Evaluation of Land-Bank Beneficiaries' Extension Services and Household Food Security in North-West Province

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DECLARATION

I the undersigned declare that: **"Evaluation of Land-Bank beneficiaries' extension services and household food security in North West Province"**

Is my own work, that all resources used and quoted have been indicated as well as acknowledged by means of complete reference, and that this thesis has not been submitted before to any institution in partial or entirely for the award of any degree.

23-09-2022

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SHEMFE AYOTUNDE OLAITAN **DATE**

DEDICATION

I dedicate this research to God the Almighty because without His grace, mercies, and the gift of life I wouldn't be able to execute this mission. I also, dedicate this to my parents Mr. Marlon Babatunde Ekundayo Shemfe DCG (RTD) and Mrs. Adenike Monisola Shemfe who have shown me endless love and support through thick and thin, thank you for your undying love. Lastly, I would like to dedicate this work to my wife Mrs. Dieketseng Palesa Shemfe and our baby Miss Kgosigadi Adeola Shemfe the thoughts of you two gave me the extra drive to push through the limits.

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LIST OF ACRONYMS

ACIAR	Australian Centre for International Research
ADP	Agricultural Development Programmes
AFASA	African Farmers Association of South Africa
AIDS	Acquired Immune Deficiency Syndrome
ATMA	Agricultural Technology Management Agency
BFASA	Black Farmers Association of South Africa
CASP	Comprehensive Agricultural Support Programme
CBOs	Commodity Based Organizations
CEW	Commune Extension Workers
COGTA	Cooperative Governance and Traditional Affairs
CSI	Coping Strategy Index
DEA	Department of Environmental Affairs
EBFIS	Experienced Based Food Insecurity Score
FAO	Food Agricultural Organization
FBOs	Farmer Based Organizations
FCS	Food Consumption Score
FIES	Food Insecurity Experience Scale
GDP	Gross Domestic Product
GHI	Global Hunger Index
HCES	Household Consumption and Expenditure Survey
HDDS	Household Dietary Diversity Score
HFSS-SM	Household Food Security Survey Module
HHS	Household Hunger Scale
HFIAS	Household Food Insecurity Access Scale
HIV	Human Immune Virus
ICT	Information Communication Technology

IFAD	International Fund for Agricultural Development
IFPR	International Food Policy Research Institute
IICA	Inter-American for Cooperation on Agriculture
IPA	Innovation for Poverty Action
IPM	Integrated Pest Management
LRD	Land Reuse Division
MDER	Minimum Dietary Energy Requirement
MDGs	Millennium Development Goals
NAFU	National African Farmers Union
NAADS	National Agency Agricultural Advisory Services
NDA	National Development Agency
NDP	National Development Plan
NGOs	Non-Governmental Organizations
OVP	Office of Vice President
OXFAM	Oxford Committee for Famine Relief
PAD	Provincial Agricultural Department
PAHP	Partnership against Hunger and Poverty
PELUM	Participatory Ecological Land Use Management
POU	Prevalence of Undernourishment
REM	Retail Emerging Markets
RSA	Republic of South Africa
SAIFSS	South Africa Integrated Food Security Strategy
SDGs	Sustainable Development Goals
SSA	Statistics South Africa
SHGs	Self-Help Groups
SMS	Subject Matter Specialist
SPSS	Statistical Package for Social Sciences
UNICEF	United Nation Children's Fund

UNO	United Nation Organization
USAID	United States Agency for International Development
USD	United State Dollar
WFP	World Food Programme
WFF	Wholesale Financing Facilities
WHO	World Health Organizations
WBOs	Women Based Organizations

ABSTRACT

Farmers' effectiveness and efficiency in agricultural practices hinges on timely and adequate information that are relevant to farmer's needs. Also, land bank support to its beneficiaries serves as "endowment" and "entitlement" which provides beneficiaries with access to credits and other means of production. Thus, the focus of this study was on "Evaluation of Land-Bank beneficiaries' extension services and household food security in Northwest Province". For this study 169 beneficiaries were selected and only 115 were willing to participate. Data collection was done with the aid of a structured questionnaire. Results from the field survey revealed that beneficiaries are aware of extension services and the relevance of information dissemination to farmer's needs and its potential to facilitate their productivity. However, factors such as information relevance and frequency of extension visits to farms are main determinant factors of beneficiaries' access to extension services. Also, most beneficiaries are food secure however, their food availability does not automatically results in food nutrition as most respondents attested to not regularly feeding on balance diet and reliance on less preferred and expensive food is a major indicator that though they might be food secure the presence of balanced diet in their meals lacks consistency. Furthermore, results indicates that that gender was coefficient at (0.8246) and significant at (5%), this implies that male headed households are more likely to access extension services either by initiating extension visits or visiting extension offices as compared to female headed households. This is because women are more tasked with home chores such as cooking, cleaning and catering for the children. Also, marital status was coefficient at (0.9723) and significant at (5%) this implies that beneficiaries that are married have more likelihood to access extension services as there is division of role amongst partners i.e. the man or woman can serve as a representative for the entire household during extension trainings while the other partner takes care of other activities that might not be farm related as compared to a single individual that has to attend training while been tasked with other off farm responsibilities. Educational level was coefficient at (0.5620) and significant at (5%) this implies that respondents with high level of education are more likely to comprehend and grasp extension training, adopt latest technologies for farming and also use multiple platforms for accessing extension services. Also, farm size was coefficient at (.0209752) with a significant value of ($P \leq 0.10$), this indicates that an increase in farm size has the probability to increase the household food security of respondents, this implies that farm size is likely to impact food security as those with smaller farm sizes are likely to have lower production output

which has the probability to result in reduction in income which limits ability to purchase food in situation where their farm products are not ready for harvest. Labour source was coefficient at (.6037481) with a significant value of (P≤0.5) this implies that sources of labour has the probability to impact food security as farmers with more labour sources such as self, family members and hired labour combined are more likely to yield higher production output as compared to farmers who rely on either self, family members or hired labour only. In addition, income of respondents was coefficient at (.0001141) with a significant value of (P≤0.5) this implies the income generated by respondents has the probability to increase or decrease household food security as those respondents with higher income have the purchasing power to buy food when needed as compared to those with lower income. This means the more income respondents have the more likely they are to be food secure and the lesser the income the more likely they are to be food insecure. Lastly, involvement in off farm activities was coefficient at (1.274086) with a significant value of (P≤0.10) this shows that respondents that are involved in off farm activities other than farming are probably more food secure than those that are not. This is because the off farm activities serve as a means of additional income to respondents which in turn increases their income generation and a better livelihood thereby giving them more purchasing power as an effective alternative to source for food rather than reliance solely on production output or income generated from sales of their agricultural products.

KEYWORDS: Land-Bank, Beneficiaries, Extension, Food Security

CHAPTER ONE

1.1 Introduction

Since the inception of mankind agriculture has been the main source of rural livelihood in the developing world and in Sub-Saharan Africa in particular. In most developing nations, the government, NGOs and International Organizations are constantly seeking measures to eradicate rural poverty while uplifting rural livelihood through several programs and activities (Ibrahim, 2017). Take for instance in Philippines, the Office of the Vice President (OVP) established a program titled "Angat Buhay" with the objectives of facilitating rural development, housing and resettlement, public education, universal health care, women empowerment as well as food security and nutrition. Basically the key aim of the program is to diminish stunting as well as malnourishment in children especially and increase access to enterprises that can help to generate income (IPA, 2018).

In order to accomplish this, "Angat Buhay" adopted a food security program titled "Partnership against Hunger and Poverty" (PAHP). The intercession of the PAHP was to enable rural support by coordinating farmers into integrated associations as well as creating a communal vegetable farm (IPA, 2018). Similarly, the South African government has implemented several land, food, and agricultural policies and projects that increases food production and income-generating opportunities. Some of these policies include the Agriculture and Land Reform Policy (ALRP), Comprehensive Agricultural Support Programme (CASP), and the South Africa Integrated Food Security Strategy (SAIFSS) (Mahlangu *et al.,* 2020). In addition, as part of government efforts to combat rural poverty and improve rural livelihood amongst the previously disadvantaged group post- apartheid era, the Land Bank of South Africa was restructured to give mainly financial assistance in form of loans to commercial farmers, transforming farmers i.e. those with high annual turnover but not as much as commercial farmers and emerging small-scale black farmers (Liebenberg, 2015). Basically, Land Bank makes accessible a wide variety of long, medium, as well as short-term loans to high, medium and low risk clients to help meet all financial demands which includes land purchase/rent and purchase of farming tools, improvement of assets as well as credit for agricultural production. However, Land Bank does not have any in-house technicalsupport capacity and the organization has no intention to establish one considering the risk factors hence, they rely on consulting intermediaries to support farmers technically

(Liebenberg, 2015). As a result of the limitation of the services rendered by Land Bank and its mandates to ensure food security, capacity building for small-scale farmers and sustainable agricultural practices, the involvement of agricultural extension service has technical support providers to its beneficiaries particularly the previously disadvantaged group cannot be over emphasized.

According to Danso-Abbeam *et al.* (2018) agricultural extension Programmes is one of the major channels used in combating rural poverty, improving rural livelihood and ensuring food security. This is because it has the capacity for technology transfer, facilitates learning for rural adults, supports farmers in solving agricultural related problems, and encourages active participation of farmers in the agricultural knowledge and information system. This implies that extension is considered as a basic tool for facilitating agricultural and economic related activities in a more effective and efficient manner to meet the people's needs. Therefore, extension is a strategic tool for enabling the safety and quality of agricultural products (Danso-Abbeam *et al.*, 2018).

1.2 Statement of Problem

South Africa is a food secure nation at the macro level although at the micro level people still experience food insecurity, malnutrition and severe hunger. According to Shisana *et al.* (2014), 45.6% of South Africans are food secure, while 26% are severely food insecure and 28.6% of the population are vulnerable to severe hunger. This poor condition of living could be associated with bad markets, inadequate labour, lack of ownership of resources (land inclusively) and high levels of illiteracy (Mantsho, 2018). Consequently, lack of these assets result in food insecurity as food safety, nutrition and accessibility cannot be achieved when these assets are lacking (Stats SA, 2002). Given these challenges, agricultural extension has the capacity to address food insecurities, safety and nutrition by ensuring transfer of technology, rural adult literacy as well as collaborations of rural communities with researchers and active stakeholders and policy makers. It is therefore of assumption that beneficiaries of land bank through access to appropriate funds and extension services are expected to be production effective and efficient which is expected to improve their livelihood and household food security status. However, this idea has not been ascertained as there is no documentation or literature which have evaluated land banks beneficiaries access to extension services to determine whether or not if their access to extension services and the support given by land bank increases their household food security status or otherwise. This study therefore seeks

to evaluate land bank beneficiaries' access to extension services and their household food security status in Northwest Province South Africa.

1.3 Research Questions

- What are the socio-economic characteristics of land bank beneficiaries?
- How accessible are land bank beneficiaries to extension services?
- What are the factors contributing to land beneficiaries' access to extension services?
- What is the household food security status of land bank beneficiaries?
- What factors determine the household food security status of land bank beneficiaries?
- How supportive is land bank to its beneficiaries?

1.4 Research Objectives

The study's core objective is to assess land bank beneficiaries' access to extension services and their household food security status in Northwest Province South Africa. The specific objectives are:

- To describe the socio-economic characteristics of land bank beneficiaries
- To determine how accessible land bank beneficiaries are to extension services
- To determine the factors that contributes to land bank beneficiaries' access to extension services
- To determine the household food security of land bank beneficiaries
- To examine factors that determine the food security status of land bank beneficiaries
- To examine land bank support to its beneficiaries

1.5 Hypotheses of the Study

The hypotheses are stated in their null forms

H_0 Hypothesis 1: there is no significant relationship between the socio-economic characteristics of land bank beneficiaries and the factors that contribute to their access to extension services.

H_0 Hypothesis 2: there is no significant relationship between the socio-economic characteristics of land bank beneficiaries and their food security status

1.6 Justification of the Study

Agriculture is the mainstay of most nation's economy in Africa, which implies that most nations and its citizens rely on efficient agricultural production for survival. Through increase in agricultural production, rural livelihood as well as food security at the grass root can be achieved. This implies that agricultural extension plays a key role in ensuring that this vision becomes a reality. This means extension support to farmers is highly required for necessary development of agricultural related activities to improve their livelihood, food security and nutrition. In addition, Land bank was established to create a financial scheme that will enable people going in to agriculture and those who are disadvantaged historically to have financial access. This implies that land bank was established to serve all farmers in South Africa. It is of assumption that the beneficiaries of land bank through access to funds and extension services have improve livelihood and food security. However, this cannot be ascertained, as there is no literature that indicates the food security status of land bank beneficiaries. Therefore, it is significant to evaluate their access to extension services and land bank support to ascertain whether it improves their household food security status or otherwise. The results derived from the study will assist The Land Bank of South Africa with policy formulation.

1.7 Operational Definition of Terms

Extension services: refers to advisory as well as other services that assist people in rural areas in making judicious use of resources available to them (Katz, 2002)

Land Bank: a structure established by the by the government of South Africa aimed at supporting commercial and emerging farmers who are disadvantaged i.e. black people, women and youth.

Food security: a situation where by all people in a population have access to adequate food required for an active and healthy living (UNO, 2010)

Household: a group of people living together in the same dwelling

Beneficiaries: an individual, group of individuals or thing that receives help or an advantage from something: one that benefits from something.

1.8 Limitation of the Study

- The study is limited to northwest province, this implies that results received from the survey does not reflect the situation in other provinces as the study focus is specific to beneficiaries within the Northwest province only.
- The focus of the study is on land bank beneficiaries and not all farmers in Northwest province.

1.9 Chapter Summary

The chapter outlines the importance of agriculture and agricultural programs in improving rural livelihood and its effect on food security. In spite of governments' efforts, South Africa is only food secure at National level while household food security is lacking in adequacy. Therefore, it is important to evaluate land bank beneficiaries' household food security as it is of assumption that the beneficiaries of land bank through access to funds and extension services have improve livelihood and food security.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The review of literatures are presented in this chapter, which discusses food security dating back to its background, impacts of agricultural extension on food security as well as land bank supports to its beneficiaries. Furthermore, the theoretical framework as well as conceptual framework for the study are also discussed in this chapter.

2.2 Historical Background of Food Security

The issue of food security originated as far back as the world food crisis of 1972-1974, and even beyond until it was declared as part of the universal human rights in 1948. By then, the right to food as comprising a key element to what can be referred to as a sufficient living standard (Abadalla, 2007; Maxwell & Frankenberger, 1995). In recent years, the concept of food security has developed, evolved, expanded and diversified which is as a result of the diverse nature of the problem of food (Abadalla, 2007; Drimie & Mini, 2003).

According to Maxwell (1996) since the world conference in 1992 the idea of food security may be conceptualized as comprising of three significant and overlapping paradigm shifts. These three shifts are; (1) from a global and national to household and individuals (2) from a food first approach to a livelihood approach (3) from the emphasis and focus on objective indicators to the consideration of subjective approach. In the 1970's understanding of food security concept was hinged basically on the notion that food security exists because of problems of food supply. As a result much effort was aimed at self-sufficient approaches at the national level. The approach was to ensure the production of adequate food supplies. In attempt to actualize this approach consideration was placed on the application measures at the reduction of price stability as well as financing the extra costs of exceptional imports at the international level (Maxwell, 2001).

In 1981 a new paradigm shift was introduced by Amartya Sen which move the issue of access to food to Centre stage. Since the early 1980's, it's impossible to regard food security as being an issue of food supply without referencing the significance of the concerns of its entitlement as well as access (Devereux & Maxwell, 2001). Sen (1981) stated in terms of his entitlement perspective, that food ownership is one of the oldest property right, which is regulated by rules in every society.

The entitlement perspective focuses on individuals' entitlement to commodity packages which includes food. Sen's opinion was a direct transition from viewing food security as a problem caused by food supply which is often attributed with issues of national self-adequacy and proposals for world food stock or import stabilization schemes, to viewing such security as entailing food accessible to individuals in a household, an idea that permits people the right to have food, so they encounter famine and hunger. In the 1980's, food security as an idea transitioned from a "food first" standpoint to a livelihood perception, specifically after the famine experienced in Africa around 1984/1985. Generally, food security emphasis food as a primary need. Such idea as buttressed by Hopkins, who opined that *" food security stands as a fundamental need basic to all human needs and organization of social life. Access to necessary nutrients is fundamental not only to life per se, but also to stable and enduring social order"* (Maxwell, 2001; Hopkins, 1986). Overtime, food security as a concept came to realization that food consumption especially in the form of short term nutritional intake is one of the goal people target. During the 1984/85 famine in Darfur region of Sudan Waal (1991) observed that people preferred to be hungry in short term in an attempt to conserve their assets and livelihood for the future. *"People are quite prepared to put up with considerable degrees of hunger in order to preserve seed for planting, cultivate their own fields or avoid having to sell an animal"*. I such difficulties the long term needs required for survival over rides the short term needs of sufficient nutrition. In recent times, the idea of food security has transited from a focus on objective indicators to focus on more subjective issues. Literatures on poverty has long differentiated between "the condition of being deprived" which refers to objective analysis and "feelings of being deprived" which is attributed to subjective analysis (Maxwell, 2001). Different objective measures creates the premise for such approaches in food security (1) the expected consumption levels , (2) the consumption of less than 80% of the needed food for sufficient energy, as well as the average calorie intake required daily for consumption (Abdalla, 2007 ; Maxwell, 2001).

A key disadvantage with the aforementioned perspective is that, it focuses on the quantitative aspect of food while the qualitative aspect in terms of nutritional adequacy are left out. Consequently, researchers have focused on the subjective dimension of food security. Such an attempt can be viewed in Maxwell's report that *"a country and people are food secure when their food systems operates in such a way as to remove the fear that there will not be enough food to eat. In particular, food security will be achieved when the poor and vulnerable, particularly*

women and children and those living in marginal areas, have secure access to the food they want" (Maxwell, 2001)

2.3 Food Security

Food security first came to light at the initial stages of increasing food supply in efforts to curb famine and starvation globally (Ndobo, 2013; Wiggins, 2004). Subsequently since the World Food Conference of 1974 views on food security as just a mere issue of food supply at national level as shifted focus and emphasis to improve access as a key element of food security by the 1980's (FAO, 1984). In the 1970's, food security was defined by the united nation as adequate food production and supply both at the national and global level (Clover, 2007). This implies that food security was considered a basic need. Presently, FAO under the United Nation suggested a definition of food security in 2001 which describes it as a situation where food exist to people at all time, where they are accessible physically, economically, socially, to adequate, secure, and nutritious food which meets their nutritional need for a healthy and active life. This definition was coined from the World Food Summit in 1996 and it is the most widely adopted definition (Mantsho, 2018). According to FAO (2006) food security hinges on four (4) pillars which are; food availability, food accessibility, food utilization and stability of food.

2.3.1 Food availability

Food availability is a situation by which there is consistent food available that is adequate and of suitable and nutritional value to all. This means food supply should be distributed through domestic and international production (Ndobo, 2013). Kannan (2000) opined that supply of food is very significant and as such no country's government should be dependent solely on international markets for the supply of food. Godall (2009) is of the view that understanding of food availability differs across nations. This implies that food availability can either be viewed as food needed for survival or nutrients to maintain a healthy life. In addition, food availability does not assure access to food this is as a result of several contributing factors such as institutional structures, government policies, business and food market which impacts food security at the household level (Ndobo 2013; Hadley, 2011). Furthermore, several factors are linked with food supply in a nation such factors includes; political instability, war and riots, inefficient market structure and shortage of effective transportation (Benson, 2004).

2.3.2 Food access

This is a situation whereby there is sustainable access to food at both household level and country at large. At the household level, it is essential to have access to sufficient means that supports their ability to obtain food that are nutritious and adequate. This entails the capacity to purchase and/or grow food, or to be given food. According Benson (2004) several factors such as gender, age and employment status determine the amount of access each member of a household has to adequate food. The power to purchase is the most important element of a household's access to food (Ndobo, 2013). However, this purchasing power hinges on various market conditions and price policies (WFP, 2007). Poverty is mostly linked to access to food because poor individuals frequently do not have access to adequate amount of food (Lado, 2001). According to (Boussard *et al*, 2006). Food insecure households do not possess essential resources to pay the price of imports and access adequate food due to distance of supermarkets to where they reside and do not have a proper means of transportation (Nord *et al*, 2009). Food access comprises of both economic and physical access. Economic access entails entitlement to food while physical access entails a place where food is available and attainable (Ndobo, 2013). Sen (1981) clarified entitlement to access food using for main components (1) trade based entitlement which implies that an individual has capacity to exchange something through consumption and food purchase from people interested to trade, (2) entitlement based on production which entails that an individual as the right to cultivate and produce food by means of their own resources or by procuring resources from individuals interested in trade by means of an exchange medium which agrees o terms of trade, (3) owned labour entitlement this entails that a person has the right to sell his/her own labour experience and skills , consequently both production based and trade based approach are linked with a person's labour experience and skills, (4) inheritance and transfer entitlements which means that a person has right to access resources which are provided by the government or any member of the community in a form of social transfers.

2.3.3 Food Utilization

An essential aspect of food is safety and quality. Food utilization hinges on safety and quality of food and emphasis that a person or household ought to be capable of selecting, storing, cooking, sharing, and consuming food in a manner that ascertain sufficient and nutritious consumptions for all members of a household and country at large. In addition, food utilization entails the use of clean water, sanitation as well as special health care in the preparation of sufficient food

(Richardson, 2010). Also, utilization of food entails the quantity of nutritional intake by an individual which ought to be safe, the right quality and adequate diet that gives sufficient energy as well as essential nutrients (WFP, 2007). An individual's body ought to have the ability to extract and utilize the nutrient from food consumption this is in accordance the meaning of an "active and healthy life" in food security definition (Ndobo, 2013). The health status and food preparation of an individual has a direct effect on food security (Staatz *et al,* 2009). Furthermore, several factors limits food security such as lack of proper care, insufficient sanitation and loss of nutrient when food is processed. Consequently other member of a household could be affected severely (Ndobo, 2013). Food utility implies the use of food, thus utility of food changes through the years due to seasonal variation and availability of food while there production of food and local consumption (Yin *et al.,* 2008)

2.3.4 Food Stability

This refers to sustainable access to obtain sufficient and nutritious food at all times at a household level regardless of unforeseen circumstances such as; unemployment, drought, conflicts or death. This implies that unanticipated economic setback should not be a risk factor to access food when required (IICA, 2009).Loss of resources due inadequate reserves and setbacks in income relates to stability a situation which may be either temporary or permanent (Schmidhuber & Tubiello, 2007). According to FAO (2006) stability as a concept is interconnected with the components of both access and stability.

2.4 Levels of food security

Food security can be categorized in several levels which are global food security, national food security, community and household food security.

2.4.1. Global Food Security

Food security at the global stage consists of various elements such as ecological, social, economic and political aspects that assist in identifying the choices as well as difficulties that decides whether people have adequate resources for the consumption of food they need (McDonald, 2010). Global food security is related to food systems which comprises of food chain and production activities such as processing, distribution and consumption amongst various areas (Misselhorn *et al.,* 2010). Food security at a global stage demands that there is adequate food production globally so as to make access to adequate food a possible for both national and sub-nationals worldwide (Ndobo,

2013; Smith et al., 1992). Global food security's main focus is on the topics that influences the supply and distribution of food both internationally and locally (Ecker & Breisinger, 2012).

2.4.2. National Food Security

Food security at the national level is described within the context that a nation is self-reliant with food. It implies that a nation has the ability to produce, supply and distribute sufficient food that is required by all its citizens (Ndobo, 2013; Smith *et al.,* 1992). Food security at the national level can be assessed by using equal balance between demand for food and supply of food at a price that is acceptable. The unevenness in demand of food and distribution supply of food does not certainly indicate that the entire households in a nation is food insecure, however it basically implies that food insecure household exists due to limited entitlement to food as a result of insufficient resources (Ndobo, 2013; Thomson and Metz, 1993). According to Devereux and Maxwell (2001) food security at national level doesn't directly ensure food security at a household level this is because at this level problem of food is not associated to food supply but rather perceived as a livelihood failure due to insufficient access to food needed. Though global food availability is progressive however, food insecurity and malnutrition is still relatively high in the world at large (Fan, 2012). To achieve nation food security economic growth aimed at poverty eradication and equal distribution of wealth amongst population is significant (Babu & Sanyal, 2009). According to Ames *et al.* (2001) economic growth doesn't not necessarily ascertain poverty eradication and food supply however, it is important for government to put in place policies that improves the uneven distribution of resources and incomes through better access to financial markets and land reforms for households with low income.

2.4.3 Community Food Security

This can be described as a state in which all residents of a community are accessible to adequate and nutritious food acquired from a food system that is sustainable (Gottlieb, 2002). In addition, to make certain that a community is food secure food systems should function effectively and with sustainable environments (Anderson & Cook, 1999). This implies that the nutritional value of the food obtained by a society hinges on its policy makers (Allen, 2004). According to Babu and Sanyal (2009) when addressing issues of food security social justice, self-reliance as well as community economic development should be highlighted region and local leaders.

2.4.4 Household Food Security

A food secure household is when all members have access to adequate food required to maintain and active and healthy life (Tonukar & Omotor, 2010). At this level a household can be considered as food secure when there is sufficient amount of safe food required by all it members. Food security at the household level can be described as the capacity to obtain adequate food by either production of food or purchase of food for all members of the households (FAO, 2010). However, Anderson (2009) suggests that household food security does not ascertain food security for all its members stating two main reason which are; the capability to obtain adequate food is not converted into real food attainment and the intra – household food distribution does not meet the specific needs of members of a household.

2.5 Food Security Indicators

This can be described as several measures of the dimensions of food security which are used to highlight change or an outcome of an activity or program targeted at a specific group. Food security is impacted by various interconnected socio-economic, political and environmental factors, thus it needs multi-dimensional considerations. In evaluation of food security conditions, several indicators are used to highlight the numerous dimension of food security status. In regards to the development of food security concepts several indicators have been highlighted to analyze the situation of food security (Sigei, 2014; Von Braun *et al,* 1996). Food security indicators are usually categorized into different classes which are "Process and Outcome" indicators. "Process" refers to the estimate of available food and supply as well as the situation of food access while "outcome" entails alternatives for utilization/consumption of food. Basically Process indicators consists of food supply and food access indicators. Indicators of food supply make available information on the possibilities of astonishments, unforeseen setbacks or in event of disaster that impacts household food security (Sigei, 2014). Unlike indicators of food supply the indicators of food access are reasonably efficient in observing food security conditions at the household level. "Outcome" entails all direct as well as indirect indicators of household food consumption, which illustrates the level, transition in consumption of food and the quantity of food stored as the yardstick for measuring food situation in a household (Sigei, 2014) .

2.6 Measurements of Food Security

To evaluate the determinants of food security it is paramount to examine the levels of food security as a bases for its analysis. Basically, food security can be measured at four different levels which

are; global, national, household and individual level. At the global level food security basically emphasis international trends such as the supply of food and its macronutrient adequacy, prices of food as well as trade policies which does not essentially emphasis how certain aspects of food security impacts households or individuals (Kotchofa, 2019). Likewise, most studies on national food security assessed the level of local supply of food and imports to meet the demand of the public (Warr, 2014). The indicators mostly used at Global and national level are the "Prevalence of Undernourishment" (PoU) and the "Global Hunger Index" (GHI). The Food Agricultural Organization (FAO) has used the PoU since 1974 to observe global food security (Cafiero *et al,* 2014). The main focus of the PoU is on the concept of food deprivation by assessing the limits such as the yardstick for the Minimum Dietary Energy Requirement (MDER) or the mean level of Dietary Energy Consumption (Pérez-Escamilla *et al.,* 2017). The key benefit of this indicator is its affordability for countries to monitor national food security (Kotchofa, 2019). The second broadly used indicator is GHI, which was established by the International Food Policy Research Institute (IFPRI) is used to track and measure hunger at both global and national level (Pérez-Escamilla *et al.,* 2017). The evaluation of GHI entails the use of data on the percentage of malnourished people i.e. individuals who do not eat adequate food needed for their daily minimum dietary energy requirements as presented by the PoU (Kotchofa, 2019). Nonetheless, food security indicators at both global and national levels are collective in value which does not essentially indicate constraints at household and individual levels (Fouilleux et al., 2017). In addition, majority of the collective indicators often measure hunger while the whole spectrum of food security experience are not put into consideration. Therefore, it is significant to have household or individual scale analysis aimed at effectively providing the required help to individuals who are food insecure (Kotchofa, 2019). At the micro levels indicators such as Household Consumption and Expenditure Survey (HCES) serves as a relevant information source for measuring individual and household food security experiences. According to Jones *et al.* (2013) HCES provides varieties of data on individual or household consumption of food both at home and away from home, it approximates consumer price indices as well as observing poverty and household socio-economic status. Usually, food security practitioners measure multiple foods and nutrition security indicators with use of data from HCES. Also, Household dietary Diversity Scores (HDDS) is one of the commonly estimated indicators which measures individual or household access to food based on what they eat within a particular duration which hinges on a set of food groups. The HDDS was presented

by the United States Agency for International Development (USAID) to assess the quality of the nutrition of household diets (Deitchler *et al.,* 2010). Furthermore, the WFP introduced another indicator called the Household Food Consumption Score (FCS) which monitors similar outcomes like the HHDS. The FCS gives data on the frequency of a households' food consumption, household dietary diversity as well as the relative significance of the various food groups in regards to their nutritional content (Pérez-Escamilla *et al.,* 2017). Also, the Coping Strategy Index (CSI) was created to evaluate means by which households cope with food inadequacy i.e. CSI helps to comprehend individual or household behaviors and survival strategies in conditions whereby deprivation of food is perceived as a threat (Maxwell and Caldwell, 2008). Additionally, CSI are essential when creating food aid programs and observing their effects in emergencies (Jones *et al.,* 2013). Although PoU, GHI, HDDS, FCS and CSI are all key indicators in the measurement of food security, the aspects of individual or household food security experiences they capture are limited (Kotchofa, 2019). In attempt to address the limitation of these indicators, an Experience Based Food Insecurity Scales (EBFIS) was developed and has been used over the last two decades to evaluate adequately food security and insecurity experiences at the household level. It is important to note that the only indicators that measures household food security directly are the EBFIS which was first introduced in the U.S. in the 1980s and early 1990s. The EBFIS comprises of variety of experiences such as household hunger, feelings of worry about running out of food and reduction in the quantity and quality of food consumed (Kotchofa, 2019). The United States Household Food Security Survey Module (HFSS-SM) comprises of eighteen item scale which assesses the four experience based food security of an household which are; (1) Anxiety/worry about lack of food for household consumption (2) lack of variety or quality of food in the household (3) decrease in food quantity consumed by adults (4) decrease in food quantity consumed by children (Pérez-Escamilla *et al.,* 2017). The eighteen item scale in the HFSS-SM consists of ten questions aimed at adults and eight questions aimed at children in a household about their food security experiences over the past twelve months before conducting the survey. In addition, the HFSS-SM provides the basis for the conception of number of other household experience-based scales such as the Latin American and Caribbean Household Food Security Scale (ELCSA), Household Hunger Scale (HHS), Household Food Security Scale (HFIAS) and most recently the Food Insecurity experience scale (FIES). Apart from HHS, which distinctively observe hunger experiences, most of the EBFIS gives wider information on food insecurity

experiences in households (Kotchofa, 2019). Observation from recent studies that adopted the EBFIS data reveals that food security is a global issue facing both developed and developing countries (Smith *et al.*2017; Kneafseay *et al.,* 2013). Also, studies using EBFIS has been certified to effectively highlight food insecurity experiences of an individual or household, and has been used in Canada, United Kingdom, Latin America, Sub-Saharan Africa and Mexico (Smith *et al.*2017; Kneafseay *et al.,* 2013). Reports from EBFIS are cross-cultural and ethnographically certified (Coates *et al.,* 2013; Ballard *et al.,* 2011). The reports from EBFIS helps not only in indicating insecure individuals but it also gives and in-depth understanding of their food insecurity (Kotchofa, 2019; Nord, 2014). Although EBFIS is useful in capturing food insecurity experiences of individuals and households its limitation is that there is no clarity amongst food insecurity, hunger, nutrition security as well as other dimensions of interest to policy makers and researchers (Jones *et al.,* 2013; Barret, 2010). As such, in most EBFIS hunger is regarded as an extreme experience in the field of food security (FAO, 2016; Coleman-Jensen *et al.,* 2015).

2.7 Household Coping Strategies

In 2017 it was reported in the Sustainable Development Goals (SDGs) that natural disasters, conflict and wars, economic among other shocks produce economic losses which amounts to more than USD 250 billion every year. These numerous shocks often have an impact on both off-farm and farm activities of the vulnerable and rural poor in developing countries as it creates major threats to their food security (Ansah *et al.,* 2020). In other to have an in-depth understanding of the severity of the food insecurity of low income household the adoption of Coping Strategy Index (CSI) is paramount. The CSI encompass all of the major strategies commonly employed by low-income families. According to Hill & Kauff (2001) for low-income families *"often living to the proverbial edge, routine strategies can make the difference between whether or not they can make ends meet each month"*. Therefore, understanding the intensity and frequency of mechanism used for coping helps not only to test the validity of the standard food security scale among families with low-income but it also enlightens policy interventions to the level that household food insecurity status is understated by the standard survey instrument (Nord *et al.,* 2010). The CSI is a collection of questions that aims to find out how household manage to cope with inadequate food for consumption. According to Maxwell (2003) coping strategies is approximated by evaluating behavior, i.e. what a particular household does when they are unable to obtain adequate food. Usually, the coping strategies are identified by the individual accountable for the preparation or

consumption of the food. Hence the coping strategy monitored are often related to food practices in the short-term (Maxwell, 1995). The CSI has been used in numerous studies to evaluate the magnitude of household food insecurity. As observed by Maxwell (1996) the short-term coping strategies that is most commonly adopted by households are; limiting portion size, skipping meals, eating foods that are less desirable and borrowing food or money. Oldwage-Theron *et al.* (2006) in a study in Vaal triangle in Gauteng found that majority of the households headed by females experienced situations of money shortage in their pursuit of food consumption during the month before the study was carried out. Limiting portion sizes and cooking limited variety of foods were the coping strategies adopted by these households in the month before the study was conducted.

2.8 Food Insecurity

Food insecurity is a situation whereby availability of safe and nutritious food required for an active and healthy life is limited (FAO, 2002). This situation also includes the feeling of worry about inadequate food for consumption or inability to purchase food when it's exhausted (Burns, 2004). Basically, people that are food insecure do not consume or grow sufficient food **as** a result of inadequate resources (Boussard et al., 2006). Food insecurity situations also prevails amongst war victims due to conflicts and chaos which results in loss of lives, properties and resources. Additionally, the urban poor and low-income households, particularly underdeveloped countries experience food insecurity, besides women and children are the most vulnerable groups in these low-income households to experience food insecurity. This is because women often devote a huge portion of their earnings to the needs of children. They are also accountable for the preparation of the food they produce or buy (FAO, 2011; European Commission, 2009). According to FAO (2008) food insecurity can be categorized into two forms which are chronic food insecurity and transitory food insecurity.

2.8.1 Chronic food insecurity

Chronic food insecurity is a persistent or long-term food inadequacy this occurs when individuals or households are not able attain their minimal food needs over an extended duration due to extended period of poverty, shortage of assets and insufficient access to productive or financial resources (FAO, 2008). Chronic food insecurity continues to impacts individuals or households that are unable to reach the essential needs to produce or buy sufficient food (European Commission, 2006). Chronic food security is considered moderate or mild food insecurity and it frequently prevails when market or structural failure within a nation is constant (Misselhorn *et al.*,

2010). Also, it has an impact on approximately one billion people annually (Staatz *et al.*, 2009). The situation of chronic food insecurity can be addressed using the conventional long term development strategies used to tackle poverty, such as education or access to useful resources such as credits. A need for a more direct food access to facilitate them to increase their productive ability is also required (FAO, 2008)

2.8.2 Transitory food insecurity

Transitory food insecurity is a temporary or short term food inadequacy which occurs when there is an unexpected decline in individuals or household capability to produce or access sufficient food to sustain a good and healthy lifestyle. This is due to temporary shocks and instabilities in availability and access of food, plus differences in domestic food production, food prices and household incomes annually (FAO, 2008). Transitory food insecurity is considered as the most severe sign of household food insecurity for the reason that it results into famine and hunger, although the situation happens temporarily (Staatz *et al.*, 2009). Also, transitory food insecurity can be a result of unsuitable government policy which leads to destabilization of food consumption trends (Cathie, 2006). Furthermore, transitory food insecurity fairly unforeseeable and can happen unexpectedly. This makes programming and planning more challenging as it requires several intercessions, plus prompt cautionary ability and safety net programmes (FAO, 2008).

According to Misselhorn *et al.*, (2010) both types of food insecurity are interlinked for the reason that chronic food insecurity is embedded in one or several occurrences of transitory shocks. This because households coping strategy adopted shows a clear sign of the connection amid the two concepts. Staatz *et al.*, (2009) stated that individuals or households are likely to trade their properties in an effort to deal with situation of transitory insecurity, which supplements their capability to obtain income or food, which sequentially results into chronic food insecurity. This entire process is regarded as a poverty trap.

2.9 The Global state of Food Security

Identifying global food security status is essential as it is significant for targeting economic and food aid, it also informs government policy across many sectors, as well as supporting early famine warnings and global monitoring systems, evaluating health, nutrition and development programs (Jones *et al.*, 2013). The concept of food security is flexible in nature as it can applied at any level of aggregation. Inclusively, global trends encompasses different trends at the national and regional levels which impacts food security (Headey, 2013). Although it's a fact that over the past half

century global food production has increased ahead of demand, food insecurity is still been experienced by a large number of people (Misselhorn *et al.*, 2012). In an effort to solve global food security challenges the World Food Summit was held in Rome in 1996 which led to the establishment of the Millennium Development Goals (MDGs) in 2000 (United Nations, 2015). In 2000 world leaders converge and committed to the fight against severe poverty and hunger among individuals by 2015. From a global perspective, according to FAO *et al.*, (2020) the latest estimates from 2019 report indicates that before COVID-19 pandemic, nearly 690 million individuals (8.9 percent) were undernourished in the global population. Undernourishment is a situation whereby an individual is unable to obtain adequate food to meet the required daily minimum dietary energy over a duration of a year (FAO, 2015). The recent estimate for 2019 has shown that since 2014 an additional 60 million people have become affected by hunger. According to FAO *et al.*, (2020) if this trend goes on, the population of undernourished individuals will exceed 840 million by 2030. Thus, the quest to achieve zero hunger is far from likely even without the negative impacts that COVID-19 will likely have on hunger. Early forecast based on the recent global economic outlook available suggests that the COVID-19 pandemic could result in an additional 83 to 132 million people to the categories of the undernourished in 2020 (FAO *et al.*, 2020). Over the years several reasons has led to hunger increase globally. A stagnant, weak or crumbling economic conditions are the main causes of poverty increase as well as undernourishment. Economic setbacks and recessions, specifically since the financial crisis of 2008-2009, have had critical effects on hunger through various channels (FAO *et al.*, 2019). Although there has been significant progress in many of the poorest countries in the world in the decline of extreme poverty rate from more than 50 percent to about 30 percent over the past two decades, about 10 percent of the global population still lives on USD 1.90 per day or under, particularly in Sub-Sahara Africa and Southern Asia (Barne, D & Wadhwa, D. 2019). During the last decade the debt of many poor economies increased significantly with total debt attainment at about 170 percent of Gross Domestic Product (GDP) in 2018 (Kose *et al.*, 2020) hence it contributes to the increasing global risk and weakens the developmental prospect in several emerging economies. Also another factor that makes many regions and countries more vulnerable to external shocks is their high dependency level on commodity-export and commodity-import. A great unevenness in income distribution, resources and assets, coupled with lack of efficient social protection policies, also undercut food specifically for the poor and vulnerable. Also structure imbalances, economic conditions and the inclusion of

policy framework linked with man-made and natural effects prompts persisting hunger and poverty (FAO *et al.,* 2020). Furthermore, frequent increase in extreme weather event, spread of pest and diseases as well as altered environmental conditions over the past 15 years are features that adds to the cruel circles of hunger and poverty, mostly when impaired by delicate institutions, violence, conflicts, as well as the extensive displacement of populations (FAO *et al.,* 2018, FAO *et al.,* 2017, FAO, 2017, Von *et al.,* 2015). As of 2018 the number of displaced people in the world was about 70 percent higher than in 2010, attaining to about 70.8million, most of which are hosts of developing countries (Barne, D & Wadhwa, D. 2019). According to FAO (2020) smallholder farmers and communities that depend directly on own production as primary source of food are affected more by these phenomena. Additionally, hunger is more predominant in countries with rapid population growth and inadequate access to education and healthcare. This provides a linkage between health conditions, nutrition and food security of the population which as a result impacts the potentials of economic growth and development.

Although the highest level of total food insecurity was observed in Africa, Caribbean and Latin America is where food insecurity is rising rapidly from 22.9 percent in 2014 to 31.7 percent in 2019, due to severe growth in South America. Though it's of utmost concern that there are 746million people experiencing severe food insecurity, an additional 16 percent or more than 1.25 billion of the world population have experienced food insecurity at moderate levels. Individuals who are moderate food secure do necessarily suffer from hunger however they do not have frequent access to nutritious and adequate food. In view of the total food insecurity (moderate or severe) distribution of people in the world, from the 2billion individuals experiencing food insecurity, 1.03 billion are in Asia, 675 million in Africa, 205 million in Latin America and the Caribbean, 88million in Northern America and Europe , and 5.9 million in Oceania. The prevalence of food insecurity at both moderate and severe level and severely level only is higher among women than men at the global level. In particular, at the moderate or severe level the gender gap in food access increased from 2018 to 2019 (FAO *et al.,* 2020).

Based on assessments, the Prevalence of Undernourishment (PoU) in Africa which was 17.6 percent of the population in 2014 increased to 19.1 percent of the population in 2019 of undernourished people. This PoU is more than twice of world average which is 8.9 percent. The PoU of Africa is the highest among all the regions. In view of the forecast for 2030 in the table

Africa is considerably off track from achieving the goal of Zero Hunger, without consideration of the effect of COVID-19. Furthermore, if this new trends continue, the PoU of Africa will increase from 19.1 percent to 25.7 percent of Undernourished individuals. It is expected that undernourishment will increase especially in the sub-Saharan region. The projected rise in PoU by 2030 would increase the number of starving individuals in Africa to about 433million, 412 million of this population would be in sub-Saharan countries (FAO *et al.*, 2020).

Table 1: Prevalence of Undernourishment in the world by region (2005-2030)

	Prevalence of undernourishment (%)							
	2005	2010	2015	2016	2017	2018	2019*	2030**
WORLD	**12.6**	**9.6**	**8.9**	**8.8**	**8.7**	**8.9**	**8.9**	**9.8**
AFRICA	**21.0**	**18.9**	**18.3**	**18.5**	**18.6**	**18.6**	**19.1**	**25.7**
Northern Africa	9.8	8.8	6.2	6.3	6.6	6.3	6.5	7.4
Sub-Saharan Africa	23.9	21.3	21.2	21.4	21.4	21.4	22.0	29.4
Eastern Africa	32.2	28.9	26.9	27.1	26.8	26.7	27.2	33.6
Middle Africa	35.5	30.4	28.2	28.8	28.7	29.0	29.8	38.0
Southern Africa	4.9	5.4	7.0	8.0	7.0	7.9	8.4	14.6
Western Africa	13.8	12.1	14.3	14.2	14.6	14.3	15.2	23.0
ASIA	**14.4**	**10.1**	**8.8**	**8.5**	**8.2**	**8.4**	**8.3**	**6.6**
Central Asia	11.0	7.7	3.0	3.0	3.0	3.0	2.7	< 2.5
Eastern Asia	7.6	3.8	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
South-eastern Asia	17.3	11.7	10.5	10.0	9.8	9.8	9.8	8.7
Southern Asia	20.6	15.4	14.4	13.8	13.1	13.8	13.4	9.5
Western Asia	11.8	10.4	10.7	11.1	11.1	11.2	11.2	13.1
Western Asia and Northern Africa	*10.9*	*9.7*	*8.6*	*8.9*	*9.0*	*8.9*	*9.0*	*10.4*
LATIN AMERICA AND THE CARIBBEAN	**8.7**	**6.7**	**6.2**	**6.7**	**6.8**	**7.3**	**7.4**	**9.5**
Caribbean	21.3	17.5	17.3	17.0	16.6	17.0	16.6	14.4
Latin America	7.8	5.9	5.4	6.0	6.1	6.6	6.7	9.1
Central America	8.1	7.9	7.9	8.6	8.3	8.4	9.3	12.4
South America	7.6	5.1	4.4	4.9	5.2	5.8	5.6	7.7
OCEANIA	**5.6**	**5.4**	**5.5**	**5.9**	**6.0**	**5.7**	**5.8**	**7.0**
NORTHERN AMERICA AND EUROPE	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**

On track Off track – some progress Off track – no progress or worsening

NOTES: * Projected values. ** The projections up to 2030 do not reflect the potential impact of the COVID-19 pandemic. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables inside the back cover. See Box 2, Annexes 1B and 2 for a description of how the projections are made.
SOURCE: FAO.

Source: FAO, IFAD & WFP (2020)

2.10 Food Security in South Africa

Several research have found that there are combined effects between unemployment, inequality, poverty and food security (FAO 2017, Wight *et al.*, 2014). Also the relationship between this elements has been stressed by the countries National Development Plan (NDP). The NDP states that food security is caused by and results into poverty. Studies on poverty in South Africa found that the rigid poverty stance in South Africa is associated with past policies of the apartheid era which professed segregation, unmaintainable living arrangement and racial inequality (Bhorat & Kanbur, 2006). However, according to COGTA (2018) The Spatial Planning and Land Management Act, Act 16 of 2013, restores land access for the previously disadvantaged and safeguards major agricultural land and environmental resources. This is section of the literature

describes the food security situation in South Africa by presenting several factors that may impact food insecurity such as poverty and inequality levels, climate change, household involvement in agricultural activities , hunger and food access as well as food levels of adequacy in accessing food.

2.10.1 Poverty and Inequality levels in South Africa.

According to Stats SA (2014), South Africa is one of the countries with a very high rate of income inequality globally and extreme high levels of poverty. South Africa's Gini coefficient is approximately at 0.68 (Stats SA, 2017). Report from Stats SA (2017), indicates that almost 56 percent of the population in South Africa live in poverty and approximately 28 percent live in abject poverty beneath the food poverty line. In South Africa, household food security is interlinked with socio-economic status of households as shown by income, their employment status and food expenses (Chakona & Shackleton, 2019, Chopra *et al.*, 2009). Consequently, the overall household income is significant for food security to be achieved Chakona & Shackleton (2019), however the prevailing high levels of poverty makes it challenging for majority of households in South Africa to obtain adequate food required to feed the whole household. According to Stats SA (2019) for most people in South Africa it's a tussle to get a decent income as the approximated average income of the poor was beneath R441 per month per individual in 2015. Most times, 90 percent of the household diets are purchased food which constitutes about 60 to 80 percent of household expenses in total (Chakona & Shackleton 2019, Chakona & Shackleton 2017, Baiphethi & Jacobs 2009). As a result, the rise in food prices, especially of wheat and maize, which are the main food for poor South Africans, stands as critical problem for the poor (Chakona & Shackleton 2019, Drimie & Ruysenaar 2010, Altman & Jacobs 2009).

2.10.2 Climate Change in South Africa

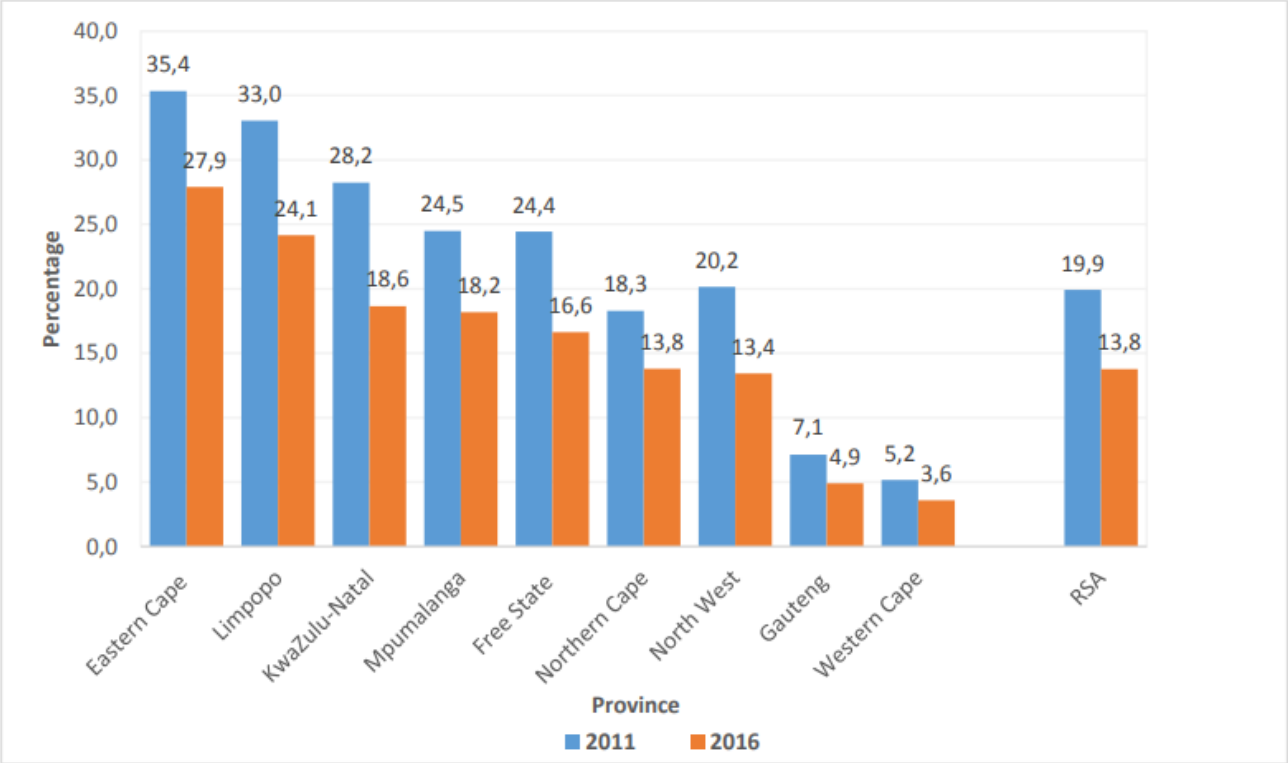
Agriculture has been subject to drastic social and economic evolution in South Africa over the past two decades. Additionally, climate change is increasingly transforming the social, economic and environmental situations affecting agriculture. Climate change puts at risk South Africa's water resources, health, infrastructure, food security, ecosystem services and biodiversity (Zwane & Montmasson-Clair, 2016). In South Africa climate change forecasts up to 2050 indicates significant warming (5-8°C) above the interior, which shows possibilities of wetter conditions in eastern region of the country and possibilities of drier conditions in the west and south of the country (DEA, 2013). Agriculture in South Africa is challenged by numerous hazards linked with

climate change such as increased evaporation rates, higher temperatures, alterations in rain patterns, increased pest and diseases as well as changes in diseases and pest distribution ranges, yields reduction and spatial change in optimal growing areas (Zwane & Montmasson-Clair, 2016). Inclusively, they affect imports and exports as countries attempt to compensate for domestic production (Stats SA, 2019). According to Masante *et al.,* (2018) the province in South Africa which was hit by drought the hardest was the Western Cape Province. Since 2015 the rainfall in the city of Cape Town and other areas within has been below average monthly, this led to imposed restriction on water through rationing and water cuts. The decline in agricultural production in the country led majorly to the contraction of the GDP in 2018 (Stats SA, 2019).

2.10.3 Household Involvement in Agricultural Activities in South Africa

Agricultural statistics are essential in the evaluation of the performance of the agricultural sector. It helps to inform strategies and policies on poverty food security, environmental sustainability as well as rural development (Stats SA, 2016). Household involvement in agriculture is a significant factor that can contribute or hinder their food security. This is because there involvement in agricultural activities increases their entitlement capacity to food in situations whereby they are unable to purchase food either as a result of unavailability of money or distance of residents to access affordable markets. Simply put household involvement in agriculture substitutes for their reliance on food purchases which as a result impacts livelihood for low-income households as their incomes could be used to cater for other needs aside food such as electricity, water bills, children school fees etc. Reports from the Census 2011 and Community survey 2016 shows that South Africa experienced a reduction in the proportion of households' participation in agricultural activities. Approximately, 2.9 million households (19.9%) were involved in agricultural activities in 2011, by 2016 households involved in agricultural activities had declined to 2.3 million (13.8%) (Stats SA, 2019). This implies that a drop of 6.1 percent was noted. Stats SA (2019) Although, the decline in household involvement in agricultural activities was found in all provinces, province that have rural majority such as Limpopo (25%), Eastern Cape (20%) and KwaZulu-Natal (20%) had the highest proportion of households involvement in agricultural production. Northern Cape (1%) and Western Cape (2%) had the least proportions of households' involvement in agricultural production this could be due to high rate of urbanization and reliance on purchased food.

Table 2: Proportion of households involved in agricultural production activities by province (2011 and 2016).



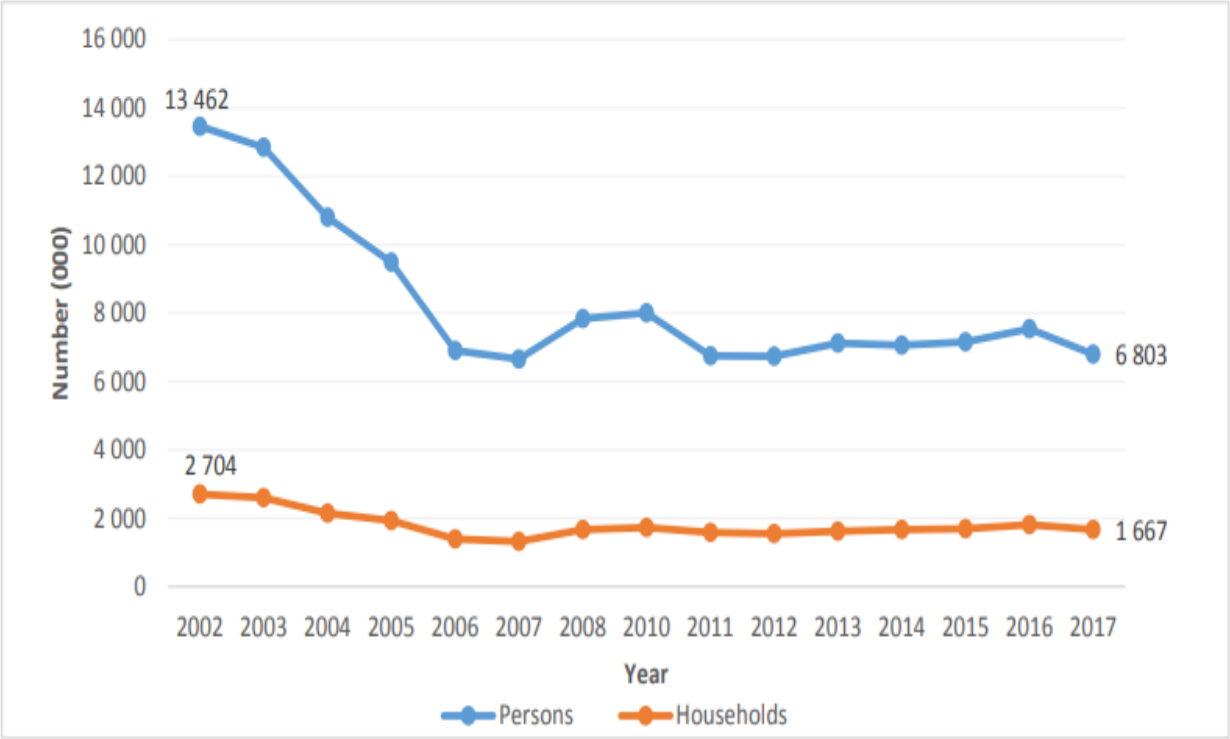
Source: Stats SA (2019); Statistics South Africa, Census 2011 and Community Survey 2016

2.10.4 Hunger in South Africa

Hunger usually leads to malnutrition and it impairs learning of individuals involved in physical or mental work, hinders recovery of sick person and impedes growth which is common in children. Though malnutrition is generally related with individuals that are underweight, it can also be associated to individuals who are obese or overweight (OXFAM, 2014). Hunger exceeds physical feelings rather its forms both physiological and physical obstacles to individuals in attaining their full potential which sequentially propagates inequality. Even if all children had access to education, learning will be difficult if they are hungry (OXFAM, 2014).Stats SA (2019) from general household survey compiled since 2002 till 2017 reveal that about 13.5 million South Africans experienced hunger in 2002 and this number decreased to 6.8 million in 2017. Also there was a decrease in households that experience hunger over the same period from 2.7million to

1.7million households. Based on this report there is a decline in the proportion of households experiencing hunger in South Africa.

Table 3: Number of households and persons vulnerable to hunger (2002 to 2017)



Source: Stats SA (2019); Statistics South Africa, General Household Survey 2002-2017

2.10.5 Household Food Access and Levels of Adequacy

Access to safe, adequate and nutritious food is regarded an intricate individual right by the World Health Organization (WHO) and the United Nations (FAO, 2011). Nevertheless, several households in low-income settlements both rural and urban do not have adequate access to fresh, healthy food and affordable commodities (Hodgson, 2012). Reports from Stats SA (2019) based on the General Household Survey shows that out of 16.2million households that were assessed in 2017 approximately 12.7million (78%) had adequate access to food while 2.5million (15.8%) had inadequate food access and about 0.9million (5.5%) of residents had severely inadequate food access.

Table 4: Percentage distribution of households by level of adequacy in accessing food and province

	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo	South Africa
Severely inadequate	7,3	4,5	13,0	6,0	4,8	11,6	3,1	12,3	1,1	5,5
Inadequate	15,5	20,1	20,5	15,7	18,6	24,4	12,9	18,6	5,3	15,8
Adequate	77,2	75,4	66,5	78,3	76,6	64,0	84,0	69,1	93,6	78,7

Source: Stats SA (2019); Statistics South Africa, General Household Survey (2017)

Also, Limpopo (96.3%) and Gauteng (93.6%) province had the highest fraction of residents with adequate food access, while households in Northwest (24.5%), Northern Cape (20.5%), Eastern Cape (20.1%), KwaZulu-Natal (18.6%) and Mpumalanga (18.6%) had the highest fraction of households with inadequate food access however, these households' inadequacy in food access was above the national average of 15.8%. Only three provinces were found to be severely inadequate in accessing food which were Northern Cape (13%), Mpumalanga (12.3%) and Northwest (11.6%) respectively. The report indicates that from 2010 to 2017 there is a little increase in the percentage of households with adequate food access. Nevertheless, a decrease in households experiencing inadequate and severely inadequate access to food is still very little, which impedes the target of zero hunger by 2030 (FAO, 2019).

2.11 Agricultural Extension and Food Security

The promotion of food security and reduction of hunger has stated in the millennium development goals (MDGs) hinges mainly on increase in agricultural production particularly the crop sector. This is because agriculture is seen as a key factor for development in the economy of many African countries especially those in the sub-Saharan region (Danso-Abbeam, *et.al*, 2018). The agricultural sector provides food and contributes to national as well as household economics (Mahlangu *et al.*, 2020). However, for the sector to develop it is the responsibility of the extension education to provide and disseminate right information to farmers at the relevant time so as facilitate farmers productivity (Asiedu-Darko, 2013). Agricultural extension programmes have been key players in resolving food insecurity as well as rural poverty. For the reasons that, it supports rural adult learning, technology transfer, helps farmers to solve problems and gets farmers to participate actively in the agricultural knowledge and information systems (Christoplos & Kidd, 2000).

According to FAO (2010) agricultural extension is a system that ought to enhance farmers' access, their organizations and other market stake holders to knowledge, information and technologies; enable their relationship with associates in research, agribusiness, education and other significant bodies, and help them in developing their own technical, organizational and management skills and practice. Furthermore, with the numerous tools and strategies available it is significant for extension services to be modified and in line with needs of beneficiaries to make certain that the intended intervention is well assimilated (Mahlangu *et al.*, 2020). According to Walisinghe (2017) agricultural extension is a significant key player in farmers' access and adoption of appropriate technologies. The significance of agricultural extension cannot be over exaggerated especially for smallholder farmer. This is because agricultural extension organizations and extension officers are key players in the transfer of technology to small-scale farmers for adoption and they also facilitate development of innovations (Masere, 2015). Studies have stressed that extension serves as a link between research and farmers and also enhances technology transfer in a manner that is effective as well as efficient. According to Ommani *et al.*, (2009) the existence of sufficient, well-trained and skilled personnel is major key to sustainable agricultural development. In addition, The Global Forum for Rural Advisory Services underlined that practitioners in extension services ought to be aware of the consistent changes to extension tools and approaches, and by so doing evaluate and choose the relevant tools and approaches that are best suitable to their objectives and working conditions (Mahlangu *et.al*, 2020).

2.12 Historical Background of Agricultural Extension and Rural Advisory

"Extension" as a term was first used in England in the second half of the 19th century to describe adult education programmes which assisted the universities in extending its work from the campuses to the neighboring societies (Swanson, 2008). The United States later adopted the term "Extension" with the creation of the land grant universities with the inclusion of research activities which was officially included in 1887 as well as extension activities which was officially included in 1914 in addition to teaching functions as part of the official mandate of the university. At this period in time, Britain had shifted the obligations of extension services to the Ministry of Agriculture, and the term for this new obligations was changed to advisory services in the 20th century. Consequently, other European countries adopted the same terminology as they began to create similar advisory services within their ministries of agriculture respectively (Swanson, 2008).

In most emerging countries the term used to create agricultural extension or advisory services was largely linked to the support organization that facilitated the creation of the service. However, many national systems still bear the "extension" title because the U.S Agency for International Development (USAID) played a key part in the creation of agricultural universities and extension systems in the 1960s and 1970s. Alternatively, approximately all extension systems are formally associated with departments of agriculture; thus, increasingly in most countries, particularly in sub-Saharan Africa, presently use the word "advisory service" (Swanson, 2008). However, some individuals ascribe advisory services more with transfer of technology, while others attribute extension services with non-formal learning or improvement of farm households' technical, social capital and management skills.

In developing countries in the 20th century most public extension systems were top-down in structure and centrally funded. At this period in time, the main focus was to ensure national food security and as Green Revolution technologies became obtainable, there was positive influence on agricultural productivity through the extension systems as it helped in transferring rice and wheat technologies (Swanson, 2008).

Nevertheless, while there was an increase in the supply of major food crops globally by the 1990s, food prices in the world had followed a constant decreasing trend through the1980s and 1990s, which weakened the small-scale farmers' income. The 1996 World Food Summit organized by the

FAO was a key occasion that added to the restructuring of the food security concept with a greater attention been targeted at food security of individuals and households, while underlining its access and nutritional dimensions (Swanson, 2008). Alternatively, the fast rise of demands for fruits, vegetables and livestock in fast developing economies such as India and China, as well as the current emphasis on the production of biofuels from food crops, particularly in the United States (mainly ethanol) as well as Europe (mainly biodiesel), and progressively in Asia and South America, is now having key possible long-term effect on world food prices (Von Braun, 2007).

Similarly, the record prices for oil and gas adds directly to the rising shift in prices of vital agricultural inputs, particularly fuel and fertilizer. In addition, there is growing anxiety about the effects of climate change, particularly in sub-Saharan Africa, and the ongoing dilapidation of natural resources in many countries that are developing. All these trends that are emerging is anticipated to directly have an effect on poor individuals access to key food products, which in turn directly have a negative impact human nutrition (Swanson, 2008).

Due to this, several donors and countries are redirecting their focus and resources on developing rural livelihood in order to ensure food security while improving the quality of life at the household level of rural families. It should be noted that at the household level food security entails "availability of food" within the nation (i.e. local food production and import), "stability of food" through the entire year "access to food" at the household level (i.e. purchasing power or entitlement), and utilization of food which is mainly ascertained by the level, quality, quantity and type of food consumption, which sequentially has a direct effect on human nutrition. It's noteworthy that an increase in farm income and rural employment can have an instant and direct effect on increase in food security at the household level. In most nations globally, hunger is generally a money problem rather than the problem of availability of food (Swanson, 2006).

2.13 Objectives of Agricultural Extension and Rural Advisory Organization

The main objectives of agricultural extension and rural advisory services entails technology transfer of major livestock and crop production systems, improving farmers and rural families skills and knowledge so they can choose the most suitable livestock and crop enterprises and also use the best effective production management practices. Agricultural extension aims to improve rural livelihoods as well as achieve food security i.e. To facilitate an increase in the incomes of farm households, nutrition and education, particularly the poor in the rural areas as well as

consolidating the management of natural resources in each country. However, to make this achievable a lot of farmers will need to organize into various categories of producer and farmer groups (i.e. generate social capital) so as to improve access to markets as well as efficiently articulating their needs and goals to extension providers, researchers and policy makers (Swanson, 2008).

Furthermore, it's noteworthy that the structure, function and role of agricultural extension and advisory systems will continually evolve during the process of agricultural development in each country which hinges mainly on farmers level of education, availability of proprietary technologies, growing commercialization of the farm sector as well as global demand and supply for primary and high-value food products due to climate change and bioenergy demands. At this development phase, majority of the cost of technical advisory services for livestock and commercial crops will be transferred to the famers directly or indirectly particularly to a large extent, commercial farmers.

Alternatively, programmes such as human nutrition, natural resource management, producers/rural youth groups and other forms of non-formal education will remain largely "public goods". Inclusively, the task of rural education and uplifting rural livelihoods to achieve food security must be considered public good. This is because it is almost impossible for a rural household that live within US$1 or US$2 a day to be able to afford more than a fraction of the extension service fees (Swanson, 2008). Below is a brief discussion of the various programme areas associated with agricultural extension and rural advisory services from the work of Swanson (2008).

2.13.1 The Transfer of Proprietary/Public Technologies

The traditional role of public agricultural extension/advisory services was the transfer of technology until national food security was achieved by several developing countries, an achievement that hinges largely on the Green Revolution. Inclusively, with the rising privatization of several latest forms of agricultural technology, the role of the private sector is increasingly significant in the development and transfer of these latest agricultural technologies to farmers. Such technologies as described by Swanson are:

- **Genetic technologies**

  During the 20th century new crop varieties and hybrids, were basically public goods. However, an increasing number of new crop varieties and hybrids have been genetically

modified since the introduction of biotechnology research. Majority of these new technologies which includes the conventional technologies created by the private sector are now proprietary goods.

• Production management technologies

This entails a wide variety of information on farm management, which gives profitable production management recommendations for particular livestock such as animal breed, nutrition and management practices as well as crops such as type of crop, fertilizer and management practices and other management practices encompassing the farming system entirely.

• Agrochemical technologies

This entails technologies for plant protection such as insecticides, herbicides and other pesticides most of which are private goods.

• Biological control technologies

This technologies consists of pathogens and predators, some of which are public goods but purchase is required.

• Agricultural mechanization technologies

This technologies encompasses all sorts of mechanical technologies that relates to the production of livestock and crops such as; planting, harvesting equipment, tractors post-harvest equipment as well as technologies for water management such as irrigation equipment. Many of these technologies are considered private goods although the management skills required operate them are still regarded as public goods.

• Information technologies

This technologies consists of mobile phones, computers, software and associated tools like the geographic information system which helps in efficient management of the farming system.

2.13.2 To Expand the knowledge and Skills of Farmers

In the United States, Canada and some countries extension is seen as not just technology transfer but also a means of rural non formal learning for farmers, women and the rural dwellers as a whole.

This implies that more focus on extension programmes should be targeted at rural families with little or no access to formal education. This shift in attention is essential as the basic national objective has moved from transfer of technology to refining rural livelihoods. Many a times, this adjustment will entail the "production, marketing and processing of higher-value crop, livestock, aquaculture and other products, as well as other skills and knowledge, such as family nutrition, health and hygiene". Furthermore, population increase as well as economic development places a fast growing demand on both water and land resources. Thus, management of natural resources such as land and water will increasingly become an issue for national agricultural extension systems. Below is an outline as described by Swanson (2008) of various knowledge and skills that most farmers and rural poor will require to upgrade their livelihood in the rural areas. However, many of this assets are regarded as public goods hence public funding is needed to facilitate such extension programmes.

- **Production and Post-Harvest Handling of Livestock, Fishery, high-value crops and other Products.**

  This entails management as well as technical knowledge and skills required for farmers to branch out from the basic production of staple food crops and start the production of livestock, fishery and high-value crop such as;

- Post-harvest management skills, this encompasses product grading, storage, processing and transportation systems of products with higher-value
- The capacity to produce quality goods of higher value that meets the standards for exportation
- Skills on agricultural mechanization, protective cover systems and water management
- Skills on how to access and make use of market information
- Knowledge and skills on information technology such as precision farming.

- **Knowledge and Skills for the Management of Natural Resources**

  This entails various knowledge and skills on how farmers can**;**

- Conserve and manage land sustainably

- Conserve and manage water sustainably through the use of various water management equipment such as deficit irrigation, water harvesting methods, water efficient crops, drip irrigation as well as watershed and river management practices.
- Conserve wildlife, agroforest and forest sustainably
- Manage biological and biodiversity sustainably
- Understand change in climate and how it affects agricultural production.

- **Family Health, Nutrition and Hygiene**

  This entails skills on:

- How to Process and Preserve food
- Nutrition of the family, particularly for young children and newborns
- Family hygiene, such as how to manage water and waste products
- Overall management of the entire household.

2.13.3 To Organize Farm Families into Various Farmer-Based Organizations

Generally, it has been ascertained that organizing farmers into various groups of farmer-based organizations is efficient in improving rural livelihood and changing rural communities at the development phase as well as achieving food security (Abaru *et al.,* 2006). However, to achieve this it is essential for members of the farmer based organizations (FBOs) to acquire new organization, leadership and financial management skills. In general, to reduce transportation costs for products and inputs as well as improve competitiveness in the marketplace while reducing the costs of transactions in producing and marketing products, it is essential for medium and small-scale farmers to form farmer-producer associations that will create links with suppliers of input. Also, farmer organizations assists agricultural extension organizations in rendering appropriate information or specific product as well as training straight to farmers group who produce specific products or crops. By so doing, agricultural extension agents can effectively link researchers and technical specialists with these farmer groups so as to assist farmers with solutions to particular management and technical issues as they emerge. Additionally, several forms of farmer based organizations are required to solve other problems, which ranges from improved watershed management as well as human nutrition. The following are the main forms of farmer based

organizations that needs to collaborate with public extension and NGOs in the development process of rural communities:

• Commodity-specific producer organizations

These organizations are required to have marketing and technical skills that will be used for producing and marketing several crops and products of high-value as well as developing a dependable value chain linkage to markets that are available.

• Socio-economic and gender-based farm organizations

This organization consists of Self Help Groups (SHGs) for women in rural communities which in general transforms into various forms of crops, products or commodity organizations. Apart from the technical as well as marketing training skills required for these women-based organizations (WBOs) in improving rural communities, these women based organizations are able to facilitate the dissemination of information on issues such as family planning, nutrition, hygiene and health (e.g. HIV/AIDS).

• Watershed or irrigation management organizations

This organizations entails planning and implementation of water-use management practices that will be sustainable.

• Farmer cooperatives

This form of organization is already existent in several countries particularly for the supply of inputs. However, for it to be generally effective it has to be farmer controlled. Alternatively, there is ineffectiveness in some farmer controlled cooperatives as it does not serve the needs of rural poor but rather basically support the needs of the commercial farm sector. Thus, several producer groups that starts with focus on crops of high-value will in the long run be responsible for supply of inputs as well as marketing cooperatives.

• Rural youth organizations

This form of organization exists in not many countries. However, in the long term they are essential in creating an efficient farmer and other producer organizations and also effective in the introduction of technologies for production and marketing system for products of high-value.

Although, limited resources has hindered the inclusion of rural youth organizations in the extension portfolio of many developing countries.

2.14 Types of Agricultural Extension Organizations

The overall function of agricultural extension and rural advisory hinges on many stakeholders which consists of government workers, civil society, private sector as well as farmers inclusively (Berthe, 2015). However, to ensure the efficiency of extension services and rural advisory services in improving agricultural production, rural income as well as livelihood these role players are categorized into various organizations such as; public extension organizations, private extension organizations, public research centers, private agricultural researchers, non-governmental organizations (NGOs) as well as farmer associations.

2.14.1 Public Extension Organization

The broadest knowledge and information dissemination institution is the public agricultural extension system (Kaur & Kaur, 2018). It consists of all institutions that provides conventional public agricultural support and other rural extension services (e.g. department of agriculture and rural development and states owned agricultural universities).

2.14.2 Private Extension Organizations

According to Kaur and Kaur (2018) privatization is when government role is been reduced by transferring ownership of assets or activities to the private sectors. Private extension consists of staffs in the private sector tasked with the role of rural advisory service delivery in the field of agriculture and are regarded as an alternative to public extension (Bloome, 1993). Although, Vandenban and Hawkins (1996) noted that farmers are responsible partly or as a whole for the cost of rural services and advices rendered. This means in the private system of extension, clients are obliged to pay for the cost of services, such services includes extensions services rendered for the promotion of a product (e.g. Agri-business firms-seed companies) or private agricultural consultations as well as obtaining farm produce (e.g. contract farming) (Kaur & Kaur, 2018).

2.14.3 Public Research Centres

These are conventional public research institutions that are either directly or indirectly involved in agricultural extension through their obligations, the institutions' work specification at foundation

level, research as well as transformation of extension models and shift towards more farmer participatory approach (PELUM Association, 2005).

2.14.4 Private Agricultural Researchers

Likewise, in the circumstance of the public research institutions, the international or private agricultural research institutions are also directly or indirectly involved in the work of agricultural extension reasons that; they play the role of ensuring that developed technologies are widely adopted, which gives a knowledge of their job specification at the foundation level, as well as transformation of research and extension approaches.

2.14.5 Non-Governmental Organizations (NGOs)

According to Kaur & Kaur (2018) NGOs are any non-profit voluntary citizen's group which is not owned or controlled by government nor created for the purpose of business that generates profit. To function in its full capacity, NGOs are usually funded by international donors, cooperate bodies as well as the government. PELUM Association (2005) opines that the main supporters of rural and particularly urban agriculture are the NGOs than the agricultural extension agents situated around the local municipalities or the provincial departments of rural and agricultural development. This is supported by Chauhan (2006) that most extension service programs, technics and advises are tailored for the rural producers thereby not putting the urban producers into consideration. In the urban structure, eco-friendly technologies are needed to maximize the little spaces for high productivity. Thus, use of organic waste and waste from water is required alongside other roles such as management of landscape and recreation. NGOs act as some of the most observable players in most aspects of rural development. NGOs are moderately well equipped with funds and resources for their programmes and their approach is participatory in nature. Thus, in certain sectors the progress of rural development are linked with NGOs (Chauhan, 2006). Although, they have criticized for encouraging dependency on donor agencies and also lack of sustainability in their rural development programmes.

2.14.5 Farmers Associations

These are association created by farmers themselves to help represent its members on the political and economic frontline. They are active players in the role of advocating for favorable policy, capacity building programmes that has an impact on their production as well disseminating production and market information (Last, 2006).

2.15 Agricultural Extension Teaching Approach

An "Approach" are principles for an organization, which informs, motivates and guides such aspects of the system such as its structure, type of leadership, program, resources and their relationships. According to Hagmann *et al.,* (2000) an approach is when several principal guides are applied in a particular situation to achieve different goals. It comprises of chains of measures for planning, organizing and managing the extension systems and practical implementation of extension services by personnel with managerial and technical qualification as well as ensuring that the methods adopted is relevant and appropriate (Kaur & Kaur, 2018).

Evidence from reports have shown that several extension approach have been adopted in the past and present and they have yielded satisfactory outcomes. Presently, extension and advisory services is rendered basically by public sector, private sector and public private partnership (Kaur and Kaur, 2018). Although all these approaches have played an important role in technology transfer to farmers, they all have their strengths and weaknesses (Kromah, 2016).

2.15.1 The General Agriculture Extension Approach.

This approach, contrary to other various other approaches is of the assumption that adequate knowledge and technology exists for the use of the local people, however, they are unable to use them due to lack of skills and techniques. Most times, this approach is controlled by the government and the achievements are evaluated based on the rate of adoption of recommendations and increase in production at the national level. This approach is considered as a top to bottom system and all decisions, resources, and major support to communities engaged in farming are been administered by the government department in charge of extension services in various regions and country at large (Kromah, 2016).

2.15.2 The Commodity Specialized Approach.

This approach focuses on the increase in production of a particular commodity or crop bringing together various role players such as research, extension, supply of input as well as marketing and pricing into a single administrations and the system of approach is fairly centralized (Kromah, 2016).

2.15.3 Training and Visit Approach

This approach entails thoroughly outlined program of visits to farmers. Extension officers and subject matter specialists (SMS) are usually trained prior to farm visits on specific skills and techniques relevant to farmers needs thereafter, this acquired skills and techniques are been

disseminated to the farmers. This approach maintains a close link between research and extension and extension officers are tasked solely with transfer of technology to farmers. The achievements of this approach is measured by production increase in specific crops or commodities. Training and visits can be categorized into three methods which are individual, group method and the mass media (Kromah, 2016).

2.15.4 Participatory Approach

This approach entails the active involvement of the rural poor in identifying the problems they themselves encounter and suggestive appropriate means of solving them, by creating meaningful strategies and executing them. This is because solutions created by a group of individuals in need has more probability of success than the one enforced externally. In addition, participatory approach gives extension officers the outline to enable participation with rural communities in aiding plan for development as well implementation of activities. It makes certain that response from extension is based on community needs and helps rural communities in implementing the activities planned as well as frequent monitoring and evaluation of events (Kaur & Kaur, 2018)

2.15.5 The Project Approach.

According to Kromah (2016) the focus of this approach is targeted at the needs and requirements of beneficiaries and donors, this implies that the entire stakeholders have to be in agreement with whatever project is been implemented and these projects should be based on public demand and needs of the end users or beneficiaries. Also, in the project approach the measure for success is based on short-term changes. However, parts of its purpose is usually demonstration of sustainable methods and techniques that can be used after the project period. Administration is central to the government with large amount of technical and financial resources from international development organizations (Kaur & Kaur, 2018).

2.15.6 The Farming Systems Development Approach.

This approach of extension system is holistic in nature at the local level. It requires close link with research and interaction with the local people to ensure that the appropriate technology is developed for local needs. The success of this approach is determined by the adoption rate as well as the continuous use of these technologies by the local people which was developed by the programme (Kromah, 2016). According to Kaur & Kaur (2018) farming system approach puts into

consideration the farm, its household as well as actives off the farm in a holistic way which caters not just for farming but all aspects of food security, nutrition, sustainability, minimization of risks, employment and generation of income which forms the several objectives of farm households. It puts into consideration the components under the control of the household and its members and their interdependencies and also considers the interaction between these interdependent components and other factors that are not under the control of the household and its members such as physical, biological as well as social economic factors. This approach places emphasis that research and extension practices ought to be guided by the needs of farmers through understanding the farming systems that exists and not the views or opinion of researchers and extension (Meena *et al.,* 2013).

2.15.7 The Cost-Sharing Approach.

According to Kromah (2016) the cost sharing approach assumes that sharing the cost of services with rural people (those who cannot afford to pay the cost in full) will encourage programmes that has the prospects of meetings rural conditions as well as increases extension personnel's accountability to rural interest. Its aim is to support farmers with information and advice that will enable their self-improvement. This implies that rural people are to share partly the cost of extension programs rendered to the rural communities. However, difficulties may occur when farmers feel pressurized to invest in unproven enterprises (Kaur & Kaur, 2018; Feder *et al.,* 2001).

2.15.8 The Educational Institution Approach.

Educational institutions are the key players in this approach, through the use of their technical knowledge as well as research ability the provide extension services for rural communities. The planning as well as implementation are usually outlined by the individuals that determine school curriculum. The main focus is usually on how to transfer technical knowledge to the rural communities (Kromah, 2018).

2.15.9 Farm Based Extension Approach

Farm based approach in extension systems is categorized into various forms such as farmer interest groups, farm field schools, farmer friend, farmer to farmer communication approach.

2.15.9.1 Farmer Interest Group Approach

This approach entails a group of farmers that are independent and share common goals and interests and self-managed by these farmers. For the common goals to be achieved the members of the group put together the resources that are available with purpose of gaining access to other

resources and sharing the profit from the outcomes. They engage jointly in financial endeavors like saving and inter-loaning with the purpose of rescuing farmers with lesser resources from debt-trap. Frequent meetings of the members of the group is required for it to function efficiently (Kaur & Kaur, 2018). Also, an important indicator of the efficiency of the group is the active and effective involvement of members of the group in meetings that lead to decisions on several challenges/obstacles experienced by group members (Riar, 2006).

2.15.9.2 Farm Field Schools

This approach has been adopted by many government, international agencies and NGOs. It's a learning process targeted at a particular group. FFS was first established in Indonesia in 1989 by the United Nations Food and Agricultural Organization, following its inception over two million farmers all over Asia have been participants in this learning form. This approach entails a collection of farmers of about 20-25 that meet once in a week for an entire crop growing season (Kaur & Kaur, 2018). It applies non-formal learning method and the field serves as the primary learning source (Vandenberg & Jiggins, 2007).

2.15.9.3 Farm Friend Approach

This is approach serves as significant connection between farmers at the village level and extension service providers. The FF are made available in villages to give advice relating to agriculture and other related activities. Basically, the FF enables dissemination of information to farmers and farm women. This is done directly either through group interactions or a one on one engagement (Kaur & Kaur, 2018).

2.15.9.4 Farmer to Farmer Approach

This type of approach entails and encourages knowledge sharing amongst farmers, a farmers with success story on a particular method shares his experiences with his fellow farmers so as to give them an in-depth understanding on the technical-know and its considered highly efficient than any other means of technology transfer. Also, it entails and encourages self-help journalism and its publication are unique as all the intricacies from article writing , editing , publishing as well as distribution are primary responsibilities of practicing farmers (Kaur & Kaur, 2018).

2.15.10 Cyber Extension Approach

This approach entails the effective and efficient use of all forms of conventional and contemporary information communication technologies (ICTs) such as the television, radio, mobile phones, internet, information kiosk, expert systems and computer based training systems in facilitating the

dissemination of relevant information to farmers. It also provides ease of access to useful information to extension managers, extension workers, research scientists as well as farmers (Kaur & Kaur, 2018).

2.16 Constraints to Farmers Access to Extension Services

It is essential that extension services provided is efficient to meet the needs of customers (i.e. farmers) and the difficulties they encounter from environmental changes and situations. This implies that access to relevant services and advices are crucial particularly for those who dwell in rural communities and their main means of livelihood is dependent on smallholder farming (Dowsing & Cardey, 2020). However, several factors determine farmers' access to extension services and they are widely classified into personal as well as household features, socio-economic as well as institutional features as well as the characteristics of farm (Abdallah & Abdul-Rahaman, 2016; Nkegbe *et al.,* 2012).

Household and personal attributes consists of age, household size and education. Researches that seek to create a linkage between access to extension and educational background usually relate it to years of formal education. It was noted in most researches that educational background gives farmers a mental attitude that is favorable for the acceptance of new methods, particularly intensive management methods as well as intensive information has been noted to impact farmers' access to extension services positively (Abdallah & Abdul-Rahaman, 2016; Catherine *et al.,* 2012; Boahene, 1995). In addition, Abdallah & Abdul-Rahaman (2016) noted that male heads who had at least primary education are more probable to receive extension visits from service providers or make a visit to the extension offices. Catherine (*et al.,* 2012) noted that age had very limited effect on farmers' access to extension. However, study conducted on technology adoption by Donkoh & Awuni (2011) noted that age had negative impact on access to extension services. Although, this was contrary to the findings of Adesiina & Baidu-Forson (1995) which observed that age had a positive impact of farmers' adoption of new methods.

Furthermore, another variable that constitutes the personal and household characteristics is the size of the household. Catherine *et al.,* (2012) observed that households with women as head of the family with many male members and other assets such as livestock and land are more probable to receive visits from extension service providers or vice-versa. In addition size of the household positive indicators of farmers' access to extension services are indicators of wealth such as size of

farm land, number of livestock, and distance to the market/location. The size of the farm and land ownership has been regarded as features of farm/plot. This implies that individuals and households with larger land size as well as shorter distance to market are more probable to access relevant information relating to agriculture through several channels (Abdallah & Abdul-Rahaman, 2016).

The socio-economic as well as institutional characteristics consists of off farm income, access to credit, frequent contact with extension personnel, group membership, cost of labor and distance to input market/store. Although, these features has not been ascertained, it is of assumption that farmers who have more of these attribute are highly probable to gain various forms to access to relevant agricultural information (Abdallah & Abdul-Rahaman, 2016).

2.17 Agricultural Extension from a Global View

Agricultural extension service delivery has shifted from "push" based approach to a "pull" based approach. This means that provision of extension services has moved from sharing of research information through government owned extension personnel to an approach that emphasizes that innovation systems in extension ought to be based on farmer's needs. This implies that farmer groups as well as co-operatives are established as mediators between farmers, researchers, extension officers as well as market buyers and suppliers. The application of these approaches has yielded mixed outcomes with some been positive while others have not been efficient. As observed the approach with the most positive potentials are those that consists of farmer groups whereby government act more as advisors by enabling opportunities at the local scale through organization of linkages between technical specialists, markets and researchers as well as regional management and records of farmers needs in accordance with research activities (LRD, the pacific community, 2016).

2.17.1 Agricultural Extension in Asia

In South East Asia the extension approach adopted is a mix of public (government) and pluralist (Private sector and government) forms of extension service delivery. The change in model of public extensions from push to pull approach as well as focus on the economy from a market stand point, has led to supposed "green revolution" in several regions in Asia resulting in increase in production since the 1960s, due to subsidies on input for production of rice. In Asia, rural migration has a high proportion and this has an effect on methods of extension service delivery. Similarly to Africa, land tenancy security has an impact on outcomes of extension service delivery. The standard form of government provision is the commune extension worker (CEW). Based on an

all-round discussion regarding agricultural extension in Asia Binswanger-Mkhize & Zhou (2012) observed that:

- The learning preference of smallholder farmers were from advanced farmers, radio and input dealers
- Extension service can be ineffective if service is paid for partially or in full, especially for women who lack security of land tenancy and are likely not to be able to pay for it.
- There is large margin between CEW to farmers' ratio (1CEW to 300 farmers in Viet Nam, 1CEW to 7villages in India) and this has not been linked increase in production.
- Most times decentralization of extension services leads to a process of inadequate funding which affects production output as they usually stay stagnant or decrease.
- The private sector extension are starting to become rooted in public sector extension, although this is effective in reaching the large and medium scale farm enterprise, it really does not have much impact in getting across to the small-scale farmers and rural communities.

Also, in Thailand the Integrated Pest Management have been noted to be functional in several cases especially a region where issues of health impacts as well as the cost of pesticides are increasing. Though, there has been limited cost-benefit evaluation of the outcomes of IPM, its essential to improve the education of extension agents as well as eradicate the perception that synthetics are more efficient (Tionco *et al.* 2015). In Asia, farmer to farmer approach such as Integrated Pest Management, farm field schools as well as participatory learning and action combined with government, non- government and private sectors efforts has facilitated farmers' involvement in programs and increased productivity. Although, diffusion beyond those directly involved has been limited due to the costs associated with these programs making it difficult for expansion (O'Halloran & Murray-Prior 2014). In Indonesia, NGOs such as International Potato Centre in collaboration with trained leaders of farmer groups has facilitated a market chain development which has impacted the agribusiness capacity, however efforts to upscale this approach to the district has been limited, and emphasis on "one village one product" implies limitation for the broader benefits of extension service delivery (LRD Pacific Community, 2016). In Philippines, regardless of the agriculture policy that supports the provision of extension services and sector divergence (especially through microfinance as well as extension in the vegetable and

fruit sectors), the growth of agriculture has been lethargic as compared to the rest of South East Asia, however, agriculture remain the main employer of labour and responsible for 70% of rural income of those in possession of lands (Briones & Galang 2013).

2.17.2 Agricultural Extension in India

Initially in India, improvements in agricultural production were facilitated by government intervention through the "pull" approach enabled by training and visit strategy. In 2007, the government of India reformed the Agricultural Technology Management Agency (ATMA) due to response from farmers on their preference on extension service delivery. The new reforms entails:

- Engaging the communities at all levels: State and district advisory committee, block advisory committee as well as community and farmer groups are jointly accountable for 'bottom up" incorporation of the needs of farmers/prioritize plans of extension service providers, which starts with participatory rural assessment that involves selecting from a 'cafeteria' of extension alternatives;
- Facilitation of extension at the block level through farm schools and farm friends (i.e. an advanced farmer who enables extension events, at least one advanced farmer for every two villages.
- Facilitating research institute at the state level, district training Centres as well as technology teams at the block scale.

This change of extension service delivery from decentralized to devolve is observed as more credible and responsive. Although, the advisory committee still dominantly consist of advanced farmers, which implies that most small-scale and the disadvantaged groups are not getting appropriate of delivery of extension (LRD Pacific Community, 2016). ATMA is still perceived as state structure in spite of efforts to imbed it in community based processes and the district extension plans does not always indicate explicitly the ideas of farmers (Babu *et al.*, 2013).

2.17.3 Agricultural Extension in Cambodia

In Cambodia, agricultural development consists of lowlands with irrigated and flood plain rice as well foothills and uplands that entails a combination of small-scale subsistence and crops production. The success of extension in this region has been hindered due to:

- Rapid migration from rural areas which results in shortage of labour although it provides support for livelihood through rural incomes and facilitates mechanization in agriculture.
- Increasing insecurity of land tenancy, which drives farming activities into areas that are less fertile as a result of opportunities developed by land franchises.
- Fluxes in climate as well as market that has led to broader economic inequalities
- Required aid budget that is more than twice of government expenditure.

Presently extension entails an approach that is pluralistic, stressing 'pull" based approaches. In spite of several intervention, extension service delivery is regarded as unsuccessful, with little economic margin in spite of increase in production. Current World Bank and Australia Centre for International Research (ACIAR) analysis indicates the inadequacy of information delivered by the private sector, especially from suppliers of input, on the other hand the services of public sector was highly noted. In 2014, some of these gaps was addressed by the government through commitment to the new $82millionUSD ASPIRE project in 5 provinces. A total of $45.5 million USD was devoted to capacity development as well as extension, plus;

- Programs and strategies designed by the provincial agricultural department (PAD) of extension which is established from evaluating the needs of farmers and its updated yearly.
- Learning groups for small-scalers which consists of 25 advanced but susceptible farmers as well as a farmer friend that enables farmer to farmer education.
- Viable funding for learning group of small-scalers to aid extension events that hinges on development strategies at the provincial level.
- A teach the teacher program at the provincial level
- A cyber based extension centre

Differently from the ATMA development in India, PAD support can be rendered by private sector staffs and NGOs though it requires joint investments (LRD Pacific Community, 2016).

2.17.4 Agricultural Extension in Vietnam

Vietnam introduced a more devolved and liberal approach to agriculture which driven by demand after the Đôi Mới economic reorganization. The government invests $20 million each year in Commune Extension Workers (CEW) through collaboration with the Ministry of Agriculture and Rural Development as well as associated district and provincial departments as well as from provincial plans for investment with supply of inputs from district and commune staffs, even

though extra funds are obtainable via particular private organizational programs such as IPM piloted in cooperation with companies that make pesticides (Binswanger-Mkhize & Zhou, 2012). Similar to the situation in Cambodia and China there is issue of land tenancy which affects motivations to spend more on farm developments. Also, the focus of government has drifted to those with that have land on larger scale in order to improve market supply. A government decree in 2011 was established to permit delivery of extension services by the private sector, this led to the private extensions and NGOs allocation of 40% from extension budget to provide extension support. The pulling out of government from the provision of extension services is a threat to the delivery of extension services in years to come (Friederichsen *et al.,* 2013; Minh & Hoffman 2012; Schad *et al.,* 2011).

Major Observations:

- It is expensive to manage large production increase that hinges on the needs of farmers
- A drift to delivery plans and needs of regional extension, whereby reliable farmer friend act as program coordinator and gets funding to form activities, though they are not employed by the government directly.
- The needs of the most vulnerable are usually not addressed by the private sector extension providers.

2.17.5 Agricultural Extension in Latin America

Post-independence from Spanish Colony, land has become concerted in possession of very few majority which are subsistence small-scalers sustained by non-agricultural income (FAO, 2011). An evaluation by the Central American agricultural policy (FAO (2011) indicates that the support for extension by the public sector has been mixed approach; in central Latin America extension support has been limited to farmer to farmer as well as co-operative methods of extension, while in the Caribbean government has been the provider of extension support through business development, use of ICT, seed security as well as integrated Pest Management combined with research and other individual government departments that enable extension and research on a regional basis, however this methods lacks organized suggestions that indicates that the extension services provided are in tune with the needs of farmers (LRD Pacific Community, 2016).

Guatemala transited to very dominant user pay system of extension in 1990; this makes what's left of extension support inadequate for poor landholders in rural communities. Subsequently, method

of extension has hinged on farmer to farmer system of extension with reliance on support from international organizations. The Nicaraguan government extension services after the war reinforced an integrated cooperative method which consists of the international, national, regional as well as local levels. Private extension program were introduced in the 1990s using the farmer to farmer method of extension. Also, the most vulnerable group in the population were excluded from agricultural development program in Panama, a reform that specifically benefited very small groups. In Brazil, emphasis is placed more on rural development programs rather than agricultural development by initiating social programs such as food vouchers for those that attend schools in Brazil (LRD Pacific Community, 2016).

Recently, studies conducted in Latin America outlines a transition to public and private 'pull" method of extension approach, stressing information technology and micro-finance mechanisms. To facilitate these approaches, other groups and NGOs must assist organizations to develop the capacity to create, adapt as well as translate technology to their situation. An area of excellence for Latin America is the facilitation as well as creation of famer co-operatives that enables farmer to farmer learning. These has enabled small-scale farmers to share knowledge, conserve agro – ecological knowledge, and manage environmental services as well food security increase. An example of this intervention is the organic coffee co-operatives produced under forest cover in Chiapas district of Mexico via farmer to farmer method of learning known as the 'campension a campesino' in collaboration with the international body "La vVa Campesina. Another example is the movement of landless Rural Workers in Brazil as well as the National Confederation of Indigenous Nations in Ecuador (Zimmerer 2011; Altieri & Tolded 2011). In Colombia, the extension services is nationally driven by training initiatives which includes pip-fruit, diary as well as berry divisions which hinges on farmers tariff system. Also extension services is done via cooperatives with procedures that enables extension and research as well as via government at the regional level. Although, they provide support for farmers, the delivery services of extension does not have the integration will assist them in addressing issues that are more significant such as land use reform (LRD Pacific Community, 2016).

Major Observations:

- Limitations of governments involvement in extension, has benefited the medium and large farmers but not small-scale farmers as they are not prioritized by private sector extension.

- Farmer to farmer learning is predominant in Central America; a system of network that pays progressive farmers to teach emerging farmers which functions at international, national and local levels to enable access to markets.
- In simple context, separation of research and extension is effective in food security increase.

2.18 Agricultural Extension in Africa

Agricultural extensions service delivery in the agricultural sector of developing countries is rapidly transforming. In this section, literature on agricultural extension approaches in some selected African countries are been presented.

2.18.1 Agricultural Extension in Malawi

In Malawi, the agricultural system has undergone numerous restructurings, as a result of political changes in the 1990's the agricultural extension service was no longer the sole responsibility of the government. In 2000, a strategy to support a mixed extension services that is driven by farmers' need and demands was established. The title of the policy document was "Agricultural Extension in the New Millennium: Towards Pluralistic and Demand-Driven Services in Malawi" (Majokweni, 2018). The policy was targeted at farmer increasing needs and demands as well as coordination of stakeholders involved in the provision of extension services in Malawi (Kamputa, 2000). Transformation started to emerge in extension service provision in the country, as such was the admission of other service providers aside from the government to participate in extension service delivery to farmers (Masangano & Mthinda, 2012).

In Malawi, extension service providers now comprises of private sector organizations, NGOs, farmer-based organizations (FBOs) as well as other multifaceted organizations (Majokweni, 2018). Nevertheless, this approach has not been satisfactory and a major factor is the increasing involvement of international NGOs who serves as providers of extension services (Ragasa *et al.,* 2015). According to Ragasa *et al.,* (2015) international NGOs are mere donors and do not provide extension, this because they depend on funding from external organizations and it's always on short term bases hence their sustainability is worrisome. In addition, mixed extension approach in Malawi has led to competition amongst extension service providers as evidenced from management challenges that do not resolve small-scale farmers' needs and demands (Chowa *et al.,* 2013).

Though, there are other extension service providers in Malawi, the government is still the key player with regards to extension personnel and delivery range. Although, the services provided by the government are regarded as not too efficient due to limited resources as well as field extension agents with inadequate training and expertise. Despite that other extension service providers like the NGOs who do not have adequate extension personnel often use government owned extension agents to reach farmers. This is because government owned extension agents are capable of reaching farmers directly in the rural communities (Masangano & Mthinda, 2012). Also, the private extension sector is faced with the problem of an enabling business environment. Regardless of the constraints in terms of capacity for the Malawian public extension, it is still the key as well as most reliable provider of extension services for farmers, which implies that extension impact would be ineffective without government involvement (Chinsinga & Cabral, 2010)

2.18.2 Agricultural Extension in Nigeria

Agricultural extension service provision in Nigeria is mainly carried out by the public sector, and the key service provider is the Agricultural Development Programme (ADP) (Saliu & Age 2009). As a result of recent developments in the delivery of extension services, there has been continuous promotion for the need of private sector participation in agricultural extension services, however the change to a private system of extension has been challenged especially because this promotion of private extension participation are funded by the public sector (Oladoja, 2004). In addition, weak organizations in Nigeria, coupled with behaviors that are counterproductive have limited the effects of extension provision. This results into high costs of public extensions service provision. In view of the challenges limiting the impact of extension services that is publicly funded, extension service provision by the private sector is been supported. As a measure to ascertain that extension costs is freely approved, there is need to improve the frequency of extension contact with farmers. Also, there are private organizations in the informal private sector that deliver extension services free of charge. They provide extension services such as general consultations that are both agricultural and non-agricultural in nature, farm tool and agro-chemicals as well as micro-financing (Adetayo & Bamishaye, 2013). According to Ogbonna *et al.,* (2016) there are also challenges combating the private agricultural extensions services in Nigeria such as inefficient training of extension agents as well as job insecurity and inadequate government support through the process of privatization of extension services. In addition, constraints to private extension service provision in Nigeria includes issues relating to input, inadequate information on advanced

technologies, sustainability and organizational challenges. Regardless of these constraints, private extension organizations are capable of filling the loop holes created by the ineffectiveness in the provision of services by the public extension organization (Zhou & Babu, 2015).

2.18.3 Agricultural Extension in Uganda

Developing countries including Uganda in the beginning of the 1990s, experienced a restructuring in agriculture. These restructuring led to the ease of trade in agricultural services, inputs and outputs, state-owned properties that facilitates production and marketing were privatized as well as down-size of civil servants as extension service providers (Majokweni, 2018). In 2001 the National Agricultural Advisory Services (NAADS) was established in Uganda, a programme Act targeted at re-developing the public extension system to a contract system which demand-driven (Mangheni *et al.,* 2003). Part of the objectives of NAADS was to improve effectiveness efficiency as well as sustainability of agriculture in Uganda. In addition, its focus was to improve access of farmers to knowledge, information and communication as well as sustainability. It was also targeted at ensuring positive attitude and effects to adoption of technologies, establishing and consolidating the relations with the general extension services as well as ensuring that extension is in tune the government principles (Benin *et al,* 2007).

However, the major challenges to the achievements of the NAADS programme were; weak farmer organizations and political pressures, inadequate ability to enforce an extension service that is market oriented as well as lack of coordination of organization involved, this unsatisfactory performance led to the termination of the programme (Mangheni *et al.,* 2003). Though, Benin *et al.,* (2007) posits that there are indications of the positive effect of NAADS on the availability and quality of extension services for farmers such as; promotion of new crop enterprise and livestock adoption as well as encouraging farmers to adopt modern agricultural practices as well as technologies for production. Nevertheless, regardless of the observed benefits from the NAADS programme, there is little improvement in the development as well as performance of the agricultural sector (Majokweni, 2018).

At present in Uganda, advisory services are provided by the public extension services, NGOs as well as private organizations. According to (Afranaakwapong & Nkonya, 2015) the NAADS provided a traditional advisory services while the latter specialize in advisory services. However, as observed by James *et al.,* (2011) willingness to pay for extensions service provision is still very

minimal, though they posited that introduction of a no-fee extension support aimed at the less privileged so as to decrease vulnerability of farmers was an essential act because, when farmers can feel the positive impact of extension support it will result in farmers overall willingness to pay.

2.18.4 Agricultural Extension in Kenya

In Kenya, small-scale farmers derive benefits from two extension systems which are; the government extension, whose target is mainly livestock and food crop and the commodity based extension that is administered by government parastatals, companies as well as co-operatives**.** The commodity based extension is primarily focused though not exclusively on marketable crops such as; tea, sisal, pyrethrum as well as coffee (Muyanga & Jane 2008). In the 1990s the delivery modes of extension that were created became lob sided to benefit solely farmers that were prioritized by extension services. However, the turnaround of extension in the direction of participatory process was propelled by the awareness that an efficient and effective extension programme can only be achievable when there is an active involvement of the end users (Majokweni, 2018). According to Nambiro *et al.,* (2006) agricultural extension in Kenya is broadly categorized into four forms of extension provision which are:

- **Public finance and public delivery**

  This consists basically of conventional government agricultural extension, however it has weakened to a large extent which is characterized by insufficient funds.
- **Private finance and Public delivery**

  This form of service provision entails the private companies sourcing the government for extension service provision.

- **Private finance and private delivery**

  This mode of extension provision is usually proficient amongst commodity out grower schemes and is also largely practiced in agriculture of high value. It entails provision of suppliers by commercial bodies with extension services required to develop technical capacity.
- **Public Finance and private delivery**

This entails government sourcing for extension service provision by the private organizations such as Commodity Based Organizations (CBOs) and Non-Governmental Organizations (NGOs).

In addition to the transition from centralized to a diversified system of extension with involvement of several stakeholders, extension service provision in Kenya have also shifted from technology transfer models led by supply to an integrated technology transfer as well as development models. The responsibilities of public extension has also transited from direct provision of extensions services to facilitating farmers as well as linking them to researchers as well as other providers of extension services. However, the weaknesses of public extensions service delivery has led to the emergence of more private extension services (Majokwena, 2018). According to Munyanga & Jane (2008) private organizations, NGOs, community-based and faith-based organizations are all branches of private extension services although the impact of the mixed system of agricultural extension has been under assessment for the strategy employed to reach farmer as well achieving desirable outcomes.

According to Nyambo *et al.,* (2009) the problems facing public funded extension service provision is that extension personnel are usually deployed to large but sparse settlements and mandated to work with farmers, this is hindered by inadequate transportation which subsequently affects extension personnel's ability to provide quality delivery services to farmers. In addition, majority of extension personnel do not have adequate business as well as group management skills which are vital for working with farmer groups. Finally, public extensions services provided via contract framing are usually regarded as not sustainable.

2.18.5 Agricultural Extension in South Africa

Agricultural extension in South Africa dates back to the years of reform that took place after 1902 which saw the importation of scientists from England employed to facilitate the growth of indigenous agriculture (Van Vuren, 1952). However, due to the scientists' unaccustomedness to indigenous farming conditions their guidance as well as advice were perceived and considered to lack usefulness in practical terms which resulted in 1907 exportation of the first South African scientists abroad to study. In 1910, the technical support services comprised of several special services with sole concentration on the services of its division without any organization from a central body (Liebenberg, 2015). Usually considered as a dominant specialist stage in the growth of the extensions services, agricultural demonstration trains as an idea was initiated in 1914 with the concept of a closer as well as personal contact with farmers as well as their challenges. This development indicated the positive intention of the Department to intervene in a partisan and uncertain agricultural community.

The Department in 1925 created a distinct sect of Extension to serve as linkage between the specialist technical services of the department and the farmers, it is noteworthy that by then the entire four province were served by only 6 scientist. Regardless, this initiative proved the success of personal contact as a valuable and essential integrated strategy to farmer facilitation. Additionally, the idea of cooperative demonstrations was initiated, which was to determine the response of the application of fertilizers, crops and pastures to the farm environment which was then adopted as trial demonstration for farmers verification, hence they become willingly persuaded (Van Vuren, 1952). Also, field trips were coordinated which served as a platform to farmers so see activities of other farmers and how they function as well as other valuable institution from an agricultural standpoint. At this phase the duties/roles of agricultural faculties was shifted to Department of Agriculture in line with the Act of Elsenburg and Stellenbosch in 1926 which led to its management in close association with the scientific capabilities at the regional divisions. This implies that the capacity of scientific research was thoroughly organized based on the organizational aim of the Department.

The roles of agricultural extension services was basically advisory services until 1933, nonetheless the support system to help farmers at the time of drought let to the introduction of regulatory duties. Instances of such events are the Small Dam and Soil Erosion Scheme of 1933, the Meat industries and Livestock Act of 1934, the Weeds Act of 1937 as well as lastly the Act on Soil Conservation in 1946. This significantly added to the functions of extension personnel, however it in turn led to a wider coverage of farmers which could have been impossible if not for the introduction of these schemes (Liebenberg, 2015). Individual contact with agricultural issues progressively made extension personnel recognize that there were inseparable links within several agricultural activities. Although specialized extension dealt with agriculture from a standpoint of a single subject or industry, the idea of scheduled whole-farm display initiated from 1942 deliberates the suitable link amongst the several branches of agriculture underneath local circumstances. This necessitated detailed observations of agricultural issues under local circumstances which includes closely knowing the individual factor which are the bent as well as ability of the farmer involved (Van Vuren, 1952). The concept of a whole-farm approach within the framework of an exact economic as well as climatic region was established, which resulted in the initiation of a decentralized approach in extension that led to the creation eight regional offices in 1948. Also by early 1940s, home economics was introduced in extension services which aimed to educate local

women and also the Land Service was targeted at developing the skills of the youths (Liebenberg, 2015).

In 1952, the division of the department responsible for technical services such as specialist and research services were reorganized to indicate the regional targets of the division of extension. This attempt let to the creation of 7 regional Development Centres which were later modified as Institutes for Agricultural Development which broadly was targeted at resolving the challenges of farmers as well as their needs for development which centers on the framework of agro-economic regions. This procedure was predominant till, 1971 when the institutions of higher learning of faculties of agriculture shifted its duties to the National Department of Education, after that the national institutes for commodity was created from 1979 until 1988. At this time the services of extension was restructured and aimed specifically towards farmers study groups rather than personal visits. In 1988, an Enquiry Commission set up for the provision of agricultural support discovered that nearly 40 percent of positions in the department of extension were empty and the department required about 300 personnel to add to the personnel plan that exist already (RSA 1984). However, due to the perceived inefficiency and increasing discontentment with the level of expertise provided by government owned extension services, farmer co-operatives, private input suppliers and some commodity/producer associations started forming their own advisory services within this period (Libenberg, 2015).

Inclusively, the structure of extension became more fractional when the Agricultural Research Council was created in 1992. Shortly after, the institutes for Agricultural Development were used to create nine provincial department of Agriculture in 1995. At this period agricultural extension services became a joint responsibility of both national as well as provincial governments (Liebenberg, 2015). Furthermore, regardless of the perceived ineffectiveness in the service delivery of government owned extension, the government through the Department of Agriculture is still largely the provider of agricultural extension support in South Africa (David & Samuel, 2014).

In South Africa, several challenges impedes the progress of agricultural extension services such as agricultural and socio-economic reform, insufficient monetary resources as well as inadequate capacity per region. Specifically, government owned extension services are tasked with the challenges of land restructuring, generating funds as well as establishing adequate initiatives

targeted at the growth of small –scale and emerging farmers (David & Samuel, 2014 ; Koch & Terblanché 2013). Also, according to Davis and Terblanche (2016) another key challenge bedeviling agricultural extensions services is understanding development strategies and how to implement them such that farmers are active participants in the technology process. In addition, agricultural extension service delivery is not accessible in all parts of the country due to inadequate human capacity resulting in shortage of extension personnel which creates a wide margin in extension personnel to farmer ratio of 1:1500 thus making it almost impossible for extension personnel to reach all the farmers he/she is been allocated (Extension Recovery Implementation Plan, 2008). Also, Davis & Terblanche (2016) posited that government's inability to apportion appropriate financial resources to extension program administration impacts service delivery negatively which leaves several farmer unattended to. Thus, the participation of private and semi-private owned extension services is slowly increasing, likewise the dependency of commercial farmers on government extension services is decreasing as they are becoming more dependent on private owned extension for agricultural support (Koch & Terblanche, 2013). However, NDA (2005) suggest that government supports the idea of public and private sector extension partnership so as to address rising demand for food as well as eradicate the impacts of its own resource inadequacy. Also, Makapela (2015) suggests the need to increase staffing and training of extension personnel as well as NGOs involvement in extension service delivery to as to increase farmers 'access to extension services and agricultural support.

2.19 Land Bank of South Africa and Farmers Support

Another essential source of farmers support are agri-business industries and commercial banks (Liebenberg, 2015). In South Africa, it's the Land Banks mandate to facilitate, support as well as promote agricultural development (Mmbengwa *et al.,* 2011). According to Machete (2008) "agricultural development entails amongst others, access of farmers to resources, such as innovative and entrepreneurial development, commercial production, and equal involvement in farming, profitable and competitive production and food security as well". The Land Bank was to contribute to this by the providing financial services to farmers (Mmbengwa *et al.*, 2011). In 2002, the land bank reformed its mandate regarding ownership of land, by facilitating larger involvement of historically disadvantaged group in agriculture and also increasing ownership of agricultural land by these disadvantaged group by providing suitable financial services (Liebenberg, 2015).

The objectives of the Land Bank now functions within the ACT NO.15 of 2002 of the Land and Agricultural Development Bank and in tune with the country's socio-economic needs and government policies. A larger outline of Land Banks mandate encompasses eleven (11) objectives which are unbiased agricultural land ownership, specifically by previously disadvantage individuals, agricultural reorganization, redistribution of land as well as development programmes targeted at previously disadvantaged group, land accessibility for farming purposes, entrepreneurship in agriculture, eradication of racial legacy as well as gender discrimination in farming, facilitate production , generate profit, innovation and investment, development of the agricultural sector and judicious use of land, sustainability of land and other natural resources like water e.g., job creation and rural development , commercial agriculture as well as food security (Mtombeni *et al.,* 2019).

Land Bank offers varieties of long, medium, as well as short-term loans to high, medium and low risk customers to help meet all financial demands which includes land purchase/rent and purchase of farming tools, improvement of assets as well as credit for agricultural production. A variety of well modified products and programs have been established to address specifically the demands of previously disadvantaged group in the agricultural sector. Furthermore, the development of the business plan required for loan application is designed via intermediaries which could either be cooperatives, private consultants, NGOs or commodity organizations in which the involvement is enabled by the bank (Liebenberg, 2015). In addition, other criteria are bank statements and proof of income or assets, ability to pay back in cash as well as the technical experience in agriculture development (Mtombeni *et al.,* 2019).

Although Land Bank provides financial services for its customers, the organization do not directly offer technical support to farmers rather they are done through intermediaries such technical support includes training, skills development as well as mentoring of small-scale beneficiaries (Liebenberg, 2015). This implies that the aspects of technical support and capacity with regards to agriculture and enterprise development are the responsibilities of the intermediaries while the land bank facilitates the monetary aspects. This responsibilities includes end to end process of lending loans, which starts with sourcing for loans, distribution to beneficiaries, monitoring, collection as well as legal recoveries (Mtombeni *et al.,* 2019).

In 2012, the organization established its Retail Emerging Markets (REM) Unit a model of funding which was targeted at emerging farmers. This division was created to address the issue of finances bedeviling emerging farmers (Liebenberg, 2015). To achieve this the Wholesale Financing Facility (WFF) was established, particularly designed for emerging farmers. Additionally, the WFF model is split into two strategies for funding; which are lending directly to farmers individually and lending to farmers according to commodity groups. The REM unit has long been integrated into the commercial Development as well as Business Banking unit of the Land Bank (Mtombeni, *et al.,* 2019).

2.20 Constraints to Farmers Access to Loans

As reported by Mtombeni *et al.*, (2019) based on report from Land Bank several factors contributes to emerging farmers inability to access loan. Such factors includes:

- Lack of ability to access land that is appropriate for agricultural activities at a cost that is affordable and with secure tenure.
- Insufficient business plans resulting from inadequate financial and technical agricultural knowledge, as well as little or no track record.
- Shortage of individual equity to invest in venture.
- Shortage of collateral
- Cost of finance/interest rates are too expensive to afford
- Insufficient technical, operational as well as managerial experience.
- Inaccessibility to formal markets
- Inadequate access to tools for risk management e.g. insurance
- Inadequate access to tools and machineries
- Inadequate access to technology that develops productivity as well as risk management
- Inadequate capacity to respond to regulatory compliance matters.

2.21 Land Bank and Extension Support

The involvement of public extension services would go a long way in supporting the Land Bank. However, Land Bank needs to be guaranteed of the efficiency of the technical and advisory support provided to its beneficiaries so as to deliver successfully on its social development (Liebenberg, 2015). Sadly, it is apparent that government owned extension capacity faces several obstacles in quality service delivery to farmers. Although, it's the expectation of the government that extension

ought to be the basic instrument of delivering on agricultural agenda, studies have shown that the personnel in government extension are not well technically endowed to deliver on this agenda (Worth, 2009). According to Hall & Aliber (2010) apart from capacity challenges in government extension, the capability to recruit adequate amount of skilled extension personnel in the short to medium term is also limited. Thus, government will need not only to increase staffing capacity of extension personnel but also ascertain that those recruited are sufficiently trained and permitted the platform to gain meaningful experience.

Nonetheless, a temporary solution to this lies in creative partnership with other providers of extensions services and advanced farmers as the government seek to improve its human and technical capacity. According to Liebenberg (2015) the capability to make use of existing government capacity is additionally hindered by resource stagnation which cannot be willingly shared or redistributed amongst provinces as a result of the established constitution put in place. Hence, a personnel stationed at on province works efficiently for a different accounting authority.

2.22 Theoretical Framework of the Study

The theoretical framework adopted for this study are the entitlement theory and the adoption and diffusion theory. The two theories provided the foundation for this research.

The entitlement theory was coined by Sen (1982) who based his analysis of food security on entitlements rather than Malthusian approach where food supply was simply based on increase food production. According to Sen's entitlement approach people's food security is based on market forces which is as a result of social and economic situations existing in a particular society. Furthermore, Sen (1982) identified two key groups core to his theory which are endowment and entitlement. Endowments entails individuals control as well as use of their resources as well as assets such as land, labour and skills traded on the market to command the food they desire. Entitlements are *"a set of alternative commodity bundles that a person can command in a society using the totality of right and opportunities that he or she faces"* (Sen, 1986). According to Sen (1982) people that lack adequate entitlement have the likelihood to experience hunger despite availability of food. Consequently, using Sen's theory food security can be evaluated in two key ways; (1) endowments which could be direct ownership of food through all means of production such as livestock and crops or by (2) exchanging their wealth i.e. wages and assets into food. Based on this theory, it is therefore of assumption that household's feeling of security and access to food

is determined by their ability to turn their wealth, assets such as land, labor, money etc. into food. Therefore, it is expected that an increase in wealth and valuable assets should in turn increase access to food and reduce worry of hunger, while a decrease in assets such as loss of land, job loss, or factor such as increase in household size and number of children can lead to household food insecurity.

On the other hand, the adoption and diffusion theory observes the process by which innovation are adopted over a certain period (Gregor & Jones, 1999), or by which innovation are transferred through particular channels periodically amongst members of a social system (Apperson and Wikstrom, 1997). The development of diffusion theory also can be found in geography, rural sociology, cultural anthropology, medical psychology and industrial economics. Nonetheless, it was first used in the field of consumer behavior in the mid-1960's (Gatignon & Robertson, 1985). Firstly as used by Rogers in consumer behavior field there are four main elements of diffusion theory which are innovation, channels of communication, time and the social system (Sigei 2014; Mahajan *et al.,* 1990). In regards to innovation, diffusion models observed the growth of a life cycle curve so as to predict early purchase sales of innovations (Sigei 2014; Mahajan *et al.,* 1990). The channels of communication comprises of both interpersonal communications and the mass media external communications impacts early innovations or adoption, on the other hand interpersonal communication impacts the shape and speed of the process of diffusion over a certain period (Sigei 2014 ; Mahajan *et al.,*1990). Intrinsically, diffusion emphases interpersonal communication within a social system over a certain period as associated with the spread of innovation (Gregor and Jones, 1999).

Subsequently, it is important to categorize adopters in a social system since they do not adopt a new product or idea at the same time. This categorization is easily done based on their various time of adoption in the social system. The various categories play a significant role as it help to determine the prospect for a new product which helps to develop market strategies to reach other categories of adopters, which can help to determine the acceptance or rejection of innovation (Sigei 2014; Mahajan, 1990).

Rogers categorized adopters using basic statistical parameters of normal distribution. Subsequently, he coined 5 categories of adopters which are the innovators which comprises of 2.5% of the schema, early adopters who comprises of 13.5%, early majority which comprises of

34%, late majority constitute also 34% and lastly the laggards who make up 16% of the categories (Sigei 2014; Mahajan, 1990). In addition, adoption of innovation such as ideas, product or technology can be determined by two contributing factors which are “perceived usefulness” and “perceived ease to use”. This implies that in situation whereby members of a society see an innovation as relevant to their needs and can access, afford and comprehend the application of such products of innovation members of the society have more likelihood of acceptance than rejection of Innovation.

In agricultural context, the South African government through use of various channels such as Land bank and the Department of agriculture through extensions services seek to support commercial and smallholder farmers with production loans, technical support, field demonstrations, agricultural shows and technology transfer on better farming practices through physical demonstration with hands on experience targeted at improving livelihoods of South Africans while ensuring food security. This study seeks to evaluate how the extension training, technical support and access to financial assistance of land bank beneficiaries has contributed to their household food security or otherwise.

2.23 Conceptual Frame work of study

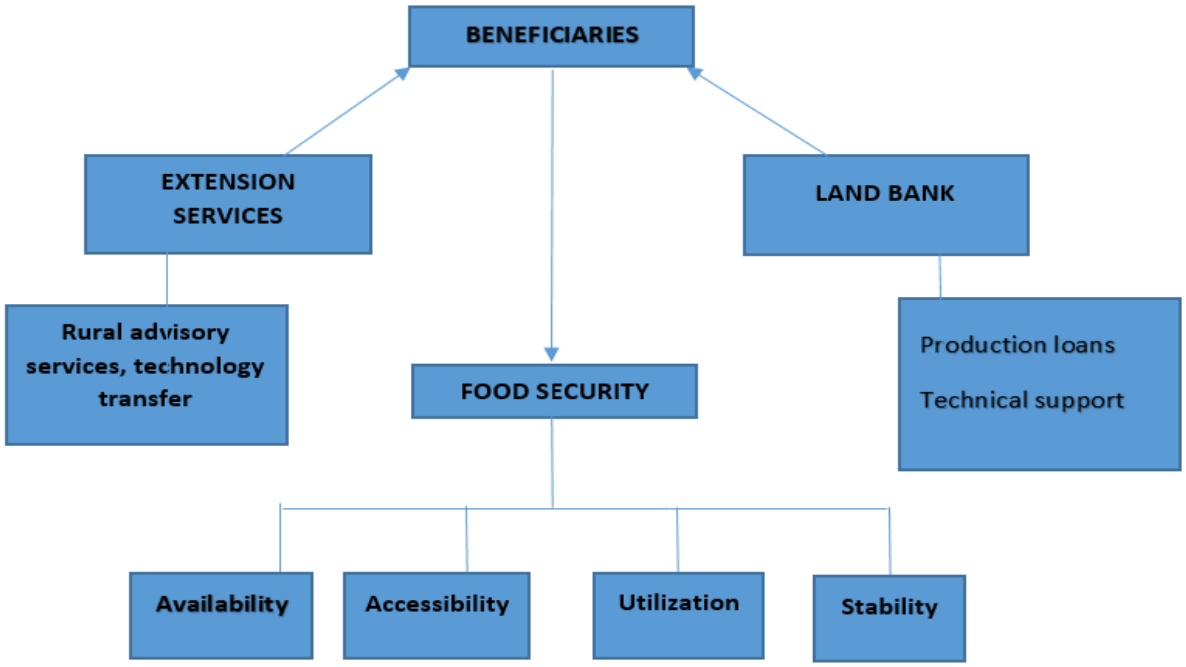


Figure 1: Conceptual framework

SOURCE: (Author, 2020)

As seen from the above figure designed by the author, is the conceptual framework of the study which illustrates the outcome of the expected result from the technical support and financial assistance i.e. production loans rendered to beneficiaries by land bank and agricultural extension services through rural advisory programs and technological transfer which is aimed at increasing as well as improving beneficiaries agricultural activities and production. Basically, the conceptual framework has seen above illustrates the expected outcomes of land bank support to farmers through access to credit as well as farmers access to extension services such as rural advisory and technology transfer which as a results creates income, reduces poverty, eradicates hunger, improve livelihood as well as food availability, accessibility, utilization and stability which forms the components of a food secure household.

2.24 Chapter Summary

From the discussions of literatures it is evident that food security is a global issue that needs to be addressed. Also, as seen from the review of literature a well-coordinated extension and advisory system has the potential of impacting food security positively. However, Sen's entitlement theory

suggests that people that lack adequate entitlement are more likely to experience hunger despite food availability.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology for the study and orientates the reader about the study area. The study area, research design, population of study, sampling technique and size, method of data collection, validity and reliability, method of data analysis as well as ethic consideration are all outlined in this chapter.

3.2 Study area

The study was be carried out in North-West province which is divided into four district municipalities namely; Ngaka Modiri Molema District, Dr Kenneth Kaunda, Dr Ruth Segomotsi Mompati and Bojanala Platinum. These four district municipalities are also divided into 18 local municipalities.

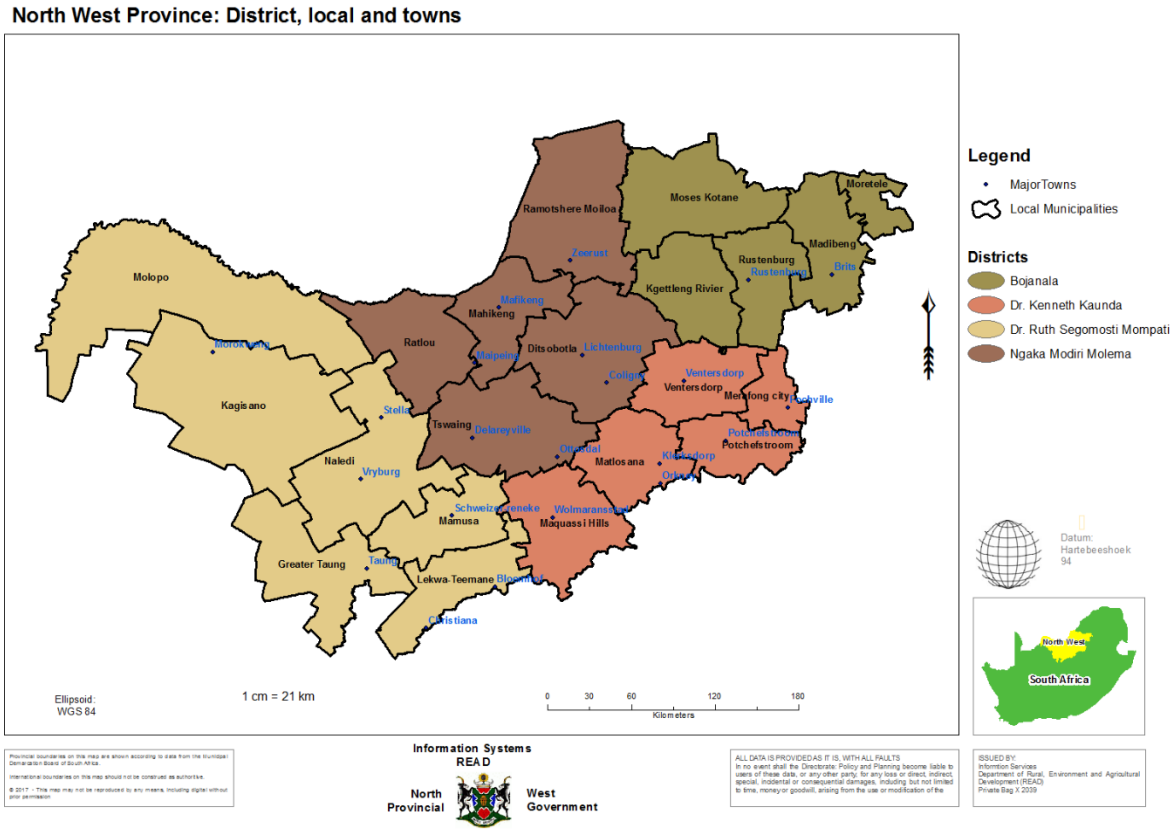


Figure 2: Map of the North-West Province

North West province is one of the nine provinces in South Africa. It is located on the Northern side of the country close to the Botswana border, and shares it borders internally with the Kalahari Desert from the west, Gauteng province to the east as well as Free State to the south. Its land mass is approximately 104 882km^2 and an estimated population of about 3 748 436. Majority of the province surfaces are flat, comprising of grass land and scattered trees. The capital of North West is Mahikeng formally pronounced as "Mafikeng" and the province consists of mostly Tswana inhabitants and their spoken language generally is Setswana. The economic activities in North West is concentrated mostly within Klerksdorp, Potchefstroom, Rustenburg and the eastern region. The main contributor to the province economy is mining and it generally represents approximately a quarter of South Africa's Mining industry. Additionally, the main livestock production in Northwest is cattle farming and the commonly produce crops are maize and sunflower, which makes it the key producer of white maize in the country.

3.2 Research design

The research design adopted for this study is descriptive and quantitative. Bless & Higson-Smith (2000) define this study concerned about condition that exist, practices that prevail, beliefs and attitude that are held process that are ongoing and trends that are developing. This study is focused on evaluation of land bank beneficiaries' extension services and household food security status in Northwest Province.

3.3 Population of Study

A target population according to Mugenda & Mugenda (2003) is designated populace to which a researcher wants to generalize the outcome of a survey. Thus, the population for this survey is all land bank beneficiaries in Northwest Province South Africa.

3.4 Sampling technique and sample size

The population for the study was optioned from the figure given at Land Bank office in Vryburg, which indicates that there are 300 beneficiaries in Northwest province. Using Krecjie and Morgan (1970) samples size table the sample frame falls at 169 with a margin error of 5% and 95% confidence level. Therefore 169 respondents were selected for the study, out of 169 selected for the study, 115 respondents voluntarily participated.

3.5 Data collection

Data was collected with a structured questionnaire that was developed based on the objectives and review of literature. A structured questionnaire was used to gather demographic information such as age, gender, marital status, educational level and household size as well as access to extension services and household food security coping strategy. The United States Household Food Security Survey Module (HFSS-SM) was adopted for the survey which consists of eighteen questions which assesses four experiences of household food security such as (worry or anxiety about inadequacy in household food consumption, inadequacy with regards to food variety and quality, decrease in food intake of adults as well as decrease in food intake of children. The HFSS-SM consists of ten questions focused on adult members of the household and eight questions on children about food security experience over the last twelve months.

3.6 Validity and Reliability

A face validity was adopted for the questionnaire which was executed by a panel of experts in agricultural extension. The reliability of questionnaires was ensured through the use of a split half technique, coefficient at R= 0.61, which indicates that the instrument was consistent and highly reliable.

3.7 Method of data analysis

Sorting and coding of data was done with Microsoft excel and analyzed with Statistical Package for social sciences (SPSS) 18.0. Descriptive statistic was used to describe personal characteristics of respondent, tables showing frequency and percentages was used to summarize the data and enhance the readability of the results. Selected critical variables were correlated using the Spearman Rho and Probit regression model was used to show relationships between socio-economics characteristics of respondents and their access to extension and household food security respectively. The Probit regression model was applied because the expected outcomes are binomial i.e. food secure or food insecure while the Spearman Rho was used to test the relationship between socio-economic characteristics of beneficiaries and their access to extension services.

3.8 Ethical Considerations

Ethical approval was given by the FNAS (Faculty of Natural and Agricultural Sciences) ethics committee of the Northwest University Mahikeng Campus before the field survey commenced. Ethical considerations was applied to all respondents regardless of gender, sex, or age. Participation was voluntary, privacy of information of respondents was extremely adhered to as

well as guidance of participants during the survey. Equal respect as well as standard measurement and treatment to every respondent was ensured throughout the survey.

CHAPTER FOUR

RESULTS AND DISSCUSSIONS

4.0 Introduction

This chapter, presents the results obtained from the survey. The results focuses on the respondents' demographic characteristics, educational level, land acquisition, information sources, respondents' extension services and their constraints in accessing extension, household food security status of respondents. Furthermore, the beneficiaries' socio-economic characteristics and their access to extension as well the beneficiaries' socio-economics characteristics and their household food security are discussed in this chapter.

4.1 Demographic characteristics of Land Bank beneficiaries in Northwest Province.

Table 5 shows the personal characteristics of land bank beneficiaries in Northwest Province South Africa. The results indicates that respondents gender distribution in the study area, is made up of (66.09%) male and (33.91%) female this indicates that there are more male beneficiaries as compared to females. Also, a large percentage of respondents are between the age of 41-50 (40.02%) and 51-60 (34.8%) this shows that young and emerging farmers in study area are very few with a total of just (1.74%). In the study area majority of the respondents are married (55.65%) as compared to those that are single (34.78%), widowed (6.09%) and divorced (3.48). In the study area primary education (28.70%) and high school (26.09%) were indicated by majority of respondents as their highest qualification, while other respondents (22.61%) each indicated informal and tertiary education as their highest level of education respectively.

Also, respondents' household size are mainly between 6-10 members (87.4%) and their farming experience in years indicates that majority of respondents have 11-16 years (44.35%) and 5-10 years (33.94%) of farming experience. In the study area majority of respondents farm sizes are between 31-60ha (45.21%). Acquisition of land by majority of respondents in the study area was done through purchase (50%) while (27.16%) were acquired through lease and (22.84%) were acquired through inheritance. The results also shows that most respondents relied on self, hired labour and family members as their source of labour (69.57%), the other (20%) relied on self and hired labour while (10.43%) relied on family members only. Furthermore table 4.1 indicates that none of the respondents are subsistent farmers (0%) rather majority of the respondents were small-scale farmers (86.96%) and a few commercial farmers (13.04%). The agricultural practice of the respondents in the study area as seen in table 5 reveals that majority of respondents are involved

in both crop production and livestock farming (80.7%) while only few respondents practiced solely livestock farming (10.43%) and crop production (8.70%).

In study area, the monthly income of respondents was mainly between 10,000 – 50,000 Rands (87.85%), while only (6.09%) of respondents had a monthly income of 101,000-150,000 Rands, the remaining respondents (5.22%) had monthly incomes of 51,000 – 100,000 Rands and (0.87%) 151,000 – 200,000 Rands. Furthermore, table 4.1 shows that a large percentage of respondents were solely farmers (81.74%) while a few respondents (18.26%) were involved in other activities aside farming. The activities these respondents were involved in as indicated table 4.1 were butchery (6.96%), carpentry (6.09%), civil services (0.87%), electric engineer (0.87%) mechanic (2.61%) and ice cream business (0.87%). In addition, table 4.1 also indicates that all these activities were generating income for the respondents (18.26%) and the income generated were 1,000 -5,000 Rands (6.09%), 5,100 – 10,000 Rands (4.35%), 15,100 -20,000 Rands(4.35%) (3.48%) 10,100-15,000 Rands. According to Abdulraheem and Worth (2011) this occurs when farm income are limited and inadequate for household needs thus prompting farmers to seek means of livelihood through off farm activities. Also table 4.1 reveals that majority of respondents did not belong to any farmer group (78.26%) and only few respondents (21.74%) belong to a farmer group. In addition the farmer groups that these respondents belonged to are NAFU (12.17%), BFASA (5.22%) and AFASA (4.35%). According to Bizikova *et al* (2020) farmers that belong to farm organisations have the benefit of increasing their income, yields, production quality, environment as well as food security.

Table 5: Socio-Economic characteristics of land bank beneficiaries in Northwest Province

VARIABLE	FREQUENCY	PERCENTAGE (%)
Gender		
Male	76	(66.09)
Female	39	(33.91)
Age distribution		
20-30	2	(1.74)
31-40	19	(16.53)
41-50	46	(40.02)
51-60	40	(34.8)
61 and above	8	(6.96)

Marital status		
Single	40	(34.78)
Married	64	(55.65)
Divorced	4	(3.48)
Widowed	7	(6.09)
Educational Level		
Informal	26	(22.61)
Primary	33	(28.70)
High School	30	(26.09)
Tertiary	26	(22.61)
Household Size		
1-5	10	(8.7)
6-10	94	(81.74)
11-15	11	(9.56)
Years of farming experience		
1-5	6	(5.22)
6-10	33	(28.7)
11-15	44	(38.26)
16-20	21	(18.27)
21-25	7	(6.09)
26 and above	4	(3.48)
Farm size in hectares		
1-30	34	(29.58)
31-60	52	(45.21)
61-90	20	(17.4)
91-120	1	(0.87)
121 and above	8	(6.96)
Land Acquisition		
Inherited	37	(22.84)
Purchased	81	(50)
Leased	44	(27.16)
Sources of Labour		
Family members	12	(10.43)
Self and Hired	23	(20)
All of the above	80	(69.57)
Type of farm enterprise		
Subsistence	0	0

Small-scale	100	(86.96)
Commercial	15	(13.04)
Type of agricultural practice		
Livestock Farming	12	(10.43)
Crop production	10	(8.70)
Both	93	(80.7)
Monthly Income of respondents		
10000-50000	101	(87.85)
51000-100000	6	(5.22)
101000-150000	7	(6.09)
151000-200000	1	(0.87)
Involvement in other activities aside from farming		
Yes	21	(18.26)
No	94	(81.74)
Type of activities		
Butchery	8	(6.96)
Carpentry	7	(6.09)
Civil servant	1	(0.87)
Electric engineer	1	(0.87)
Mechanic	3	(2.61)
Ice cream business	1	(0.87)
Not applicable	94	(81.74)
Income generation from these activities		
Yes	21	(18.26)
No (NA)	94	(81.74)
How much income is generated?		
1000-5000	7	(6.09)
5100-10000	5	(4.35)
10100-15000	4	(3.48)
15100-20000	5	(4.35)
NA	94	(81.74)
Farmers group		
Yes	25	(21.74)
No	90	(78.26)
Type of farmers group		
NAFU (National African Farmers Union of South Africa)	14	(12.17)

AFASA (African Farmers Association of South Africa)	5	(4.35)
BFASA (Black Farmers Association of South Africa)	6	(5.22)
Does not belong to any farmers organization	90	(78.26)

4.2 Land Bank Beneficiaries access to Extension Services in Northwest Province

Table 4.2 indicates that all beneficiaries (100%) are aware of extension services and majority of respondents (84.35%) accessed information through extensions services while (15.65%) do not access information through extension services. Also, the most accessed extension services by respondents was the government owned extension (61.7%), while (22.60%) relied on both the use of government and non-government extension and only (15.7%) relied solely on non-government form of extension services. According to Koch and Terblanche (2013) just like other developing countries, the South African government is the main provider of extension services to farmers which are provided for free in form of social work while the state bears all expenses. Inclusively, extension services is being accessed often (44.3%) as well as very often (31.3%) in the study area only few respondents (20%) rarely accessed extension services while (4.3%) never accessed extension services. This is supported by the work of Nkosi (2017) on the level of access to agricultural extension and advisory services by emerging livestock farmers in KwaZulu-Natal which revealed that public extension services was adequately accessible to (82.7%) of smallholder farmers in the province. Although, respondents (85.2%) affirmed relevance of extension information to beneficiaries' needs, (14.8%) of respondents were of the view that extension information are not relevant to the needs of beneficiaries. Furthermore, (80.9%) of respondents affirmed that extension information does enhance their productivity while (19.1%) of the respondents' are of the view that extension information does not enhance their productivity. Also, the most common source of extension information amongst respondents were extension agents (38.6%), contact farmers (35.34%) and radio broadcast (18.88%), this is supported by Adegboye *et. al.,* (2013) which revealed that extension personnel are prominent sources of information in Nigeria. Also, Fadiji *et al* (2005) suggested that extension personnel and radio are the most prominent source of information to farmers in rural northern Nigeria while a study conducted in South Africa in Free State by Afful & Lategan (2014) indicated public extension is the main source of information for most farmers' production activities. The specific information commonly accessed by respondents in the study area were vaccination programs (24.86%), weather

information (16.02%), record keeping method (13.26%), crop protection (10.5%), post-harvest techniques (10.5%) as well as diseases and pest control (9.94%). Furthermore, (80.9%) of respondents indicated that they do have access to feedback extension agents on the outcomes of extension information when applied, while (19.1%) indicated that they do not have any access to feedback extension agents. Also, in the study area the most preferred extension approach as indicted by respondents are the farmer to farmer (42.6%) and training and visit (33.04%) approach. In addition, beneficiaries preferred extension teaching method were indicated by majority as physical demonstration with hands on experience (60.92%) as well as individual visits (32.17%) while their preferred method of accessing agricultural information was indicated as extension farmers meetings (40%) and from fellow farmer friends (33.04%).

Table 6: Land Bank Beneficiaries access to Extension Services in Northwest Province

VARIABLE	FREQUENCY	PERCENTAGE (%)
Awareness of Extension Services		
Yes	115	(100)
No	0	(0)
Do you Access information through extension services ?		
Yes	97	(84.35)
No	18	(15.65)
Accessed extension information through		
Government	71	(61.7)
Non-Government	18	(15.7)
Both	26	(22.60)
Frequency of access to extension information		
Very Often	36	(31.3)
Often	51	(44.3)
Rarely	23	(20)
Not at all	5	(4.3)
Relevance of extension information to beneficiaries needs		
Yes	98	(85.2)
No	17	(14.8)
Does information enhance farmers productivity		
Yes	93	(80.9)
No	22	(19.1)
Beneficiaries sources of extension information		

Extension Agents	97	(38.6)
Radio Broadcast	47	(18.88)
Contact Farmers	88	(35.34)
Workshops/farm courses	7	(2.81)
Others	10	(4.02)
Specific extension information accessed by beneficiaries		
Vaccination programs	45	(24.86)
Record Keeping methods	24	(13.26)
Weather information	29	(16.02)
Crop Protection	19	(10.5)
Post-harvest techniques	19	(10.5)
New technology for farming	8	(4.41)
Diseases and pest control	18	(9.94)
New medicine for livestock	7	(3.9)
Drip irrigation techniques	4	(2.21)
Feeding and breeding of livestock	6	(3.31)
NR (No Response)	2	(1.10)
Do you feedback extension agents on results of information accessed when put to use?		
Yes	93	(80.9)
No	22	(19.1)
Beneficiaries' preferred extension teaching approach		
Farmer field School	17	(14.9)
Training and visit	38	(33.04)
Farmer to farmer	49	(42.6)
Contract farming	11	(9.56)
Beneficiaries preferred extension teaching method		
Physical demonstration with hands on experience	70	(60.92)
Group discussion and group activities	8	(6.96)
Individual visits	37	(32.17)
Beneficiaries preferred method of accessing agricultural information		
Through mass media (radio, television, newspaper)	14	(12.17)
Through phone	17	(14.8)
Through extension farmers meetings	46	(40)
Fellow farmers	38	(33.04)

4.3 Factors that Determine Beneficiaries Access to Extension Services in Northwest Province.

Table 4.3 presents the determinants factors of beneficiaries' access to extension services in Northwest Province. According to report the main determinants factors that impact respondents' access to extension services are frequency of extension agents visits to farms (39.90%) and relevance of extension information to the needs of farmers (38.46%). Also, (10.10%) of respondents are of the view that type of farm enterprise impacts extension agents commitments in rendering adequate support to farmers as commercial farms tend to have preferential treatments as compared to small scale and emerging farmers. Furthermore, the specific problems that hinders farmer's access to extension services are the relevance of information to needs of respondents (24.3%), while (17.4%) stated that most times extension agents claim to have exceeded the designated amount of kilos apportioned to them to visit farms monthly, (15.7%) of the respondents stated that most information accessed were outdated as well as (13.9%) indicated that there are limited access to current programs on agricultural practices. Also, another problem farmer's encounter as stated by (13.0%) is that less attention is given to emerging and small-scale farmers by extension agents which often leads to bias in extension service support while (11.3%) of respondents stated that agricultural extension information doesn't reach farmers in a timely manner. This supported by the study of Afful & Lategan (2014) which opined that inadequate funding towards extension as worsened performance in the sector which has a direct impact on the productivity of farmers. Also, Hlatshwayo & Worth (2016) stated that several challenges faces the sector currently due to lack of adequate funding such as laying off of experience and skilled workers, high extension to farmer ratio and absence of basics such as inputs, relevant agricultural information as well as transportation of extension agents for farm visits.

Furthermore, beneficiaries were asked to suggest how these problems can be resolved and (21.7%) stated that frequent farm visits of extension agents to farmers should be implemented while (20%) stated that there should be improvement in agricultural research, (19.1%) of respondents stated that there is need for government to equip extension agents adequately in order to assist farmers while (11.3%) opined that local community stations should be built in rural areas to enhance farmers access to agricultural information. Also, (7.8%) of respondents stated that extension agents need to prioritize small-scale and emerging farmers as the bias in extension support limits farmers access to information thereby affecting their productivity, while (7%) of respondents stated that

there should be recruitment and training of more extension personnel, (5.2%) of respondents emphasized that more private extension organization should be established.

Table 7: Determinant Factors of Beneficiaries' Access to Extension Services in Northwest Province

VARIABLE	FREQUENCY	PERCENTAGE (%)
Which of these factors determines your access to extension services		
Ratio of extension agents to farmers	3	(1.44)
Distance and location of extension offices	14	(6.73)
Relevance of information to farmers needs	80	(38.46)
Literacy level of farmers to comprehend extension training	7	(3.37)
Frequency of extension agents visits to farms	83	(39.90)
Type of farm enterprise (small-scale or commercial)	21	(10.10)
The main problems farmers face in accessing extensions services are?		
Less attention is given to small-scale farmers	15	(13.0)
Relevance of information accessed	28	(24.3)
Limited monthly mileage/kilos allocated to extension agents	20	(17.4)
Access to current programs	16	(13.9)
Information transfer to farmers are not timely	13	(11.3)
Outdated information	18	(15.7)
Ratio of extension agents to farmers	5	(4.34)
What do you think can be done to resolve these problems?		
Frequent farm visits should be implemented	25	(21.7)
Provide community stations	13	(11.3)
Prioritize small-scale farmers	9	(7.8)
Establishments of more private extension services	6	(5.2)
Eradicate lip services and ensure implementation	5	(4.3)
Agents should be more equipped to assist farmers	22	(19.1)
There is need for transparency and accountability	4	(3.5)
Recruitment and training of more extension officers	8	(7.0)
There should be improvements in agricultural research	23	(20.0)

4.4 Beneficiaries Food Sources and Monthly Expenditure

Report from the study area as indicated in table 4.4 shows that respondent's sources of food are mainly purchased (52.86%) and from their own production (47.14%). Also, majority of respondents spend about 1700-2200 Rands on food purchase monthly while (18.26%) spend 2900-

3400 Rands on food purchase monthly. The total monthly expenditure of majority of respondents are (62.62%) about 5100-10100 Rands and (17.4%) about 10200-15200 Rands monthly.

Table 8: Beneficiaries Food Sources and Monthly Expenditure

VARIABLE	FREQUENCY	PERCENTAGE (%)
Food Source		
Owned Production	99	(47.14)
Purchased	111	(52.86)
Barter, gift, exchange for labour	0	0
Food aid	0	0
Others	0	0
Money Spent on food purchase monthly		
500-1000	3	(2.61)
1100-1600	19	(16.52)
1700-2200	26	(22.61)
2300-2800	16	(13.91)
2900-3400	21	(18.26)
3500-4000	19	(16.52)
4100 and above	11	(9.57)
Total Monthly Expenditure		
1000-5000	12	(10.44)
5100-10100	72	(62.62)
10200-15200	20	(17.4)
15300-20300	7	(6.09)
20400 and above	4	(3.48)

4.4.1 Household Food Security of Land Bank Beneficiaries in Northwest Province

Report from the survey shows that a large number of respondents (74.78%) had no worries over food shortage or money to purchase food should they run out however, (48.70%) of respondents affirmed that sometimes there were occasions were food purchased did not last and they didn't have money to buy more. Also, (74.78%) of respondents affirmed that sometimes they could not afford to eat balanced meals. Although majority of respondents (59.13%) never skipped or cut meal sizes, (39.13%) indicated that their household skipped meals in the last 12 months because

there wasn't enough money to purchase food and it appears to be a regular occurrence amongst these group as (48.9%) indicated that these happens almost every month. Also majority of respondents (70.4%) indicated that in the last 12 months they never ate less than they should because there wasn't enough money for food however, (29.6%) of respondents indicate that they felt they ate less than they should in the last 12 months. Furthermore, majority of respondents (84.3%) were never hungry in the last 12 months but didn't eat, because there wasn't enough money for food as compared to few respondents (15.7%) that experience this situation. Also, only (1.7%) of respondents lost weight in the last 12 months because there wasn't enough food or money to buy. In addition, (0.87%) of respondents did not eat the whole day because there was no money to purchase food and (0.87%) further affirmed that the situation occurred in a month or 2.

Table 8.1: Household Food Security of Land Bank Beneficiaries in Northwest Province

Variables	**Frequency**	**Percentage (%)**
"We worried whether our food would run out before we got money to buy more"		
Often	8	(6.96)
Sometimes	21	(18.26)
Never True	86	(74.78)
" The food we bought just didn't last, and we didn't have money to buy more"		
Often	0	0
Sometimes	56	(48.70)
Never True	59	(51.30)
"We could not afford to eat balanced meals"		
Often	0	0
Sometimes	86	(74.78)
Never true	29	(25.22)

In the last 12 months, did you or other adults in the house cut meal or skip meal because there wasn't enough money to buy food?		
Yes	45	(39.13)
No	68	(59.13)
No Response	2	(1.74)
If yes how often did this happen?		
Almost every month	22	(48.9)
Some months but not every month	14	(31.11)
1 or 2 months only	9	(20)
In the last 12 months did you eat less than you felt you should because there wasn't enough money for food?		
Yes	34	(29.6)
No	81	(70.4)
In the last 12 months were you ever hungry but didn't eat, because there wasn't enough money for food?		
Yes	18	(15.7)
No	97	(84.3)
In the last 12 months did you lose weight because there wasn't enough money for food?		
Yes	2	(1.7)
No	113	(98.3)
In the last 12 months did you or other adults in the household ever not eat for a whole day because there wasn't enough money for food?		
Yes	1	(0.87)
No	114	99.13
If yes how often did this happen?		

Almost every month	0	0
Some months but not every month	0	0
1 or 2 months	1	(0.87)
Not Applicable	114	(99.13)

4.4.2. Household food security of land bank beneficiaries with children age 0-17 in the household

This section shows the report of household food security status of respondents with children between ages 0-17 years of age in the household. Majority of respondents (87.8%) indicated that they never relied on low-cost food to feed their children as compared to the few respondents (9.6%) that experienced such situation. Also, only few respondents (7.0%) indicated that sometimes they couldn't afford to feed their children balanced meals in the last 12 months as compared to majority of respondents (90.4%) that never experienced this situation. Furthermore, only few respondents (2.6%) indicated that sometimes their children were not eating adequately because they couldn't afford enough food in the last 12 months as compared to (94.8%) of respondents that never experienced this situation. In addition majority of respondents (97.4%) indicated that their children were never hungry and could not afford more food. However, (96.5%) indicated that their children did skip meals in the last 12 months although majority (74.8%) affirmed that this occurred in a month or 2 only as compared to (18.3%) of respondents that experienced this situation in some months but not every month, although none of the respondents (97.4%) reported that their children did not eat the whole day.

Table 8.1.1: Household Food Security Status of Land Bank Beneficiaries with Children Age 0-17 in the household.

Variables	**Frequency**	**Percentage (%)**
"We relied on only few kinds of low-cost food to feed our children because we were running out of money to buy food" in the last 12 months		
Often	0	0

Sometimes	11	(9.6)
Never true	101	(87.8)
Not Applicable	3	(2.6)
"We could not afford to a balanced meal, because we could not afford that" in the last 12 months		
Often	0	0
Sometimes	8	(7.0)
Never true	104	(90.4)
Not Applicable	3	(2.6)
"The children were not eating enough because we just couldn't afford enough food" in the last 12 months		
Often	0	0
Sometimes	3	(2.6)
Never True	109	(94.8)
Not Applicable	3	(2.6)
In the last 12 months did you ever cut the size of any of the children's meal because there wasn't enough money for food		
Yes	10	(8.7)
No	102	(88.7)
Not Applicable	3	(2.6)
In the last 12 months were the children ever hungry but you just couldn't afford more food?		
Yes	0	0
No	112	(97.4)
Not applicable	3	(2.6)

In the last 12 months did any every of the children ever skip a meal because there wasn't enough money for food		
Yes	111	96.5
No	1	0.9
Not Applicable	3	2.6
If yes how often did this happen?		
Almost every month	0	0
Some months but not every month	21	(18.3)
1 or 2 months only	86	(74.8)
No Response	5	(4.3)
Not Applicable	3	(2.6)
In the last 12 months did any of the children never not eat the whole day because there wasn't enough money for food?		
Yes	0	0
No	112	(97.4)
Not Applicable	3	(2.6)

4.6 Land Bank Beneficiaries Household Coping Strategy in Northwest Province South Africa

Reports from the survey revealed that the mostly commonly used coping strategy by respondents was relying on less preferred and less expensive food (81.74%), limiting portion sizes during meals (47.83%), rationing money by purchasing prepared food (47.83%) as well as reducing consumption of adults in other for children to eat (44.35%), reducing number of meals eaten in a day (40.9%), and harvesting immature crops, hunting or gathering of wild food (20%). The least commonly used coping strategies by the respondents in the study area were skipping the entire day without eating (0%), feeding working individuals in the households at the expense of non-working members (1.74%) as well as sending family members to eat elsewhere as neighbors, friends and relatives. This is supported by Mojela *et al.* (2018) in their study of household food security and

coping strategies in Gauteng Province which found that majority of households (86%) in the population relied on less expensive and preferred food as a major coping strategy followed by limiting portion sizes during meals, rationing money they had to purchase prepared food and also restricting adults consumption in other for children to eat. The least adopted strategy similar to the report from this study as compared to Mojela *et al.* (2018) was skipping the entire day without eating, purchasing food on credit as well as sending members of the household to eat elsewhere.

Table 9: Land Bank Beneficiaries Household Food Security Coping Strategy in Northwest Province

Variables	Frequency	Percentage (%)
Did you reduce the number of meals eaten in a day?		
Yes	47	(40.9)
No	68	(59.1)
Did you skip the entire day without eating?		
Yes	0	0
No	115	(100)
Did you ration the money you had and bought prepared food?		
Yes	55	(47.83)
No	60	(52.17)
Did you rely on less preferred and less expensive food?		
Yes	94	(81.74)
No	21	(18.26)
Did you purchase food on credit?		
Yes	12	(10.43)
No	103	(89.6)

Did you gather wild food, hunt or harvest immature crops?		
Yes	23	(20.0)
No	92	(80.0)
Did you send household members to eat elsewhere such as neighbors, friends or relatives house?		
Yes	4	(3.5)
No	111	(96.5)
Did you borrow food or rely on help from a friend or relative?		
Yes	18	(15.65)
No	97	(84.35)
Did you reduce consumption of adults in order for small children to eat?		
Yes	51	(44.35)
No	64	(55.65)
Did you limit portion size at meal times?		
Yes	55	(47.83)
No	60	(52.17)
Did you feed working members of the household at the expense of non-working members?		
Yes	2	(1.74)
No	113	(98.26)

4.7 Determinants of Land Bank Beneficiaries Household Food Security in Northwest Province

The report from the study indicates that availability of money to purchase food (94.78%) was a major determinant factors of beneficiaries' household food security status in the province, followed by access to the market to either buy or sell (85.2%), production output of beneficiaries

(78.3%) drought from climate change (77.39%), loss of livestock to theft and diseases (63.5%), number of working individuals in the family (61.7%), the size of the household (58.3%) as well as distance to the city to access market (40%).

Table 10: Determinants of Land Bank Beneficiaries Household Food Security in Northwest Province.

Variables	Frequency	Percentage (%)
Owned Production Output		
Yes	90	(78.3)
No	25	(21.7)
Access to market to either buy or sell		
Yes	98	(85.2)
No	17	(14.8)
Distance to the city to access market		
Yes	46	(40)
No	69	(60)
Loss of livestock to theft and diseases		
Yes	73	(63.5)
No	42	(36.5)
Drought		
Yes	89	(77.39)
No	26	(22.61)
Household Size		
Yes	67	(58.3)

No	48	(41.7)
Money to buy food		
Yes	109	(94.78)
No	6	(5.22)
Number of working individuals in the family		
Yes	71	(61.7)
No	44	(38.3)

4.8 Main Determinant Factors of Respondents' Household Food Security in Northwest Province

In this section respondents were asked to state their own specific determinants rather than a list of factors to choose from. The main determinant factors of beneficiaries household food security as stated by most respondents was their own production output (37.39%), money for food purchase (29.57%), drought (17.39%) from climate changes as well as loss of livestock to theft and diseases (14.78%) the least determinant factors identified by the respondents in the study area were access to market (6.96%) and number of dependents in the household (3.48%). This indicates that in the study area majority of beneficiaries are dependent on their own production as means of livelihood and rely on availability of money to purchase food as their main alternatives.

Table 11: Land bank beneficiaries view of the main determinant factors of their household food security in Northwest Province.

Variables	Frequency	Percentage (%)
Money	31	(26.95)
Rate of Production	40	(34.8)
Number of Dependents	4	(3.48)
Access to market	8	(6.96)

Drought	15	(13.04)
Loss of livestock to theft and diseases	17	(14.78)

4.9 Beneficiaries Support from Land Bank in Northwest Province

In the study area (73.9%) of respondents do not have any other source of funds aside from land bank while (26.1%) of respondents affirmed to receiving government social grants such as child welfare and grants for those above the age of 60. majority of the respondents (58.26%) are on short term loans while (28.70%) are on medium term loans only (13.04%) of respondents are on long term loans. Majority of the respondents (58.26%) affirmed that the support they got from land bank was adequate in facilitating their agricultural productivity while (41.74%) affirmed that the support they got from land bank was inadequate in facilitating their agricultural productivity. The majority (58.26%) that affirmed that land bank support was adequate in facilitating their agricultural productivity stated that the funds from land bank was used to buy livestock and feeds (19.13%), build storage facilities for post-harvest (7.83%), farm extension (6.96%), while (5.22%) used the funds to secure land lease and (4.35%) of beneficiaries used the funds for land purchase for farming and drip irrigation equipment respectively, (3.48%) each of beneficiaries bought tractors, pivots and ploughs respectively. Furthermore, respondents (41.74%) that affirmed that land bank support was inadequate in facilitating their agricultural productivity stated that their reason were that the period of loan implementation from land bank took too long (19.13%), whiles others (17.3%) stated that the interest rates were too high and (4.35%) stated that the process of selecting beneficiaries was too strict and vigorous.

Table 12: Beneficiaries support from land bank in Northwest Province

Variables	Frequency	Percentage (%)
Do you have any other sources of funds aside from Land Bank		
Yes	30	(26.1)
No	85	(73.9)
What type of support do you get from Land bank?		

Short term loans	67	(58.26)
Medium term loans	33	(28.70)
Long term loans	15	(13.04)
Are these support adequate in facilitating you agricultural productivity?		
Yes	67	(58.26)
No	48	(41.74)
If yes , state how the support has facilitated your agricultural productivity		
Bought livestock and feeds	22	(19.13)
Bought Drip irrigation equipment	5	(4.35)
Farm extension	8	(6.96)
Secured lease	6	(5,22)
Bought tractors	4	(3.48)
Land purchase	5	(4.35)
Storage facilities	9	(7.83)
Pivot	4	(3.48)
Borehole for crop production	2	(1.74)
Ploughs	4	(3.48)
Not Applicable	46	(40.0)
Why did you state that land bank support is inadequate for your productivity?		
Period of loan implementation takes too long	22	(19.13)
The interest rates on loans are too high	20	(17.39)
The selection process for loan allocation are too strict and vigorous	5	(4.35)
Not Applicable	68	59.13

4.10 Spearman Rho analysis of socio-economic characteristics of land bank beneficiaries and their access to agricultural extension services in Northwest Province.

The result from the Spearman Rho shows that gender was coefficient at (0.8246) and significant at (5%), this implies that male headed households have more access to extension services either to initiate extension visits or visit extension offices as compared to female headed households. This is because women are more tasked with home chores such as cooking, cleaning and catering for the children. This is supported by BahadurGhartiMagar (2011) which found that women do not like residential trainings as it clashes with household works which might need to be paused thereby making it exhausting to function effectively both during trainings and at home. Also, marital status was coefficient at (0.9723) and significant at (5%) this implies that beneficiaries that are married have more likelihood to access extension services as there is division of role amongst partners i.e. the man or woman can serve as a representative for the entire household during extension trainings while the other partner takes care of other activities that might not be farm related as compared to a single individual that as to attend training while been tasked with other off farm responsibilities. Educational level was coefficient at (0.5620) and significant at (5%) this implies that respondents with high level of education are more likely to comprehend and grasp extension training, adopt latest technologies for farming and also use multiple platforms for accessing extension services. This in contrast to the findings of Loki *et al.* (2020) in eastern cape which found that the more educated respondents are the lesser they perceived the need for accessing extension services as they could rely on their education to seek agricultural information without depending on extension agents. Farmer group was coefficient at (0.3768) and significant at (10%) this implies that regardless of most beneficiaries not been part of a farmer group or organization it has little or no effect on their access to extension reason been that extension agents are tasked with disseminating agricultural information to farmers regardless of them being part of a farmer group or not. Also, household size was coefficient at (0.3658) and significant at (10%), this also show that the size of the household has no effect on access of farmers to extension this is because all the household needs regardless of its size is at least a sound representative that can grasp whatever information is been disseminated which he or she can later demonstrate to the rest members of the household during on-farm activities.

Table 13: Spearman Rho analysis socio-economic characteristics of beneficiaries and their access to agricultural extension services in Northwest Province.

Variables	Access Factors	Gender	M Status	Educational level	Type of farm	Type of agric practice	Off farm activities	Farmer group	Age	Household Size
Access	1.0000									
Gender	Sig-0.0209 Coffn 0.8246	1.0000								
M Status	Sig 0.0033 Coffn 0.9723	0.0228	1.0000							
Educational level	Sig 0.0546 Coffn 0.5620	-0.1356	-0.1068	1.0000						
Type of farm	Sig -0.1199 Coffn 0.2019	-0.1138	0.0886	0.2597*	1.0000					
Type of agric practice	Sig 0.1751 Coffn 0.0612	-0.0367	0.0818	0.0693	-0.0131	1.0000				
Off farm activities	Sig -0.1925* Coffn 0.0393	0.0058	0.1744	-0.2650*	0.1162	-0.1049	1.0000			
Farmer group	Sig -0.0832 Coffn 0.3768	0.0255	-0.1201	-0.0596	0.1195	-0.0645	0.0139	1.0000		
Age	Sig -0.1779 Coffn 0.0571	-0.0135	-0.0504	-0.0724	0.0029	-0.1520	0.1411	-0.0010	-0.1779	1.0000
Household size	Sig -0.0851 Coffn 0.3658	0.0440	0.2364*	-0.1711	0.0000	-0.1719	0.1619	-0.1480	-0.0851	0.2228*

Source: Authors (2021)

4.11 Probit regression analysis of respondents' socio-economic characteristics of and their household food security status.

The results shows that farm size was coefficient at (.0209752) with a significant value of ($P \leq 0.10$), this indicates that an increase in farm size has the probability to increase the household food security of respondents, this implies that farm size is likely to impact food security as those with smaller farm sizes are likely to have lower production output which has the probability to result in reduction in income which limits ability to purchase food in situation where their farm products are not ready for harvest. Also, Labour source was coefficient at (.6037481) with a significant value of ($P \leq 0.5$) this implies that sources of labour has the probability to impact food security as farmers with more labour sources such as self, family members and hired labour combined are more likely to yield higher production output as compared to farmers who rely on either self, family members or hired labour only. In addition, income of respondents was coefficient at (.0001141) with a significant value of ($P \leq 0.5$) this implies the income generated by respondents has the probability to increase or decrease household food security as those respondents with higher income have the purchasing power to buy food when needed as compared to those with lower income. This means the more income respondents have the more likely they are to be food secure and the lesser the income the more likely they are to be food insecure. Lastly, involvement in off farm activities was coefficient at (1.274086) with a significant value of ($P \leq 0.10$) this shows that respondents that are involved in off farm activities other than farming are probably more food secure than those that are not. This is because the off farm activities serve as a means of additional income to respondents which in turn increases their income generation and a better livelihood thereby giving them more purchasing power as an effective alternative to source for food rather than reliance solely on production output or income generated from sales of their agricultural products.

Table 14: Probit Regression analysis of socio-economic characteristics of land bank beneficiaries and their household food security in Northwest Province South Africa.

Variables	Coefficient	Std. Error	Z	P>|z	[95% Conf.	Interval]
Gender	-.1044344	.338059	-0.31	0.757	-7670178	.5581491
Age	-.0048571	.0349246	-0.14	0.889	-.0733082	.0635939
Marital status	-.049096	.2381674	-0.21	0.837	-.5158955	.4177035
Educational level	0.250674	.1997884	0.13	0.900	-.3665106	.4166454
Household size	-.096611	.0842354	-1.15	0.251	-.2617594	.0684373
Farming experience	-.0198363	.042126	-0.47	0.638	-.1024017	.0627291
Farm size	.0209752	.0100862	2.08	0.038**	.0012066	.0407437
Labour source	.6037481	.2128471	2.84	0.005*	.1865755	1.020921
Type of farm enterprise	0 (omitted)					
Type of agricultural practice	-.3295856	.2884432	-1.14	0253	-.8949239	.2357526
Income	.0001141	.0000281	4.05	0.000*	.0000589	.0001692
Off farm activities	1.274086	.4929045	2.58	0.010**	.3080112	2.240161
Cons	-4.149286	2.221483	-1.87	0.062	-8.503312	.2047402
LR chi^2 (11)= 44.40						
Prob >chi^2= 0.0000						
Pseudo R^2= 03343						
Log likelihood=-44.204837						

NB * and ** indicates 5% and 10% levels of significance correspondingly

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

INTRODUCTION

This chapter presents a summary of the findings, conclusion of the outcomes as well as recommendation in accordance to the findings. The aim of the introduction is to alert and brief the reader of the outcome of the study. As well as recommendation for future research.

5.1 Summary

The focus of the study was on evaluating land bank beneficiaries' access to extension service and their household food security in North-West Province South Africa. Simple random sampling technique was adopted to select 169 respondents for the study, out of 169 sampled respondents 115 voluntarily participated in the study. This technique gave respondents in the area equal chances of being selected and the collection of data was executed with the aid of a structured questionnaire. The results revealed that a large percentage of the beneficiaries are male (66.09%) as compared to female (33.91%), majority of respondents age is between 41- 50 years (40.02%) and 51-60 years (34.8%) also report indicates that majority of respondents are married (55.65%) and the highest educational acquired by majority was primary education (28.7%) and high school (26.09%). Household size of majority of respondents was between 6-10members (87.4%) while the farming experience in years for majority of beneficiaries was between 11-16 years (44.35%) and the size of farm for majority was between 31-60 hectares (45.21%). Land acquisition for majority of beneficiaries was done through purchase (50%) while the labour source for a large percentage of respondents (69.57%) comprises of self, family and hired labour, majority of the beneficiaries are smallholder farmers (86.96%) and the most common agricultural practice was both livestock and crop production (80.7%). The monthly income for majority of respondents was between 10,000Rands – 50,000Rands monthly (87.85%). Also, (81.74%) of respondents are solely farmers while (18.26%) were involved in income generating off-farm activities. This off-farm activities generated extra incomes of about 1000Rands – 5000Rands for majority of respondents (6.09%). Also majority of respondents (78.26%) do not belong to any farmer group or organization as compared to (21.74%) who belonged to farmer organizations such as NAFU, BFASA and AFASA.

In the study area all respondents (100%) are aware of extension services and (84.35%) accessed extension services. The most commonly accessed extension was the public extension services (61.7%), while (44.3%) accessed extension often, (31.3%) affirmed accessing extension services very often. Furthermore, (85.2%) affirmed that extension information was relevant to their needs as well as (80.9%) agreeing to its enhancement of their agricultural productivity. The most common source of information as identified by respondents was extension agents (38.6%), contact farmers (35.34%) and radio broadcast (18.88%). The specific programs accessed by majority of beneficiaries are vaccination programs (24.86%), weather information (16.02%), record keeping methods (13.26%), post-harvest techniques (10.5%) and crop protection (10.5%). Also, (80.9%) affirmed to giving feedback to agents when information received are put to use. The identified preferred extension approach by beneficiaries was farmer to farmer (42.6%) and training and visit (33.04%). Also the preferred teaching method identified by majority of respondents was physical demonstration with hands on experience (60.92%) and preferred method of accessing extension was identified as extension farmers meetings (40%). Majority of respondents identified frequency of extension visits to farms (39.90%) and relevance of information to farmer's needs (38.46%) as the main determinant factors of their access to extension services. Furthermore, majority of respondents expressed that outdated information and extension agents claiming to have exhausted allocated monthly kilos are major hindrance to extension access.

The source of food for majority of respondents was purchased food (52.86%) and owned production output (47.17%). Monthly food purchase for majority of respondents was around 1700Rands-2200Rands, while monthly expenditure for majority of respondents (62.62%) was between 5000Rands – 10,100Rands. Furthermore, majority of respondents (74.78%) showed no worry over food purchase or money to buy more in the last 12months. However, (48.7%) of respondents had issues of food shortage and didn't have money to buy more in the last 12 months. In addition, (74.78%) affirmed that sometimes they couldn't afford to buy balanced meals, while (59.13%) attested to have skipped/cut meal sizes and this seems to be regularly occurring as (48.9%) noted that it occurs almost every month.

Report from the survey indicates that (87.8%) never relied on low-cost food to feed their children, while (7%) affirmed that they could not feed their children balanced meals and (2.6%) reported that their children were not feeding adequately. However, (96.5%) noted that they did skip their

children's meal although it was not a regular occurrence as (74.8%) noted that this occurred only in a month or 2.

The most commonly adopted coping strategies identified by respondents was reliance on less expensive and preferred food (81.74%), cut down of portion sizes during meals (47.8%), rationing money to buy food (47.83%) and reducing number of meals eaten per day (40.9%). The main determinant of food security identified by respondents were money to buy food (94.78%), access to market to buy or sell (85.2%), production output (78.3%), drought (77.39%) as well as loss of livestock to theft and diseases (63.5%). Also, respondents were asked to specify rather than select from a list of factors that determine food security they identified production output (34%), money (26.95%), loss of livestock to theft and diseases (14.78%) and drought (13.04%).

Report from the survey indicates that (73.7%) of respondents are solely dependent on land bank for funding while (26.1%) affirmed to receiving social grants from the government either through child welfare grants or those for age 60 and above. Majority of respondents (58.26%) are on short term loans while (28.70%) are on medium term loans and (13.04%) are on long term loans. In addition, (58.26%) of respondents affirmed that land bank support was adequate in facilitating their agricultural productivity while (41.74%) stated that the support was inadequate. The respondents that affirmed adequacy of land bank support stated that funds received was used to buy livestock and feeds (19.13%), storage facilities (7.83%) as well as farm extension (6.96%) etc. The respondents that affirmed inadequacy in land bank support stated that their reasons was that loan implementation takes too long (19.13%), interests rates were too high (17.3%) and selection process was too strict and vigorous (4.39%).

Furthermore, report from spearman rho reveals that gender was significant at (5%) which implies that male beneficiaries had more likelihood of having access to extension due to less home chores and commitment as compared to females that have to take care of children, cook and clean. Marital status, educational level were also significant at (5%) while farmers' group/organization and household size were significant at (10%) respectively. Also, the probit regression analysis shows that farm size was significant at ($P \leq 0.10$) its implications is that, the larger the size of farm the high the probability of more production output which result in food availability and also increase in income to purchase food as an alternative to owned production. Also labour source and income

were significant at ($P \leq 0.05$) respectively while involvement in off-farm activities was significant at ($P \leq 0.10$).

5.2 Conclusion

Based on the outcomes from the research, it can be established that beneficiaries are aware of extension services and the relevance of information dissemination to farmer's needs and its potential to facilitate their productivity. Also, from the report it can be concluded that physical demonstration with hands on experience is a major method of disseminating information to farmers. However, certain factors hinders the effectiveness and efficiency of information access such as frequency of extension visits to farms and relevance of the information been disseminated as beneficiaries in the smallholder enterprise are of the opinion that most information are outdated as well as perceived bias on the part of extension agents as they tend to prioritize farm visits based on the type of farm enterprise i.e. preference is given to commercial farmers as compared to smallholder farmers that actually need more guide and training. Furthermore, it can be concluded based on report that off-farm activities has the potential to increase income of respondents as those who participated in off-farm activities attested to generating additional income as compared to respondents that are solely farmers.

Also, based on report it can be concluded that most beneficiaries are food secure however, there food availability does not automatically results in food nutrition as most respondents attested to not regularly feeding on balance diet and reliance on less preferred and expensive food is a major indicator that though they might be food secure the presence of balanced diet in their meals lacks consistency.

Lastly, based on report it can be concluded that land bank support to beneficiaries are fairly adequate. This is because some of the beneficiaries are dissatisfied with issue of high interest rates, the long duration it takes before loans are implemented and the strict selection process of beneficiaries.

5.3 Recommendation

Based on observation of the results, it is thus recommended that:

1. Frequency of extension visits to farmers needs to be addressed and implemented. This can be achieved by providing adequate transportation facilities to extension agents. This will

enable extension agents to embark on more farm visits which results in a wider coverage of farmers that needs guide and training with regards to new farming methods.

2. Physical demonstration with hands on experience should be the method of information dissemination to farmers as this would give equal advantage to all in grasping extension training and new farming methods irrespective of their educational background.
3. There is urgent need for improvement in agricultural research as majority of farmers are of the view that extension information are relevant to enhancing their productivity. However, most of the information are outdated.
4. Also, community stations should be built for farming communities in the province to enhance easy access of farmers to useful information as an alternative to frequency of extension visits.
5. All forms of bias should be eliminated by extension agents by prioritizing smallholder farmers rather than concentrating on commercial farmers who are already advanced in farming techniques.
6. Off-farm activities among farmers should be encouraged as it is clear that this results in additional income generation which subsequently improves their livelihood as well as giving them more purchasing power to source for food as an alternative to their own production output.
7. Land bank needs to speed up the process of loan implementation as this impedes farmers' ability to be productive. This is because the lengthiness in duration of loan implementation incapacitates there productive as they can't function effectively while waiting for funds required for on-farm activities.
8. Also, there is need to review the interest rates on loan allocation as some beneficiaries are of the view that interest rates are too high considering that majority of them are on short term loans.
9. Lastly, the selection process for beneficiaries needs to be less vigorous, if the objectives of land bank to support women and youths from previously disadvantaged group and food security is to be achieved.

5.4 Further Research

Further research suggests that the evaluation of non-land bank beneficiaries should be carried out so as to improve the quality of work and give a broader understanding to see if access to credit had an effect on access to extension services and household food security or otherwise.

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APPENDIX

NORTH WEST UNIVERSITY

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

Introduction and Consent

Dear Respondent,

This questionnaire is for data collection for research on "Evaluation of Land Bank Beneficiaries Extension Services and Household Food Security in Northwest Province South Africa. The information collected on this questionnaire is for research purpose only.

"The benefit of this research is that you will be helping us to understand how accessible beneficiaries are to extension services, the adequacy of land bank supports or otherwise and its effect on beneficiaries household food security. If you do not wish to continue, you have the right to withdraw from the study, without penalty, at any time."

Participant - I choose, voluntarily, to participate in this research project. I certify that I am at least 18 years of age [or have a signed parental consent form on file with the department].

Signature of participant Date

…….. ……

Please indicate with an **X** where applicable

SECTION A: SOCIO-ECONOMIC DATA

1. Gender

Male	
Female	

2. Age of respondent ….....

3. Marital status:

(a) Single ……... (b) Married …….. (c) Divorced……. (D) Widowed……..... (e)Separated……

5. Highest level of education:

(a) Informal……. (b) Primary……. (c) High school…….. (d) Tertiary……

6. Household Size ……..

7. Farming Experience in years ……

8. Farm size in hectares ……..

9. How did you acquire land for farming? (a) Inherited …….. (b) Purchased…….. (c) Leased……

10. What is your source of labour on farm? (a) Family Members……. (b) Self and Hired…….. (c) All of the above……

11. Type of farm enterprise: (a) Subsistence …….. (b) Small-scale…… (c) Commercial……..…

12. Type of Agricultural practice: (a) Livestock farming…….. (b) Crop production……..… (c) Both……

13. Monthly Income of Respondents ……..

14. Are you involved in other activities aside from farming? (a) Yes…….. (b) No……

15. If yes, what other activities are you involved in aside farming?

.....

16. Does this activity generate additional income? (a) Yes ……. (b) No……..

17. If yes, how much does it generate? ……

18. **Do you belong to any farmer group?** (a) Yes……. (b) No……

19. **If yes, name the farm group …**……..

SECTION B: DATA ON RESPONDENTS ACCESS TO EXENSION SERVICES

20. **Are you aware of extension services?** (a) Yes…..... (b) No……

21. **Do you access information through extension services?** (a) Yes…… (b) No ……

22. **Where do you access your extension services from?**

Government	
Non-Government	
Both	
Others specify	

23. **How often do you access information through extension services?**

Very often	
Often	
Rarely	
Not at all	

24. **Are the information accessed relevant to your needs?** (a) Yes …… (b) No…….

25. **Does the information accessed if put to use enhance your productivity?** (a) Yes….. (b)
No…..

26. **What are your agricultural information sources?**

Extension agent	
Radio broadcast	
Contact farmers	
Workshops/farm courses	
Others specify	

27. What are the specific information you access through extension services?

……
……

……

28. Are you giving access to feedback your extension agents on outcomes of information received when put to use? (a) Yes……. (b) No……

29. What is your preferred extension approach? (a) Farmer Field School……. (FFS) (b) Training and visit……. (c) Farmer to farmer…… (d)Contract farming……

30. What is your preferred extension teaching method? (a) Physical demonstration with hands on experience…….. (b) Group discussion and group activities……. (c) Individual visits…….

31. What is your preferred method of accessing agricultural information? (a)Through media (Radio, television, newspaper)…… (b) Through phone……(c) Through extension farmers meetings…….. (d) Fellow farmers……

SECTION C: FACTORS THAT DETERMINE ACCESS OF BENEFCIARIES TO EXTENSION SERVICES

32. Which of these contributes to your access to extension?

Ratio of extension agents to farmers	
Distance/location of extension offices	
Relevance of information to farmers needs	
Literacy level of farmers to comprehend extension training	
Frequency of extension agents visit to farms	
Type of farm enterprise (small-scale or commercial)	

33. In your own view what are the main problems farmers face in accessing extension services?

……..
……..
……..

34. What do you think can be done to resolve the problems preventing farmers' access to extension services?

……
……
……

SECTION D: DATA ON HOUSEHOLD FOOD SECURITY STATUS OF RESPONDENTS

35. What is the primary source of your food?

Owned production	
Purchased	
Barter, gift, exchange for labour	
Food aid	
Others	

36. How much do you spend on food purchase monthly?

.....

37. What is your monthly expenditure in total? …….

38. HOUSEHOLD FOOD SECURITY SCALE SURVEY MODULE QUESTIONNAIRE

(Fill blanks with correct answers)

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months? ……..

2. "The food that we bought just didn't last, and we did not have money to get more." Was that often, sometimes, or never true for you in the last 12 months? …….

3. "We could not afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months? .....

4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)…….

5. (If yes to question 4) how often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?.....

6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)…….

7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No) ……

8. In the last 12 months, did you lose weight because there wasn't enough money for food?
(Yes/No)…….

9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No) ……

10. (If yes to question 9) how often did this happen—almost every month, some months but not every month, or in only 1 or 2 months? …….

(Questions 11-18 to be asked only if the household with children age 0-17)

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months? ……

12. "We could not feed our children a balanced meal, because we could not afford that." Was that often, sometimes, or never true for you in the last 12 months? .....

13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months? .....

14. In the last 12 months, did you ever cut the size of any of the children's meals because there
wasn't enough money for food? (Yes/No)……

15. In the last 12 months, were the children ever hungry but you just couldn't afford more food?
(Yes/No)…….

16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No) ……

17. (If yes to question 16) how often did this happen—almost every month, some months but not every month, or in only 1 or 2 months? …….

18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)…….

38. Household Food Security Coping Strategy

QUESTIONS	**YES**	**NO**
Did you reduce number of meals eaten in a day?		
Did you skip entire days without eating?		

Did you ration the money you had and bought prepared food?		
Did you rely on less preferred and less expensive foods?		
Did you purchase food on credit?		
Did you gather wild food, hunt, or harvest immature crops?		
Did you send household members to eat elsewhere, Such as neighbors, friends or relatives house?		
Did you borrow food, or rely on help from a friend or relative?		
Did you restrict consumption of adults in order for small children to eat?		
Did you limit portion size at mealtimes?		
Did you feed working members of household at the expense of non-working members?		

SECTION E: DETERMINANTS OF BENEFCIARIES HOUSEHOLD FOOD SECURITY STATUS

39. Which of these do you consider as determinant factor to household food security?

Owned production output	**YES**	**NO**
Access to market either to buy or sell		
Distance to the city to access market		
Loss of livestock to diseases and theft		
Drought		
Household size		
Money to buy food		
Number of working individuals in the family		

40. In your own view what are the main determinants of your household food security status?

…….

…….

……..

SECTION F: DATA ON TYPES OF BENEFCIARIES SUPPORT

41. What are your other sources of funding aside from Land Bank?

…….

42. What types of support do you get from Land Bank?

Short term loans	
Medium term loans	
Long term loans	

43. Are these supports adequate in facilitating your agricultural productivity?

YES	
NO	

44. IF YES , state how the support has facilitated your agricultural productivity

……..
……..
……..

45. IF NO, what makes land bank support inadequate?

……..
……..
……..

THANK YOU FOR YOUR PARITICIPATION.