AN ASSESSMENT OF THE EFFECTIVENESS OF SMALL-SCALE FISH FARMING IN IMPROVING LIVELIHOODS OF SMALL-SCALE FARMERS: A CASE OF SELECTED HOUSEHOLDS IN CHINSALI DISTRICT

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DECLARATION

I, ESTHER SABILA hereby declare that this dissertation;

a) Represents my work;
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CERTIFICATE OF APPROVAL

The dissertation of Ms. Esther Sabila is approved as fulfilling part of the requirements for the award of the Degree of Master of Development Studies by the University of Lusaka.

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DEDICATION

This research is dedicated to my late mother, Esther Chakowela Sabila. You have been my guiding star mum, both when you were present in this life and in your heavenly existence. I love you lots.

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LIST OF ACRONYMNS

ADB	Asian Development Bank
AFDB	African Development Bank
DC	District Commissioner
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
MoFL	Ministry of Fisheries and Livestock
NADP	National Aquaculture Development Plan 2015 to 2020.
UNDP	United Nations Development Program

ABSTRACT

Small-scale fish farming is an agriculture mechanism that helps to eradicate poverty among the poor especially in rural areas. The main objective of this study therefore was to assess the effectiveness of small-scale fish farming in improving the livelihoods of small-scale farmers in Chinsali District. The following were the research questions for the study: To what extent does small-scale fish farming improve employment provision in Chinsali District? To what level does small-scale fish farming lead to increased household income generation in Chinsali District? What is the contribution of small-scale fish farming in improving food security in Chinsali District? This investigation was accomplished through a mixed research approach involving both quantitative and qualitative methods. Questionnaires were prepared and administered to 55 small-scale farmers involved in fish farming in Chinsali District. In addition, data was obtained from four (4) government officers from the Ministry of Fisheries and Livestock using semi-structured interviews in order to add expert views to the topic. The findings of the study were analysed using SPSS version 27 and thematic analysis. The results of the study showed that small-scale fish farming was making headways in improving the livelihoods of small-scale farmers in Chinsali District by making significant contributions to employment provision, income generation and food security. However, the results also showed that the benefits from small-scale fish farming were currently not adequate enough to fully improve the livelihood of small-scale farmers as the yields being attained from small-scale fish farming in the district were very minimal. Nevertheless, there is need for the Ministry of Fisheries and livestock to conduct rigorous national research on the impact of small-scale fish farming in Zambia. There is also need to provide training and funding to small scale fish farmers in Chinsali District in order to improve efficiency in fish production. In the long run, small-scale fish farming would significantly improve the livelihood of small-scale farmers in Zambia through employment provision, income generation and ensuring a sustained food security. Small-scale fish farming would also improve the image of the Ministry of Fisheries and Livestock (MoFLS).

CHAPTER ONE
INTRODUCTION

1.0 INTRODUCTION

In this chapter, the introduction to the study is presented. This is done by first explaining the background to the research topic. This is followed by the operational definition of terms, the statement of the research problem, the research objectives and the research questions. The chapter concludes the scope of study, the significance of the study and the organisation of the report.

1.1 BACKGROUND

The fish industry plays a significance role in the economic growth of the nation mainly through providing opportunities for 'employment, income generation, and contributing to food and national security' (Ministry of Agriculture & Ministry of Fisheries and Livestock 2016:5). The fish industry is the third largest contributor to Zambia's Gross Domestic Product (GDP) after mining and crop production. The fish industry contributes about 3.2 percent to the country's GDP (Ministry of Agriculture & Ministry of Fisheries and Livestock 2016:5). It supports thousands of people through both direct and indirect employment. According to Isaac Malasha (2007:07), 20 000 people are directly employed in the industry while more than 250 000 are involved in fish processing, trading and subsistence fishing.

The fish industry in Zambia is a thriving contributor to economic and social development due to the abundance of water resources which accounts for 7 percent (53, 700 km squared) of the country's surface area in the form of lakes, rivers, swamps and wetlands. The industry is supported by two main river basins comprising of the Zambezi River basin and the Luapula River basin respectively. The Zambezi River basin area involves the Upper, Middle and Lower Zambezi, the Kafue and Luangwa Rivers, and the Lukanga Swamps. On the other hand, the Luapula River basin comprises the Chambeshi River, the Bangweulu Lakes and surrounding swamps and the Lake Mweru-Luapula fishery (Malasha 2007:07).

Apart from contributing to economic development the fish industry also contributes significantly to social development. The industry contributes powerfully to food security and public health. By 2013 the industry contributed 20 percent of animal protein intake through fish and fish products (Musumali *et al* 2013:02). However, this has risen to 55 percent by 2018 thereby providing essential micronutrients to the majority of Zambians (European Commission 2018:02).

Although the fish industry contributes positively to both economic and social development, about 50 percent of the estimated fish demand is unmet. This is due to population growth in Zambia leading to growth in the demand for fish in the country both for local and the international market. In addition, capture fisheries are operating at a fully exploited or over-exploited level (European Commission 2018:01). This development has led to the development of aquaculture production which is beginning to respond to the ever-increasing demand for fish bit by bit.

The aquaculture fish industry is currently contributing about 30 000 tones to the total fish production on the market. Therefore, in order to increase the output of fish production through aquaculture, the government of the Republic of Zambia and its cooperating partners are putting in a number of mechanisms. In the first place, the Ministry of Fisheries and Livestock with the support of the Food and Agriculture Organization (FAO) has developed a National Aquaculture Development Plan 2015 to 2020. Apart from that, FAO has engaged the African Development Bank (AFDB) to support aqua-parks projects in the country (European Commission 2018:01).

Another major institution that has come on board to support the aquaculture industry is the European Union working together with the European Investment Bank (EIB) which has been testing out various inclusive and bottom-up approaches. One of those inclusive and bottom-up approaches that have developed in Zambia is small-scale fish farming. Through the

African Development Bank (AFDB) and other cooperating partners, the government of the Republic of Zambia has been supporting the emergency of small-scale fish farming in the country through granting loans and skills training on fish farming to small-scale fish farmers in the country (European Commission 2018:01; Kaminski *et al* 2018:04).

This support has been extended to small-scale fish farmers in Muchinga Province of which Chinsali District is a part of. This has seen the rise of small-scale fish farmers not just in Muchinga Province but throughout the country. According to the 2023 Aquaculture Survey Main Report (Ministry of Fisheries and Livestock 2023:13), there was a total of 19 697 households involved in fish farming in Zambia, of which 3 075 were from Muchinga Province.

This study therefore hoped to assess the effectiveness of small-scale fish farming in improving the livelihoods of small-scale farmers in Chinsali District.

1.2 OPERATIONAL DEFINITIONS

The study will employ the following operational definitions of terms:

- **Aquaculture** - the cultivation, propagation or farming of fish, aquatic vegetation, or other living aquatic resources whether from eggs, spawn, spat or seed or by rearing fish lawfully taken from the wild or lawfully imported into the country, or by other similar process.
- **Development –** refers to the improvement of human life in society from a bad state to good conditions of living. It can be social, economic and political development.
- **Fish farming –** is a term used synonymously with the term aquaculture. It means the cultivation, propagation or farming of fish, aquatic vegetation, or other living aquatic resources whether from eggs, spawn, spat or seed or by rearing fish lawfully taken from the wild or lawfully imported into the country, or by other similar process.
- **Household** - a group of people who live together under one roof.

- **Participatory development** - the empowering of people to fully involve themselves in participating in their own development programs.
- **Poverty** - is a standard of living that is below the minimum level considered decent and reasonable by society' such as not having food, clothing, shelter and social services like education, health care, water and sanitation.
- **Rural development –** is a process of improving the quality of life and economic well-being of people living in rural areas.
- **Sustainable development** - the ensuring that development taking place today meets the needs of the present without compromising on the future generations in meeting their needs.
- **Livelihood** - a set of activities essential to everyday life that are conducted over one's life span. Such activities could include securing water, food, fodder, medicine, shelter, clothing. An individual's livelihood involves the capacity to acquire aforementioned necessities in order to satisfy the basic needs.
- **Food security** - is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

1.3 STATEMENT OF THE PROBLEM

Small-scale fish farming has emerged as a vital trend in Zambia's fish industry, engaging 19,697 households nationwide as of April 2023 (Ministry of Fisheries and Livestock 2023:13). The government and partnering organizations are actively supporting this sector, recognizing its potential for economic and social development, particularly in rural areas. Small-scale fish farming is also seen as a solution to mitigate the decline of capture fisheries, which are being over-exploited (European Commission, 2018). Furthermore, it is hailed as a poverty-reduction strategy, enhancing household income generation among rural communities (Rahman *et al* 2011). Despite its potential, there is a knowledge gap regarding the effectiveness of small-scale fish farming in improving the livelihoods of rural small-scale farmers. This

research therefore aimed to address this gap by providing informed insights into the impact of small-scale fish farming on rural livelihoods.

1.4 STUDY OBJECTIVES

1.4.1 General Objective

To assess the impact of small-scale fish farming on livelihoods of the small-scale farmers in Chinsali District.

1.4.2 Specific Objectives

1. To determine the extent to which small-scale fish farming improves employment provision in Chinsali District.
2. To establish the extent to which small-scale fish farming leads to increased household income generation in Chinsali District.
3. To assess the contribution of small-scale fish farming in improving food security in Chinsali District.

1.5 RESEARCH QUESTIONS

1. To what extent does small-scale fish farming improve employment provision in Chinsali District?
2. To what level does small-scale fish farming lead to increased household income generation in Chinsali District?
3. What is the contribution of small-scale fish farming in improving food security in Chinsali District?

1.6 SCOPE OF THE STUDY

This research was conducted in Chinsali District. The research strictly focussed on assessing the effectiveness of small-scale fish farming in improving the livelihoods of small-scale farmers.

1.7 SIGNIFICANCE OF THE STUDY

This research will provide a basis on which government through the Ministry of Fisheries and Livestock and cooperating partners will evaluate the approaches currently being used in the implementation of small-scale fish farming especially among the rural communities in Zambia. It will further provide empirical evidence on the role of small-scale fish farming in improving the livelihoods of those involved in fish farming and on the role that small-scale fish farming is currently playing in the eradication of poverty in Zambia. In addition, the research will help stakeholders to know the challenges being faced by small-scale fish farmers in the country in order to provide solutions. Finally, the research will add to the existing body of knowledge on small-scale fish farming and its role in social and economic development in Zambia.

1.8 ORGANIZATION OF THE REPORT

This research is organised into six chapters: Chapter 1 presents the contextual information about the study. It presents the background information, operational definition of terms, statement of the problem, the objectives of the study and the research questions to state but a few; Chapter 2 discusses relevant literature or similar studies conducted by other researchers regarding small-scale fish farming. It also presents the critique of the literature review and the conceptual and theoretical frameworks adopted by the study; Chapter 3 explains the methodology used in this study. It states the research approach taken by the study, the research design, study population, sample size and sampling design. It also discusses the instruments used by the study, data collection and analysis procedures. It concludes with study variables; Chapter 4 presents results and analysis of findings obtained from the collection of data; Chapter 5 discusses the findings of the study; Chapter 6 presents the conclusion and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.0 INTRODUCTION

In this chapter, literature review is conducted by discussing thematic areas identified from objective one, two and three. One thematic area is identified from each specific objective. This is followed by a critique of literature reviewed and concludes with the presentation of both the theoretical and conceptual frameworks.

2.1 EMPIRICAL REVIEW

2.1.1 THE EXTENT TO WHICH SMALL-SCALE FISH FARMING IMPROVES EMPLOYMENT PROVISION

Globally, there has been a growing recognition of the role that small-scale fish farming plays in employment provision especially in rural areas. Various authors affirm that small-scale fish farming is a source of employment for entire-households as almost all members of households practicing fish-farming are involved in various stages of fish-farming (Rahman *et al* 2011; Richardson & Suvedi 2018; Parrao 2012). This is affirmed by Asif et al (2015:290) who points out that Fish farming is a significant social–economic activity especially for rural communities as it is a major source of employment and income generation.

In a nutshell, small-scale fish farming has opened doors for members of households of small-scale farmers to be employed through the development of small-scale fish farming. This development has arisen due to the view that small-scale fish farming is the solution to filling the growing demand for fish throughout the world. Rahman *et al* (2011:130) in a study conducted in Bangladesh titled, “Impact of Fish Farming on Household Income: a Case Study from Mymensingh District”, explains that fish farming become popular to the farmers of rural Bangladeshi in response to the increased demand for fish for the growing population.

Consequently, adds Rahman *et al* (2011:130), there is a growing participation of households especially in rural areas of Bangladesh in small-scale fish farming. Rahman *et al* (ibid) further explains that many rural farmers in Bangladeshi are involving themselves in fish farming. He further points out that many families are converting their rice fields into ponds due to the economic profitability of fish farming compared to cultivating rice or other crops.

In a similar perspective, the development of small-scale fish farming in Myanmar mainly happening through the participation of rural households is due to the country's need to meet the growing demand for fish in addition to improving livelihood of poor and vulnerable households in rural Myanmar. According to Aung *et al* (2021:21), in research conducted in Myanmar titled, "Technical efficiency of small-scale aquaculture in Myanmar: Does women's participation in decision making matter?", the involvement of rural households in fish farming in Myanmar was a deliberate government policy which stated in 2012.

Aung *et al* (2021) further explains that in the year 2012 the government of Myanmar instituted economic reforms whose goal was to reduce poverty and to develop rural areas mainly through new agriculture policies that aimed to promote diversification of smallholder agriculture including fish farming. Aung *et al* adds that since the year 2012 the number of both small-scale and medium-scale fish producers has expanded rapidly. He points out that Small-scale farmers have embarked into fish farming by turning their rice fields and unused backyard lands into fish ponds. Such an initiative has seen a growing participation of many households in rural Myanmar in fish farming.

Employment provision through small-scale fish farming in the agriculture sector is not only limited to countries outside Africa. It has also taken root in Africa. This has seen an increase in the participation of many households especially in rural areas in fish farming. For example, Olaoyo, O. J. in a study with the title, 'Assessment of Social-Economic Analysis of Fish Farming in Oyo State, Nigeria'**,** written in the year 2013, points out that in Nigeria, a

good number of households are now involved in small-scale fish farming. To show the contribution of households in fish production, Olaoyo further explains that in 2017 households involved in fish farming were able to produce over 85 000 tonnes of fish. These operate small-scale farms ranging from homestead concrete ponds to small earthen ponds (Olaoyo 2013:45).

The participation of households in fish farming activities in Africa can be further seen in the words of Howard & Omlin (2007:67) as they state that fish farming is a favoured community activity in western Kenya. In Western Kenya new ponds are continuously under construction and are being stocked in order to reduce dependence on captured fish from Lake Victoria and as a source of income for people in rural Kenya. Many small-scale farmers are therefore taking part in the activity in order to improve their welfare and that of their families (ibid). Pravakar *et al* (2013:391) also hold similar views, which many rural dwellers have taken up fish farming activities as their secondary occupation.

Locally (Zambia), literature reviewed shows that the growth of small-scale fish farming is mainly due to high demand for fish as a result of population growth. This sentiment is supported by the European Commission (2018:01) who point out that population growth in Zambia is the leading cause of growth in the demand for fish in the country. The development of small-scale fish farming is also due to support rendered by national and international development programs (Mudenda 2009; Harrison 1996).

On the other hand, according to Kaminski *et al* (2018:04), in a study conducted in Zambia titled “Aquaculture in Zambia: An overview and evaluation of the sector’s responsiveness to the needs of the poor” the development of small-scale fish farming in Zambia is also due to the ‘growing importance of promoting aquaculture as an enterprise. It is believed that pursuing aquaculture as a business would enable farmers to sustainably manage their systems for increased incomes’

In a nutshell, many households have taken up fish farming in all the ten provinces in Zambia. The 2023 Aquaculture Survey Main Report shows that by April 2023 a total of 19 697 households were involved in fish farming countrywide. Of the number, Muchinga Province has a total of 3 075 households who are actively involved in small scale fish farming. In support of the report findings, Kaminski *et al* (2018:08) indicates that small-scale fish farming is scattered throughout Zambia in all the ten provinces with thousands of small-scale farmers engaged in fish production.

2.1.2 THE EXTENT TO WHICH SMALL-SCALE FISH FARMING LEADS TO INCREASED HOUSEHOLD INCOME GENERATION

Generally, Literature reviewed at a global level show that small-scale fish farming is a powerful mechanism for income generation among those involved in it throughout the world. This is affirmed by Snowman (2006:60) who points out that small-scale fish farming is the main income generator to improve livelihoods in Asia, Africa and Latin America.

Literature reviewed further shows that small-scale fish farming contributes significantly to income generation among those who practice it. According to a study conducted in Bangladesh by Rahman *et al* (2011) with the title, “Impact of Fish Farming on Household Income: a Case Study from Mymensingh District”, small-scale fish farming is outlined as the major contributor to household income among those who practice it. The study showed that small-scale fish farming contributes between 15.35 to 86.63 percent on household income of respondent farmers and that the average contribution of fish farming is 50.99 percent. The second major contributor to household income generation in Mymensingh District is crop farming which amounts to 20 percent with other areas such as business, remittance, service and wages adding to the remaining income of small-scale fish farmers with mixed results. This study shows that fish farming is the major source of income in Mymensingh District of Bangladesh.

In a similar vein, in Africa, small-scale fish farming is also seen as a powerful mechanism for employment and income generation. For example, Mugah (2020) in a study titled “The perceived benefits of Fish Farming to Rural Communities: The Demotivating Factors of The Sector’s Development in Busia County in Kenya” states that fish farming plays ‘a major part in employment creation, income generation, and foreign exchange. It has also been considered a relatively low-risk intervention to community empowerment.’

Similar views as to those of Mugah are held by Adewuyi *et al* (2010). Adewuyi *et al* conducted a study titled “Analysis of profitability of fish farming in Ogun State, Nigeria”. The study set out to describe the socioeconomic status of fish farmers, to determine the profitability of fish farming and to examine the determinants of fish output. The findings of the study concluded that fish production in Ogun state was economically viable. This was because of its capacity to create jobs, increase earnings as well as boost living standards of the people involved.

Olaoyo (2013:45), in a study conducted in Nigeria titled “Assessment of Social-Economic Analysis of Fish Farming in Oyo State, Nigeria”, shares Similar views to those held above as he states that small scale-fish farming has developed because it creates employment, income and improves the standard of living of people (Olaoyo 2013:45). This is highly noted especially among people in the rural areas. Phosa (2018) elaborates on this in his study carried out in South Africa titled, “Contribution of Small-scale Fish Farming Subsector to Rural Income Generation in Thulamela Municipality in Limpopo Province, South Africa. Phosa (2018) argues that fish farming practices positively contributes to the generation of income for the poor and marginalized rural communities. As Be’ne *et al* (2010:934) puts it, many small-scale farmers in the rural areas are highly dependent on fish farming as a source of full-time, seasonal and occasional income. It is further seen as a powerful contributor to foreign exchange revenue in many developing countries (Mathew 2013:50).

In Zambia, just like in the rest of Africa, small-scale fish farming is seen as both a source of employment and income generation. For example, according to the Ministry of Agriculture & Ministry of Fisheries and Livestock (2016:5), the fish industry plays a significance role in the economic growth of the nation by providing opportunities for 'employment, income generation, and contributing to food and national security.'

The above view is also supported by Kaminski *et al* (2018) in a study titled "Aquaculture in Zambia: An overview and evaluation of the sector's responsiveness to the needs of the poor". Kaminski *et al* (2018:05) in this study discovered that 'participation in aquaculture by resource poor farmers derives benefits through "income", "employment" and "consumption" pathways.'

Similarly, according to Isaac Malasha (2007:07), in a study paper submitted to the Research Project on Food Security and Poverty Alleviation through Improved Valuation and Governance of River Fisheries in Africa with the title, "The Governance of Small-Scale Fisheries in Zambia" fish farming generally provides direct employment to more than 20 000 people in Zambia while more than 250 000 are involved in fish processing, trading and subsistence fishing.

2.1.3 THE CONTRIBUTION OF SMALL-SCALE FISH FARMING IN IMPROVING FOOD SECURITY

Globally, literature reviewed shows research that does not directly focus on the contribution of small-scale fish farming in improving food security. However, various authors have touched on matters that reflect the contribution of small-scale fish farming in some way to issues relating to improved food security of people who practice small-scale fish farming. Areas such as poverty reduction and improved nutritional are some of the areas connected to improved food security that various researchers have dealt with. Poverty reduction and improved nutrition are key elements somehow

related to food security. As Bondad-Reantaso & Perin (2009:03) sums it up, small-scale fish farming improves livelihoods and provides income opportunities to enhance the quality of human life.

Fish farming is generally promoted as a mechanism of enabling small-scale fish farmers to improve their economic, food and nutritional security. For example, research conducted on eight (8) case studies in three Asian countries, namely Bangladesh, Philippines and Thailand by the Asian Development Bank (ADB) in 2005 titled, “An Evaluation of Small-scale Freshwater Rural Aquaculture Development for Poverty Reduction”, the results of the case studies shows that small-scale fish farming improves ‘farmers access to livelihood capital assets and process that influence outcomes in terms of incomes, employment, nutrition, and natural resources sustainability’ (ADB 2005). Such findings show that small-scale fish farming contributes positively towards improving conditions that facilitate an improvement in household food security.

In addition to the above view, Rahman *et al* (2011:13) in the study “Impact of Fish Farming on Household Income: a Case Study from Mymensingh District” found out that by adopting aquaculture, small-scale fish farmers ‘can improve their income in a sustainable manner that might be key to mass reduction of poverty.’ Mass reduction of poverty entails an improvement in living conditions. In addition, adds Rahman *et al* (ibid), small-scale fish farming leads to a better income security among those who practice it (ibid). Generally, an improved income security leads to reduction in poverty levels and improved food security as people have access to more financial resources to enable them purchase food throughout the year.

Another view that can be linked to the contribution of small-scale fish farming towards improving food security is held by Richardson & Suvedi (2018). Richardson and Suvedi (2018) carried out research in Cambodia titled ‘Assessing the Potential for Small-Scale Aquaculture in Cambodia’. Through their research, the two authors wanted to assess the potential of small-scale

fish farming in Cambodia. The two concluded that small-scale fish farming 'holds considerable potential to improve nutrition, enhance household food security and supplement household incomes through the sale of surplus fish.'

In addition, Richardson & Suvedi recommended that there was need for the small-scale fish farming in Cambodia to adopt aquaculture technologies and improved resource management in order for fish farming to powerfully contribute to the alleviation of poverty among poor households. Richardson and Suvedi (2018) suggest that embracing new technologies would give opportunities to small-scale farmers to diversify from rice farming to fish farming.

In Africa, just like globally, various authors have touched on various issues connected to the improvement of people's welfare due to their involvement in small-scale fish farming. For example, Mugal (2020) in a research titled, "The perceived benefits of Fish Farming to Rural Communities: The Demotivating Factors of The Sector's Development in Busia County in Kenya" states that 'fish farming is a formidable contributor to improved living for many households. This is because it provides high quality nutrition which is within the financial reach for the lower economic classes in society.'

In support of the above view, Phosa (2018) points out that small-scale fish farming plays a major role in improving rural livelihoods. According to Phosa (ibid), small-scale fish farming achieves this by helping small-scale fish farmers to generate enough income which is later used to purchase other household requirements such as food. These sentiments are supported by Sarwer *et al* (2016:134) who posits that small-scale fish farming has improved the lives of many rural dwellers by improving their livelihood status.

In Zambia, literature reviewed shows similar findings as literature reviewed at both global and regional level. literature reviewed identifies small scale fish farming as a powerful mechanism in the fight against poverty. This view is supported by Kaminski *et al* (2018) in research titled, "Aquaculture in Zambia:

An overview and evaluation of the sector's responsiveness to the needs of the poor". In this study, Kaminski *et al* discovered that involvement in aquaculture by the poor 'is linked to poverty alleviation.' This is mainly through improvements in income generation and improved food provision.

Musuka and Musonda (2013) seem to enhance Kaminski *et al*'s views that participation in aquaculture is linked to poverty alleviation. Musuka and Musonda (2013:299) elaborates that small-scale fish farming contributes significantly to household food security through provision of cheap fish as food, nutrition, income, diversification of rural livelihood and employment generation, thus stimulating rural economy. These views shows clearly that small-scale fish farming is a powerful contributor to the improvement of livelihoods in Zambia especially among the rural poor. To make emphasis of the role fish farming players in enhancing the rural community's welfare, Musuka and Musonda (2013:301) further point out that income generated from small-scale fish farming is also used to enable small-holder fish farmers to pay for a number of other things such as school fees and foodstuffs for their children.

2.2 ESTABLISHMENT OF RESEARCH GAPS

As already pointed out, a good number of studies have been conducted throughout the world on various areas to do with small-scale fish farming. However, nothing or very little research has been done on the efficiency of small-scale fish farming in improving livelihoods. While various authors have argued that small-scale fish farming is a major source of income for small-scale farmers, empirical studies are lacking to confirm the effectiveness of small-scale fish farming in improving household livelihoods. This research therefore focused on filling this knowledge gap. It hoped to assess the effectiveness of small-scale fish farming in improving livelihoods of small-scale fish farmers in Chinsali District.

2.3 CRITIQUE OF LITERATURE REVIEW

Literature reviewed is well balanced as it is both theoretical and practical. Various studies have been conducted throughout the world on various issues related to small-scale fish farming. From the reviewed literature, it was clear that small-scale fish farming played some role in enhancing both economic and social development. Literature reviewed shows that Small-scale fish farming provides employment to households especially in rural areas of various countries. It further helps households involved in it to generate additional income. Additionally, it plays some role in the fight to end poverty among the world's poor in various regions of the world.

However, literature reviewed shows that most of the studies conducted on small-scale fish farming has focused on developing countries mainly in Asia and Africa. This concentration on developing countries somehow shows a lack of interest in small-scale fish farming in developed countries. Such a scenario prevents us from having a real global perspective on small-scale fish farming and its benefits.

2.4 THEORETICAL FRAMEWORK

This research adopted three theoretical models in assessing the effectiveness of small-scale fish farming in improving livelihoods of small-scale fish farmers in Chinsali District, namely, developmentalism, structuralism and sustainable livelihood framework. It is imperative to use the eclectic or holistic model in order to have a comprehensive understanding of a phenomenon. The eclectic model advocates for a combination of different theories or models in conducting studies in order to have a deeper and comprehensive understanding of a phenomena being investigated (Alkin 2013).

Developmentalism is the first theory that the study adopted. According to Charlie & Elaine (2007), developmentalism is a theory that is concerned with how society grants to individuals the capacity for taking part in creating their own livelihoods, governing their own affairs, and participating in self-government. In this regard, the researcher hoped that developmentalism would be helpful in understanding the contribution of small-scale fish farming

in improving people's livelihoods. There is a general belief that fish-farming helps to improve the livelihood of people practicing small-scale fish farming.

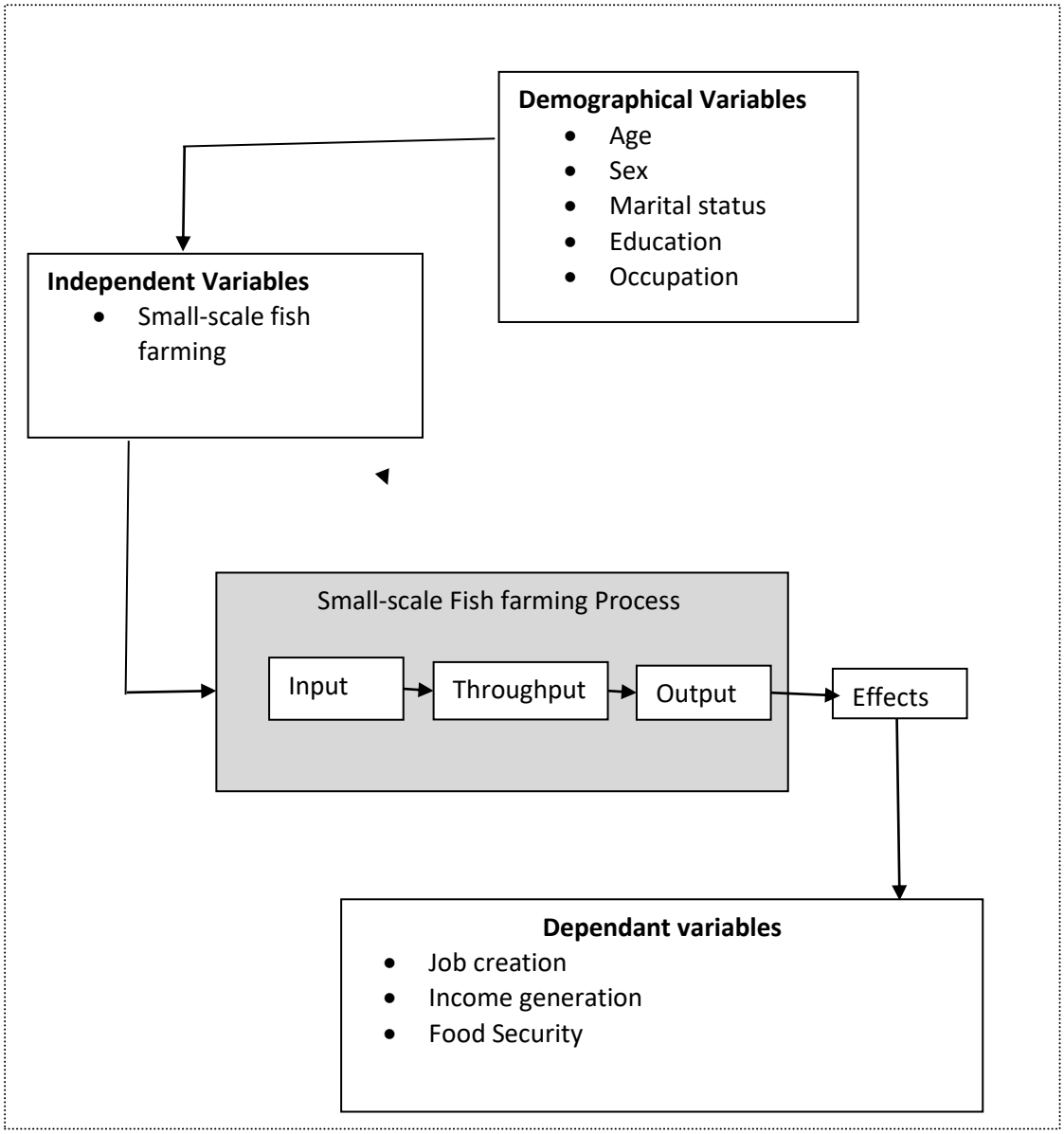
On the other hand, structuralism theory focuses on the structural aspects which impede the economic growth of the developing nation which is done through agriculture to modern, urbanised and service economy (Mkhize 2011:53). In this regard, the researcher adopted the theory in order to understand the role of small-scale fish farming in improving livelihoods in a particular structural system, that is, the household (family). In addition, this research was conducted in a developing nation, in Zambia, thereby fitting very well with areas were structuralism suits its analysis.

Finally, the sustainable livelihoods framework places people, especially the rural poor people, at the centre of a web of inter-related influences that affect how these people create a livelihood for themselves and their households (Mkhize 2011:53). For a livelihood to be sustainable, it must be people centred; responsive and participatory; multi-level; conducted in partnership; and dynamic (Satge 2002:3). In this regard, the research was carried out in a rural district of Zambia in Chinsali District. In addition, the sustainable Livelihood framework helped the researchers to have a deeper understanding of how small-scale fish farming helped people to create a livelihood for themselves and their households.

2.5 CONCEPTUAL FRAMEWORK

A conceptual framework is a diagram that identifies and illustrates the relationship between all relevant systematic, organizational, individual, or other salient factors that may influence program/project operational and successful achievement of program or project goals (Dane 1990). Therefore, the conceptual framework adopted below shows the interaction or relationship of various forces in improving livelihoods through small-scale fish farming. There is a general belief that household fish farming would lead to improved livelihoods in families.

Figure 2.1: Shows the Relational & Dynamic model small-scale fish farming conceptual framework



The above conceptual framework shows that if well implemented small-scale fish farming can lead to a number of positive effects such as job creation, income generation and food security.

CHAPTER THREE
METHODOLOGY

3.0 INTRODUCTION

This chapter outlines the methodologies that were used in the study. It first explains the research approach, study design, study population and sample size. It further outlines the sampling design, data collection and analysis techniques that were used. The chapter concludes with a look at the study variables.

3.1 RESEARCH APPROACH

The research used a mixed method approach involving both qualitative and quantitative methods. Data was collected through the use of a questionnaire to collect data from 55 respondents representing households practicing fish farming in Chinsali District while semi-structured interview guides were used to gather information from key informants from the District and Provincial Ministry of Fisheries and Livestock Offices. In addition, the researcher used the eclectic theoretical model to have a comprehensive understanding of the phenomenon.

3.2 RESEARCH DESIGN

This study used a mixed research approach involving both quantitative and qualitative methods. The instruments that were used to collect data involved questionnaires and semi-structured interview guides. In addition, information was coded using Microsoft excel before being transferred into Statistic package for Social Sciences (SPSS) version 23 for analysis. Thematic analysis was used to analyse data from government officials.

3.3 STUDY POPULATION

The population for the study consisted all households involved in small-scale fish farming in Chinsali District. According to records at the Ministry of Fisheries and Livestock District office in Chinsali (MoFL 2024), there are currently 500 households practicing small-scale fish farming in Chinsali District.

3.4 SAMPLE SIZE

The sample size for the research was determined based on the minimum sample size that would be required for analysis at ward level. Given that Chinsali District is divided into 11 wards, in order to get a balanced view of the experiences of households practicing small-scale fish farming in Chinsali district, an equal number of respondents were selected from each ward. Consequently, five respondents were selected from each ward bringing the total to 55 respondents. In addition, in order to have an expert view on the topic, four (4) experts (key informants) on fish farming from the Provincial (2) and District (2) Ministry of Fisheries and Livestock offices were also be selected. The sample size was therefore as outlined in table 3.1 and 3.2 below.

Table 3.1: ***Sample frame for Households practicing small-scale fish farming in Chinsali District.***

S/N	WARDS IN CHINSALI DISTRICT	HOUSEHOLDS
1	Itapa ward	5
2	Chilunda ward	5
3	Chilinda ward	5
4	Kaunga ward	5
5	Malalo ward	5
6	Chipanga ward	5
7	Chambeshi ward	5
8	Lubwa ward	5
9	Ichinga ward	5
10	Nkakula ward	5
11	Munwakubili ward	5
	Total	**55**

Table 3.2: ***Sample frame for Ministry of Fisheries & Livestock Office in Chinsali District.***

S/N	TARGETS	No.
1	Provincial Office	2
2	District office	2
	Total	**4**

3.5 SAMPLING DESIGN

The sample for the study was selected using the simple random sampling technique. It targeted heads (leaders) of households practicing small-scale fish farming in the 11 wards of Chinsali District.

3.6 DATA COLLECTION

The researcher collected data from respondents (small-scale fish farmers) through a structured questionnaire. On the other hand, data was collected from experts on fish farming from the Ministry of Fisheries and Livestock District Office through semi-structured interview guides.

3.7 DATA ANALYSIS

The data collected from small-scale fish farmers were analysed using Statistical Package for Social Sciences (SPSS version 23). Information was first coded using Microsoft excel before being transferred into the SPSS software for analysis. Thereafter, data analysis was performed and appropriate tables and figures were produced. On the other hand, data from key informants was analysed through thematic analysis.

3.8 STUDY VARIABLES

Independent, dependent and extraneous (compounding) variables[1] were all considered during the study as follows:

3.8.1 Independent variable – small-scale fish farming was the identified independent variable for the study.

3.8.2 Dependent variables – the study identified job creation, income generation and food security as dependent variables.

3.8.3 Extraneous variables – government and market for fish were identified as extraneous variables.

[1] The dependent variable represents the output or effect (or is tested to see if it is the effect). The independent variable represents the inputs or causes (or tested to see if they are the cause). In a statistics experiment, the dependent variable is the event studied and expected to change whenever the independent variable is altered. An extraneous variable may alter the dependent or independent variable though it is not the actual focus of the experiment (Everitt 2002)

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF FINDINGS

4.0. INTRODUCTION

This chapter presents the findings of the investigation in response to the set objectives and research questions of the study. The results are presented in relation to the three main questions of the study:

1. To what extent does small-scale fish farming improve employment provision in Chinsali District?
2. To what level does small-scale fish farming lead to increased household income generation in Chinsali District?
3. What is the contribution of small-scale fish farming in improving food security in Chinsali District?

4.1 DEMOGRAPHIC FACTORS FOR THE SAMPLE

4.1.1 Description of Age, Sex, Marital Status, Education and Occupation Variables for head of households

4.1.1.1 Population Sample Age Distribution

The age ranges for the sample (55) were as follows: 10 were 24 years old and below representing 18.2 percent; 6 were between 25 – 29 years old representing 10.9 percent; 9 were between 30 – 39 years old representing 16.4 percent; 18 were between 40 – 49 years old representing 32.7 percent and; 12 were 50 years and older representing 21.8 percent. The findings are further presented in the table and figure below:

Table 4.1: Respondents Age Range

		Frequency	Percent
Valid	24 years and below	10	18.2
	25 to 29 years	6	10.9
	30 to 39 years	9	16.4
	40 to 49 years	18	32.7
	50 years and above	12	21.8
	Total	55	100.0

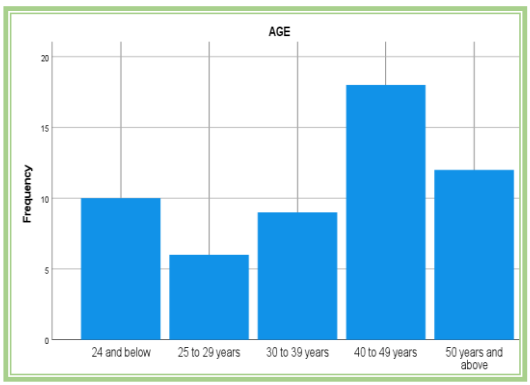


Figure 4.1: Respondents Age Range

4.1.1.2 *Population Sample Sex Distribution*

The sex range among the 55 sampled population included 37 males representing 67.3 percent and 18 females representing 32.7 percent as presented in table 4.2 and figure 4.2 below:

Table 4.2: Respondents Gender

		Frequency	Percent
Valid	female	18	32.7
	male	37	67.3
	Total	55	100.0

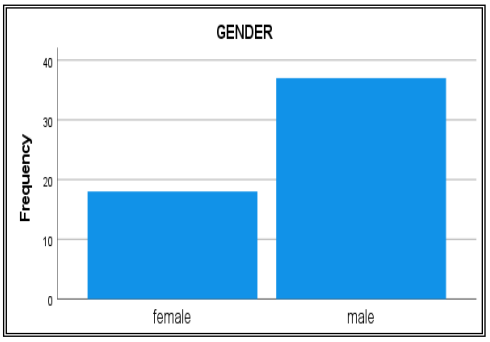


Figure 4.2: Respondents Gender

4.1.1.3 Population Sample Marital Status Distribution

The marital status of the sample that provided data included 33 individuals who were married representing 60 percent, 16 individuals who were single representing 29.1 percent and 6 individuals who were widowed representing 10.9 percent as presented in table 4.3 and figure 4.3 below:

Table 4.3: Respondents Marital Status

		Frequency	Percent
Valid	married	33	60.0
	single	16	29.1
	widowed	6	10.9
	Total	55	100.0

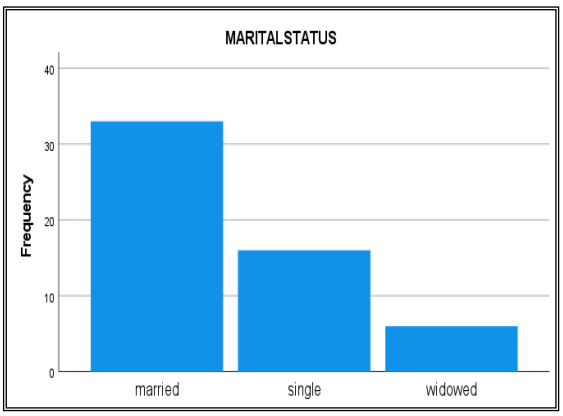


Figure 4.3: Respondents Marital Status

4.1.1.4 Population Sample Education Level Distribution

The following were the education levels reached by the sample: 6 had no education background representing 10.9 percent; 15 had a primary school background representing 27.3 percent; 25 had secondary school education background representing 45.5 percent; finally, 9 had tertiary education background representing 16.4 percent. This information is also presented in the table and figure below:

Table 4.4: Respondents Education Level

		Frequency	Percent
Valid	No education	6	10.9
	Primary education	15	27.3
	Secondary education	25	45.5
	Tertiary education	9	16.4
	Total	55	100.0

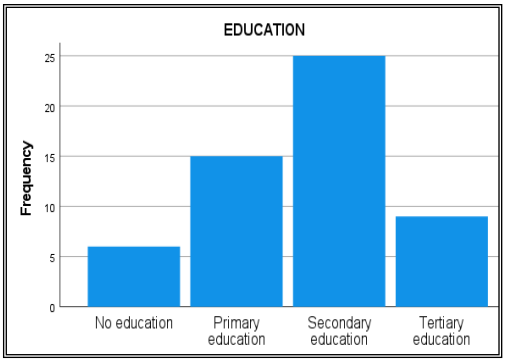


Figure 4.4: Respondents Education Level

4.1.1.5 Population Sample Occupation Distribution

The following were the occupation of the sample: 3 worked as cleaners representing 5.5 percent; 38 were farmers representing 69.1 percent; 6 were landlords representing 10.9 percent; 1 was a police officer representing 1.8 percent; 2 were security guards representing 3.6 percent; 2 others were soldiers representing 3.6 percent and: 3 were teachers representing 5.5 percent. This information is also presented in the table and figure below:

Table 4.5: Respondents Occupation

		Frequency	Percent
Valid	Cleaner	3	5.5
	Farmer	38	69.1
	landlord	6	10.9
	Police Officer	1	1.8
	Security guard	2	3.6
	Soldier	2	3.6
	Teacher	3	5.5
	Total	55	100.0

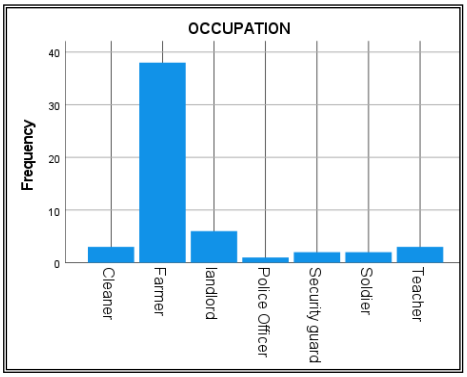


Figure 4.5: Respondents Occupation

4.1.2 Background Information on Participating Government Officers

The background information of the four (4) government officers from the Ministry of Fisheries and Livestock focused on their job title, department from which they operate, their responsibilities and, the period they have spent working in the department. The results are produced in the table below:

Table 4.6: Demographical factors for government Officers

SN.	CODE	JOB TITLE	DEPARTMENT	RESPONSIBILITY	LENGTH OF WORK IN DEPARTMENT
1	ASO1	Aquaculture Research Officer	Fisheries	Research Development	4 years
2	ASO2	Provincial Fisheries Officer	Fisheries	To ensure sustainable management of fisheries resources & aquaculture development	23 years
3	ASO3	Aquaculture Assistant	Fisheries	Offering extension services under aquaculture by training & farm visits	1 year 8 months
4	AS04	Livestock Technician	Livestock	Extension services and offering training on various livestock techniques of both fish & livestock	8 years

4.2 THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO EMPLOYMENT PROVISION IN CHINSALI DISTRICT

In order to establish the contribution of small-scale fish farming to employment provision in Chinsali District, 8 questions were prepared and administered to 55 of the sampled population using a questionnaire. The following were the findings:

4.2.1 Findings from Heads of Households on the contribution of small-scale fish farming to employment provision in Chinsali District

4.2.1.1 Length of Practice of Small-Scale Fish Farming

In the first place, the researcher wanted to find out how long the respondents had been practicing small-scale fish farming. It was discovered that: 25 of the respondents had only been practicing for less than five (5) years representing 45.5 percent; 24 had been practicing fish farming between 5 to 10 years representing 43.6 percent; 3 had been practicing for 15 to 20 years representing 5.5 percent and; another 3 had been practicing for more than 20 years representing 5.5 percent too. The results are further presented in the table and figure below:

Table 4.7: Length of Practice

		Frequency	Percent
Valid	15 to 20 years	3	5.5
	20 years +	3	5.5
	5 to 10 years	24	43.6
	less than 5 years	25	45.5
	Total	55	100.0

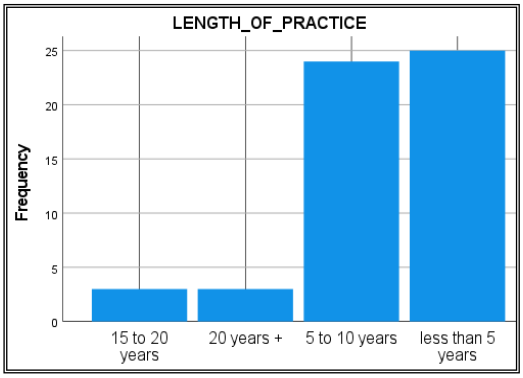


Figure 4.6: Length of Practice

4.2.1.2 Training for Fish Farming

It was also important to find out whether or not the small-scale fish farmers had received training in fish farming or not. It was established that none of the 55 respondents had been trained in fish farming.

4.2.1.3 Type of Fish Farming Training Received

In a follow up question to finding out if small-scale famers that data was collected from had been trained in fish farming, the researcher wanted to find out the type of training that the fish farmers had received. Unfortunately, this question was not applicable to all the respondents as none of 55 had received any form of training in fish farming.

4.2.1.4 Funding for Fish Farming

The researcher also wanted to find out if any of the small-scale fish farmers had received funding from government or elsewhere to establish and run their projects. Results collected showed that none of the 55 small-scale fish farmers had received funding.

4.2.1.5 Type of Funding for Fish Farming Received

The researcher further wanted to find out the types of training received by small-scale fish farmers in Chinsali District. However, given that the earlier question on whether they had received training or not in small-scale fish farming, had attained a negative 100 percent response, this question also come back 100 percent negative.

4.2.1.6 Number of Fish Ponds

The researcher also wanted to have an understanding of the number of fish ponds operated by small-scale fish farmers in the district. The finding showed that 7 out of 55 respondents owned 1 fish pond each representing 12.7 percent, 18 owned 2 fish ponds each representing 32.7 percent, 9 owned 3 fish ponds each representing 16.4 percent, 12 owned 4 fish ponds each representing 21.8 percent. Finally, 9 owned 5 fish ponds or more representing 16.4 percent. The results are further presented the table and graph below:

Table 4.8: No. of Fish Ponds

		Frequency	Percent
Valid	1	7	12.7
	2	18	32.7
	3	9	16.4
	4	12	21.8
	5+	9	16.4
	Total	55	100.0

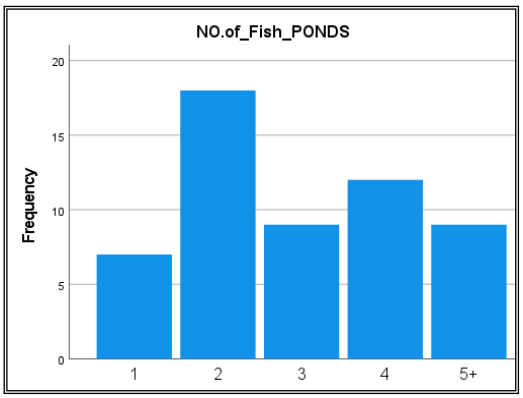


Figure 4.7: No. of Fish Ponds Owned

4.2.1.7 Types of Fish Being Cultivated in Fish Ponds

The researcher also wanted to identify the types of fish cultivated by small-scale fish farmers in Chinsali District. The following were the results obtained:

Bream fish was being kept 3 of the respondents representing 5.5 percent; another 3 respondents kept both bream and tilapia also representing 5.5 percent; 13 of the respondents kept impende, representing 23.6 percent; 6 respondents kept red belly fish while another 6 kept tiger fish representing 10.9 percent respectively; another 3 kept both tilapia and impende and; finally, 21 respondents kept tilapia only, representing 38.2 percent. The results obtained are further presented in a table and figure below:

Table 4.9: Type of Fish Kept

Type of Fish		Frequency	Percent
Valid	Bream	3	5.5
	Bream and Tilapia	3	5.5
	Impende	13	23.6
	Red belly	6	10.9
	Tiger fish	6	10.9
	Tilapia and Impende	3	5.5
	Tilapia	21	38.2
	Total	55	100.0

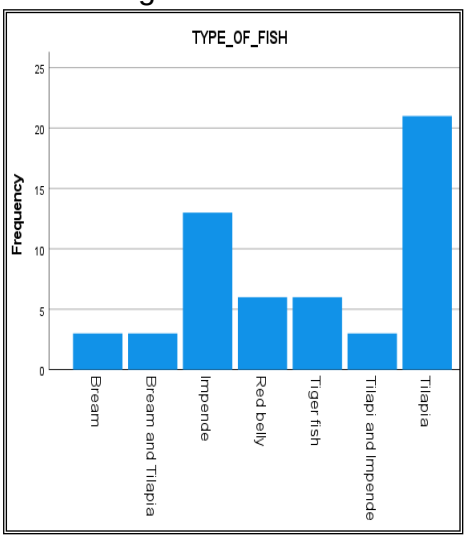


Figure 4.8: Type of Fish Kept

4.2.1.8 Number of Family Members Involved in Fish Farming

Finally, as regards the contribution of small-scale fish farming to improvements in employment provision in Chinsali District, the researcher wanted to find out the number of people involved in fish farming in each household where data was collected. It was son was involved in fish farming from 12 households where data was collected representing 21.8 percent; 2 people were involved in fish farming from families of 19 respondents representing 34.5 percent; 3 were involved from families of 18 respondents representing 32.7 percent and; finally, 4 people

were involved in small-scale fish farming from each of the families of 6 respondents. The findings are further presented in the table and figure below:

Table 4.10: No. of family members involved in fish farming

		Frequency	Percent
Valid	1	12	21.8
	2	19	34.5
	3	18	32.7
	4	6	10.9
	Total	55	100.0

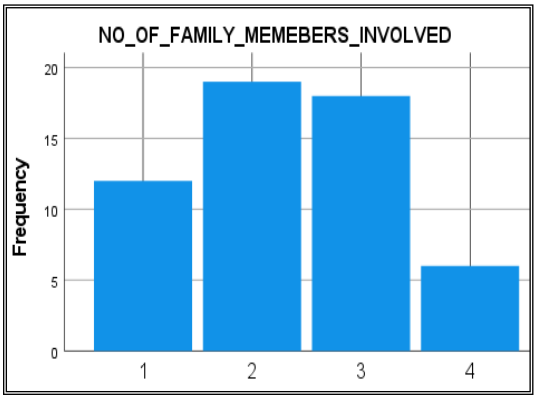


Figure 4.9: No. of family members involved in Fish Farming

4.2.2 Views of Government Officers on the contribution of small-scale fish farming to employment provision in Chinsali District

In addition, in order to get expert views on the contribution of small-scale fish farming to employment provision in Chinsali District, 9 questions were asked to officers from the Ministry of Fisheries and Livestock. For ease reference, the questions have been reproduced before the tables indicating the results:

5. How many families are actively involved in small-scale fish farming in Chinsali District?
6. Did any of the small-scale fish farmers receive any form of training in fish farming from government or any other organization?
7. If yes, what type of training did they receive?
8. Do small-scale fish farmers receive any form of funding from government towards establishing their fish farming business?
9. If yes, what type of funding do they receive?
10. How many fish ponds do most small-scale fish farmers own in Chinsali District?
11. What type of fish do they keep in their fish ponds?

12. In your view, is small-scale fish farming helpful in employment provision in Chinsali District?
13. If yes, how?

Table 4.11: Interview Responses on the contribution of small-scale fish farming employment provision in Chinsali District – Senior Officers

S/N	CODE	Response Q5	Response Q6	Response Q7
1	ASO1	586	yes	Pond construction and management
2	ASO2	584	yes	Site selection, pond construction and management, fish production and, fish feed
3	ASO3	500	yes	Pond construction & management, pond stock and restock, feed formulation, fish harvesting and fingering transportation and molla cultivation
4	AS04	500	yes	Pond construction, site selection for pond construction, feed formulation, fish production and pass-on the gift

S/N	CODE	Response Q8	Response Q9	Response Q10
1	ASO1	yes	CDF, ZAEDP	2
2	ASO2	yes	Micro – ZAEDP & Macro - ZAEDP	3
3	ASO3	No	N/A	5+
4	AS04	yes	Through NGOs working in collaboration with government, the government gives loans	4

S/N	CODE	Response Q11	Response Q12	Response Q13
1	ASO1	Macrocher (green headed bream)	yes	Source of income
2	ASO2	Macrocher and oriocromis	Yes	has improved employment provision in the district
3	ASO3	Macrocher, tilapia rendalli and oriocromis	Yes	People are able to raise income from their facilities
4	AS04	Macrocher, tilapia rendalli and oriocromis	Yes	Through procuring feed, feed supplies employ more people. When fish is harvested, people are employed to help out and to sell

4.3 THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO HOUSEHOLD INCOME GENERATION IN CHINSALI DISTRICT

The second objective of this study focussed on establishing the extent to which small-scale fish farming led to increased household income generation in Chinsali District. This objective raised the research question, “to what level does small-scale fish farming lead to increased household income generation in Chinsali District?” Five questions were deduced from the second research question and presented to respondents and the following were the findings:

4.3.1 Findings from Heads of Households on the contribution of small-scale fish farming to household income generation in Chinsali District

4.3.1.1 Annual average household income

In the first place, the researcher wanted to establish the annual average household income in Chinsali District. The following were the results: 48 of the respondents made less than K30 000 annually representing 87.3 percent; 4 made between K30 000 – K50 000 annually representing 7.3 percent; 2 made between K70 000 and K90 000 annually representing 3.6 percent and; 1 made above K90 000 annually representing 1.8 percent. the findings are further presented in the table and figures below:

Table 4.12: Annual Average Household Income

		Frequency	Percent
Valid	K30 000 to K50 000	4	7.3
	K70 000 to K90 000	2	3.6
	K90 000+	1	1.8
	less than K30 000	48	87.3
	Total	55	100.0

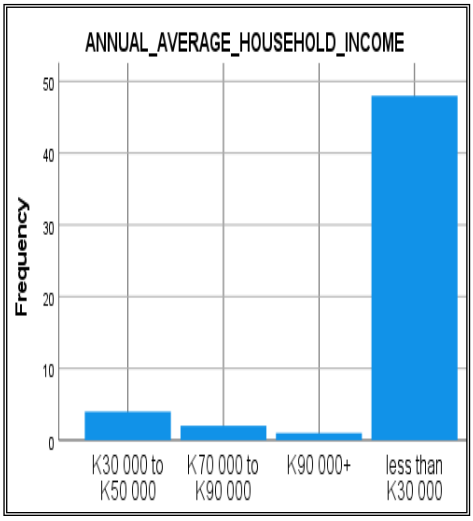


Figure 4.10: Annual Average Household Income

4.3.1.2 Fish Farming contribution to annual household income

Secondly, the researcher hoped to understand the annual contribution of small-scale fish farming to small-scale farmers annual income. The results

showed that fish farming contributed less than K10 000 among 46 of the 55 respondents. On the other hand, it contributed between K10 000 to K25 000 for the remaining 9 respondents. The results are further outlined the table and figure below:

Table 4.13: Annual Income from Fish Farming

		Frequency	Percent
Valid	K10 000 to K25 000	9	16.4
	less than K10 000	46	83.6
	Total	55	100.0

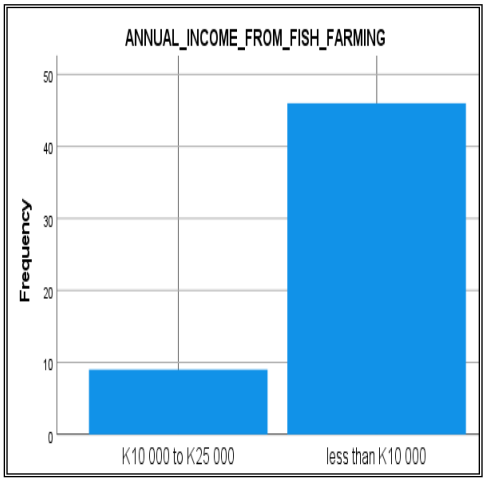


Figure 4.11: Annual Income from Fish Farming

4.3.1.3 Other ventures fish farmers are involved in to raise income

The researcher further wanted to have a grasp of other ventures that small scale farmers who practiced fish farming were involved in to raise their income annually. The results showed that: 30 of the respondents were also involved in crop production representing 54.5 percent; 9 were employed somewhere else and earning some form of wages representing 16.4 percent ;22 were involved in charcoal burning (making) representing 40 percent involvement of fish farmers in charcoal burning; 3 were also into business representing 5.5 percent; 2 owned houses that they were renting out representing 3.6 percent and; 9 were involved in other things that helped them to earn income representing 16.4 percent. the results are further presented in the table below:

Table 4.14: Other venture small-scale farmers are involved in

No.		YES		NO		TOTALS	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
1.	Crop production	30	54.5	25	45.5	55	100
2.	wages	9	16.4	46	83.6	55	100

3.	Charcoal burning	22	40	33	60	55	100
4.	Business	3	5.5	52	94.5	55	100
5.	Land Lord	2	3.6	53	96.4	55	100
6.	Any Other	9	16.4	46	83.6	55	100

4.3.1.4 Highest source of income

The researcher also wanted to have an understanding of the highest sources of income for the small-scale fish farmers. The following were the results obtained: 3 of the respondents stated that business ventures were their highest sources of income representing 5.5 percent; 13 acknowledged charcoal burning as their highest source of income representing 23.6 percent; 21 of the respondents affirmed crop production as their highest source of income representing 38.2 percent representation; fish farming had 12 of the respondents affirming it as their highest source of income; 3 of the respondents affirmed earning more through being land lords than any other sources representing 5.5 percent and; finally, 3 viewed wages as their highest sources of income representing 5.5 percent. The results are further presented in the table below:

Table 4.15: Highest source of income

		Frequency	Percent
Valid	business	3	5.5
	charcoal burning	13	23.6
	crop production	21	38.2
	fish farming	12	21.8
	landlord	3	5.5
	wages	3	5.5
	Total	55	100.0

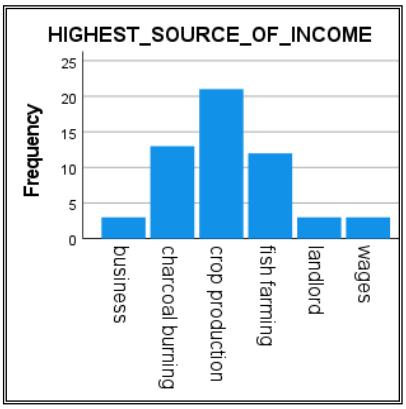


Figure 4.12: Highest Source of Income

4.3.1.4 Suggestions to improve the effectiveness of small-scale fish farming

Finally, with regard to the second objective, the researcher wanted to hear suggestions from small-scale fish farmers on how the practice can be made effective. This was much more qualitative as respondents were given an

open-ended platform. The following were the suggestions made: 13 of the respondents suggested that training should be given either through government involvement or other institutions such as NGOs to all small-scale fish farmers and all those who would wish to join the practice; secondly, 21 of the respondents called for some form of financial support either through grants or loans as the lack of capital was a major hindrance to them attaining higher harvests; 11 suggested support in the making of fish ponds as some lacked knowledge on how to really develop well-structured fish ponds thereby affecting the growth and development of the fish produced in their fish ponds; finally, 15 had a view that government would do well to provide feed to feed their fish in order for the fish to mature in record time. Most of the small-scale farmers had a challenge buying feed due to lack of enough funds.

4.3.2 Views of Government Officers on the contribution of small-scale fish farming to household income generation in Chinsali District

In addition, in order to get expert views on the contribution of small-scale fish farming to household income generation in Chinsali District, five questions were asked to officers from the Ministry of Fisheries and Livestock. For ease reference, the questions have been reproduced before the tables indicating the results:

14. What is the annual average household income for most small-scale farmers in Chinsali District?
15. How much of their household's annual income comes from small-scale fish farming?
16. What other ventures are they involved in to raise income as households?
17. Of the ventures you have mentioned, which venture seems to bring in more income for small-scale fish farmers in the district?
18. What do you think should be done to improve the effectiveness of small-scale fish farming in Chinsali District?

Table 4.16: Interview Responses on the contribution of small-scale fish farming to household income generation in Chinsali District – Senior Officers

S/N	CODE	Response to Q14	Response to Q15	Response to Q16

1	AS01	Less than K30 000	Less than K10 000	Maize farming, horticulture and business
2	AS02	Less than K30 000	K10 000 – K25 000	Crop farming and livestock production
3	AS03	Less than K30 000	K10 000 – K25 000	Crop production, livestock production and capture fisheries
4	AS04	K30 000 - K50 000	K10 000 – K25 000	Livestock rearing and crop production

S/N	CODE	Response to Q17	Response to Q18
1	AS01	Maize farming	Access to inputs (feed, fingerings) and business development services
2	AS02	Crop farming	Feed for fish production, feed production, marketing skills
3	AS03	Crop production	Funding from both government and NGOs to help in reaching the farmers who need these services
4	AS04	Growing crops and chicken rearing	Increase on training for farmers, encourage emergency of more small-scale fish farmers, encourage use of locally formulated feed due to the expensive nature of commercial feed

4.4 THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO IMPROVING HOUSEHOLD FOOD SECURITY IN CHINSALI DISTRICT

The third and final objective of this research involved investigating the contribution of small-scale fish farming in improving household food security among small scale farmers in Chinsali District. Four questions were deduced from the third research question (What is the contribution of small-scale fish farming in improving food security in Chinsali District?) of this study and presented to the 55 respondents in order to have a clear view as to whether small-scale fish farming contributed to food security or not. The following were the findings:

4.4.1 Findings from Households on the contribution of small-scale fish farming to improving household food security in Chinsali District

4.4.1.1 Number of times fish is consumed per month

In the first place, the researcher wanted to find out the number of times small scale fish farmers consumed fish from their fish ponds monthly. Four options were presented to the famers in order for them to select one out of the four, namely, 2 – 4 times, 5 – 8 times, 9 – 12 times and 13 and above times. The

results obtained showed that fish takes about 3 to 6 months to mature in the fish pond. According to farmers, fish is therefore only eaten once it matures. All the 55 fish farmers from whom data was collected from unanimously pointed out that, consequently, they only consumed fish 2 – 4 times from each fish pond in a given period of fish cultivation. Therefore, the more fish ponds a farmer had, the more chances of consuming fish regularly.

Table 4.17: No. of Time fish is consumed

		Frequency	Percent
Valid	2 to 4 times	55	100
	5 to 8 times	0	0
	9 to 12 times	0	0
	13+	0	0

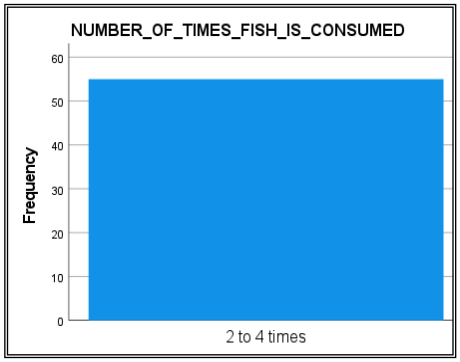


Figure 4.13: No. of times fish is consumed

4.4.1.2 Small-scale fish farming Improves household food security

The final three questions (question 20 to 22) in the questionnaire used the Likert scale to assess the contribution of small-scale fish farming in three areas focussing on improving household food security. Namely, at the level of improving food expenditure; improving the health status of family members by meeting their nutritional values and; at helping to diversify household diets. The results are presented in the table below:

Table 4.18: Contribution to food security

No.	CONTRIBUTION TOWARDS IMPROVING FOOD SECURITY	Strongly disagree	disagree	neutral	agree	Strongly agree
1.	Helps to improve household food expenditure	0%	0%	0%	38.2%	61.8%
2.	Helps to improve the health status of family members by contributing towards meeting their nutritional needs	0%	0%	0%	60%	40%
3.	Helps to diversify household diet	0%	5.5%	5.5%	45.5%	43.6%

4.4.1.3 Reasons for strongly agree

It was further imperative to have a comprehension as to why the respondents would strongly agree or strongly disagree to any of the three of the statements regarding the contribution of small-scale fish farming to food security. However, none of the respondents strongly disagreed to any of the three statements. Nevertheless, some respondents strongly agreed to all three statements. The following were the reasons as to why they strongly agreed:

4.4.1.4 Reasons for strongly agree to the statement, "income from fish farming helps to improve household food expenditure".

The reasons for strongly agree to the above statement came from 61.8 percent of the respondents with various reasons that can be reduced to the following: money raised from the sale of fish allowed the farmers to purchase other food stuffs that they could otherwise would have purchased; it increased family income thereby allowing the family to afford to buy extra food stuffs; it was a source of extra-income generation for the family thereby increasing the family's income thus affording to buy more food stuffs.

4.4.1.5 Reasons for strongly agree to the statement, "Fish farming helps to improve the health status of your family members by contributing towards meeting their nutritional needs".

The reasons for strongly agree to the above statement came from 40 percent of the respondents with various reasons that can be reduced to the following: fish from ponds consumed by families of small-scale fish farming practicing families helped to provide nutritious food to growing children in the family; since it is a source of proteins it helps to provide nutrients to family members.

4.4.1.6 Reasons for strongly agree to the statement, "Fish farming has helped to diversify your household's diet" are as follow.

The reasons for strongly agree are as follows: it contributes to a diversified household diet through the provision of enough money to purchase various

kinds of food; it further diversifies the family diet as the family partakes part of the fish from the ponds.

4.4.2 Views of Government Officers on the contribution of small-scale fish farming to improving household food security in Chinsali District

In addition, in order to get expert views on the contribution of small-scale fish farming to improving household food security in Chinsali District, 4 questions were asked were asked to officers from the Ministry of Fisheries and Livestock. For ease reference, the questions have been reproduced before the tables indicating the results:

19. How often on average do small-scale fish farmers consume fish from their own ponds monthly?

    NOTE: Respond to the following questions (20 – 22) with statements on the contribution of small-scale fish farming towards improving household food security in Chinsali District using the Likert scale.

20. Income from fish farming helps to improve household food expenditure of small-scale fish farmers in Chinsali District.
21. Fish Farming helps to improve the health status of family members of small-scale fish farmers by contributing towards meeting their daily nutrition needs.
22. Fish farming helps to diversify household diet among small-scale fish farmers in Chinsali District.

	Statement	Strongly disagree	disagree	agree	Strongly agree	No opinion
Q20	As in Q20 above					
Q21	As in Q21 above					
Q22	As in Q22 above					

NOTE: for question 20 - 22 whenever an officer provided a strongly agree or strongly disagree answer, he or she had to gives a reason for such a response.

Table 4.19: Government officers views on the contribution of small-scale fish farming to food security

S/N	CODE	Response to Q19	Response to Q20	Response to Q21	Response to Q22
1	AO01	2 – 4 times	Neutral	Neutral	Neutral
2	AS02	5 – 8 times	Agree	agree	Agree
3	ASO3	2 – 4 times	Agree	Strongly agree	Agree
4	AS04	13 times	Strongly agree	Strongly agree	Strongly agree

S/N	CODE	Reasons for strongly agree to Q20	Reasons for strongly agree to Q21	Reasons for strongly agree to Q22
1	AO01	N/A	N/A	N/A
2	AS02	N/A	N/A	N/A
3	ASO3	N/A	It is a main source of protein and income from same is diverted to others sources of proteins	N/A
4	AS04	Income from fish farming supplements for extra-food items	Fish nutrition provides some omega 3 that are very essential for body health	Income channeled towards other household needs that household have challenges accessing

CHAPTER 5
DISCUSSION OF FINDINGS

5.0 INTRODUCTION

This chapter discusses the finding of the study as presented in chapter 4 of this paper. The discussion is divided into four parts. The first part focusses on the demographical factors of the sample. The second, third and fourth focus on the three major areas of concern, namely, the contribution of small-scale fish farming to employment provision; household income generation and, to improving household food security.

5.1 DISCUSSION OF THE DEMOGRAPHIC FACTORS FOR THE SAMPLE

5.1.1 Discussion of the demographic factors for heads of households

The demographic factors might seem to be irrelevant in discovering the final research outcomes. However, they might play a factor in a subject's performance, in this case, in carrying out the cultivation of fish. In the first place, the demographic factor Age shows that different age ranges are involved in small-scale fish farming. Even young people were interested in fish cultivation. Ten of the respondents were young people who were 24 years old and below. This shows a sense of interest among the youth. Equally, the elderly, are also involved in small-scale fish farming. The highest percentage of people practicing fish farming in Chinsali District was drawn from people ranging between 40 – 49 years (32.7%) and those who are 50 years old or older (21.8%). This shows that small-scale fish farm is appealing to people across all ages.

In terms of demographic factor Sex, the results showed that males (67.3%) were still dominant in the practice of small-scale fish farming in Chinsali District. This might show that males are still predominantly heads of households and are therefore considered to be owners of family venture. Nevertheless, the results also show that women (32.7%) and asserting themselves gradually in economic matters. More and more women are taking up previously male dominated areas in family, community and national issues.

In relation to the marital status distribution, it can be noted that a majority of married individuals (60) were involved in small-scale fish farming than those who are single or widowed. This shows how enterprising these people were for the good of their families. Nevertheless, single people are also taking part in small-scale fish farming in Chinsali District. These have a 29.1% representation. In addition, 10.9% of widowed individuals are also fully involved in the venture. This shows that fish farming is firmly an attractive venture for people with different marital status.

The demographic factor, education level distribution, shows an interesting phenomenal. One would think that those without any education background would be more into fish farming than those who had been to school. However, the results showed that the education level with a higher percentage of people involved were those who had attained secondary education (45.5%). Those with a tertiary level of education are also involved in fish farming with a 16.4% representation. Not to be outdone, those without an education background (10.9%) and those who only attended primary school (27.3%) are also highly involved. This shows that fish farming is equally an attractive proposition for people with different education backgrounds.

In reference to the population sample occupation distribution, most small-scale fish farmers identified themselves as farmers (69.1%). This was a positive outcome in relation to this research, the aim of which was to assess the impact of small-scale fish farming on livelihoods of the small-scale farmers in Chinsali District. This outcome works well with the idea of examining the impact of fish farming on small-scale farmers. Nevertheless, we also get a picture that people from different occupations are also interested in fish farming. Teachers (5.5%), Land lords (10.9%), security guards (3.6%), soldiers (3.6%) and cleaners (5.5%) are all involved in fish farming in Chinsali District.

5.1.2 Discussion of findings on Background Information of Participating Government Officers

The background information of the four (4) government officers from the Ministry of Fisheries and Livestock shows that the officers are highly qualified and have massive experience in the Ministry through the holding of important positions in their department. Their responsibilities also show that they have vast experience in the Ministry therefore their input would be trustworthy as they will share from experience concerning the contribution of small-scale fish farming to improving livelihoods in Chinsali District. However, one of the officers did not seem to have much experience as he or she had only worked in his or her department for 1 year and 8 months. Nevertheless, being an officer in the Ministry entails one being qualified enough for the job. His or her responsibilities of offering extension services under aquaculture by training and farm visits also shows that someone has massive knowledge concerning fish farming.

5.2 DISCUSSION OF FINDINGS ON THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO EMPLOYMENT PROVISION IN CHINSALI DISTRICT

In order to have a holistic understanding of the contribution of small-scale fish farming to employment provision in Chinsali District, various areas were assessed. That is, length of practice, training, funding, number of ponds owned, type of fish cultivated and number of people involved in fish farming per household.

5.2.1 Discussion of findings from heads of households on the contribution of small-scale fish farming to employment provision in Chinsali District

5.2.1.1 Length of Practice of Small-Scale Fish Farming

The length of practice of small-scale fish farming among the 55 respondents was assessed through the provision of five choices that respondents had to choose from: Less than 5 years; 5 – 10 years; 10 – 15 years; 15 – 20 years and 20 years and above. The results showed that most of the small-scale fish farmers were new to the venture in Chinsali District. 89.1 percent of the respondents had only been in fish farming for not more than 10 years. Only a

few, 10.9 percent, had been in small scale fish farming for more than 10 years. This shows that small-scale fish farming is a new phenomenon in Chinsali District. It also shows that many people are just becoming aware of its valuable contribution to poverty eradication in the district. Additionally, it also shows that slowly, small-scale fish farming is contributing towards employment provision in the district.

5.2.1.2 Training for Fish Farming

Training in whatever someone is doing is important if efficiency is to be achieved in that particular field. That is why the researcher wanted to find out from the respondents if they had been trained in fish farming before or after setting up their ventures. Unfortunately, results obtained showed that none of the 55 small-scale fish farmers had been trained in fish farming. This finding puts a doubt on the small-scale fish farmers abilities to fully benefit from small-scale fish farming as an enterprise and as a field for job provision in the district. However, the researcher puts into mind many capable entrepreneurs are not always trained.

5.2.1.3 Type of Fish Farming Training Received

In a follow up question, to the one on training, the researcher wanted to determine the kind of training the farmers had received. However, as results already showed, the small-scale fish farmers had received no training in fish farming therefore rendering this part of research “impotent”. It is however important to understand that the type of training received usually determines how efficient one might be in a particular venture. Unfortunately, according to results obtained, in Chinsali District, training for small-scale fish farmers has not been prioritized.

5.2.1.4 Funding for Fish Farming

The results obtained showed that none of the respondents had received funding from government or NGOs in order to setup or run their small-scale fish farming projects. This means that small-scale fish farmers had totally relied on themselves to organise capital. This might have affected their ability to start and operate their fish farming ventures at a much more profitable

way. This might also have reduced their venture's abilities to involve or employ more people to manage their projects.

5.2.1.5 Type of Funding for Fish Farming Received

The findings showed that none of the respondents had received funding to operate their small-scale fish farming projects therefore the question on the types of funding received also come back in the negative. It was the researcher view that it was necessary to find out whether small-scale fish farmers were benefiting from government funding in Chinsali District be it in the form of grants or loans. However, the respondents' responses showed that this was not the case.

5.2.1.6 Number of Fish Ponds

In order to have a comprehension of how much small-scale fish farmers are involved in small-scale fish farming the researcher wanted to find out the number of fish ponds owned by the small-scale fish farmers. The findings showed mixed results with a good number of farmers owning one or two (12.7% and 32.7% respectively) fish ponds. The rest of the fish farmers owned three (16.4%), four (21.8%) or five and more (16.4%). These results show that while to some, fish farming was a major venture, to others it was just a by the way. One would easily comprehend that a person who owned one fish pond or two did not consider small-scale fish farming as a priority income generation project. However, the more fish ponds a person has, the more one would be considered to be very serious in fish farming. The more he or she would involve other people to ensure success too.

5.2.1.7 Types of Fish Being Cultivated in Fish Ponds

The purpose of this area was to identify the type of fish considered to be worth cultivating among small-scale fish farmers. It was clear from the finding that many were involved in cultivating tilapia: 38.2% of the respondents indicated that they kept tilapia fish only; 5.5% kept both tilapia and bream fish and; another 5.5% kept both tilapia and impende. Thus, bringing the total to 49.2% of respondents who were keeping tilapia in their fish ponds. Nevertheless, the finding also show that other farmers are also keeping other types of fish such as impende (23.6%), tiger fish (10.9%) and, red belly fish

(10.9%). This shows that small-scale fish farmers in Chinsali District are experimenting with different types of fish in order to discover which among these would help them to reap tangible results from fish farming.

5.2.1.8 Number of Family Members involved in Fish Farming

Finally, the researcher wanted to find out the number of people involved in fish farming per household in order to have an understanding of how much fish farming was profitable as an employment provision venture. The researcher discovered, through results obtained, that fish farming was helping to an extent in employment provision in Chinsali District. Only 12 respondents representing 21.8 percent reported that their fish farming ventures involved only one person in their households. On the other hand, the rest reported an involvement of more family members in the project. For example, 34.5 percent of the respondents stated that 2 members of their families were involved in the project. Similarly, 32 percent reported that 3 members of their families were involved in their small-scale fish farming ventures. These findings show that small-scale fish farming can be a powerful mechanism for employment provision in Chinsali District if fully promoted.

5.2.2 Discussion on the Views of Government Officers on the Contribution of Small-scale fish farming to employment provision in Chinsali District

The views of government officers about the contribution of small-scale fish farming in Chinsali District shows that small-scale fish farming contributes significantly to employment provision in the district with all four respondents acknowledging that there are over 500 families involved in small-scale fish farming in the district. In addition, all of them responded positively that small-scale fish farming was helpful in employment provision in Chinsali District. This role of fish farming is also recognized in other areas. Various researchers on small-scale fish farming affirm that small-scale fish farming is a source of employment for entire-households as almost all members of households practicing fish-farming are involved in various stages of fish-farming (Rahman *et al* 2011; Richardson & Suvedi 2018; Parrao 2012). This

is also reported by Asif et al (2015:290) who point out that Fish farming is a significant social–economic activity especially for rural communities as it is a major source of employment and income generation.

However, a disparity was noted between the officers' views with that of heads of households. For example, according to the four officers, training in fish farming in various areas such as pond construction was being offered to small-scale fish farmers. However, the finding among the small-scale fish farmers that provided data showed that none of the 55 had ever been trained in small-scale fish farming. A similar situation was also observed in relation to funding, three of the officers stated that some form of funding was being offered to small-scale funding although all the small-scale fish farmers who were part of the sample denied ever receiving some funding.

5.3 DISCUSSION OF FINDINGS ON THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO HOUSEHOLD INCOME GENERATION IN CHINSALI DISTRICT

The second objective of this study focussed on establishing the extent to which small-scale fish farming led to increased household income generation in Chinsali District. In order to fully comprehend the situation, five questions were asked to respondents: what is your annual average household income? How much of your household's annuals average income comes from fish farming? What other venture are you involved in to raise income as a household? What is your highest source of income? What do you think should be done to improve the effectiveness of small-scale fish farming in Chinsali District?

5.3.1 Discussion of findings from heads of households on the contribution of small-scale fish farming to household income generation in Chinsali District

5.3.1.1 Annual average household income

The finding of the study revealed that most of the small-scale fish farmers' annual average income was less than K30 000 (87.3%). Only a few earned

beyond K30 000 with 7.3% making between K30 000 – K50 000 yearly. On the other hand, two other grouping earn between K70 000 – K90 000 (3.6%) and K90 000 and above (1.8%). These findings reflect a not very positive situation as it shows that many of the respondents are struggling financially. An average earning of below K30 000 is not a very positive outcome as such an amount of money would not be enough for a family person to fully satisfy his/her family's needs. Nevertheless, the results also show that some of the respondents are not doing badly in terms of their annual average income.

5.3.1.2 Fish Farming contribution to annual household income

The findings show a very poor contribution of fish farming to the annual average income of many of the respondents with 46 out of 55 respondents confirming that fish farming contributes less than K10 000 to their total household average income. These findings show that fish farming is not contributing much towards earning small-scale farmers income in Chinsali District. Nevertheless, given that many of the respondents earn less than K30 000 annually from all other ventures they are involved in, one would conclude that small-scale fish farming is making a worthwhile contribution after all. This picture is enhanced with the results showing that 9 of the 55 respondents stated that fish farming contributed K10 000 to K25 000 towards their annual average income.

This shows that if taken seriously, small-scale fish farming would be very beneficial to small-scale farmers in Chinsali District in relation to income generation. This has proved to be the case in South Africa. As Phosa (2018) points out, in a study carried out in Thulamela Municipality in Limpopo Province, South Africa, fish farming practices positively contribute to the generation of income for the poor and marginalised communities. This is supported by Be'ne *et al* (2010:934), who states that many small-scale farmers in the rural areas are highly dependant on fish farming as a source of full-time, seasonal and occasional income.

5.3.1.3 Other ventures fish farmers are involved in to raise income

Apart from fish farming the results showed that small-scale farmers were involved in other ventures. Crop production gained the highest percentage in comparison to other ventures. 54.5 percent of the respondents were involved in it (crop production). This is followed by charcoal burning which had 40 percent of the respondents being involved in it. The two are the main areas the respondents are involved in to raise income. At a small-scale involvement, the results showed that the respondents were also involved in business ventures (5.5%), wages (16.4%), land lords (3.6%) and any other ventures (16.4%). The interesting factor in these findings has to do with charcoal burning. With the current climate change issues resulting from things such as deforestation, it is worth noting that small-scale farmers were highly involved in it as a source of income. It would therefore be imperative for government and cooperating partners to target these people in relation to sensitisation messages in order to reverse some of the effects of charcoal burning on climate change.

5.3.1.4 Highest source of income

The findings showed that small scale fish farming (21.8%) is regarded as the third highest source of income among the sampled population. It is only lower to crop production (38.2%) and charcoal burning (23.6%). This shows that given the necessary support, fish farming can be a powerful mechanism in Chinsali District for income generation. It can even raise to the highest income earner for the small-scale farmers. For example, according to Snowman (2006:60), small-scale fish farming is among the main income generator in relation to improving livelihoods in Asia, Africa and Latin America. Such a view is also held by Rahman *et al* (2011), who points out that in Bangladesh, small-scale fish farming is the major contributor to household income among those who practice it. On average, it (small-scale fish farming) contributes 50.99% of household income.

On a negative part, charcoal burning coming out second only to crop production as the highest source of income among the sampled population shows the trouble that we are in as a country in relation to the dangers of deforestation.

5.3.1.4 Suggestions to improve the effectiveness of small-scale fish farming

Finally, the responses towards suggestions that need to be carried out to improve the effectiveness of small-scale fish farming in Chinsali District shows that the respondents understand the challenges and solutions to their challenges. Funding either through grant provision or through loan facilities was highly advocated for by the respondents. Another solution highly advocated for was training provision in fish farming. For the farmers, if these two were provided small-scale fish farming would be a very effective view towards poverty eradication in Chinsali District. One would therefore agree that the major obstacle to fish farming being very effective in Chinsali District has been due to lack of training in fish farming and lack of capital to effectively operate their fish farming projects.

5.3.2 Discussion on views of Government Officers on the contribution of Small-scale fish farming to household income generation in Chinsali District

The views of government officers on the contribution of small-scale fish farming to household income generation in Chinsali District indicates that they are somehow in agreement with the findings from the 55 respondents although they differ a bit in some areas. Like the larger percentage of the 55 small-scale farmers, the government officers pointed out that the average annual income for the small-scale fish farmers is less than K30 000. In addition, they put the annual contribution of small-scale fish farming to the annual household income at less than K10 000 (1 respondent) and between K10 000 – K25 000 (3 respondents). These two answers provided were also similarly provided by small-scale fish farmers although for them the larger percentage (83.6%) agreed that fish farming contributes less than K10 000 while the rest went with K10 000 – K25 000.

The rest of the responses have similar attributes between the farmers responses and those of government officers. For example, both government

officers and the farmers acknowledged crop production as the highest venture in the earning of household income. In addition, government officers also mentioned things such as granting funding, training, and improving access to inputs for small-scale fish farmers as key to improving efficiency in small-scale fish farming in Chinsali District.

5.4 DISCUSSION OF FINDINGS ON THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO IMPROVING HOUSEHOLD FOOD SECURITY IN CHINSALI DISTRICT

The contribution of small-scale fish farming in improving household food security among small scale farmers in Chinsali District was the third and final area of research that the researcher focussed on. In order to do this, the researcher deduced four areas of examination, the first being, the number of time fish from the fish ponds of small-scale fish farmers was consumed in their households. Other areas involved finding out if fish farming helped to improve household food expenditure, the health status of family members and to diversify household diet.

5.4.1 Discussion of findings from heads of households on the contribution of small-scale fish farming to improving household food security in Chinsali District

5.4.1.1 Number of times fish is consumed per month

In the process of data collection, the researcher discovered that fish is usually consumed 2-4 times per fish production cycle which takes between three to six months. Therefore, the consumption of fish regularly was dependent on the number of fish ponds a small-scale fish farmer had. Those with one fish pond consumed fish fewer times than those who had more fish ponds. Therefore, those with more fish ponds had fish contributing more to their food security in terms of fish consumption than those with a fewer number of fish ponds. It was therefore evident that food security in terms of fish consumption would only be attained through encouraging fish farmers to develop more fish ponds and to start the fish cycle at different intervals so that one can have fish at different stages of growth throughout the year.

5.4.1.2 Small-scale fish farming Improves household food security

The findings on questions 20 to 22 on the questionnaire showed that the small-scale fish farmers unanimously agreed that fish farming was a “life changer” in terms of contributing to the improvement of food security. The respondents agreed and strongly agreed in all the three statements where small-scale fish farming is viewed as a contributor to food security. That is at the level of improving food expenditure, the health status of family members and at helping to diversify household. This clearly shows that small-scale fish farming makes some contribution to food security in Chinsali District.

5.4.1.3 Reasons for strongly agreeing

5.4.1.3.1 Income from fish farming helps to improve household food expenditure

Reasons given for strongly agreeing to the above statement show that small-scale fish farming makes a significant contribution to improving household food expenditure. According to the respondents, money from the sale of fish after harvesting helps them to purchase other food stuffs. This view is supported by Musaka and Musonda (2013:301), who point out that income generated from small-scale fish farming is also used to enable small-holder fish farmers to pay for a number of other things such as school fees and foodstuffs for their children. This shows that indeed, small-scale fish farming adds onto income generated from other ventures in supplementing household budgets towards purchasing other food stuffs. This shows that if many of the small-scale fish farmers improved their capacity much more tangible benefits would accrue from fish farming.

5.4.1.3.2 Fish farming helps to improve the health status of family members by contributing towards meeting their nutritional needs

One would agree with the reasons given for strongly agreeing that small scale fish farming helps to improve the health status of family members by contributing to meeting their nutritional values. According to the respondents, it helped to provide nutritious food to growing children in the family and was a source of proteins for all family members. This view about small-scale fish farming is also supported by other researchers. For example, according to

Mugal (2020), ‘fish farming is a formidable contributor to improved living for many households in that it provides high quality nutrition which is within the financial reach for the lower economic classes in society.’

In addition, Richardson and Suvedi (2018) in their research in Cambodia concluded that small-scale fish farming held ‘considerable potential to improve nutrition, enhance household food security and supplement household incomes through the sale of surplus fish.’ This being the case, the results also showed that most of the fish farmers were not fully benefiting from the nutritional value of fish farming as fish was only consumed two to four times in three to six months.

5.4.1.3.3 Fish farming helps to diversify household diets

According to the respondents, fish farming contributes to a diversified household diet in two major ways, firstly, through the provision of money to purchase various kinds of food. Secondly, through the consumption of the very fish cultivated from their fish ponds. The two reasons are a powerful testament to the ability of fish farming to add to a diversified diet for fish farmers. Enough income earned through fish farming can allow a farmer to purchase other food stuffs and eating the very fish allows the farmer to break away from the usual type of relish the famers household consumes.

This view is also held by Rahman *et al* (2011:13) through a study conducted in Bangladesh in which a conclusion is reached that small-scale fish farming improves income security leading to poverty reduction and improved food security as small-scale fish farmers have access to more financial resources to enable them purchase food throughout the year. Therefore, with an increased output in terms of fish production, great benefits would accrue to the small-scale fish farmers.

5.4.2 Discussion on views of Government Officers on the contribution of small-scale fish farming to improving household food security in Chinsali District

Government officers affirmed that small scale fish farming contributes to improving household food security in Chinsali District. Two (50%) of the officers affirmed what the 55 respondents stated, that fish was only consumed 2 – 4 times by households practicing small-scale fish farming in every three to six months. However, the other two officers went with 5 – 8 times and 13 times respectively. Nevertheless, all the officers affirmed that small-scale fish farming contributed to improving household food expenditure (Q20), the health status of family members (Q21) and to a diversified household diet (Q22). Apart from one officer who was neutral on all three questions, the other three either strongly agreed or simply agreed on all three questions. Their responses were in conformity with the responses from the 55 small-scale fish farmers.

CHAPTER 6
CONCLUSION AND RCOMMENDATIONS

6.0 INTRODUCTION

This final chapter presents the conclusion and recommendations to the findings and discussion on the effectiveness of small-scale fish farming in improving livelihoods of small-scale farmers in Chinsali District.

6.1 CONCLUSION

This study was aimed at investigating the effectiveness of small-scale fish farming in improving livelihoods of small-scale farmers in Chinsali District of Muchinga Province. In order to carry out the investigations, three specific objectives of the study were set. That is: To determine the extent to which small-scale fish farming improves employment provision in Chinsali District; To establish the extent to which small-scale fish farming leads to increased household income generation in Chinsali District and; To assess the contribution of small-scale fish farming in improving food security in Chinsali District.

Firstly, with regard to the first objective, which was, “to determine the extent to which small-scale fish farming improves employment provision in Chinsali District”, it was discovered that small-scale fish farming played a role in employment provision for family members in households where it was practiced. Data collected showed that an average of three members of each household were directly involved in the venture. However, given that most of the practitioners of small-scale fish farming only owned two to three fish ponds, it can be concluded that small-scale fish farming was not living up to its full potential in terms of employment provision in Chinsali District. The more fish ponds a farmer owns the more he/she might require more people to be involved in the business. Nevertheless, it is important to acknowledge the contribution that small-scale fish farming was currently making in employment provision in the district.

In relation to the second objective, which was, “to establish the extent to which small-scale fish farming leads to increased household income generation in Chinsali District”, it was discovered that small-scale fish farming was making some important contributions to income generation in Chinsali District among those who practiced it. It was discovered that small-scale fish farming comes third to crop production and charcoal burning in income generation in the district. However, though this was the case, it was discovered that the highest earners (9 of the respondents only) from small-scale fish farming only earned between K10 000 to K25 000 annually. On the other hand, the rest of the small-scale fish farmers earned below K10 000 annually. This shows that currently, not much income is being earned from small-scale fish farming in the district.

In relation to the third and final objective under investigation, which was, “to assess the contribution of small-scale fish farming in improving food security in Chinsali District”. It was discovered that small-scale fish farming was a powerful mechanism in improving food security among small-scale farmers. The respondents confirmed through strong agreements that small-scale fish farming helped to significantly improve their food expenditure through the provision of money earned from the sale of harvested fish. Secondly, it was discovered that small-scale fish farming helped to improve the health status of family members especially the young ones as it was a source of protein.

Finally, it was discovered that small-scale fish farming helped households to diversify their diets through the provision of money to purchase various types of food stuffs and through the consumption of fish cultivated in their fish ponds. However, the benefits from small-scale fish farming were currently not adequate enough to improve food security fully in the sense that not much yields were being attained from small-scale fish farming in the district. In addition, farmers only get to partake of their produce 2 to 4 times in three to six months. Nevertheless, the practice, if improved can be a source of major benefits for small-scale farmers.

6.2 RECOMMENDATIONS

Based on results presented in this study, the following were the recommendations:

1. There is need for the government and especially the Ministry of Fisheries and livestock to conduct rigorous national research on the impact of small-scale fish farming in Zambia.
2. There is need government to provide training to small scale fish farmers in Chinsali District for them to be efficient in fish production.
3. There is need for government and other cooperating partners to take an interest in funding small-scale fish farmers through grants and loan provisions for them to be able to have enough income to operate their fish farming ventures efficiently.
4. There is need for government to encourage diversification for small scale farmers in the district. Many of the small-scale farmers are highly involved in charcoal burning to raise income for their families. Small scale fish farming if done proper would be a good venture in replacing ventures that are destructive to the environment such as charcoal burning is.
5. There is need for government through the Ministry of Fisheries and Livestock to encourage partnerships among small-scale fish farmers. Partnerships such as the formation of cooperatives would enhance the practice of small-scale fish farmers in the district.
6. There is need for government to consider improving water sources for small-scale fish farmers. Water is one of the biggest obstacles to the cultivation of fish as most of the farmers are dependent on very little water sources.

There is also need for further research to be carried out either by government or other researchers such as social scientists on small-scale fish farming in the following areas:

7. To investigate specifically on people who had received funding and training on small-scale fish farming in order to establish how their small-scale fish farming projects were benefiting from such kind of funding and training.

8. To assess the challenges that small-scale fish farmers were experiencing in their ventures in order to provide solutions to their predicaments.
9. To assess the benefits of small-scale fish farming to economic and social development.
10. To carry out research on the impact of small-scale fish farming in reducing fish prices on the market.

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APPENDICES

APPENDIX 1: INFORMATION SHEET & CONSENT FORM

INFORMATION SHEET

Title:

An Assessment of the Effectiveness of Small-Scale Fish Farming in Improving livelihoods of Small-scale Farmers: A Case of Selected Households in Chinsali District

Principle Investigator: Esther Sabila
Supervisor: Dr. Glyn Nkonje, PhD

Sponsor: Self

Dear Participant,

May I invite you to participate in this study being conducted by Esther Sabila as part of the requirement for the award of a Master of Arts in Development Studies.

What is the Purpose of the study? - To assess the impact of small-scale fish farming on livelihoods of the small-scale farmers in Chinsali District.

Potential benefits of the study - Small-scale fish farming is hailed as a powerful tool in eradicating poverty. Therefore, information obtained through this study will help to provide knowledge on the effectiveness of small-scale fish farming in improving livelihoods. Consequently, helping government and other stakeholders to provide the necessary support with an informed mind to small-scale fish farmers and would be small-scale fish farmers.

Are there any risks to the participants in this study? There are no risks involved in the study for the participants.

Are there any benefits to the participants in this study? Participation is on a voluntary basis and will not carry any financial or material benefits for the participants.

Right to Withdraw – The participant is at liberty to withdraw at any time from the study.

Confidentiality - The information you provide will be strictly kept confidential and will solely be used for the purposes of the study.

If there are any clarifications or questions kindly contact any of the following:

PRINCIPAL INVESTIGATOR:
Esther Sabila
University of Lusaka
School of Postgraduates Studies
Department of Education
P.O Box 36711
Lusaka.
Mobile Number: 0978 280555
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RESEARCH SUPERVISOR:
Dr. Glyn Nkonje
University of Lusaka
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Department of Development Studies
P.O Box 36711
Lusaka.
Mobile Number: 0955 301149
E-mail: gkhonje@gmail.com

RESEARCH CONSENT FORM

RESEARCH TITLE:

An Assessment of the Effectiveness of Small-Scale Fish Farming in Improving livelihoods of Small-scale Farmers: A Case of Selected Households in Chinsali District

PRINCIPLE INVESTIGATOR: ESTHER SABILA

If you agree to participate in this study, kindly consent by signing this document:

ATTESTED CONSENT

I understand all that has been explained to me as above and it is clear to me what this study is all about. So I voluntarily consent to take part in the study. I agree to provide information for the study on my own without coercion.

Participant Signature: _____

Date: _____

Enumerator: _____

Date: _____

APPENDIX 2: RESEARCH INSTRUMENTS

Research Instrument 1

HEAD OF HOUSEHOLD'S STRUCTURED QUESTIONNAIRE ON AN ASSESSMENT OF THE EFFECTIVENESS OF SMALL-SCALE FISH FARMING IN IMPROVING LIVILIHOODS OF SMALL-SCALE FARMERS: A CASE OF SELECTED HOUSEHOLDS IN CHINSALI DISTRICT.

Date: _____

RESPONDENT'S CODE

PART A: PERSONAL DETAILS

1. How old are you? (Please Tick in appropriate box)

a)	24 and below	
b)	25 to 29 years	
c)	30 to 39 years	
d)	40 to 49 years	
e)	50 years or above	

2. What is your gender? (Please Tick in appropriate box)

a)	Male	
b)	Female	

3. What is your marital status? (Please Tick in appropriate box)

a)	Single	
b)	Married	
c)	Divorced	
d)	Widowed	

4. How far did you go in your education (level of education)? (Please Tick in appropriate box)

a)	No Education	
b)	Primary Education	
b)	Secondary Education	
c)	Tertiary Education	

5. What is your occupation?

   _____

PART B: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO EMPLOYMENT PROVISION IN CHINSALI DISRICT

6. For how long have you been practicing fish farming? (Please tick in appropriate box).

a)	Less than 5 years	

b)	5 – 10 years	
c)	10 – 15 years	
d)	15 – 20 years	
e)	20 years +	

7. Did you receive any form of training in fish farming from government or any other organization? (Please tick in appropriate box).

a)	Yes	
b)	No	

8. If yes, what type of training did you receive?.....
   ……
   ……
   ……
   ……

9. Did you receive any form of funding from government towards establishing your fish farming business? (Please tick in appropriate box).

a)	Yes	
b)	No	

10. If yes, what type of funding did you receive?.....
    ……
    ……
    ……
    ……

11. How many fish ponds do you own? (Please tick in appropriate box).

	Number of fish ponds	Tick in one box only
a)	1	
b)	2	
c)	3	
d)	4	
e)	5+	

12. What type of fish do you keep in your fish ponds? …….
    ……..

13. How many members of your household are involved (employed) in the fish farming business? (Please tick in appropriate box.

	Household participate in are involved your fish farming business?	Tick in appropriate box
a)	1	
b)	2	
c)	3	
d)	4	
e)	5	
f)	6+	

PART C: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO HOUSEHOLD INCOME GENERATION IN CHINSALI DISRICT

14. What is your annual average household income? (Please tick in appropriate box).

	Annual average household income	
a)	Less than K30 000	
b)	K30 000 – K50 000	
c)	K50 000 – K70 000	
d)	K70 000 – K90 000	
e)	K90 000 +	

15. How much of your household's annual average income comes from fish farming? (Please tick in appropriate box).

	Income from fish farming annually	
a)	Less thank K10 000	
b)	K10 000 – K25 000	
c)	K25 000 – K40 000	
d)	K40 000 – K55 000	
e)	K55 000 – K70 000	
f)	K70 000 +	

16. What other venture are you involved in to raise income as a household? (Please tick in appropriate box. You can tick in more than one).

	Other ventures involved in	
a)	Crop production	
b)	Wages	
c)	Charcoal burning	
d)	Business	
e)	Land lord	
f)	Any other	

17. What is your highest source of income? (Please tick in appropriate box).

	Sources of income	
a)	Crop production	
b)	Wages	
c)	Charcoal burning	
d)	Business	
e)	Land lord	
f)	Fish farming	
g)	Any other	

18. What do you think should be done to improve the effectiveness of small-scale fish farming in Chinsali District?

……

……

……
……
……

PART D: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO IMPROVING HOUSEHOLD FOOD SECURITY IN CHINSALI DISRICT

19. How often do you consume fish from your ponds per month?

	Number of times	Tick in one box only
a)	2 – 4 times	
b)	5 – 8 times	
c)	9 – 12 times	
d)	13 +	

Note: Respond to the following questions (18 – 20) with statements on the contribution of small-scale fish farming towards improving your household's food security (Please tick in the appropriate box for each statement).

20. Income from fish farming helps to improves your household food expenditure.

Strongly disagree	disagree	Neutral	agree	Strongly agree

a) Give reasons for strongly disagree ……
……
……
……
b) Give reasons for strongly agree ……
……
……
……..

21. Fish farming helps to improve the health status of your family members by contributing towards meeting their nutrition needs.

Strongly disagree	disagree	Neutral	agree	Strongly agree

a) Give reasons for strongly disagree ……
……
……
……
b) Give reasons for strongly agree ……
……
……
……..

22. Fish farming has helped to diversify your household's diet.

Strongly	disagree	Neutral	agree	Strongly

disagree				agree

a) Give reasons for strongly disagree ……
……
……
……

b) Give reasons for strongly agree ……
……
……
……..

Research Instrument 2

KEY INFORMANTS' SEMI-STRUCTURED INTERVIEW GUIDE ON AN ASSESSMENT OF THE EFFECTIVENESS OF SMALL-SCALE FISH FARMING IN IMPROVING LIVILIHOODS OF SMALL-SCALE FARMERS: A CASE OF SELECTED HOUSEHOLDS IN CHINSALI DISTRICT.

Date: _____

RESPONDENT'S CODE

PART A: KEY IMFORMANTS GENERAL INFORMATION

1. What is your job title? ……
   ……..
   .
2. Which government department do you belong to? ……..
   ……
   .....

PART B: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO EMPLOYMENT PROVISION IN CHINSALI DISRICT

3. How many families are actively involved in small-scale fish farming in Chinsali District? ……..

4. Did any of the small-scale fish farmers receive any form of training in fish farming from government or any other organization? (Please tick in appropriate box).

a)	Yes	
b)	No	

5. If yes, what type of training did they receive?.....
   ……
   ……
   ……
   ……

6. Do small scale-fish farmers receive any form of funding from government towards establishing their fish farming business? (Please tick in appropriate box).

a)	Yes	
b)	No	

7. If yes, what type of funding do they receive? ……..
   ……
   ……
   ……
   ……

……
……

8. How many fish ponds do most small-scale fish farmers own in Chinsali District? (Please tick in appropriate box).

	Number of fish ponds	Tick in one box only
a)	1	
b)	2	
c)	3	
d)	4	
e)	5+	

9. What type of fish do they keep in their fish ponds? ……
……..
.....

10. In your view, is small-scale fish farming helpful in employment provision in Chinsali District? ……..

PART C: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO HOUSEHOLD INCOME GENERATION IN CHINSALI DISRICT

11. What is the annual average household income for most small-scale farmers in Chinsali District? (Please tick in appropriate box).

	Annual average household income	
a)	Less than K30 000	
b)	K30 000 – K50 000	
c)	K50 000 – K70 000	
d)	K70 000 – K90 000	
e)	K90 000 +	

12. How much of their household's annual average income comes from small-scale fish farming? (Please tick in appropriate box).

	Income from fish farming annually	
a)	Less thank K10 000	
b)	K10 000 – K25 000	
c)	K25 000 – K40 000	
d)	K40 000 – K55 000	
e)	K55 000 – K70 000	
f)	K70 000 +	

13. What other ventures are they involved in to raise income as households?
……
……
……
……

14. Of the ventures you have listed above, which venture seems to bring in more income for small-scale farmers in the district? (Please tick in appropriate box).
    ……
    ……
15. What do you think should be done to improve the effectiveness of small-scale fish farming in Chinsali District?
    ……
    ……
    ……
    ……
    ……
    ……

PART D: THE CONTRIBUTION OF SMALL-SCALE FISH FARMING TO IMPROVING HOUSEHOLD FOOD SECURITY IN CHINSALI DISRICT

16. How often on average do small-scale fish farmers consume fish from their own ponds monthly?

	Number of times	Tick in one box only
a)	2 – 4 times	
b)	5 – 8 times	
c)	9 – 12 times	
d)	13 +	

Note: Respond to the following questions (16 – 18) with statements on the contribution of small-scale fish farming towards improving household food security in Chinsali District (Please tick in the appropriate box for each statement).

17. Income from fish farming helps to improve household food expenditure of small-scale fish farmers in Chinsali District.

Strongly disagree	disagree	Neutral	agree	Strongly agree

    a) Give reasons for strongly disagree ……
    ……
    ……
    ……
    b) Give reasons for strongly agree ……
    ……
    ……
    ……..

18. Fish farming helps to improve the health status of family members of small-scale fish farmers by contributing towards meeting their daily nutrition needs.

Strongly disagree	disagree	Neutral	agree	Strongly agree

a) Give reasons for strongly disagree ……
……
……
……

b) Give reasons for strongly agree ……
……
……
……..

19. Fish farming helps to diversify household's diets among small-scale fish farmers in Chinsali District.

Strongly disagree		disagree	Neutral	agree	Strongly agree

a) Give reasons for strongly disagree ……
……
……
……
……

b) Give reasons for strongly agree ……
……
……
……
……

APPENDIX 3: PLAGIARISM REPORT

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