The International Journal of Multi-Disciplinary Research
ISSN: 3471-7102, ISBN: 978-9982-70-318-5

THE EXPLORATION OF FISH SUPPLY IN CHIPATA CITY. CASE STUDY CHIPATA CITY, ZAMBIA.

(Conference ID: CFP/624/2018)

By

Levison Mwanza
levy.mwanza34@yahoo.com
Student:
Information and Communications University

Abstract

Climate variability has been one of the major issues of the 21st century. In fact, its importance keeps on increasing with the realization that its impacts cut across all sectors of a country's economy. Hence, it should not only be looked at just as an environmental issue but also a developmental issue. Presently, the scientific consensus on climate change is that human activity is very likely the cause for the increase in global average temperatures over the past several decades (IPCC, 2001).

Drylands and the plateau areas of sub-Saharan Africa, southern and central Africa, are homes to nearly 50 percent of its populations who depend on agriculture including livestock, crops and fisheries, as their main livelihood strategy. Sporadic and irregular rainfall patterns are the most important environmental driver for these regions and water, in particular surface water, is the primary element of scarcity in drylands. Generally, drylands and the plateau areas water bodies are unstable and strongly pulsed ecosystems owing to intermittent and largely unpredictable precipitation. Such systems are characterized by very productive and highly resilient, small opportunistic fish species with boom and bust fluctuation adapted to strong environmental disturbances, and are, therefore, difficult to do fishing.

As a result of this productivity, they can sustain very high yields in years of good rains, but being largely short-lived as they also respond rapidly to environmental changes in hydrological regimes, which means that alternating periods of low productivity are inevitable. The focus of this review is to both documents the general resilience of many fish resources to climatic variability including their underestimation in livelihood importance.

Particularly, in protracted crisis situations and to enhance the potential supply of fish from dryland areas through improved use of the available water bodies, and in particular small reservoirs. The important role that small water bodies play in supplying essential micronutrients and protein to rural communities has largely been overlooked since the termination of the FAO (Food Agriculture Organisation/ALCOM (Aquaculture for Local Community Development) programme in 1998,

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

although they are more productive on a per unit area basis than the large lakes and reservoirs and, when pooled, constitute a much larger area of water.

Most of the fish production, however, is consumed locally and goes unrecorded in official catch statistics. By refocusing attention on the fish productivity of small water bodies and reservoirs in drylands and plateau areas, in particular by integrating fisheries with developments in water harvesting, irrigation and improved water storage facilities, the potential to increase the role played by fish in the diets of dryland and plateau people, and to provide improved livelihood opportunities is great. Therefore, the general and increased unpredictability of the rainfall required to sustain surface water bodies creates uncertainties in annual production.

However, these are the prevailing conditions that are commonly affecting the district of Chipata. As a district, it is known to be a plateau type where water bodies are less, therefore, affecting fish supply to the city of Chipata.

The case study was designed to adopt a quantitative and qualitative approach in order to generate descriptive statistical information in form of frequencies, pie-charts, tables, graphs as well as percentages. The sample was comprised of 110 questionnaires. That is, one hundred (100) fish traders, none-traders, and ten (10) officials in the department of fisheries at district level. There are some fish traders and none-traders that have negative and positive views from some senior staff in the department of fisheries.

Purposive and simple random samplings were used to select respondents. The statistical package for social sciences (SPSS) and STATA analysis were used to analyse the data. This paper also further recommended that in order to help implement some technology in aquaculture farming, the government through the department of fisheries will train and retrain some farmers and other staff, in that respect, especially to do with fish farming management in the ponds and other water bodies, such as, the dams in the district.

DEDICATION

This research paper is dedicated to my only Sons Levy, Ghatto, and the only Daughters Prudence and Gloria and my wife Alibetty Banda Mwanza for their moral and financial support during my research process. I also want to dedicate it to Jehovah God for giving me good health during my research work.

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

ACKNOWLEDGEMENTS

I wish to thank my supervisor of this research, KALINDA CHIPUTA and GIVEN PHIRI my lecturers for their dedication and educative comments and advice. I also wish to thank the Information and Communication University for allowing me to enrol with them and give me this rare opportunity to carry out this research work and also Zambia Research Development Centre (ZRDC) for giving me the scholarship.

My special thanks go to my wife MRS ALIBETTY BANDA MWANZA for her financial support and encouragement during data collection exercise and writing of the report.

TABLE OF CONTENTS

SUBJECT PAGE

List of tables

List of figures

List of acronyms

AMSL Average annual water levels in meters

AI Aridity index

ALCOM Aquaculture for Local Community Development (programme)

CAADP Comprehensive Africa Agriculture Development Program (of NEPAD)

FAO Food and Agriculture Organization (of the United Nations)

GDP Gross domestic product

GRZ Government Republic of Zambia

ICLARM International Centre for Living Aquatic Resources

IPCC Intergovernmental Panel on Climate Change

MEI Morpho-edaphic index

NEPAD New Partnership for Africa's Development

NGO Non-governmental Organization

RLLF Relative lake level fluctuation

RLLF Annual relative lake level fluctuation

RLLF Seasonal relative lake level fluctuation

SADC Southern African Development Community

SMB Small water body

UNCCD United Nations Convention to Combat Desertification

ZRA Zambia Revenue Authority

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

1.0 CHAPTER ONE

1.1- **Introduction and rationale.**

The role and importance of fish in securing food and nutrition for humans, particularly in developing countries, has frequently been overlooked. Fisheries and aquaculture are often arbitrarily separated from other parts of the food and agricultural system in food security studies, debates and policy-making (HLPE, 2014). Furthermore, nourishment is no longer only a question of calorie availability. Food security should be broadened to also include alimentary and nutritional aspects. There is now robust evidence that a lack of essential micronutrients, such as zinc and vitamin A, affects hundreds of millions of malnourished people around the world (IPCC, 2013).

In this regard, the importance of fish, and in particular small fish, for sustainable and healthy livelihoods in Africa, as well as their strong relationship with climate-driven water dynamics and their role during times of crisis and disasters, are generally undervalued and little understood. This is because most small fish are consumed locally and, as such, go unrecorded in catch statistics (Kolding et al., 2016). This dilemma is particularly prominent in the drylands or plateau areas, where the focus has traditionally been almost exclusively on terrestrial crops and animal husbandry. However, given the widespread distribution of drylands in Southern and Central Africa, and the extent of fish production and regional trade on the continent, all fisheries do, or have the potential to contribute to the livelihoods of people in the drylands, either directly to those fishers and fish farmers working in dryland areas, or as a vital source of food for drylands populations.

Zambia has been experiencing an increase in the frequency and intensity of droughts and floods. According to Usman and Reason (2004), this situation is to be expected as some parts of Southern Africa which includes Angola, Zambia, Namibia, Mozambique and Malawi are expected to record significant increase in heavy rainfall events.

On the other hand, rainfall variability has manifested itself in higher rainfall anomalies and the more intense and widespread droughts that have been reported (Boko et al. 2007; Faucherea, et al. 2003; Yanda and Mubaya, 2011). Recent studies indicate that temperatures in Zambia have been increasing especially over the last three decades (GRZ, 2007; World Bank, 2006; Jain, 2007; Ngoma, 2008, Shitumbanuma, 2008) while the country has experienced an increase in the frequency and intensity of droughts and floods. In the case of Southern Zambia, it has been a case of frequent and intense droughts, although some areas also experience floods. Sichingabula (1995) reported that the climate of Zambia has been characterized by epic dry and wet periods.

Rainfall records show that Southern Zambia experienced below and above average rainfall in the periods 1886 – 1925 and 1926-1970, respectively (Sichingabula, 1998). Zambia experienced droughts in the seasons 1916/17, 1924/25, 1949/50, 1983/84, 1987/88, 1991/92, 1994/95 and 1997/98 (Sichingabula 1998). Occurrence of droughts has also been reported in the 2001/03 and 2004/05 seasons (Lekpricakul, 2008). These events are also understood to be closely related to El Niño and the Southern Oscillation phenomenon which affects Eastern and Southern Africa fisheries activities because of high temperatures that some species of fish died out.

This study takes the government departments and City council areas of Chipata perspective to address the current and future contribution of fisheries and aquaculture to drylands and plateau areas

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

livelihoods and resilience. The goal of this study is to improve the understanding of the importance of fisheries and aquaculture to the livelihoods of communities in the drylands of Chipata city council areas and the province at large, to discuss future threats and opportunities to human resilience and identify potential investment opportunities in the fisheries and aquaculture sector that will strengthen the resilience of the sector in drylands and plateau areas to enhance food security and nutritional.

FAO (2000) has defined drylands as those areas with a length of growing period of 1 to 179 days; however, this includes regions classified climatically as arid, semi-arid and dry sub humid. So, Southern and Central African areas are undergoing significant challenges brought about by a number of environmental and socio-economic disruptions. Some of these disruptions are human-made and natural disasters, degradation of aquatic resources and environment, climate changes. These often have their most profound effects in the more harsh and unfavourable environments such as the drylands and plateau areas.

The southern and central African regional population, most of who depend on agriculture, including livestock, crops and fisheries as their main livelihood strategy. This report focuses mainly on the drylands and plateaus of Central Africa, Chipata, Zambia. The areas shown in the general drying out of the climate in the district since about 1970 and the increased abstraction of water for fishing means that many notable hydrological features are disappearing (Welcomme and Lymer, 2012) as in the case of Chipata district. This is most clearly observed in the desiccation of Tim and Chiparamba dams which have contracted by 80 percent in the last 48 years relating to (Lemoalle et al., 2012). The decreased rainfall in the lower lands of the district over the past four decades, and its effect on the major water bodies of the district, which is directly reflected in the fisheries yields.

Some areas that are predominantly made up of drylands, such as East, West and South of Chipata, while others have important dryland areas which occupy parts of the district, such as Chipangali. Dryland areas often have weak institutional support, limited infrastructure, low levels of financial market development, and often few commercial opportunities for growth. As a consequence, dryland communities have had to learn to live with the precarious nature of their livelihoods. Their ability to cope with shocks and pressures, especially by undertaking

frequent migrations, are well documented (Swallow, 1994; McPeak and Barrett, 2001). While the situation in the district is reaching critical levels in some areas with frequent droughts, depleted natural resources and damaged habitats the potential areas for fishing.

1.2-**The drylands or plateaus of the district**

Adapted from (UNEP-WCMC, 2007), in accordance with UNCCD and CBD and updated in 2014improvement is substantial if the right policies, priorities and investments are made over the coming years.

This report outlines the current knowledge of fisheries and aquaculture in relation to the drylands of the district; it describes the variability and vulnerability of the sector. This suggests how resilience can be strengthened and proposes options for investment so as to help achieve this potential. The report was intended primarily for the government of Zambia, as well as their regional, international and civil society partners, relevant private sector actors and the development community to work on the above alluded to areas.

1.3-STATEMENT OF THE PROBLEM

Although the issue of fishing and aquaculture have been under discussion and extensively researched for some time (Kapasa, 2008), it was not known which factor is clear about fish supply in Chipata town. Therefore, if these factors are known, may be many but needs a lot of attention to be researched on, that some specific ones be established. However, having this an attempt was to have an exploration of fish supply in Chipata City. Case study Chipata city, Zambia.

1.4-PURPOSE OF THE STUDY

Aquaculture research needs intensification, and was designed in a manner that it is more responsive to the needs of the industry.
Aquaculture research should put more emphasis on trials aimed at

culturing more local species, producing fish feeds from locally available materials and improving the quality of fish pond environment and other water bodies, like dams. The facilities at NARDC have the capacity to achieve this level of research.
However, the work of the National Aquaculture Research and Development Centre (NARDC) was supported with fish farming trials conducted in different parts of the country. However, the attempt was to explore fish supply in Chipata City. Case study Chipata city, Zambia.

1.5-RESEARCH OBJECTIVES

General Research Objective

To find out about fish supply in Chipata city. Case study Chipata city, Zambia.

1.6-Specific Research objectives

1. To establish the cause of scarcity of fish supply in the city.

2. To assess the type of fish commonly found on the market of the city

3. To identify the sources of fish in the city.

1.7-Specific Research Questions

1. What is the cause of scarcity of fish supply on the markets of Chipata city?

2. What are common species of fish found on the markets of Chipata city?

3. What are the common sources of fish supply on the markets of Chipata city?

1.8-Research Variables

Scarcity of fish supply	On the markets of Chipata city.
Common species of fish	On the markets of Chipata city.
Common sources of fish	On the markets of Chipata city.

1.9-Significance of the Study

In-depth studies, was undertaken with a view of developing an administrative structure that would facilitate aquaculture development in the country. Therefore, the findings of the study might also inevitably contribute to the knowledge in the field of aquaculture in general, in the country. And that this was to reduce the erratic supply of fish in some parts of the country, like the situation is on the markets of Chipata city, in Zambia.

1.10-THEORETICAL FRAMEWORK

A brief review of the capture fisheries in the district and its characteristics was also undertaken, because changes in natural fisheries would also influence policy relating to aquaculture development. The study was carried out with the help of Department of Fisheries. Aquaculture and fisheries training staff were consulted, whilst interviews with fish traders, none-fish traders and senior officials was conducted.

However, aquaculture has not yet been developed to a level where it is a major income generating activity among rural and peri-urban households in the district of Chipata. Therefore, this has been creating some shortfalls regarding fish supply on the markets of Chipata city, in Zambia.

1.11-DEFINITION OF OPERATION TERMS

Resilience: able to bring to spring back to its former shape when pressure is removed.

Fishing: an extraction of fish from the waters, such as; dams, lakes, swamps, rivers, etc.

Plateau: an upland area with a fairly flat surface and steep slopes. Rivers often dissect plateau surfaces.

Scarcity: a situation in which there is not enough of something, such as; fish, (food), water, etc.

CHAPTER TWO

2.0-LITERATURE REVIEW

The objective of this literature review was to present evidence that would reinforce the conclusion and support the portion of other previous studies regarding this outlook.

2.1-Continental perspective

Furthermore, there are ways to achieve greater food security and relieve poverty to an extent through the development of aquaculture (Brummet, 1999). Reduced annual and dry season rainfall, and changes in the duration of the growing season, are likely to have implications for aquaculture and create greater potential for conflict with other agricultural, industrial and domestic users in areas where water is scares. These impacts are likely to be felt most strongly by the poorest aqua-culturists, whose typically smaller ponds retain less water, dry up faster, and are, therefore, more likely to suffer shortened growing seasons, reduced harvests and a narrower choice of species for culture. However, aquaculture may also provide opportunities for improving water productivity in areas of worsening water scarcity (World-fish Centre, 2007)

Fish provides the main source of animal protein for some 200 million people on the African continent (Heck et al., 2007). Fisheries also provide a direct source of livelihoods to over 10 million Africans, while five to ten times that number engage in fisheries as a secondary activity for food security in rural areas. Fish depend on available open surface water and inland fisheries are normally associated with wetlands. Water, and in particular surface water, is the primary element of scarcity in drylands (Kapatuė et al., 2013) and dryland and plateau fisheries and aquaculture may therefore sound like a paradox.

To fully understand this dynamic relationship, we must first understand the climatic and hydrological characteristics of drylands and plateaus then how these attributes affect fish production.

However, upon refilling during years of good rains, the fishery immediately recovers and resumes very high productivity within a very short time – usually less than a year. At the moment, both Lake Ngami, which was dry from 1982 to 2002, and Lake Liambezi, which was dry between 1986 and 2009, are highly productive and characterized by outstanding fish yields (Keta Mosepele, pers. com.; Peel et al., 2015). Another human-made example is the Khasm el-Girba reservoir in Sudan, which is physically flushed and completely drained on an annual basis owing to siltation problems, causing massive fish kills in the process. Still, after refilling, the fish populations recovered rapidly (El-Thair and Kolding, 1995) and there is no evidence that the recurrent flushing had any significant impact on the species composition, demographic composition or potential yield. Similarly, the Kokologho reservoir (max. area 64 ha, 2.5 m depth) in Burkina Faso was completely drained in 1991 in order to enlarge the dyke. After only one hydrological cycle (in 1992) the recorded catch was a remarkable 170 kg/ha (Baijot et al., 1997).

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

2.2-Zambian perspective

Hydrological conditions in drylands and plateaus of Chipata district

Drylands and plateaus are subject to large year-to-year variations in precipitation, with prolonged dry periods interspersed with wetter years. Chipata district major water bodies are, such as, the Lutembwe, Chingoma, and Lunkhuswe streams. Other wetlands are the constructed smaller dams, such as Apolo dams 1 and 2, Tim dam at Chipata district fisheries office, in Chanje, Chiparamba area in Chikuwe, Sairi, in Chikando area in Nzamane, in Mpezeni and Makungwa area in Madzimawe chiefdoms, all have one dam each.

They generally drying out, the climate in the district since about 1970 and the increased abstraction of water for fishing mean that many notable hydrological features are disappearing (Welcomme and Lymer, 2012) as in the case of Chipata district

This was most clearly observed in the desiccation of Tim and Chiparamba dams which has contracted by 80 percent in the last 48 years relating to (Lemoalle et al., 2012). The decreased rainfall in the lower lands of the district over the past four decades, and its effect on the major water bodies of the district, which is directly affect the fisheries yields.

In addition, to long-term climatic changes, most drylands are best understood as ecological gradients owing to uneven levels of precipitation across different sub-type boundaries. However, more important than the difference in precipitation, is the gradual change in the predictability of the rainfall pattern. This is because the decrease in average precipitation along dryland sub-types is positively correlated with an increase in variability in time and space.

This means that the irregularity of water, the most important ecological constraint, has increased from the moist part to the dry part of the precipitation gradient. In the driest areas the main problem is not so much the aridity itself, but that the rainfall is highly unpredictable in time and space (Vetaas and Kolding 1991; Baijot et al., 1997).

These environmental conditions are reflected in all other parameters correlated with water availability, such as vegetation patterns, biological production including fish and people's lives and livelihoods. Of all the climatic factors, the daily and inter-annual variations in precipitation are the most crucial for rain-fed and irrigated agricultural production (FAO, 2008a).

-Climate change

Climate change will further influence precipitation regimes and the recent Fifth Assessment Report of the Intergovernmental Panel on

Climate Change (IPCC) indicates that it will have a significant impact on fish production and water management systems in coming decades. Predictions suggest that differences in precipitation between wet and dry seasons in Zambia will widen and that extreme flood and drought events will become more prominent, intensifying seasonal fluctuations relating to (IPCC, 2013). Higher temperatures may also amplify water level fluctuations in dryland water bodies as a result of increased evaporation, particularly in exposed systems where evaporative water loss is high.

There is already evidence that such changes are emerging. Gownaris et al. (2016b) analysed long-term changes in seasonal and inter-annual relative Lakes level fluctuations (RLLF. All of the dams

situated in drylands showed significant positive increase in seasonal water level fluctuations, thus supporting the IPCC predictions of intensified seasonal oscillations.

- Environmental variability

There is increasing evidence that fish production in African inland fisheries in general, and dryland fisheries in particular, is more dependent on the external climatic drivers (amongst which are increased long-term and seasonal variability of surface water bodies, than on human exploitation rates and various management interventions (Jul-Larsen et al., 2003; Kolding and van Zwieten, 2011, 2012; Gownaris et al., 2016a & b).

When comparing this cyclical pattern with the most conspicuous observed changes in the district reservoirs the long-term, inter-annual and seasonal fluctuations in water level and streams inflow there appears to be a correlation between the detrended landing statistics (for the country like Zambia among the SADC countries) and long-term climate driven oscillations in the water levels which are remarkably correlated with most of the dams over the years. Smaller dams follow the same pattern of climatic change and, like most terrestrial farmers; the biggest environmental concern for district fishers is usually insecurity about annual rainfall.

"Fish come with the rain" is the most commonly expressed statement when asking African inland fishers about the factors controlling fish production (Kolding et al., 2016) relating to Zambian inland fishing pattern, too.

Good empirical examples of this aphorism are the many isolated endorheic (closed) water bodies in the district drylands, such as Apolo dams 1 and 2. Besides, Tim, Chiparamba and Chanje dams which periodically dry out completely, becoming muddy or even dusty depressions.

2.3-Comparative perspective

-Fish resources

Zambia as a whole is well endowed with fisheries resources from the rivers, streams and inland waters such as floodplains, lakes and reservoirs. Also, as a country, aquaculture is expanding rapidly and where the potential for increased fish production is considerable.

Many of the countries in Africa with large dryland areas, such as Egypt, Ghana, Kenya, Namibia, Nigeria, Senegal and Uganda, also produce large quantities of fish which are traded locally, preserved and transported to regional and international markets. However, for Zambia as a country, not much has been done. Instead, much fish has been imported from neighbouring countries, such as Malawi and Mozambique, like in the case of eastern province.

-Small water bodies and reservoirs (storages)

To create water reservoirs, ranging in size from one to 25 000 ha, and contributing some 82 percent of the nation's surface water (Melcher et al., 2012). Small reservoirs support and enhance synergies between multiple livelihood strategies and cushion seasonal variability in access to water.Inland temperature changes, higher inland water temperatures may reduce the availability of wild fish stocks by harming water quality, worsening dry season mortality,

bringing new predators and pathogens, and changing the abundance of food available to fishery species, (Worldfish Centre, 2007) this is in relationship with the Chipata district water bodies.

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

- Fish production

Total fish supply in Africa in 2011 was 9 million tonnes (FAO, 2012) made up of 84 percent capture fisheries and 16 percent aquaculture – although the production of inland capture fisheries is thought to be considerably underestimated. After Asia, Africa is the second largest producer of fish from inland waters, with production reported to be 2.6 million tonnes per year; Lake Victoria alone produces 1 million tonnes (Kolding et al., 2014b).

However, Kolding et al. (2016) estimated the actual total inland catches to be significantly higher (around 20 million tonnes), based on the total area of freshwater resources (lakes, rivers, reservoirs, floodplains and swamps) on the continent of around 1.3 million km2(Lehner and Döll, 2004; de Graaf et al., 2012) with an average annual production of fish of around 150 kg/ha (van der Knaap, 1994; Marshall and Maes, 1994; Kolding and van Zwieten, 2006). It is highly probable that the official production records are underestimated by nearly an order of magnitude.

-The importance of small fish.

The most productive district fisheries all target small fish species weighing between one and a few grams. The “Kapenta or Siavonga, Chisense and Usipa from within the country and outside country such as Malawi and Mozambique, respectively are all of high yielding, and extremely important for local consumption and most of it go unrecorded in official catch statistics.

Post processing and conservation is straightforward and fuel conserving because these species are simply sundried in a few days, in contrast to larger fish that need gutting, salting or smoking for preservation.

The simple preservation techniques and ease of storage and transportation make these small fish species available at most Chipata city markets at high cost. They are sold in small portions by weight, fetching the same price as large fish (Brummett, 2000) and thus are highly accessible. Heaps of small fish are ubiquitously found on local city markets.

Because small fish are sundried whole, with heads, bones and internal organs intact, they are a concentrated source of multiple essential nutrients, in contrast to large fish which are usually not eaten whole, are filleted and therefore do not contribute as much to micronutrient intake (Longley et al., 2014).

2.4-Baseline

-Aquaculture

The aquaculture industry in Africa has a very long history but also a slow incubation period (Hara, 2001). Governments, international organizations and Non-Governmental Organisations (NGOs) have since the early 1970s implemented aquaculture development programmes in rural Africa, particularly under the umbrellas of FAO and ALCOM, and the International Centre for Living Aquatic Resources Management (ICLARM)/World Fish (Hecht et al., 2005).

The Aquaculture for Local Community Development Programme (ALCOM) programme was a large programme in southern Africa (primarily Botswana, Lesotho, Malawi, Zambia, Zimbabwe and Tanzania) that was implemented from 1986 to 1998 and supported primarily by Sweden (initially), Belgium (later) and FAO.

Initially it was dedicated to implementing small-scale aquaculture in rural communities, but later it expanded to also investigate the utilization of small water bodies (SWB), such as dams and stock watering reservoirs, for aquaculture and fisheries production. Many small reservoirs had been built in southern Africa (by the end of the project the ALCOM database included more than 18 000 reservoirs.

lakes and swamp in the SADC region), but fish production was usually a secondary function. Unfortunately, owing to disjointed funding and programmatic restructuring, the ALCOM programme was not brought to a satisfactory conclusion and many of the results have never been published or disseminated (FAO, 1999). Most of the activities initiated under ALCOM collapsed shortly after the programme was terminated, van der Mheen (1999).

FAO (1999) non-commercial small-scale sector makes an insignificant contribution to fish supply in the region but makes an important contribution to household or community livelihoods.

The main reasons for the failure of aquaculture to develop in Africa have been identified as a failure to adopt the appropriate technology, a lack of sustainability, and the fact that the target beneficiaries (of development projects) have usually been rural resource-poor farmers (FAO, 1999).

In retrospect, however, it appears that aquaculture in sub-Saharan Africa has had difficulties in competing economically with the capture fisheries, the production of which continues to rise steadily by about 3.7 percent per year (Welcomme and Lymer, 2012), even though catches are probably underestimated by nearly an order of magnitude (Kolding et al., 2016).

In summary, as history has shown (van der Mheen, 1999; FAO, 1999), it is highly doubtful whether small scale aquaculture will be a viable option for improving protein production in dryland environments, compared to traditional terrestrial animal husbandry. However, culture-based capture fisheries in which restocking takes place or species are introduced to small dryland reservoirs can be effective methods of increasing fish production in reservoirs with diminished fish populations or after severe droughts (van der Mheen, 1994). Baijot et al. (1997) reviewed and compared the establishment of fish populations in newly created small reservoirs across the drylands,

and found that the evolution of fish communities with indigenous and or introduced species is more or less similar.

Nearly all of these reservoirs were successfully populated by small cyprinids and characids; tilapia species; and catfish. Deeper reservoirs and lakes would sometimes accommodate larger predators such as tiger fishes and Nile perch. In water bodies that did not dry out completely, the introduction of Nile perch was always successful (Beijot et al., 1997). Even shallow lakes and reservoirs, which regularly dry out almost completely, are still able to support viable populations of hardy species such as Clarias spp. because these species are able to survive buried in the mud, or will usually be the first species to populate new inundations through tributaries or even move over land for short distances (Huchzermeyer, 2013).

-Contribution to the economy

Given the low level of accurate reporting of the production, processing and trade of fish in Africa, it is difficult to estimate the economic contribution of the sector. The contribution of fish produced in the drylands is unknown but increasingly estimates are demonstrating that the value is considerable Small-scale fisheries play a remarkable role in poverty alleviation through their capacity to absorb surplus labour (Béné et al., 2007; Béné et al., 2010). Actually, the small-scale fisheries sector often

denigrated for its backwardness and inability to generate wealth is remarkably efficient (in an economic sense) in absorbing the excess of unskilled labour in the developing world (Kolding et al., 2014b). However, the links between fisheries/aquaculture and poverty alleviation are sometimes complex and still unclear (Béné et al., 2016).

- Reducing exposure

Reducing exposure to the risks that fishers, fish processors, fish farmers and fish consumers face from fish shortages require addressing the current poor, or in many cases absent, state of fisheries management and development, which to a large extent is based on antiquated principles and theory.

For example, much of the fisheries legislation in Anglophone Africa can be traced back to colonial British game legislation, where hunting and angling were seen as a "gentlemen's" sport with the important principle of "giving the game a fair chance" (Malasha, 2003). This attitude has important implications for various fishing methods that may be prohibited because they are seen as herding, indiscriminate, and unselective and considered particularly unethical when immature individuals are targeted. In addition, during the last decade of the colonial period, a new and ground-breaking fisheries theory was developed in the UK, which rapidly became the doctrine of modern rational fisheries management. The theory (Beverton and Holt, 1957) was based on mathematical models, stipulated minimum size limits for exploited species in order to maximize yields, and was soon exported to the colonies (Beverton, 1959), resulting in widespread mesh-size regulations and Condemnation of catching small and immature fish (Kolding and van Zwieten,2011).

Better information about weather and climate change, and disease, is also important for enabling people to make the right livelihood decisions. As mentioned above, early warnings of floods, storms, droughts and other natural hazards can help people to avoid loss of life and equipment and make better harvesting decisions.

General water shortage is, of course, one of the major challenges facing drylands. In many cases, however, the problem is not absolute water scarcity but the highly uneven distribution of rain over the seasons, and a lack of infrastructure to regulate supplies for use in dry seasons and dry years.

CHAPTER THREE

METHODOLOGY

In this chapter, highlights show the methodologies that were used in the collection of data and how the data analysis was done. The chapter presents the research design, the target population, the sample size, sampling procedures as well as the data collection procedures and analysis and the instruments that were used.

3.1 Research design

The qualitative method was used by the researcher in order to obtain the in-depth information about the phenomenon under investigation while the quantitative method ensured high levels of reliability of the gathered data. Case studies are concerned with a rich and clear description of events relevant to the case. They also strived to portray what is likely to be in a particular situation (White, 2003). Therefore, the researcher conducted a case study in order to get in depth understanding of the phenomenon under study.

3.2 Target population

According to Moulton (1998), "a population is a collection of objects, events or individuals having some common characteristic that the researcher is interested in studying". Central statistical office (CSO) 2010, shows that there about 1,592,661 people in eastern province but Chipata district alone has about 455,783 people.

In this study the target population comprised of one hundred (100) fish traders in selected city markets and ten (10) officials in the department of fisheries at district levels in Chipata district, in Eastern Province of Zambia.

3.3 Sample size

A sample is a subset of a population that is used to represent the entire group as a whole (White, 2003). The sample size of this study consisted of a total of one hundred and ten (110) participants distributed as follows: one hundred (100) fish and none fish traders and ten (10) senior officials in the department of fisheries at district level.

3.4 Sampling technique

Selection of the fish traders was done using the simple random sampling technique. This gave all the fish traders and none-fish traders on the markets of Chipata city an equal chance to participate in the

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

study. Kombo and Tromp (2006), argue that simple random sampling 'it is a procedure in which all the individuals in the defined population have an equal and independent chance of being selected as a member of the sample'.

In this study, two sampling techniques were employed, namely, a simple random sampling was used to draw fish traders and none-fish traders and, purposive sampling was used to select senior officials in the department of Fisheries at district level. This was done in the sampled fish traders' city markets in Chipata in order to complete the questionnaires.

3.5 Instruments of data collection

The main research tools used in the study were questionnaires. According to Orodho and Kombo (2002), research instruments include questionnaires, interview schedules and observations. Furthermore, the questionnaires were used to gather data over a large sample and were both open-ended as well as closed questions. Semi-structured questionnaires were used in the study to capture information from the fish traders; none fish traders and the fisheries officials concerning the exploration of fish scarcity supply in the city of Chipata. The questionnaires are of two types, one targeted directly to fish traders, none-fish traders and the other type targeting the district fisheries officials.

3.6 Data analysis

The researcher started the process of data analysis as soon as the research is accomplished. In this study, both cases, that is, qualitative and quantitative data analysis were used, respectively.

3.7 Qualitative Data Analysis

In line with qualitative data analysis, Kombo and Tromp, (2006), argue that, 'The responses can be categorized into various classes which are called categorical variables,' and adds that, 'in qualitative research, data can also be analysed mathematically. Themes refer to topics or major subjects that come up in the discussion.

This form of analysis categorizes some related topics.' Qualitative data were analysed by content analysis. Content analysis is the systematic qualitative description of the composition of the objects or materials of the study (Mugenda and Mugenda, 1999). The data were analysed by using the pie-chart, tables, graph and statistical measures such as percentages. This helped to summarise and describe variables stated, such as, frequencies of common fish sources, reasons of scarcity of fish supplies and common species of fish on the city markets of Chipata. And the structured data was used

to analyse through content analysis in order to understand consistence of information from various respondents. Therefore, the results was presented using frequencies, pie-chart, tables, graphs as well as percentages.

3.8 Quantitative Data Analysis

In this particular study, quantitative data was analysed using the statistical package for social sciences (SPSS) and STATA to generate descriptive statistical information in form of frequencies, variables, pie-chart, tables, graphs as well as percentages.

'Statistics are a set of mathematical methods used to extract and clarify information from observable data. Statistics generate simple numbers to describe distributions' (Kombo and Tromp, (2006). Besides, Gall et al, (1996), states that mathematical technique is appropriate for organizing, summarizing as well as displaying a set of numerical data.

The researcher used two techniques as a way of processing and analysing data from the research findings.

3.9 Triangulation

The researcher used the first type of triangulation in which a variety of sources were used to collect data. This is because the researcher used this technique to collect data from the distribution of questionnaires to the respondents. Also, the researcher used another type of triangulation, which was the application of multiple of theories and perspectives in interpreting the data. Then, another type of triangulation was the use of multiple methods to study the problem under investigation. This was through the use of other literatures, and the primary data which were collected from the respondents.

3.10 Ethical Consideration

Ethics as defined by (Strydom, 2000) are a set of moral principles suggested by an individual or group, is widely accepted and which offers rules and behavioural expectations towards respondents and other stakeholders in research. During the study, the researcher observed the ethical considerations by respecting the rights and views of the participants.

The researcher asked for the written informed consent from the Information and Communication University in order to conduct the research. White (2003), cites the relevance of the information to the participants' decision as one of the most important elements in informed consent.

Permission to conduct the research with the help of fish traders and none-fish traders required from the district administration, chairpersons on the city markets, and extension officers who allowed the researcher to engage the respondents in the study.

Furthermore, this study was to ensure that information collected be only used for the purposes of research in my academic research.

Confidentiality of data collected from participants would be followed appropriately. Confidentiality, guarantees that data linked to information to respondents, such as, names, locations of household and identification numbers will not be exposed during the study. No follow ups would be made for respondents. The researcher explained to clarify to the respondents that there would be confidentiality. Participants' activities will not be interfered by the researcher's point of view or opinion during discussions and interviews.

Regarding respect, such as gender, socio-economic status, age, religion and ethnicity, all were demonstrated with high integrity and honesty in all the stages of the research. Respondents were not put at risk, discrimination and disadvantaged in any way due to their participation. 37

Besides, the researcher maintained the highest level of confidentiality during the study in order to protect and promote the rights of the respondents on any form of oppression due to their responses.

3.12 Scope of study

The project looked at the exploration of scarcity of fish on the city markets of Chipata city. It was, specifically looking at the scarcity of fish on the markets of Chipata city as the target area, that is, fish traders, none-fish traders and fisheries officials' performances. The research was only targeting Eastern province, specifically, Chipata district, Chipata city because it's the only feasible area in which the project was to be done by looking at the time frame and the level of funding of the researcher.

3.13 Limitation of study

In the pursuit of this study, several limitations were experienced. Such as the following;

- Cost in terms of time, effort and finances to carry out an extensive and exhaustive research.
- Obtaining accurate data because of fear of appraising and victimization on the part of respondents.

- The study was qualitative in nature, therefore, it relied on respondents' perceptions and views and quality of data depended on them.
- Since the study focused in the Eastern province, Chipata district, and some randomly selected fish traders and none-fish traders on the city markets of Chipata, the findings of the study may not be generalized to all the Republic of Zambia.
- The purposive sampling procedures decreased the generalization of the findings.
- In the qualitative study, the findings were not subjected to other interpretations.

CHAPTER FOUR

4.0 In this chapter, presentations show the background characteristics of the respondents and further presentations to do with the findings of the study in line with the purpose of study, that is, to investigate the cause of scarcity of fish supply on the markets of Chipata City, Zambia.

4.1Table 1

Respondents background characteristics.
Respondents from different markets of Chipata city and the department of Fisheries.

Name of markets	Frequency	Percentage %
Kapata	69	62.7%
Saturday	24	21.8%
Nabvutika	06	5.5%
Kamanda	01	0.9%
ChipataDistrict Senior staff fisheries	10	9.1
Total	110	100%

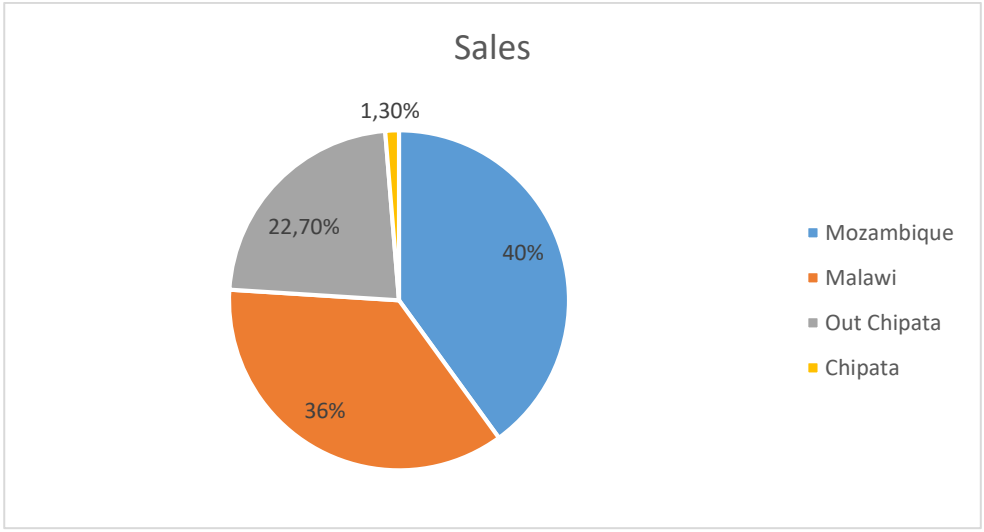
Source; Field data, 2018.

Explanation

These respondents were readily available to be interviewed. Therefore, 69(62.7%) were respondents from Kapata market, 24(21.8%) were respondents from Saturday market, 06(5.5%) were respondents from Nabvutika market, 01(0.9%) were respondents from Kamanda, and 10(9.1%) were respondents finally from Chipata district fisheries department senior staff, respectively. 40

4.2 Pie Chart (figure 1)

SOURCES OF FISH IN CHIPATA CITY



SOURCE; FIELD DATA 2018

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

EXPLANATION

BLUE stands for Mozambique which shows 40% of fish coming into Chipata city, Zambia.

BROWN stands for Malawi which shows 36% of fish coming into Chipata city, Zambia.

GREY stands for outside Chipata shows 22.7% of fish coming into Chipata city, Zambia.

YELLOW stands for Chipata shows 1.3% of fish coming from within the district Chipata, Zambia.

4.3 Table 2

RESPONDENTS INTERVIEWED FROM DIFFERENT MARKETS IN CHIPATA CITY– FISH TRADERS AND NONE-FISH TRADERS

SERIAL NO.	RESPONSES FROM MARKETS	PERCENTAGE		RESPONDENTS INTERVIEWED	
		FISH TRADERS (YES)	NONE-FISH TRADERS (NO)	FISH TRADERS (YES)	NONE-FISH TRADERS. (NO)
1	KAPATA	50.9%	11.8%	56	13
2	SATURDAY	21.8%	00%	24	00
3	NABVUTIKA	4.55%	0.9%	05	01
4	KAMANDA	00%	0.9%	00	01
5	CHIPATA DISTRICT FISHERIES SENIOR STAFF	9.1%	00%	10	00
	TOTAL	86.4%	13.6%	95	15

SOURCE: FIELD DATA 2018

Explanation

The respondents who accepted to be interviewed are as follows; 69(62.7%) but 56(50.9%)were fish traders and 13(11.8%) none-fish traders respondents from Kapata market, 24(21.8%) all were fish traders respondents from Saturday market, 06(5.5%) but 05(4.55%) were fish traders and 01(0.9%) was none-fish traders of the respondents from Nabvutika market, 01(0.9%) was none-fish trader respondent from Kamanda, and 10(9.1%) were respondents finally from Chipata district fisheries department senior staff, respectively.

4.4Table 3

RESPONDENTS ON THE CAUSE OFSCARCITY OF FISH SUPPLY IN THE CITY OF CHIPATA FROM DIFFERENT MARKETS.

REASON	NO. OF RESPONDENTS	PERCENTAGES	
A	11	11%	
B	08	08%	
C	81	81%	
TOTAL	100	100%	

SOURCE; FIELD DATA 2018.

NOTE

REASON (A)-Long distance from the sources of fish.

REASON (B)-Less sources of water bodies in the district.

REASON (C)-Both A and B.

EXPLANATION

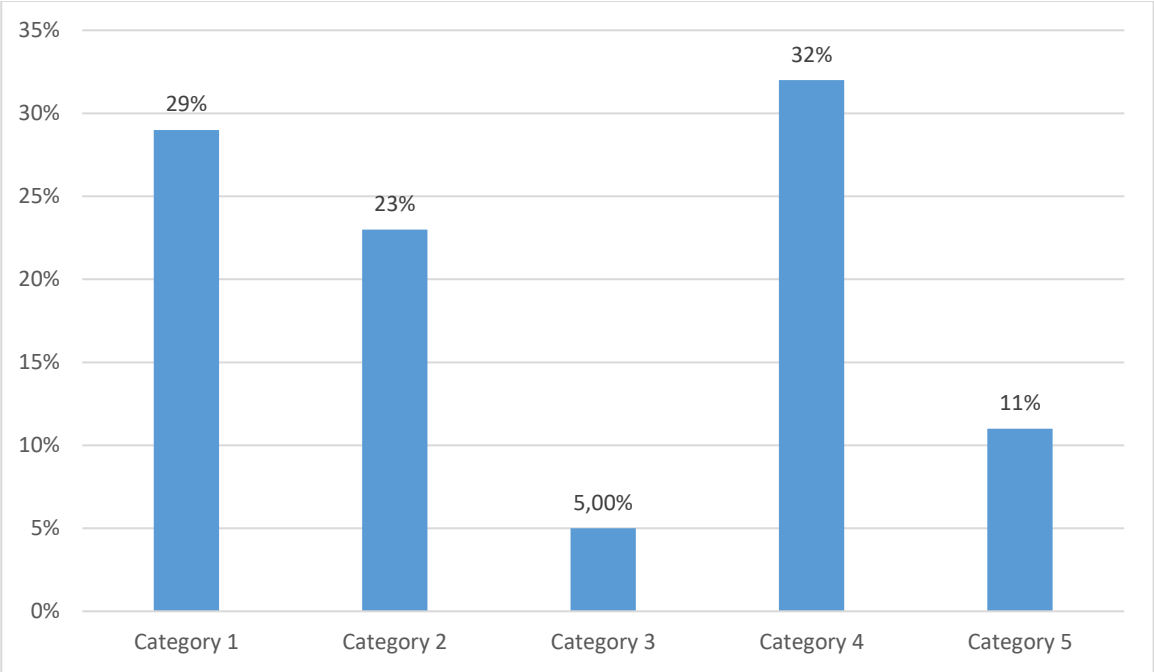
Eleven (11) respondents, that are 11%, explained that it was due to reason A as to why there is scarcity of fish supply in the city of Chipata.

Eight (08) respondents, that are 08%, explained that it was due to reason B as to why there is scarcity of fish supply in the city of Chipata.

Eighty-one (81) respondents, that are 81%, explained that it was due to reason C as to why there is scarcity of fish supply in the city of Chipata.

4.5 Figure 2

TYPE OF FISH ON HIGH DEMAND ON THE MARKETS OF CHIPATA CITY.



SOURCE; FIELD DATA 2018.

NOTE

Category 1; siavonga

Category 2; usipa

Category 3; chisense

Category 4; big fish

Category 5; all types as above mentioned.

EXPLANATION

The 29% of respondents explained that the general population like buying siavonga though being expensive on the markets.

The 23% of respondents explained that the general population like buying usipa though not so expensive, because of its low quality in terms of taste.

The 5% of respondents explained that the general population like buying chisense because of being cheap on the markets.

The 32% of respondents explained that the general population like buying big fish though very expensive on the markets, known to be of good quality and taste.

The 11% of respondents explained that the general population like buying all the type of fish as above mentioned.

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

CHAPTER FIVE

DISCUSSION AND INTERPRETATION OF THE FINDINGS

In this chapter, the presentation is focusing on the discussion and interpretation of the findings of the study. Mainly, as the purpose of study is to investigate the cause of scarcity of fish supply in the city of Chipata Markets, Zambia.

The general picture is that development is about bringing sustainability of the existing natural resources. Therefore, the department of fisheries have to take care of its natural resources to avoid easy and quick depletion of species and other related ecosystems to it.

The findings are that from table 1, Kapata market had a higher number of respondents, followed by Saturday, Nabvutika, and Kamanda markets, respectively. Equally, the staff at the department of fisheries at district level overwhelmingly responded to the interviews conducted.

The Pie chart (figure 1) revealed that much or larger percentage of the fish consumed by the residents of Chipata is mainly from outside the country. And only a smaller percentage of fish is locally produced or supplied to the city of Chipata. The chart indicates that about 40% of fish has been coming from Mozambique. Then, about 36% of fish equally has been brought into the country from Malawi. This shows that about 76% of fish is clearly from outside the country and the district of Chipata as well.

Besides that, about 24% of fish is from within the country, Zambia. Again, about 22.7% of fish supplied to the city of Chipata has been from outside the district of Chipata, but within Zambia. As a district, is about 1.3% of fish which is been supplied to the city of Chipata. In total, it is about 98.7% of fish which is been supplied to the city of Chipata is from outside.

Table 2 revealed that the three groups of respondents accepted to be interviewed were the fish traders' none-fish traders and the senior members' staff from the fisheries department. The table shows that Kapata market, 50.9% were fish trader and 11.8% of them were none-fish traders' respondents, respectively. Respondents from Saturday market, only 21.8% were the fish traders. Then for Nabvutika market respondents, 4.55% were the fish traders and 0.9% none –fish traders. And for Kamanda market respondents, 00% was for fish traders and 0.9% indicates none-fish traders. The neutral respondents of 9.1% were from the department of fisheries.

The fish traders' respondents further explained two major issues which have been affecting them at the border check-points of Mwami (Chipata district) and Chanida (Katete district), respectively. Firstly, are high border levies charged by the Zambia revenue authority (ZRA) causing fish to become scarcer and more expensive on the city markets of Chipata. Secondly, there is too much paper work from border check-points clearance given by ZRA and the department of fisheries, which cause further delays of scarcity of fish supply on the city markets of Chipata. The other reason mentioned was council levies charged by city council authorities slumped on fish traders were too high, on these on the city markets of Chipata, affecting the fish supply and pricing negatively.

Table 3 revealed that the main cause of scarcity of fish supply in the district, to be more particular, Chipata city. Some respondents explained clearly that one of the causes of scarcity of fish supply in the city of Chipata were long distances from the sources of fish. Secondly, it was also eluded to that the other major cause of scarcity of fish supply to the above-named city was and is still the existing problem, is having less water bodies in the province as well as in the district. Thirdly, other

respondents overwhelmingly expressed their feelings or minds that the current situation is more natural as it is to do with physical geographical features of the province and the district as well.

Besides, the current streams are not perennials and other water reservoirs easily dry-up due to some droughts during rain seasons in some years. Compounded with the above-mentioned factors, and less existing dams in the district, have, therefore, resulted into scarcity of fish supply in the city.

However, though these challenges, as above mentioned, the population of the of Chipata city is high, as shown by Central statistical office (CSO) 2010, shows that there about 1,592,661 people in eastern province but Chipata district alone has about 455,783 people. This clearly shows that there is high demand of fish, though its scarcity.

Fish is source of proteins which are essential for human bodies. So, it is needful for one to consume fish products. Fish is part of human diet, therefore, deserves to be sustained at all times.

Because of this scenario, the province, the district and the city of Chipata in particular, as shown from graph 1 (figure 2), this gives a message that there is high demand of fish though its scarcity. The varieties of kapenta species which appeared from the graph, explains or suggests how much the residents of Chipata city favours these species gives more to it that there is need to have fish products.

Siavonga, despite being expensive, it has second highest rate of about 29% demand of being liked by the consumers. Though of low quality in terms of terms taste, Usipa has a third rate of about 23% demand by the Chipata city residents or consumers. Regardless of it having low demand, Chisense, is being consumed at the rate of about 05% by the local consumers of Chipata city. For the big fishes, such as, breams, are most expensive species of fish on the markets of Chipata city. Even though it is expensive, many of the consumers of Chipata city like buying these varieties. So, amongst all these varieties, the big fishes are highly consumed by the local residents of Chipata city and have the highest rate of about 32% demand.

To sum up, about 11% of the respondents indicated that residents of Chipata city like buying all the four varieties which are very common on the markets of the city. This entails that, despite scarcity of fish supply in the city of Chipata, there is extremely high demand of the commodity by the residents.

During rain and cold seasons, these are known to be the worst hit of having less fish supply on the markets. In rain season, the traders explained that it is due to fish ban and lack of facilities to adequately process and prepare fish for marketing from fishing centres. For cold seasons, it is inclined to weather patterns which do not favour fishing activities at the times of fishing. In view of this, it was reported that fish supply becomes low and resulting into being so expensive. In warm or hot seasons, fish become more plenty and prices are usually fair for consumers to buy fish.

Also, fresh or frozen fish is found on the markets, though not very much common. In some cases, the stocks are found in limited shops that have facilities to store some fish. Nonetheless, the amounts are little, and are usually being underestimated or undervalued because of this, there are no statistical records.

CHAPTER SIX

The study points out number issues regarding the scarcity of fish supply in the city of Chipata and what it has caused to its communities. However, some recommendations and conclusion have been drawn.

Conclusions

In the mainstream development discourse, agricultural and fisheries departments' growth are considered central to rural poverty reduction. The agricultural sector accounts for 20 percent of sub-Saharan Africa's GDP and 67 percent of the total labour force (FAO and IFAD, 2008). As having the evidence of an increase in the numbers of poor and malnourished people owing to a mounting gap between agricultural output and population growth (ADB et al., 2008; FAO and IFAD, 2008). Better water management, including increased construction of small reservoirs, is proposed as one of the solutions to agricultural growth and climate change resilience in many areas of Africa (NEPAD, 2003; FAO, 2008a) and while there is general agreement that development in water management should take several forms and benefit many people by better integrating irrigation and other uses (Venot et al., 2012), the potential for fisheries and improved nutrition has generally received negligible attention (HLPE, 2014).

Climate change scenarios are primarily predicting increased variability and volatility in the precipitation regimes of drylands, and the impact of these anticipated changes on food production will be felt primarily in terms of fluctuating supply. Without increased resilience and better adaptation, the rural populations most at risk from anticipated climate change impacts are those subsisting in semi-arid zones.

Diversification and buffer capacity are a key to improved resilience and the potential to expand the role played by fish in the livelihoods of dryland people is considerable. Freshwater environments are among the most volatile and ephemeral ecosystems that exist and many fish species are highly adapted to fluctuating and variable conditions.

In fact, recent research (Kolding and van Zwieten, 2012; Gownaris et al., 2016b) shows that the fluctuating nature of most African freshwater systems appears to promote fish production rather than impede it. Combined with the increased recognition of the nutritional value of fish for food security and healthy diets, the importance of fish for a diversified livelihood strategy in drylands should be emphasized, promoted and developed, in concert with other food producing activities.

The focus of this review has been on both documenting the general resilience of many fish resources to climatic variability and the underestimation of fish and fisheries in livelihood importance, but also on enhancing the potential supply of fish from dryland areas through the improved use of the available water bodies, and in particular from small reservoirs by focusing on small, highly productive species.

The role of small water bodies in supplying essential micronutrients and protein to rural communities has largely been ignored since the termination of the ALCOM programme in 1998 (FAO, 1999) although they are more productive per unit area than the large lakes and reservoirs and comprise a much larger area of water combined.

Most of the fish production, however, is consumed locally and goes unrecorded in official catch statistics. By refocusing attention on fish productivity in small water bodies and reservoirs in drylands, and in particular by integrating fisheries with developments in water harvesting, irrigation

and improved water storage facilities, the potential to increase the role of fish in the diets of dryland people, and to provide improved livelihood opportunities, is great.

Recommendations

Fish availability is considered to be low in Africa when compared with other parts of the world, although both the reported catches and consumption statistics are probably seriously underestimated.

With growing human populations and increasing global demand for fish, the situation is likely to worsen in coming years (World Bank, 2013).

This will have particularly profound effects on the food security and nutrition of people living in the drylands, especially as they become increasingly vulnerable to the effects of climate change.

For African drylands, the anticipated future climate changes are predominantly increased variability and volatility in the precipitation regimes (FAO, 2008a: Müller, 2013). The impact of the expected hydrological changes on food production will, therefore, be felt primarily in terms of supply stability. Most at risk from the climate change impacts are the rural populations who have few options, other than migration, for adapting to yet more water scarcity.

Under the expected conditions of higher rainfall variability, increased temperatures and evaporative losses, understanding the nature of rainfall events and the scope for water management to buffer or store rainfall will be key to development and food security. Rain-fed systems will continue to offer the greatest scope for adaptation in terms of area, number of farmers and overall contribution to global food production. Runoff can be controlled to a degree, while rainfall and evaporate-transpiration cannot. The effective management and storage of water in drylands is, therefore, considered to be one of the most important challenges for continued livelihood support and food security, like it is to do with fishing in these affected areas.

The fisheries sector will depend on and need to be included in this development, and “agricultural” policy makers should recognize its importance. While natural water bodies will continue to play an important role, increasing the amount of surface water available from small reservoirs, such as dams will also provide opportunities for significantly improved fish production in the eastern province as well as in the district of Chipata.

To achieve this potential there is a need for a far greater level of investment in people, institutions, practices and infrastructure than is currently the case. The interdependence of lake, ponds, flats, swamps, marshlands, dams and river fisheries and aquaculture, in both drylands and adjacent areas, means that they all have a critical role to play in the future resilience and food security of people in dryland areas to improve on the fish production in eastern province and Chipata district as well.

By constructing some factories or industries to manufacture food for fish, and fishing equipment.

By constructing some roads leading to the fishing areas.

By restocking of fingerings of fish into already built dams and ponds, and also retraining of staff and training of new staff in line with fish management.

REFERENCES

[1] ADB et al., (2008). Investment in agricultural water for poverty reduction and economic growth in sub-Saharan Africa. Washington DC, International Water Management Institute and World Bank.
[2] Baijot, E., Moreau, J. & Bouda, S. (1997). Hydro biological aspects of fisheries in small reservoirs in the Sahel region. Wageningen, the Netherlands. ACP-EU Technical Centre for Agricultural and Rural Cooperation.
[3] Béné, C., Macfadyen, G. & Allison, E.H. (2007). Increasing the contribution of small-scale fisheries to poverty alleviation and food security. FAO Fisheries Technical Paper. No. 481. Rome, FAO.
[4] Béné, C., Hersoug, B. & Allison, E.H. (2010). Not by rent alone: analysing the pro-poor functions of small-scale fisheries in developing countries. Development Policy Review.
[5] Béné, C., Lawton, R. & Allison, E. (2010). Trade matters in the fight against poverty: narratives, perceptions and lack of evidence in the case of fish trade in Africa. World Development.
[6] Béné, C., Arthur, R., Norbury, H., Allison, E.H., Beveridge, M., Bush, S., Campling, L., Leschen,
[7] W., Little, D., Squires, D., Thilsted, S.H., Troell, M. & Williams, M. (2016).Contribution of fisheries and aquaculture to food security and poverty reduction: assessing the current evidence. World Development.
[8] Beverton, R.J.H. (1959). Report on the state of the Lake Victoria fisheries. Fisheries Laboratory, Lowestoft, UK.Mimeo.
[9] BLEHLE, C. (1998). Integrated aquaculture and irrigation in Zambia.FAO Aquaculture Newsletter 19. Fisheries and Aquaculture Dept.
[10] Boko, M. I., Nianga, A, Nyong, C et al (2007). "Africa in Climate Change",
[11] In Yanda, P. Z and Mubaya, C. P (2011). Managing a Changing Climate in Africa-Local Vulnerabilities and Adaptation Experiences. Dar as Salaam. Mkuki naNyota Publishers Ltd.
[12] BROX, O. (1990). The common property theory: epistemological status and analytical utility. Human Organization. Norway: Dept. of Social Sciences, the University of Tromso.
[13] BRUMMETT, R. (1999). Integrated aquaculture in sub Saharan Africa. Environment, Development and Sustainability. Netherlands: Kluwer Academic Publishers.
[14] BRUMMETT, R. and M. WILLIAMS., (2000). The evolution of aquaculture in African rural and economic development. Ecological Economics.
[15] BRUMMETT, R., J. LAZARD and J. MOEHL., (2008). African aquaculture: realizing the potential. Food Policy.
[16] CHILUFWA, H. and J. Tengas., (1996). Agroforestry Manual for Northern Zambia. Lusaka.
[17] De Graaf, G., Bartley, D., Jørgensen, J. & Marmulla, G. (2012). The scale of inland fisheries, can we do better? Alternative approaches for assessment. Fisheries Management and Ecology.
[18] De Graaf, G.J. & Garibaldi, L. (2014). The value of African fisheries. FAO Fisheries and Aquaculture Circular. No. 1093. Rome, FAO.
[19] DoF., (2010). National Aquaculture Development Plan. Overcoming the slow growth of Aquaculture in Zambia 2010-2015. FAO, 2005. Aquaculture production, (2003). Year book of Fishery Statistics- Vol.96/2. Food and Agriculture Organization of the United Nations. Rome, Italy.
[20] FAO. (1999). Utilization of small water bodies for aquaculture and fisheries – aquaculture for local community development programme. Project findings and recommendations. Project FI: GCP/RAF/277/BEL Terminal Report. Rome, FAO.

[21] FAO. (2008a). Climate change, water and food security. Technical background and document from the expert consultation, 26–28 February 2008. Synthesis Paper. No. HLC/08/BAK/2. Rome, FAO.
[22] FAO. (2008b). Vue Générale Du Secteur Des Pêches National Burkina Faso. Rome, FAO.
[23] FAO. (2010). Yearbook of fishery and aquaculture statistics. Rome, FAO.
[24] FAO. (2012). The state of world fisheries and aquaculture (SOFIA) 2012. Rome, FAO.
[25] Fauchereau, N., Trzaska, S., Rouault, M and Richard, Y. (2003). "Rainfall Variability and Changes in Southern Africa during the 20th Century in the Global Warming Context." Natural Hazards.
[26] GEHEB, K. and T. BINNS. (1997). 'Fishing farmers' or 'farming fishermen'? The quest for household income and nutritional security on the Kenyan shores of Lake Victoria. African Affairs.
[27] Goulding, I. & Kamel, M. (2013). Institutional, policy and regulatory framework for sustainable development of the Egyptian aquaculture sector. World Fish Project Report. No. 2013-39. Penang, Malaysia, World Fish.
[28] GRZ (2007). The National Adaptation Programme on Action, Ministry of Tourism, Environment and National Resources. Lusaka. Zambia.
[29] HALWART, M. (2005). The ecology of fish in rice fields. In: Fernando, C.H., F. Goeltenboth and J. Margraf (eds.) Aquatic ecology of rice fields-a global perspective. Ontario, Canada: Volumes Publishing, Kitchener.
[30] HALWART, M. & Settle, W. eds. (2008). Participatory training and curriculum development for farmer field schools in Guyana and Suriname. A field guide on integrated pest management and aquaculture in rice. FAO.
[31] Hara, M.M. (2001). Could marine resources provide a short-term solution to declining fish supply in SADC inland countries? The case of horse mackerel. Food Policy.
[32] Hecht, T., Moehl, J., Halwart, M. & Subasinghe, R. (2005). Regional review on aquaculture development. Sub-Saharan Africa. FAO Fisheries Circular. Rome, FAO.
[33] Heck, S., Béné, C. & Reyes-Gaskin, R. (2007). Investing in African fisheries: building links to the Millennium Development Goals. Fish and Fisheries.
[34] HLPE. (2014). Sustainable fisheries and aquaculture for food security and nutrition. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome, FAO.
[35] Hoffman, A. (2010). Social networks and power relations in the dagaa business in Mwanza. Tanzania. 30-Law and Governance Group, Wageningen University. (MSc thesis.)
[36] Huchzermeyer, C.F. (2013). Fish and fisheries of Bangweulu wetlands, Zambia. Rhodes University, South Africa. (MSc. thesis.)
[37] HARRISON, E. (1996). Digging fish ponds: perspective on motivation in Luapula province, Zambia. Human Organization 55(3). Society for Applied Anthropology.
[38] HASSAN, M. R., (2004). National Mission Report for training institutions and syllabus development: National Strategy for aquaculture Sub-sector: Project ZAM/ 2901: FAO
[39] HISHAMUNDA, N. and N.B. RIDLER. (2005). Farming fish for profits: A small step towards food security in sub-Saharan Africa. Food Policy.
[40] IPCC.2013. Climate change (2013): the physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex & P.M. Midgley, eds. Cambridge, UK and New York, NY, USA. Cambridge University Press.
[41] KAPASA, C.K., (2008). Orientation of Department of Fisheries Staff in Fisheries Management. Kafue: Department of Fisheries.

[42] KASOMA, P.F., (1994). "Participatory Rural Newspapers as agents of Development: A Reciprocal Agenda Setting Model," in White, S., et al., (eds.), (1994). Participatory Communication, Working for Change and Development. New Delhi: SAGE Publications.
[43] KOFFI, C., M. OSWALD and J. LAZARD., (1996). Rural development of tilapia culture in Africa: from myth to reality. In; Pulling, R.S.V., J. Lazard, M. Legendre, J.B. Amon Kothias and D. Pauly. Manila, Philippines: The third international symposium on tilapia in aquaculture. ICLARM Conf. Proc. 41.
[44] Kolding, J. & van Zwieten, P.A.M. (2006). Improving productivity in tropical lakes and reservoirs. Challenge Program on Water and Food − Aquatic Ecosystems and Fisheries Review Series 1. Theme 3. Cairo, Egypt. WorldFish Centre.
[45] Kolding, J. & van Zwieten, P.A.M. (2011). The tragedy of our legacy: how do global management discourses affect small-scale fisheries in the south? Forum for Development Studies.
[46] Kolding, J. & van Zwieten, P.A.M. (2012). Relative lake level fluctuations and their influence on productivity and resilience in tropical lakes and reservoirs. Fisheries Research.
[47] Kolding, J. & van Zwieten, P.A.M. (2014). Sustainable fishing in inland waters. Journal of Limnology.
[48] Kolding, J., van Zwieten, P.A.M., Mkumbo, O., Silsbe, G. & Hockey, R.E. (2008a). Are the Lake Victoria fisheries threatened by exploitation or eutrophication? Towards an ecosystem-based approach to management. InG. Bianchi & H.R. Skjoldal, Eds. The ecosystem approach to fisheries.
[49] Kolding, J., Béné, C & Bavinck, M. (2014a). Small-scale fisheries − importance, vulnerability, and deficient knowledge, chapter 22. InS. Garcia, J. Rice & A. Charles, eds. Governance for marine fisheries and biodiversity conservation. Interaction and co-evolution. Wiley-Blackwell.
[50] Kolding, J., Bundy, A., van Zwieten, P.A.M. & Plank, M. (2015a). Fisheries, the inverted food pyramid. ICES Journal of Marine Science.
[51] Kolding, J., Haug, L. & Stefansson, S. (2008b). Effect of oxygen on growth and reproduction in Nile tilapia (Oreochromis niloticus). Can. J. Fish. Aquat. Sci.
[52] Kolding, J., Medard, M., Mkumbo, O. & van Zwieten, P.A.M. (2014b). Status, trends and management of the Lake Victoria fisheries. InR.L. Welcomme, J. Valbo-Jørgensen, & A.S. Halls, eds. Inland fisheries evolution and management – case studies from four continents. FAO Fisheries and Aquaculture Technical Paper. No. 579. Rome, FAO.
[53] Kolding, J., van Zwieten, P.A.M. & Mosepele, K. (2016). "Where there is water there is fish". Small-scale inland fisheries in Africa: dynamics and importance. InT. Tvedt & T. Oestigaard, Eds. A history of water. Series 3, Volume 3. Water and food: from hunter-gatherers to global production in Africa. London, I.B. Tauris. (In press.)
[54] KOMBO, D.K. and Tromp, D.L.A., (2006). Proposal and Thesis Writing: An Introduction. Kenya: Pauline's Publications Africa.
[55] Lehner, B. &Dolls, P. (2004). Development and validation of a global database of lakes, reservoirs and wetlands. Journal of Hydrology.
[56] Lemoalle, J., Bader, J.-C., Leblanc, M. & Sedick, A. (2012). Recent changes in Lake Chad: observations, simulations and management options (1973–2011). Global and Planetary Change.
[57] Longley, C., Thilsted, S.H., Beveridge, M., Cole, S., Nyirenda, D.B., Heck, S. & Hother, A.-L. (2014). The role of fish in the first 1 000 days in Zambia. IDS Special Collection. Brighton, UK. Institute of Development Studies.

[58] Lekprichakul, T. (2008). Impact of 2004/2005 Drought on Zambia's Agricultural Production: Preliminary Results. Vulnerability and Resilience of Social-Ecological Systems, Research Institute for Humanity and Nature.

[59] LUNGU, O., (2008). Acidification from long-term use of urea and its effects on selected soil properties. African Journal of Food, Agriculture, Nutrition and Development Vol. 8, No. 1

[60] MALASHA, I. (2007). Fisheries co-management: the Zambian experience. In Dickson, M. & Brooks, A. (eds), Proceedings of the CBFM-2 International Conference on Community Based Approaches to Fisheries Management, Dhaka, Bangladesh, 6-7 March 2007. Conference paper No. 12. Dhaka, the World Fish Centre.

[61] Malasha, I. (2003). Colonial and post-colonial fisheries regulations: the cases of Zambia and Zimbabwe. InE. Jul-Larsen, J. Kolding, J.R. Nielsen, R. Overå, & P.A.M. van Zwieten, eds. Management, co-management or no management? Major dilemmas in southern African freshwater fisheries. Part 2: case studies, p. 253−266. FAO Fisheries Technical Paper. No. 426/2. Rome, FAO.

[62] Maryland Sea Grant Extension (2001). What is aquaculture? Publication number UM-SG-MAP-91-01.

[63] Marshall, B.E. & Maes, M. (1994). Small water bodies and their fisheries in southern Africa. CIFA Technical Paper. No. 29. Rome, FAO.

[64] Melcher, A.H., Ouedraogoa, R. & Schmutz, S. (2012). Spatial and seasonal fish community patterns in impacted and protected semi-arid rivers of Burkina Faso. Ecological Engineering.

[65] MOULTON, J. (1998). Understanding social research. Pretoria. Van Schalk.

[66] MOEHL, J. (2005). Aquaculture and food security in the Africa region: the dilemma of the remote rural fish farmer. FAO Aquaculture Newsletter.

[67] MUGENDA, O. M., and A. G. Mugenda. (1999). Research methods: Quantitative and qualitative. Nairobi. Acts Press.

[68] Müller, C. (2013). African lessons on climate change risks for agriculture. Annual review of nutrition.

[69] MUGENDA, O. M., and A. G. Mugenda. 1999. Research methods: Quantitative and qualitative approaches. Nairobi: Acts Press.

[70] MUDENDA H.G., G. L. Lulemba, M. V. Musonda, G. Sinkala, B. C. Mubanga and E. Maembe. (2005). Intensification and Commercialization of Aquaculture in Zambia. Lusaka.

[71] MUDENDA, C.G. (2004). The Economics of Fish Farming in Zambia. A report prepared for the FAO.

[72] MWANGO, J., Musonda M., Mazingaliwa, K. A. (2002). Review of Aquaculture Extension in Zambia. Lusaka. MACO.

[73] MUTUNA, C. L., (2009). Fisheries development facilitation manual for field workers and community leaders. DoF/PLARD.

[74] MUWANGA, R., (1992). The Need to Re-introduce the Closed Fishing Season Regulation in Zambia. Lusaka: Department of Fisheries.

[75] MUIR, J. (2005). Managing the harvest? Perspectives on the potential of aquaculture. Philosophical Transactions of the Royal Society B.

[76] Ngoma, J. (2008). Effects of Climate Change on Maize Production in Zambia. Department of Water and Environmental Studies, Linköping University. Campus Norrköping, SE-601 74 Norrköping, Sweden.

[77] ORODHO, H. (2003). Essentials of Education and Social Sciences Research Methods. Nairobi; Masola Publishing Company.

[78] OXFAM, (2007). Education Charges a Tax on Human Development, Country Reports. OXFAM.

[79] Peel, R.A., Tweddle, D., Simasiku, E.K., Martin, G.D., Lubanda, J., Hay, C.J. & Weyl, O.L.F. (2015). Ecology, fish and fishery of Lake Liambezi, a recently refilled floodplain lake in the Zambezi Region, Namibia. African Journal of Aquatic Science.

[80] PILLAY, T.V.R. (1977). Planning of aquaculture development - an introductory guide. Farnham, Surrey, Fishing News Books Ltd. for FAO.

[81] Sacrah, M.-T. & Birkett, C.2000. Fishing and farming at Lake Chad: response to lake-level fluctuations. The Geographical Journal.

[82] STEWART, J.A. 1995. Assessing sustainability of aquaculture development. PhD thesis, Institute of Aquaculture, University of Stirling.

[83] SIRRINE, D., C. SHENNAN and J.R. SIRRINE. (2010). comparing agro-forestry systems' ex ante adoption potential and ex post adoption: on-farm participatory research from southern Malawi. Agro-forestry Systems.

[84] Soma, K., Mwango, J., & Mazingaliwa, K. (1999). Analysis of fish culture in Zambia. Japan International Cooperation Agency (JICA).

[85] THORNTON, A., E. NELL and G. HAMPWAYE. (2010). Cultivating Kaunda's plan for self-sufficiency; is urban agriculture receiving support in Zambia? Development Southern Africa.

[86] Venot, J.-P., de Fraiture, C. & Nti Acheampong, E. (2012). Revisiting dominant notions: a review of costs, performance and institutions of small reservoirs in sub-Saharan Africa. IWMI Research Report. No. 144. Colombo, Sri Lanka. International Water Management Institute.

[87] WHITE, C. J. (2003). Research methods and techniques. Pretoria: C. J White.

[88] WILLIAM, C. (1977): Economic appraisal of the fishing industry in Zambia. Lusaka. Dept. of Fisheries.

[89] World Bank.2013. Fish to 2030. Prospects for fisheries and aquaculture. World Bank report. No. 83177-GLB. Washington DC. The World Bank.

[90] The World Bank (2010). The World Development Report; Development and Climate Change. Washington DC, The International Bank for Reconstruction and Development/ The World Bank.

[91] SOPHIE Kaonde Ng'andu (2013). Writing a research proposal in education research. Lusaka. The University of Zambia Press (UNZA Press).

[92] Shitumbanuma, V. (2008). What has Happened to the Climate in Zambia in Recent Decades. Paper Presented at SADC Land and Water Management Applied Research Programme. Scientific Symposium Theme: Towards Meeting the Challenges of Climate Change. 27-30th May 2008, Lusaka, Zambia.

[93] Sichingabula, H. M. (1995). The Climate System and Climate Change; Global Warming, Drought and Desertification in Zambia. Paper Presented on 23-24th June, 1995 at Intercontinental Hotel, Lusaka, Zambia.

[94] Sichingabula, H. M. (1998). ""Rainfall Variability, Drought and Implications of its Impacts on Zambia, 1886-1996" in Water Resources Variability in Africa during the XX th Century " International Association of Hydrological Sciences Publication No. 252.

[95] Yanda, P. Z., and Mubaya, C.P. (2011). Managing a Changing Climate in Africa. Local Level Vulnerabilities and Adaptation Experiences. Dar-as-salaam. Mkukina

APPENDICES

APPENDIX A

INFORMATION AND COMMUNICATION UNIVERSITY

OFFICE OF THE REGISTRAR

Tel: +260-211-845754/0211221662 P.O Box 30226, Lusaka 10101, Zambia

Cell: +260-979303567/0979-718215 *Email: admin@icuzambia.net /academic@icuzambia.net*
16th March, 2018.

Provincial Livestock and Fisheries Officer,

Eastern Province,

P.O Box 510……,

Chipata.

RE: LEVISON MWANZA, SIN: 1510346914

I hereby write to introduce the above-named student to your good office. He is a full-time student of the Information and Communications University, and currently undertaking a research project, "an exploration of fishes in fish farming blocks failing to grow in the fish ponds". Therefore, this serves to ascertain that; as part of the academic requirement for the fulfilment of the His Masters' programme, He will be involved in data collection within your province for the above stated project. The data collected and the subsequent research results are solely used for academic purposes.

I take this opportunity to thank you for your cooperation.

Yours faithfully,

Dr. R. Silumbe Programmes Coordinator

Cc; Vice Chancellor
Cc: Dean School of Education

Cc; Dean of students

APPENDIX B

WORK PLAN (TIME FRAME)

Activity in weeks	1	2	3	4	5	6	7	8	9	10
Topic formulation	xxx	xxx								
Literature review collections			aaa	aaa						
Designing of data collection tools	Bbb	bbb								
Production of data collection tools (questionnaires)		qqq	qqq							
Field visits (data collection)					ggg	ggg				
Data analysis										
Compilation of research report							Ccc	ccc		
Finalising of the report									Eee	eee

APPENDIX C

INFORMATION AND COMMUNICATION UNIVERSITY

Dear respondent:

You have been picked randomly via the use of probability techniques to participate in this research project. Therefore, your full participation will be highly appreciated.

It is my sincere assurance that the findings generated in this study will be handled with the highest level of confidentiality and for this academic exercise only.

Please respond to the following questions as truthfully as possible. Where there are options provided, select the appropriate response by putting a tick [√] in the box or space of your choice.

FISHERIES STAFF

SECTION A: PERSONAL DETAILS

Residential area……..

District……

Position……

SECTION B: CHIPATA CITY FISH SUPPLY DETAILS

1. Mention the common species of fish found on the markets of Chipata city/district.

2. Is the district rich in fish resources? If yes, give reasons…….

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

A) If no, give reasons…….

B) If outside the country, name the country……..

3. How is fish usually prepared from the sources of catch/fishing?

4. Are fishing activities common in Chipata district? If no, give reasons…….

5. When is fish supply erratic on the markets of the city/district of Chipata?

6. What are the causes of fish supply erratic on the markets of the city/district of Chipata?

……
……....

7. What suggestions would you give so that fishing activities can improve on the fish supply scarcity on the markets of the city of Chipata?

.....

8. What mode of transport do fish traders use to ferry their fish from the fishing sources?

9. As a fish specialist, what are the common challenges do

A) Fish traders face creating fish supply limited on the markets of Chipata city/ district?

B) Fish farmers face creating fish supply scarce on the markets of Chipata city.

THANK YOU FOR YOUR PARTICIPATION.

APPENDIX D

INFORMATION AND COMMUNICATION UNIVERSITY

Dear respondent:

You have been picked randomly via the use of probability techniques to participate in this research project. Therefore, your full participation will be highly appreciated.

It is my sincere assurance that the findings generated in this study will be handled with the highest level of confidentiality and for this academic exercise only.

Please respond to the following questions as truthfully as possible. Where there are options provided, select the appropriate response by putting a tick [√] in the box or space of your choice.

FISH AND NONE FISH TRADERS ON THE MARKETS OF CHIPATA CITY.

PERSONAL DETAILS.

1. Residential Area…….

2. District……....

3. Name of the market place…….

4. Are you a fish trader? YES ☐ NO ☐

FISH TRADING

5. What type of fish do your customers like most? Is it SMOKE ☐ FRESH ☐ ☐

FROZEN ☐ SUNDRIED?

6. Is fish supply a problem in Chipata city? YES ☐ NO ☐

7. Name the season when fish supply is a problem in the city. Is it in RAIN SEASON ☐
DRY SEASON ☐ COLD SEASON ☐

8. What are the main sources of fish which you have been selling at this city market? Is it from……? ☐

A) MALAWI

B) MOZAMBIQUE ☐

C) CHIPATA DISTRICT ☐

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

D) OUTSIDE CHIPATA DISTRICT IN ZAMBIA? ☐

9. What are the causes of fish supply to be a problem in Chipata city or district? Is it …….?

A) LONG DISTANCES FROM THE SOURCES OF FISH ☐

B) LESS SOURCES OF WATER BODIES IN THE DISTRICT ☐

C) BOTH A and B ☐

10. What type of fish is on high demand on the market? Is it …….?

(A) KAPENTA ☐

(B) USIPA ☐

(C) CHISENSE ☐

(D) BIG FISH ☐

(E) ALL TYPES AS MENTIONED ABOVE ☐

11. How is fish commonly being prepared from the sources? A) SMOKE ☐ B) SUNDRIE ☐ C) FROZEN ☐ D) FRESH ☐

12. What is the common mode of transport do you use from the sources of fish to the city of Chipata?

A) BY ROAD WAYS ☐ B) BY AIR WAYS ☐ C) BY RAILWAYS ☐

D) WATER WAYS ☐

13. What suggestions do you have in order to improve on fish supply in the city or district of Chipata?

A) PUTTING UP MANY DAMS, ICE PLANTS AND FISH FOODS INDUSTRIES ☐

B) TRAINING OF MANY FISH FARMERS ☐

C) BOTH A and B. ☐

D) OR WRITE ANY OTHER……...

14. What are the common challenges do you face as a fish trader? Write at least five items.

1)…….

2)…….

3)…….

4)……...

5)……...

THANK YOU FOR YOUR PARTICIPATION

ISSN: 3471-7102, ISBN: 978-9982-70-318-5

APPENDIX E

BUDGET

ACTIVITY	DESCRIPTION	UNITY	TOTAL (K)
Literature Review	This involve Secondary data collection; From the library, internet and Consultations.	Lump sum	250
Proposal writing	This involves typing of draft proposal, editing and printing. Stationary This involves buying of stationery i.e. ream of paper, pens and pencils for proposal writing.	Lump sum	100
Data collection tools	This involves typing and printing and photocopying of the questionnaire and interview guide. Fifty photocopies of the questionnaire will be produced to meet the sample size.	Lump sum	300
Data analysis	This involves giving respondents to Administer questionnaires.	Lump sum	250
Report writing	This involves putting together of report Views. Stationery will be added to conduct this activity. Typing and printing will be done.	Lump sum	180
Pens		5 x 3	15
Pencils		5 x 1	5
Note pad		5 x 5	25
Ream of paper		1 x 60	60
Flash disk		1 x 100	100
Total			1285