch different types and sizes of fish now? Is the fish that you catch now bigger or smaller compared to what you used to catch?
17. If there is a difference in the types and sizes of fish that you catch, what do you think is the reason for this change?

### **Section 3: Market**

18. Do you catch the fish because you already have market or do you catch it first and then look for the market?
19. How much were you selling the fish for when you started the fish business? Please tell me the price for each type of fish you used to sell.
20. How much do you sell the fish for now? Please tell me the current price for each type of fish.
21. Why have you increased or reduced the price of fish over the years?
22. How do you decide on what price to sell your fish for?
23. Is there a market by the river for selling fish?
24. Have there been any changes that you have noticed over time in terms of fish supply and demand?

#### **Prompts**

Is there more demand for more fish in general?

Is there more or less of a certain type of fish in the rivers/lakes/dams?

Has the size of fish that you find in the rivers/lakes/dams become smaller or larger?

Is the demand for this type/size of fish the same or is there a demand for a different type and size of fish?

25. What type of customers do you sell your fish to?
26. Are the people you sell your fish to mostly men or women and are they wholesaler or retailers?
27. Where do many of these customers come from?
28. Do you sell the fish fresh or do you sell it dry?
29. If you sell both, how much do you sell the fresh fish for and how much do you sell the dry fish for (List the fish types and the prices for each type)?
30. What units of measurements do you use for selling fish (e.g is it mu ma saka or utu dishi?)
31. Do these units change with change of season or do they stay the same?

32. Does the price of these units (e.g ama saka or utu dishi) change with change of season?
33. If yes, when do the prices change and how much are the old and new prices?
34. Why does the price change when the season changes?
  
35. How much were you selling the fish for when you started?
36. How much do you sell it for now?
37. Why is there a difference in the price of fish between now and when you started selling fish?
38. Which type of fish do customers from this area prefer? What do customers from other areas prefer?
39. Why do you think they prefer this/these type (s) of fish?
40. Do you manage to sell all the fish that you catch in good condition? If not what do you do with the fish that do not manage to sell, does it get spoiled and thrown away?

#### **Section 4: Policies**

41. Are there any challenges you find in catching and selling your fish?
42. Are you affected by the fish ban or closing of the rivers? If so, how?
43. Are there any changes or laws that were introduced by the government (policies) that have affected your catching and selling of fish?
44. When were these changes introduced and how have they affected you?
45. Have any of these changes been introduced in the past five years.
46. What do you think can be done to help you work better as a fisherman?
47. What do you think can be done to improve the supply of fish? What can be done to improve the fish industry?

**Thank you so much for taking part in this study, is there anything else you would like to add before we come to the end of the interview?**

## **Appendix E**

### **Interview questions for the representatives of the Department of Fisheries**

#### **Section 1**

1. How long have you been working in this department?
2. What is your position in this department?
3. What does your position entail?
4. What is the function of the department of fisheries?

#### **Section 2**

1. Please tell me about the fish distribution network in Kitwe?

Prompts:

Where does the fish the residents of Kitwe eat normally come from?

Does the distribution of fish change when the seasons change and when there is a fish ban?

2. How is the fish distribution in Garneton area?

Prompts:

Where does the fish the residents of Garneton eat come from?

Does the type of fish the residents of Garneton eat change with change in seasons?

3. What factors affect the distribution of fish in Kitwe, and in particular Garneton?

Prompts:

Is it the fish ban?

Change of seasons?

Transportation?

4. Have there been any changes in the demand for certain types and sizes of fish in the past five years in Kitwe?

Prompt:

Has there been more demand for a certain type/size of fish

What has caused this?

5. How does the government determine when to import fish and what type of fish to import for Zambia and Kitwe? Are these imports determined separately per province?

Prompts:

Is this determined by market or demand?

Is this determined by demand?

How is the demand determined?

6. What type of fish is mostly imported in Zambia and where does it come from?
7. Is this imported fish found in Kitwe? If it is where in Kitwe is it found?
8. Of the imported fish mentioned, which of these is accessible to low-income households?
9. Are there a lot of fish farmers in Kitwe?
10. What fish do the fish farmers in Kitwe usually farm?
11. Why do they choose this/these particular types of fish to farm?
12. Is the fish farmed in Kitwe distributed throughout Kitwe?
13. Is the farmed fish accessible to low-income households including those in Itimpi?

Prompt:

Which one in particular?

### **Section 3**

1. What are the fish related policies?
2. Which of these are the most recent fish policies?

Prompts:

How recent are these policies?

What do they emphasise?

3. Have any of these been introduced in the past five years? If so, which of these have been introduced in the past five years?
4. How have these policies helped the fish industry?
5. How have they affected fish distribution and consumption in Kitwe?
6. What do you think can be done to enable or improve fish distribution and access in Kitwe/Garneton?

**As we conclude the interview, is there anything else you would like to add?**