

**AN ASSESSMENT ON TRAINING OF SMALL SCALE FARMERS IN
MOIBEN SUB-COUNTY, UASIN GISHU COUNTY AFFECTS HOUSEHOLD
FOOD SECURITY**

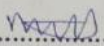
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**A THESIS SUBMITTED TO THE SCHOOL OF AGRICULTURE AND
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REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF
SCIENCE IN AGRICULTURAL EXTENSION EDUCATION, UNIVERSITY
OF ELDORET, KENYA**

2025

DECLARATION**Declaration by the Candidate**

This Research thesis is my original work and has not been presented for a Master's degree in any other University.

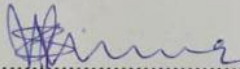
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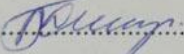
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DEDICATION

This research is dedicated to my parents Alice and Michael Yator through whom I realized my interest in plants and farming. Their unwavering support enabled me to appreciate a family's contribution in every step and most especially towards realizing my academic goals by sourcing fresh ideas and perspectives. Additionally, I want to extend my appreciation to my husband Dr. Runji for his persistent efforts, which served as moral support and guidance when I was preparing the thesis.

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ABSTRACT

Food security revolves around the availability, access, and intake of nutritious food. Therefore, to realize food security, trainings for farmers is often encouraged to enhance productivity. However, most small-scale farmers often rely on their traditional knowledge and patterns for farming. The main purpose of this research was to examine the establishment of a relationship between training small-scale farmers and food security and evaluate training carried out in Moiben sub-county with the aim of improving household food security status. The specific objectives were to establish the effectiveness of food production training on food security among small-scale farmers, to examine the effectiveness of financial literacy training on food security of small-scale farmers and to determine the effectiveness of adoption of agricultural technologies on food security of small-scale farmers in Moiben sub-county and socioeconomic factors influencing food security. The study adopted a mixed-methods design focusing on positivism philosophy. The target population was 10,869 small-scale farmers from which a sample size of 385 small-scale farmers within Moiben sub-county was derived. The instrument for collecting data used for the research was a questionnaire which contained items to address each objective and was able to measure household food security status using food insecurity experience-based measurement scale. The findings of food insecurity status showed that the prevalence rate for severity and moderate severe food insecurity were 40.062% and 58.74% respectively. Research experts checked validity, while reliability test was performed by use of Cronbach Alpha test and the result of reliability was set at a level of 0.81. Descriptive and inferential statistics was analyzed using statistical package for social sciences (SPSS) Version 29. Inferential statistics such as Pearson Product Moment Correlation Coefficient (PPMCC) and Multiple Linear Regression Analysis was performed to test hypotheses. Descriptive data was presented in tables, figures and pie charts, while inferential statistics was presented using multiple linear regression and Pearson Product Moment Correlation Coefficient. Qualitative data was analyzed thematically as per objective as they emerged. Results indicated that, training small-scale farmers on food production improved food security by 0.036 units, increase in one unit of financial literacy increased food security by 0.102 units and increase in one unit of the adoption of agricultural technologies decreased food security by 0.000824units. Statistical significance indicated the F- ratio using Analysis of variance that training on food production, financial literacy and adoption of technologies was statistically significant at a value of $P \leq 0.05$. Further, correlation analysis was conducted between socio-economic and food security was conducted education level positively correlated with food security with a value of 0.151 indicated a significant value of $P \geq 0.05$.

The findings are significant with regard to increasing the information available on food security to small-scale farmers where agriculture institutions act as resource centers such as KALRO (Kenya Agriculture Livestock and Research Organization), Ministry of Agriculture, academic institutions such as Universities and Colleges, and Journals. The study recommends more training session and diversity of information on areas to be trained, which directly influence food security such as new technology, and adequate awareness about the training to be conducted among small-scale farmers.

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ABBREVIATIONS AND ACRONYMS

FAO	Food and Agricultural Organization
IFAD	International Fund for Agricultural Development
NACOSTI	National Commission for Science, Technology and Innovation
RIPAT	Rural Initiatives for Participatory Agricultural Transformation
UN	United Nations
WB	World Bank
WFP	World Food Program
WHO	World Health Organization
KALRO	Kenya Agriculture Livestock and Research Organization

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the key concept of the background of this research. A concise description of the problem statement, purpose and objectives is also provided in this chapter. Research questions and significance are also presented. Further, the limitations and assumptions of the study were also presented. Finally, the scope of the study is also presented in this chapter.

1.1 Background of the Study

Food and Agricultural Organization defines food security as the situation where all individuals at all times have both physical and financial capability to attain basic food (Thomas, 2006). The main components of food security, therefore, include the availability, access, utilization, and stability of food. Godfray *et al.*, (2010) explain that farming is directly linked to food security thus making it an avenue within which food security can be improved on. Worldwide, food insecurity affects 5% to 25% of the population of both developed and developing countries (Abbasi, Ghoochani, Ghanian, & Kitterlin, 2016). East Africa community experiences chronic and persistent food insecurity situation which is influenced by various factors such as little or no risk mitigation against changing weather condition which influences farming activities (Omiti *et al.*, 2011; Smith *et al.*, 2000).

Food security has a relevant role in the livelihood and well-being of human beings. In recent years, the importance of food security has escalated as illustrated by efforts from the United Nations (UN), World Food Program (WFP), World Bank (WB), and the

Food and Agricultural Organization (FAO) to ensure that this security is achieved (Kenya Food Security Steering Group, 2024). The food security status in Kenya has been achieved through government effort at national, county and household level without full resolution. However, national food security does not guarantee availability of foods within households. It has been observed that the government continually feeds a section of the population that is perpetually food insecure, on average 1 million per year, especially, in arid and semi-arid areas. Reports from Kenya Food Security Steering Group has shown government intervention through measures such as provision of inputs, tools and equipment, purchase of food relief, mass livestock vaccination, bore hole rehabilitation, provision of water tanks, desilting water pans and dams. Additional strategies put in place include government purchase and storage of Strategic Grain Reserves. This helps to intervene in the cereal market, and cushion the country for a short period of scarcity as reported from Kenya food security Steering Group.

32% of households in Uasin Gishu county face food insecurity, which is mainly prominent in the months of May to August (GoK, 2014). Prevalence of stunting is 31.2% while 11.5% of children under-five are underweight (KDHS, 2014) which is attributable to less diet diversification due to overdependence on crops such as maize. The county, being commercially oriented in terms of livestock and crop generation, produces enough for local consumption and sale to other neighboring counties and further afield. Relatively large farm sizes, superior soils and favorable climatic conditions play a major role in making the county a leading producer in most of the important crops in the country such as maize. Small scale farmers' play a significant role in improving the food security status in many household and offer food production, report from World Trade Institute reinforces of positive impact small scale have on

food security such as key drivers for sustainable agriculture, securing food productivity and income stability in developing countries and least developed countries (World Trade Insitute

The current extension delivery system which provides an opportunity for training for small scale farmers is an evolution where private sector, NGOs, and civil society players and this has influenced how extension is managed, application of method and approaches, this is according to National Agricultural Sector Extension Policy (2012). Participatory training, demonstration in the form of forums, workshops, and field days and usage of books and pamphlets is the most popular method of training method used in training small scale farmers (CIDP, 2022). The status of farming practices, hence, determines whether the food is safe, nutritious, and available to all. In Kenya, there are programs to enhance food security including storage of food for emergency cases, and provision of emergency funds to ensure that food is available (Kimiye, 2015). According to the regional MoA annual report (MoA, 2010), only a small portion of maize farmers in Uasin-Gishu County have been involved in training. Nonetheless, the value of training farmers on food security is undermined by various political, social, technological, and economic reasons. According to the agricultural sector of Uasin Gishu County, the county is largely-dependent on the production of maize (GoK, 2018).

Innovative practices have been taught to small-scale farmers to ensure the availability, access, and utilization of food (Stewart *et al.*, (2015). This means that the innovative input addresses the wholesome nature of food security to ensure that not only is it available to the public but also accessible and easy to utilize in a manner that promotes health. Contrary to most developed countries, food security in Africa is a major problem

that has seen the development of diverse programs to manage the situation (World Bank, 2010). In Kenya, Poulton & Kanyinga (2014) suggest that farming and improvements on farming are stagnant due to political influence and economic ability. This influences food security directly since political propaganda and lack of economic empowerment could negatively affect farming-related practice. Food security implies that all people have equal access to food that is nutritious and significant to their wellbeing (Bajagai, 2014). The achievement of food security, therefore, reflects a healthy and productive globe. Food security is directly affected by farming practices.

Maize is the dominant food crop in the County, thus, production of maize crop directly influences food availability and food security status of small scale farmers in Moiben sub county. Further, per capita maize consumption in Kenya according to Nyoro *et al.*, (2004) varies between 98 to 100kgs, which is equivalent to a minimum 2700 thousand metric tons annually. In addition, large scale production accounts for only 25 percent of the total production with small scale production covering the remaining 75 per cent (Export Processing Zone Authority, 2005). Recently, households have experienced loss of maize after harvesting due to a reduction of buyers. This situation is detrimental to the food security of Uasin Gishu since maize rotting in stores reduces the availability of food for all persons in the county. On the other hand, the county government has proposed new agricultural farming techniques that have not been fully implemented by farmers (Uasin Gishu County Development Integrated Plan, 2018). This threatens food security especially arising from changes in climate and a major population rise of over 200, 000 people (KNBS, 2019).

Agriculture contributes majorly to the economic livelihood of the county and its citizens, according to Kimiywe (2015), relative to other counties in the country. The Annual Development plan (2024-2025) from Uasin Gishu County reported to have conducted several training to farmers including; 8 field days in the year 2022-2023, exchange tours, agricultural trade shows and 4 held exhibitions as well as conducting training of common interest groups. From the report, it is clear that training is being conducted; however, the impact of such training has not been accounted for, and this necessitates the need to conduct research to establish the relationship the training will have on the food security of small-scale farmers, especially in Moiben Sub County, Uasin Gishu County, where the majority of the population engages in farming activities as an economic activity.

1.2 Statement of the Problem

In Kenya, despite the provision of programs in place to improve Food security such as storage of food for emergency cases as well as emergency fund to ensure food is available, yet the situation of food insecurity exists (Kimiye, 2015). Furthermore, large scale farmers are used (accustomed) to the utilization of research and technology to maximize farm produce, while small scale farmers rely on their traditional knowledge and patterns for farming. This reliance can be considered as a barrier to training of technological innovation that would help small scale farmers' households to improve their food security. The training and visit approach is popular in Uasin Gishu County as farmers attend meetings and summits organized by agricultural organizations then proceed to implement the lesson on their farms (Patel, *et al.*, 2019). Despite its popularity, this training method and its relevance to food security has not been assessed in Moiben sub-county. Kenya Integrated Agriculture Management

Information System (KIAMIS) has registered small-scale farmers in Moiben sub-county, totaling to 1,644, who engage in crop farming and 13,276 livestock farmers who both actively play a key role in attainment of food security in Moiben sub-county. Small scale farmers undergo training with the aim of capacity building to improve and increase on their production, This is however, not the case because no study has been conducted to confirm the statement that training of small scale farmers is conducted to improve food security and this drives the need to conduct the research to establish a relationship that exist between training and food security. In comparison with other sub counties, Moiben has a lower rate of farmers taking up training and advice from county government (CIDP 2019).

1.3 Purpose of the Study

The main purpose of this study was to establish relationship between training uptake and food security by small-scale farmers.

1.4 Objectives of the Study

The main objective of this study is to examine training uptake of small-scale farmers on food security in Moiben sub-county, Uasin Gishu County. The following are the specific objectives of the study:

- i. To examine the relationship between food production training on food security of small-scale farmers among households in Moiben sub-county, Uasin Gishu county.
- ii. To examine the effectiveness of financial literacy training on food security, among small-scale farmers in Moiben sub-county, Uasin Gishu County.

- iii. To determine the effectiveness of adoption technology on food security for small-scale farmers in Moiben sub-county, Uasin Gishu county.
- iv. To determine socio-economic factors influencing food security in Moiben sub-county

1.5 Research questions

1. What is the effect of food production training on food security for small-scale farmers in Moiben sub-county?
2. How is financial literacy training affecting food security for small-scale farmers in Moiben sub- County?
3. What is the effect of adoption of agriculture technologies on food security for small scale farmers in Moiben sub-county?
4. How do socio-economic factors influence food security for small scale farmers in Moiben sub-county?

1.6 Significance of the Study

The information derived from this study will benefit the residents of Moiben and the county government of Uasin Gishu by highlighting the effects of small-scale farmer training on food security. It is also hoped that the findings of this study will assist government and non-governmental organization to improve programme planning and offer programmes that meet the needs of small-scale farmers, and as a result improve food security in the region. Farmer associations may also benefit from the findings of this study because the findings can be incorporated into teaching methods to enrich the content and make agricultural extension education programmes meaningful to the needs of the small-scale farmers. This will help in the improvement of knowledge

based on small-scale farmer training which translates to smart farming. Moreover, a food secure population will benefit the Government of Kenya in terms of economic and social productivity from a healthy population. The study will be beneficial to students and other researchers' intent on the knowledge of small-scale farmer training and its relationship to food security. The findings are further significant in increasing the information available on food security that can be used by scholars, authoritative institutions such as Ministry of Agriculture and the public.

1.7 Scope of the Study

In the study on the effect of training small-scale farmers on food security the research was limited to small-scale farmers who have already undergone training in Moiben sub-county in Uasin Gishu County within a period of the last two years (2022-2024) at the beginning of planting seasons and harvesting periods. The targeted program were training program whose objectives were to improve food security through training. The size of the farms was therefore specified to 10-hectare sized farms or less. Food security focused on food availability, food utilization and food access aspects.

1.8 Limitations of the Study

This study anticipated the limitation of resources needed to gather extensive information on the relationship of training small-scale farmers on food security and total reliance of information about farming from Extension officers and information relating to farming only in Moiben Sub County. The study focused on training method, adoption of agricultural practices and financial literacy and its effects on Food security. This denied the study possible information that could enrich the findings. The study

may additionally be limited by social-cultural barriers such as the refusal to fill information such as number of people in a household and amount of money earned monthly, in the study, due to various beliefs regarding agriculture and food as well as low literacy level, absentee farmers, refusal to pick phone calls.

1.9 Assumptions of the Study

This study assumed that the respondents participated with honesty and integrity during the research hence avoided the provision of biased information and availability of the respondents throughout the research period.

1.10 Operational Definition of Key Terms

Food Security: The United Nations defines food security as the existence of a condition where all human beings have constant physical, economic, and social access to food that is safe, nutritious, and adequate to meet their wellbeing (World Health Organization, 2018). In this study, food security will mean constant physical, economic and social access to maize, vegetables, and animal products.

Food Availability: is an important dimension of food security, which discusses the sufficient supply of quality food from agricultural production (Wheeler & Von Braun, 2013). In this study food, availability refers to sufficient supply of quality food from agricultural production (Wheeler, 2013). Sufficient quantities of appropriate food are physically available. The food may come from domestic production, commercial imports or food assistance.

Food Utilization: underlines the importance of such processes as marketing, storage, processing, cooking practices, feeding practices and levels of nutrition to the attainment of food security (Barret, 2010). In this study food utilization concerns with

individual and household good use of the food to which they have access, appropriate food processing and storage practices, adequate knowledge and application of nutrition and child care principles, and adequate health and sanitation services, how food is shared within the household, compared with each person's nutrient requirements. Utilization also includes biological use, which is linked to a person's health.

Food Access: Income or other resources are adequate to obtain sufficient and appropriate food through home production, buying, barter, gathering etc. The focus here is on the economic access of households to food. Food may be available but not accessible to people who do not have adequate land to cultivate or enough money to buy it.

Small-Scale Farmer: A small-scale farmer is one who manages areas varying from less than one hectare to 10 hectares (FAO 2017) smallholding of land using their resources and relies on the produce for food consumption as well as income (Shabangu, 2016).

Training: Farmer training a type of education that takes place mostly in informal platforms to provide the farmers with the knowledge and experience needed for effective agricultural practice (Waarts, Ge & Ton, 2012). In this study, training will involve sharing farming knowledge in community meetings, agricultural meetings, Field days. Farmers' field day, Agricultural shows and Farmers field school.

Food insecurity: The United Nations' Food and Agricultural Organization (FAO) defines food insecurity in scale of mild to severe food insecurity. The closer to the severe side of spectrum a person is, the more a person's health and well-being is endangered by hunger.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

The study accorded experimental fiction appraisal on variables by giving a wider area of background of research theme in relations to previous academic works as well as records and documents written by other writers as regards food security, training of small-scale farmers, and associated effects. Literature reviewed were those that addressed food security, training of small-scale farmers, and associated effects in this study. Further in this chapter, the researcher included a conceptual framework and theoretical framework.

2.1 Food Security Concept

As the global population continues to grow, so does the need for food. Godfray *et al.*, 2010 identify food production as an increasing challenge with a growing populace. This challenge is stressed upon with the concern over the high number of human beings that are hungry, yet there is no control in population growth. According to Fanzo *et al.*, (2018), a better number of people in the globe do not get access to sufficient nutrients from food.

Food security is directly associated with farming activities and while extensive literature focuses on large-scale farming to feed the masses, small-scale farming and its produce are not well identified as a significant contributor to food and its security (Stewart *et al.*, 2015).

The United Nations suggests that for food security to be absolute, certain conditions have to be met. These include the availability of food, access to food, and the utilization

of food (Crush & Frayne, 2011). These conditions are additionally hierarchical as there might be food excluding access then the food may be accessible but fails to be utilized appropriately. Food security, therefore, encompasses the accessibility to food by all human beings; and this food must be safe and adequately nutritious to fulfill the dietary needs of individuals as well as ensure that the individual is wholly healthy (Bajagai, 2014). Concepts related to food security also include community food security and household food security. The Public Health Association of British Columbia defines community food security as a situation where all citizens have a food system that is safe, nutritious, personally acceptable, and sustainable and one that maximizes healthy choices, equal access, and individual reliance in the community (Bajagai, 2014).

In a study of the significant factors affecting the sustainability of community food security, Wabwoba & Wakhungu (2013) established that the participation of community members and environmental factors such as climatic conditions largely affect community food security. Bajagai (2014) specifically noted that the definitions of food security, are fictional at best, since equal access, having a nutritious diet, and maximizing of healthy choices was not a reality for all individuals. Despite food security being not fully realizable, different global, national, and local institutions have put sufficient effort towards achieving a modicum of food security. Given the concept of food security, it is very imperative to define food insecurity as the lack of physical, economic, and social access to basic nutritious food (Barrett, 2010). Additionally, food insecurity can either be chronic or acute. The world still struggles with food insecurity especially due to the increasing population, climate change, and the limitations in providing safe foods. Finally, the Food and Agricultural Organization defines food security as the situation where all individuals at all times have both physical and

financial capability to attain basic food (Thomas, 2006). Figure 2.1 outlines the dimensions of food security.

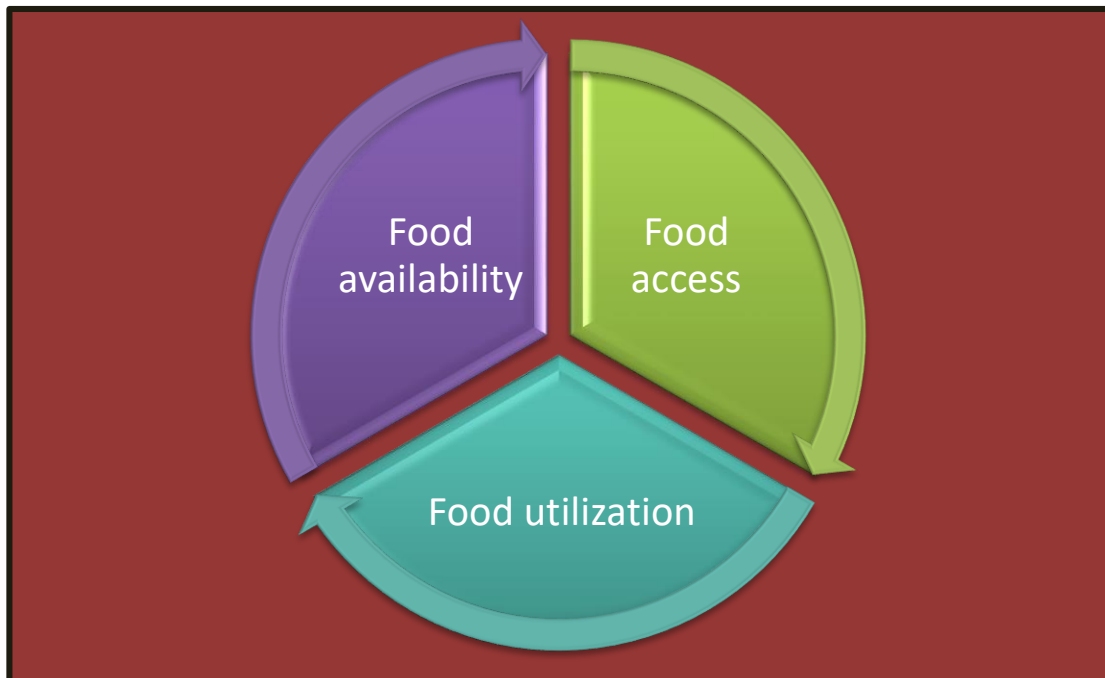


Figure 2.1. Dimensions of food security (adapted from Timmer, 2000)

Despite the rapid increase in the amount of food produced across the world that is enough to feed the entire global population, an estimated 1 billion people are reported to go to bed hungry (CGIAR, 2011). Several indicators have been developed and are widely used in analyzing food security and they include: dimensions (availability, access, stability and utilization). Africa Regional Overview of Food security and Nutrition 2017 report indicated an increase in the number of undernourished people in Sub-Saharan Africa from 200 Million in 2016 to 224 Million in 2017. Increased conflicts, adverse economic conditions and challenging global economic condition are factors attributed to food insecurity in the region.

Global food security Index report (2022) Kenya scored 53% and was ranked 82 out of 113 countries. Maize is the country's most important staple food crop and it contributes significantly to food security, maize production in Uasin Gishu county is mostly rainfed. Due to unfavorable weather, the national production fell by 2% in 2021, from 3.8 million tons in 2020 to 3.3 million tons in 2021. Rainfall began late in both seasons and distribution was AFA book of statistics poor throughout the country especially in October to December reports from (2022), the uncertainty influenced the food security situation especially the rainfall fed food production.

2.1.1 Food Availability

Food availability is an important dimension of food security which discusses the sufficient supply of quality food from agricultural production (Wheeler & Von Braun, 2013). The availability of food in a particular region means that the supply of food is enough to cater to the total population in that particular region. Food availability is often measured using the records of rainfall, the market survey of food, agricultural production, harvesting time, and consumption of foods (Burchi and De Muro, 2016). In Moiben Sub County, food availability is often related to rainfall, agricultural production, (Biwott and Ngeywo, 2015). In 2019 for instance Bii (2020) explains that the maize yield in Moiben was affected by too much rainfall which led to the rotting of crops in the fields. Furthermore, a better number of farmers decided not to sell to the Kenya Cereals and Produce Board quoting unfair prices and delayed payment. Maize is one of the most important cereal crops that provide staple food to large number of human populations in Moiben sub-County. Food security and social-economical welfare of the farming population depends on maize cultivation (Ajani and Onwubuya,

2012) and small scale farmers represent the highest number among the farming population thus attaining food security is critical.

Maize is the main source of food for the poor rural people. The grains are rich in vitamins A, C and E, carbohydrates, essential minerals, and contain 9% protein; they are also rich in dietary fiber and calories, which are a good source of energy (Mghenyi, 2006). Improving maize productivity will not only reduce food insecurity and government spending but will also increase opportunities to many jobless youths and other non-maize producer farmers through commodity production value chain. The country suffered a maize deficit of 6.8 million bags in 2012, and was forced to spend millions of shillings for maize importation (Muendo, 2012). At the start of the year 2014, the deficit was also reported to have increased to 10 million bags by the ministry of Agriculture and they recommended that the shortfall to be bridged by importation from the neighboring countries. This directly affected the availability of food in Moiben and also Uasin Gishu since most of the residents depend on maize from their farms or sale.

2.1.2 Food Access

In Kenya, Oluoko-Odingo (2011) explains that the quantity of food is more important in comparison with the quality of food. Primarily though, most staple foods in Kenya are dietary rich hence translating to quality food. Hansen *et al.*, (2011) additionally suggest that most Kenyan adults take an average of three meals per day. Amendah, Buigut, & Mohammed (2014) nonetheless explain that in poor families, the frequency of meals is limited to twice a day meal or one large meal in a day. In urban areas, (Amendah *et al.*, 2014), the lack of access is attributed to economic difficulties while in

rural areas, lack of food access depends on the climate, food output, and commercial activities associated with food.

The availability of food does not guarantee its access to every individual (Porkka *et al.*, 2013). Food access, therefore, revolves around income, expenditure, and the capacity to buy food among individuals, households, and communities. This further reflects that access to food requires an individual to have enough resources to acquire food. According to Wong *et al.*, 2011, affordability and the quality of healthy food are dependent on diverse factors including the income of an individual or a family as well as dietary preferences. Additional indicators in the access of food include the price of the food, the frequency of meal consumption, and the culture of consumption in a region.

Compared to other counties, availability and food access in Uasin Gishu County is 'better especially given the practices of both small- and large-scale farming. Cheptoo (2014) explains that Uasin Gishu has often been described as the breadbasket of the country, due to its massive food production. This implies that access to food in the county is easier due to local availability, good quality, and affordable prices. In Moiben Sub County, access to food is almost constant due to a large number of small-scale farmers and backyard gardening practices that ensure a constant supply of food for families (Biwott & Ngeywo, 2015). Nevertheless, food access is threatened by rainfall challenges that lead to crop destruction, pests, diseases, and the lack of up-to-date farming knowledge. Additionally, food access is limited by insufficient awareness through training, Bii (2020). Training on food access aims at creation of financial awareness which affects food security situation.

2.1.3 Food Utilization

Food utilization underlines the importance of such processes as marketing, storage, processing, cooking practices, feeding practices and levels of nutrition to the attainment of food security. Barrett (2010) explained the importance of the dietary quality of available food. According to the author, Townsend *et al.*, (2001) believe that there is a correlation between food insecurity and obesity. According to them, in a logistic regression analysis, mildly food insecure women were 30% more likely to be overweight than those who were food secure. Thus, food insecurity had an unexpected and paradoxical association with overweight status (Townsend *et al.*, 2001). Farre *et al.*, (2011) elucidate on the potentials of Genetic Engineering as a strategy for tackling nutrient deficiency in food. They further explained that Genetic Engineering offer prospect of nutritionally complete staple crops that could realistically address malnutrition on a global scale (Farre *et al.*, 2011). According to Ivers *et al.*, (2009) HIV infection reduces the efficiency of nutrient absorption and utilization due to compromised immunity. Malabsorption of fats and carbohydrates is common, which invariably affect the absorption and utilization of fat-soluble vitamins. They conclude that infections can lead to metabolic changes, including changes in insulin and glucagon levels, result from both reduced food intake and the immune response to infection. (Ivers *et al.*, 2009). A study in Uasin Gishu county, reports prevalence of undernutrition among elderly to be 41% and stronger relationship between food security and nutrition of the elderly (Bore, Samwel Waku-Wamunga, & Serem, 2019). Further, in Uasin Gishu a study done in Kamkunji estate indicates among 15,000 house hold 16.2% of them were food secure and household headed by women were food secured compared to household headed by men (Tioko, 2015)

2.2 Small-scale Farming

There are many varying scholarly inputs on small-scale farming. The concept incorporates several key elements. This could mean; the family unit otherwise known as family farms (Dogliotti *et al.*, 2011) predominantly provides a farm on which labor. It could also mean farmers and farms that are resource-poor about farming and financial inputs (Pannel, Llewellyn & Corbeels, 2014). Another varied definition could be based on farms of a particular size, most commonly two hectares (World Bank 2010). It could also mean farms that are largely run for subsistence crops. In the Moiben sub-county, a significant percentage of farmers engage in small-scale farming (Wakhu-Wamunga, Mukabane & Wakhu, 2016).

The high percentage consequently means that small-scale farming is significantly important in the region. The adoption of new farming approaches by some small-scale farmers has also been counted as positive for farmers in enhancing agricultural practice and food security (Shelburne *et al.*, 2017). This implies that if more farmers adopted those training recommendations, then there would be better outcomes for food security not only in Moiben but also the rest of Kenya. Small-scale farming is widely practiced in Kenya, particularly, in the highland areas (Kimenyi, 2002). The Kenyan economy is still dependent on agricultural activities. While there are large farming lands, most of the population still practices small-scale farming. Historically, Kenya relied heavily on agriculture, but this has changed with the emergence of other economic activities such as tourism, banking, and mining. Riungu (2011), however notes that, in Kenya, small-scale farmers have been continually marginalized and face more challenges compared to their counterparts in large-scale farming. Nonetheless, a variety of programs involving both small-scale and large-scale farmers have been proposed and

implemented to improve agriculture in Kenya. The most significant program to farmers has been observed to be training to improve the yields of crops and diversify farming.

Small-scale farmers in Kenya mainly grow crops such as maize, wheat, grains, potatoes, and vegetables (Stephens *et al.*, 2012). Korir (2011), specifically notes that in Uasin Gishu, the food crops grown include: maize, wheat, millet, legumes, and traditional vegetables. These crops are consumed at home, and those with farm sizes of more than one acre often sold a portion of their produce (Kiplangat & Rotich, 2012). Maize and wheat are largely grown in Moiben, though Waku-Wamunga, Mukhabane, and Waku explain that this has recently changed in favor of cash crops. Most small-scale farmers are attracted to the returns from cash crop farming and as such reduce cultivation of food crops. However, Bii's (2020) observation on maize rotting from extensive rainfall, could limit food produce hence cause food insecurity.

In a study of smallholder markets, Fischer and Qaim (2012) explain that small-scale farmers are more likely to use family labor as opposed to hired labor as part of the farm inputs. Sheahan, Black, and Jayne (2013) also argue that small-scale farmers are likely to underutilize fertilizer hence differential yields. The size of land for most small-scale farmers determines the inputs as most farmers do not want to spend money on appropriate fertilizers then fail to get returns (Cheptoo, 2014). Biwott (2014) however discusses the increased use of agrichemicals in Moiben Sub County such as Diammonium phosphate (DAP) fertilizer, which has high phosphorus content and is good for root development. According to Akenga *et al.*, (2018)'s study, that in Uasin Gishu, 85% of farms are between 0 to 10 acres. This means that most farmers in Uasin

Gishu are small-scale farmers since only 11% own 10 to 50 acres of land (Akenga *et al.*, 2018).

The Food and Agriculture Organization of the United Nations is constantly taking a hands-on approach to agriculture more so small-scale farming for sustenance and overall food security. According to a research study on small-scale family farming conducted by the FAO regional initiative in the Near East and North Africa region, the primary aim of this type of farming is to reduce rural poverty (Clapp, Newell, and Brent, 2018). The end goal for the research, and studies they undertook was to make recommendations, and suggest policies to support and improve the functioning of small-scale farming. This is aimed at aiding the small-scale farmers by raising their chances of success with their farming projects. In addition to publications made, there are also forums set up for this purpose. Education, sensitization, and training are being emphasised for ultimate food security globally.

Diao, Hazell, Thurlow (2010) suggest that small-scale farmers have a large responsibility in the development of Africa as their produce feeds most of the population. In Uasin Gishu, farmers often convince other farmers to adopt new methods of farming for better productivity (Shelburne *et al.*, 2017). This implies that small-scale farmers have a significant role in influencing better practice through the training they receive, by sharing knowledge with other farmers. Consequently, the focus on improved small-scale farming practices through training may have better influence on food security in the end. A successful report on Collaboration between USAID and government to implement the advanced Maize Seed Adoption Program (AMSAP), in which 30 agronomist trained 25,000 farmers, resulted in farmers increasing maize

production from 2.2 metric ton per hectare to 7 metric ton, and increasing income by 1500 USD. In Kenya, One school One acre program has been rolled out to train at least 20,000 students and parents on agriculture and food production with aim the parent will replicate the best farming practice from the model farms and increase their food production which in the long run address the issue of food security through attainment of food security at household level (MasterCard, 2023).

2.3 Agricultural Extension and Food Security

2.3.1 Effectiveness of Adoption of Technology on Food Security

Agricultural extension works in a wider knowledge system that embraces different components of which research and agricultural education are some (Rivera, *et al.*, 2001). The Extension services mainly involve sharing of agricultural information to the farmer. These messages are what constitute information, which the farmer absorbs and tries to implement in their farming practices.

According to Jones and Garforth (1997), agricultural extension is important because in the first place, information about good or new agricultural practices in a particular environment from research station or farmers experience can be assembled synthesized and made available to use.

Secondly, this information can be used especially for educational purpose to further investigate it or to disseminate knowledge. Training interventions focus on knowledge or skills transfers on the topic of food security for the benefit of not only the farmers, but also the entire global population (Stewart *et al.*, 2015). In relation to the region or area of interest, the objectives for training small-scale farmers are tailored accordingly.

One of the most significant roles of small-scale farming, or domestic and family farming, is providing food and nutrition security for the society starting from the basics of the family (Gray *et al.*, 2014). Global agricultural production has kept up with the population increase over the past half a millennium primarily because of the intensification of agricultural practices (Tilman *et al.*, 2011). This intensification has further been accompanied by the call for sustainable agriculture due to rising competition for land, water, and agricultural resources (Garnett *et al.*, 2013). Despite the global appreciation of production, accessibility to food remains unequal. This is therefore a core objective for training small-scale farmers on food security. This implies enhanced training for increased sustainable food production. It is also important to develop and research more on the relation of the population and its growth to the production of food.

Small-scale farmers are important to achieving food security; as there is potential in small-scale processing that has not been fully exploited (Gordfray *et al.*, 2010). How small-scale farmers may contribute to food and nutrition security remains a challenge in many developing countries (Recha *et al.*, 2014). Despite the small-scale farmers being the main producers especially from rural areas, they are frequently the most food insecure. Small-scale farming contributes to food and nutrition security, which is enhanced through relationships with entrepreneurs and dealers through training in the knowledge of inputs and business skills. Global initiatives such as the United Nations through the Food and Agriculture Organization should find new ways on how to assist small-scale farmers.

According to Coleman-Jensen, Gregory, and Singh (2014), food-secure households have access to sufficient and nutritious food, which translates to an active family. Small-scale farmers who use family labor, should produce enough to feed them while sustaining their labor. Hence, small-scale farmers require and continue to receive more education and training. The regard for the environment makes it more critical for educative forums, because, farmers take part in the production of both food and non-food products on a small-scale.

According to Ngele et al. (2015), most farmers do not attend extension programs for training, which poses a threat to food security. Nonetheless, the handful who attend frequently contribute to the informal training of other farmers by providing farming advice, which leads to improved practice. It has also been asserted that agricultural extension is a key element currently employed in the improvement of agricultural development (Larsen & Lilleør, 2014). Training and visit programs have been widely adopted in Africa and Kenya, with Muatha, Otieno, and Nyikal (2017) emphasizing the importance of extension awareness. The training and visit technique is popular in Uasin Gishu, where farmers attend seminars and summits held by agricultural organizations before implementing the teachings on their farms (Patel et al. 2019). In Africa, and particularly in Kenya, organizations such as the One Acre Fund support small-scale farmers in extension services (Youn & Forti, 2016). The organizations further visit farmers in their particular locations to appraise the application of the training and provide assistance as needed. These efforts have contributed to not just improved farming methods but also increased food security. Ateka, Onono-Okelo, and Etyang (2019) found that combining farmer field schools with training and visit programs is more beneficial. Despite the employment of these technologies to improve farming and

food security, Braun and Duveskog (2011) raise concerns about their long-term viability in agriculture and conservation. Davis et al. (2012) argue that in East Africa, the outcomes of farmer field schools, training, and visit programs are inconsistent, making it difficult to assess the efficacy of agricultural extension.

In Tanzania, one of the successful extension programs with positive outcomes for food security is the Rural Initiatives for Participatory Agricultural Transformation (Lilleør & Lund-Sørensen, 2013). The program provides technology solutions for farmers who are accustomed to conventional farming methods. This project has important contributions for farmers in rural areas. Moiben sub-county is one of the less urban places in Uasin Gishu that requires practical transformation agricultural training, which has a significant and good impact on food security. As mentioned by Ateka et al., 2019, combining these extension initiatives is also beneficial in increasing agricultural outcomes and establishing sustainability in practice. The successful implementation of farmer training, as well as the favorable outcomes of the research mentioned above, show the potential for success in Moiben through small-scale farmer training. Uasin Gishu county integrated development plan 2023-2024 proposed to train 398,060 farmers in the entire county in a period of five years. In the same plan, Moiben sub-county intends to develop a cold room for harvested produce and provide certified seedlings for Macadamia, coffee, tea crops to small-scale farmers to diversify food production and improve food security status. Hence, this study aims to evaluate effect of adoption of such technology in Moiben towards food security.

2.3.2 Effectiveness of Financial Literacy Training on Food Security

Financial literacy is the ability to process information and make informed decision on personal finance (Mutua 2010). Financial literacy is an important element for small-scale farmers to pave ways for increased productivity, income and profitability and improved livelihood. Financial literacy will assist farmers have understanding of cash flow, evaluating risks and being able to monitor progress in terms of money management. Financial literacy will also help small scale farmers recognize the importance of regular savings, thoughtful expenditure and have understanding of how to calculate cost and profit margins, and work out cash flow plans. Financial literacy will further enable farmers have understanding on the role of financial service providers to their products.

Koigi (2012) indicate majority of small-scale farmers in Kenya, especially Uasin Gishu county, lack financial literacy. Conversely, they lack financial inclusion, judging from the fact that there are few or no financial institutions available in the county. The Kenyan Government, together with other non-governmental organizations (NGOs) have done little to ensure that the farmers have financial know-how, in order to make sound decisions regarding their finances to improve their production in the long-run. However, one of the 6 institutions that have focused on this subject matter is the Agricultural Finance Cooperation (AFC). According to the company's website, in the areas in which it operates, it receives up to 90% of loan applications, processes 85% of them, and uses 83% of its revenue for research and development (Agricultural Finance Corporation, 2017). The parastatal also claims that it gets up to 93% of new clients annually (Agricultural Finance Corporation, 2017). Although these claims and this data cannot be substantiated, the steps that the organization has undertaken to improve

financial education among small-scale farmers, helping them to make sound financial decisions in the process, and improve the agricultural sector in western Kenya are laudable.

Numerous low-class people especially in developing countries as opposed to the middle class or high-class people rely on farming on their parcels of land for survival. A majority of the world's poor live in rural areas and rely on subsistence farming to survive (Food and Agriculture Organization [FAO], 2008). Small-scale farmers are credited with producing up to 80% of food in poor nations (International Fund for Agricultural Development [IFAD] 2015). This means that small-scale farmers may not only feed themselves, but also supply metropolitan markets. Agriculture has and continues to dominate the economies of the majority of African governments. Because the agricultural sector employs a considerable proportion of the African labor force, incomes from these activities provide a source of income for many (IFAD, 2012). Small-scale farming presents an economic livelihood strategy for the majority of the world's population more so in Africa.

In the absence of a formal established economy and access to the market or commercial organizations, subsistence farming is frequently the primary means for households to meet their food needs. A greater proportion of African small-scale farmers are thought to produce agricultural products for survival (Salami, Kamara, & Brixiova, 2017). Despite this central role in the food system, World Bank statistics show that small-scale farmers themselves often belong to the continent's poorest and marginalized people (Azadi *et al.*, 2016).

The role of small-scale farming especially in the African continent has led to the growth and development of many rural areas. There is also increased revenue from small-scale farming by various countries. Because of sufficiency in training on food security, this has led to better-skilled practices in farming, sufficiency in household food and increased revenue, therefore, improving the economies of these countries (Stewart *et al.*, 2015). The importance of small-scale farming in contributing to household food security, as well as, providing a productive economic livelihood strategy in various regions, has established small-scale farming as a key contributor in food security. The Annual Development Plan (2022-2023) for Uasin Gishu County established loan disbursement as an empowerment program for the agriculture sector; however, no record of disbursement has been recorded, resulting in struggles among agricultural participants, particularly small-scale farmers who, in most cases, lack financial inclusion from other financial institutions such as banks. Sang and Keror (2012) in Moiben Sub County demonstrate that training has a considerable impact on agricultural financial management. The introduction of financial systems, such as farmer financial assistance programs, is sometimes followed by training requirements. This accounts for economic significance as training enables small-scale farmers to produce better and sustain the economy through engaging with microfinance institutions. According to Kangogo, Lagat, and Ithinji (2013), training may not be economically significant because some farmers decide to stop farming owing to new practices, while others use credit and loans for various projects. This has an impact on training and may be counterproductive, particularly in farming, as practices are anticipated to improve, but the income boost produces a diversion into other economic pursuits.

2.3.3 Effectiveness of adoption of Agricultural technology

Access to extension services is critical in promoting adoption of modern agriculture. Report from feed the future (2011), points out how persistent food security in Kenya has been attributed by low agricultural productivity, declining land size, climate change and variability. The solutions to such problems such as use of improved seed and fertilizer has positively impacted productivity and food security. Additionally, Green revolution in Africa, an organization that seeks to promote agricultural transformation and improve food security, highlighted that without mechanized agriculture, productivity suffers drastically and lowers farmer's earnings from agriculture. Recommendations from Malabo, Montpellier Panel (2014), developed National Agricultural Mechanization Investment Plan to boost productivity. To attain these goals, farmers from developing countries must spend more on fertilizers, seeds and agro-chemicals. Access to extensions services therefore creates a platform for acquisition of relevant information hence promoting technology adoption. Access to information through extension services reduces the uncertainty about a technology's performance, hence may change individual's assessment from purely subjective to objective over time, thereby promoting adoption.

Related to this is access to extension services, which was also found to be positively related to the adoption of modern agricultural production technologies and was found to be significant at 10 percent level. This means that farm households are more likely to adopt modern agricultural production technologies if they have access to extension services. Extension services are one of the prime movers of the agricultural sector and have been considered as a major means of technology dissemination.

Visits by extension agents to farmers and participation of the latter in field days, tours, agricultural shows or seminars are cost effective ways of reaching out with new maize technology. Regarding the visits, which were paid by extension agents, 41% of households in Moiben sub-county declared receiving at least one visit by extension agents; about 78% were adopters and only about 27% were non-adopters illustrating the low output of extension services which most probably impacted negatively on adoption decision. (Adoption of a New Maize and Production Efficiency in North Rift Kenya, Mignouna *et al.*, (2010).

2.3.4 Effectiveness of Adoption of Agricultural Technology on Food Security

Technological innovations are particularly important for small-scale farmers as they can maximize the output from agricultural practice using sustainable technology. Ton *et al.*, (2013) identified interventions that had been used to train farmers in promoting new technology to improving food security. Some of these technologies include genetically modified foods, conservation agriculture, and new fertilizers (Meena *et al.*, 2016). In response to the loss of soil biodiversity and climate change from unsustainable agriculture, precision agriculture was introduced to advance agriculture such as nanotechnology (Duhan *et al.*, 2017). The application of this technology allows for the detection and profiling of microorganisms for the detection of benefits and harm. For farmers to adopt these new technologies, they have to be trained so that they maximize the yields from their agricultural produce. While large-scale farmers are used to the utilization of research and technology to maximize farm produce, small-scale farmers rely on their traditional knowledge and patterns of farming. This reliance can be considered a barrier to the training of technological innovations that would help small-scale farmers improve food security.

Davis *et al.*, (2004) explain that the lack of adequate government support and technological infrastructure to support small-scale farmers has created a very extensive gap between small-scale farming and food security. This implies that technological input on the training of farmers is affected by both political and economic tensions, which limit their technological application of training to small-scale farmers. The use of technologies in farming has been successful in other developed countries and this means that Africa and Kenya, in particular, can benefit from the training of technological input in farming and small-scale farmers. It is further important to note that some of the innovative practices are being applied by small-scale such as the use of genetically modified seeds to grow crops.

In Uasin Gishu, the County Integrated Development Plan (CIDP, 2018-2022) reports on the implementation of training of 60,000 farmers along with demonstrations of new farming technology and empowerment programs such as the kijana na Acre program (CIDP, 2018-2022). In the training of mechanized farming, the Chebororwa agriculture center has been established as a multipurpose hall with equipment such as seed drill, potato planter, farm tractor, and maize planter to assist in the mechanical training of farmers (CIDP, 2018-2022). The plan further intends to use technology in farming training and farming strategies including soil management technologies, artificial intelligence crop pests, and disease control, and further mechanization of farming.

2.4 Theoretical Framework for the Study

This study adopted neo-Malthusian theory. It displays how increase in population will have an impact on food production, which will eventually influence food security.

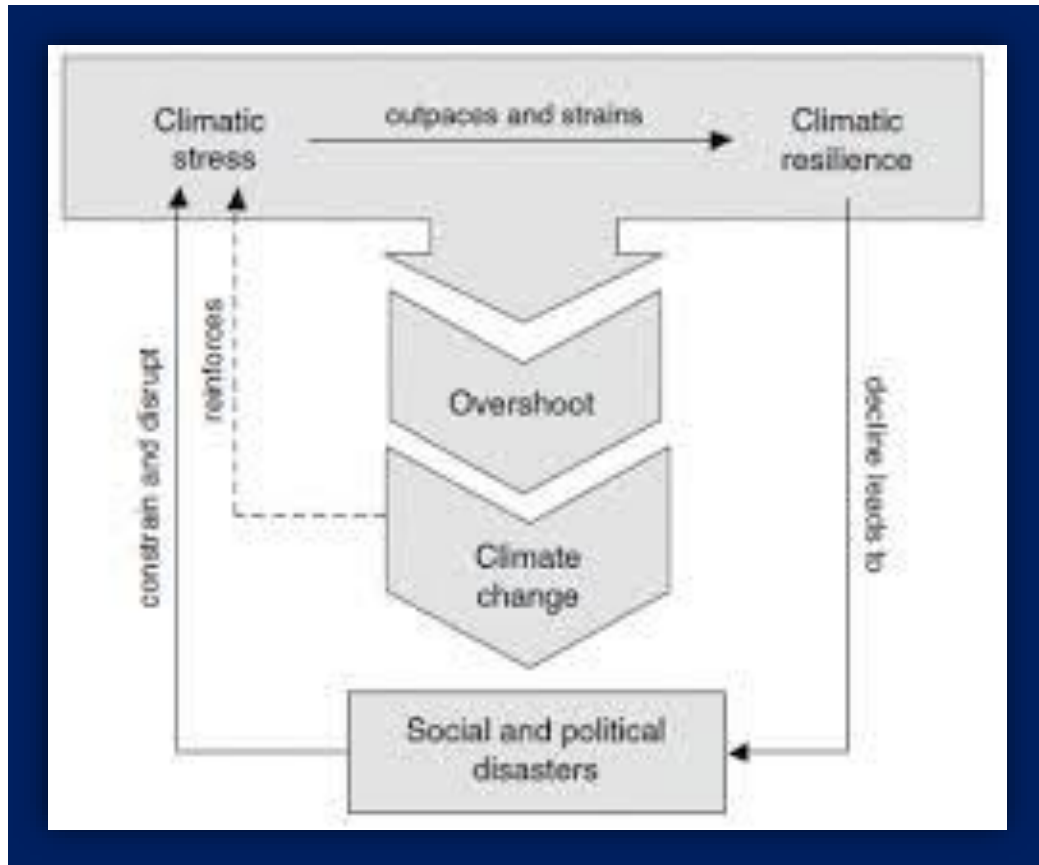


Figure 2. 2. Theoretical Framework. (source: ebrary.net)

The theory supports the study in that Food security situation is predicated to worsen due to population pressure, which implies the resources, will be inadequate for the growing population and a situation that is food insecure occurs. However, if the increasing population then develops creative ways on how to manage the resources to avoid over exploitation, food security situation may be improved.

2.5 Conceptual Framework for the study

The conceptual framework in figure 2.2 addresses the interaction between food security, various training aspect for small-scale farmers, and the related effects. Food security situation is influenced by independent variable which include personal factor such as educational level the higher the educational level the more food secured an individual is, for institutional factor the number of training personnel the more the training the food secured situation improves and when they interact, food security situation can either experience food security or insecurity, intervening variable also impact the food security and these are the competency level of the training personnel, the nature of the training and the frequency of the training. Economic factor which is also independent variable influences food security the level of income provides access to food and promotes food security.

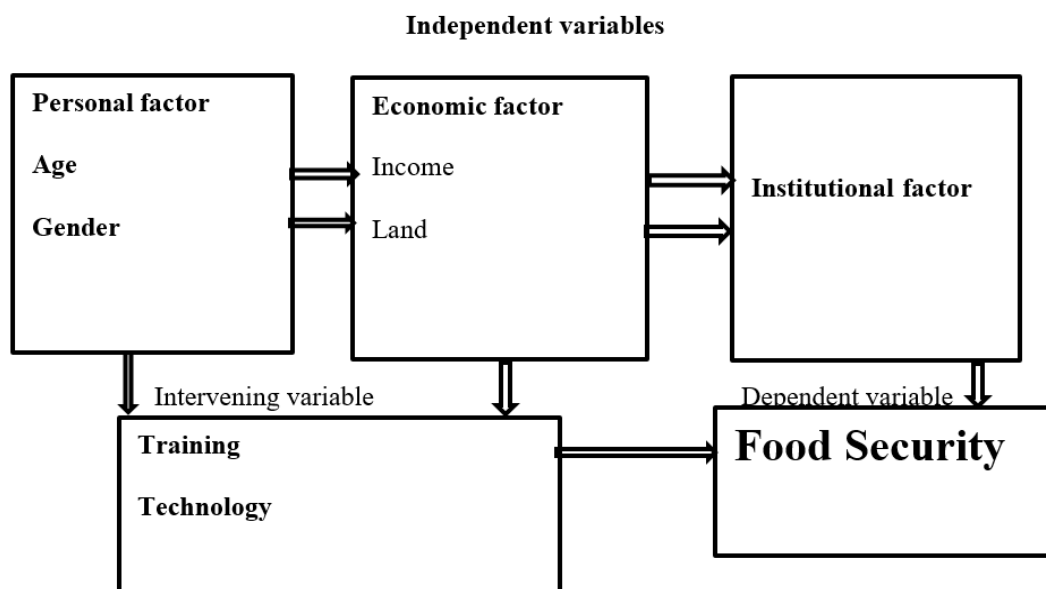


Figure 2. 3.: The conceptual framework

Source: Author, 2025

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

The chapter explains the methodology the researcher used to ensure achievement of the study objectives. The methodology included research design, study area, target population, the sampling technique, sample size, data collection instrument, validity and reliability, data analysis procedures as well as ethical considerations.

3.1 Research Design

The study adopted descriptive design. Descriptive research design helped to provide answers to the questions of who, what, when, where, and how associated with a particular research problem.

3.2 Location of the Study

The area of study was Moiben sub-county, which is one of the administrative units found in Uasin Gishu County. According to the 2019 Kenya Population and Housing Census, Moiben sub-county has an approximate population of 180,000 people within its five locations, which are Tembelio ward, Sergoit ward, Meibeki ward, Moiben ward, and Kimumu ward (Republic of Kenya, 2019). Figure 3.1 shows the location of Moiben sub-county in Uasin Gishu County. Uasin Gishu County divides into three agro-ecological zones (AEZs) namely; the upper highlands (UH), upper midlands (UM) and lower midlands (LM) zones. High and reliable rainfall experienced in the county support crop farming, livestock rearing and forestry. The major crops in the county are maize, beans, wheat, sunflower and potatoes while the livestock include dairy farming,

beef cattle, poultry, sheep, goats, pigs, beekeeping, rabbit farming and fish farming. The mean annual total household income is KES 871,076. The mean annual on-farm income earned by households in Uasin Gishu County is KES 334,320 with crop income accounting for 62% compared to livestock income which accounts for 20% (GoK, 2014). According to the Kenya Population and Housing Census (KPHC) of 2019 the total population of Uasin Gishu County stood at 1,163,186 in 2019 and it is projected to grow to 1,257,330 by 2023 at a growth rate of 3.8% which is higher than the national population growth rate of 2.9%. Approximately 56.1 % of the County's population is concentrated in the rural areas whereas 43.9% lives in urban areas. Poverty rates in the county are estimated at 47% compared to 43.37% at the national level. Access to water in the county is relatively high.

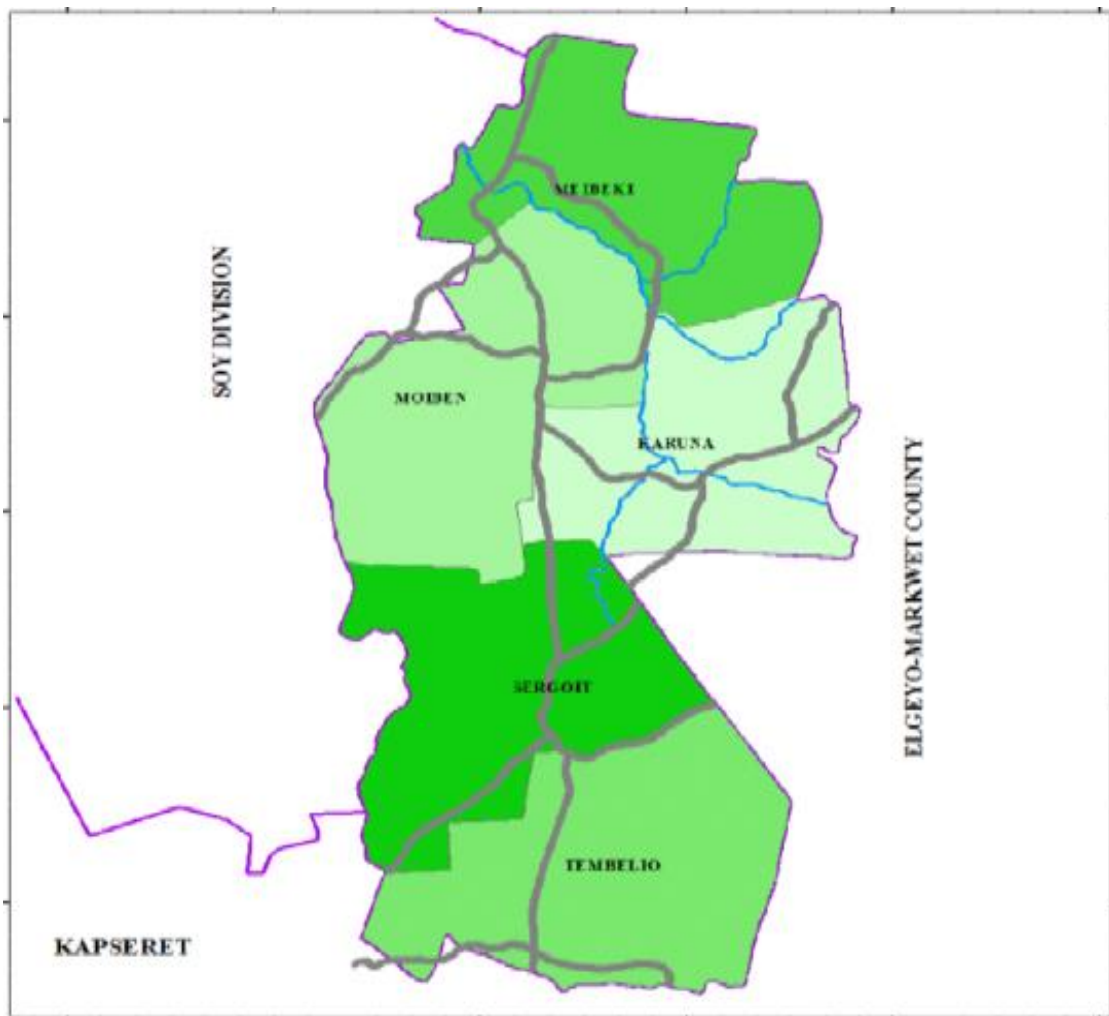


Figure 3. 1. Moiben Sub-county, Moiben Location (Source, Akenga, 2020)

Moiben stands at an altitude of more than 2000 meters above sea level and has a rainfall range of 900-1100mm. The rainfall increases with altitude and its general distribution are high peaks in April and August and dry months are January and February (Global Historical weather and climate data, 2024). Moiben has rich volcanic soil around Segero and the Moiben rural center and well-drained deep brown loam clay at Moiben center (Muchena, Wamicha &Njoroge, 2012). The bottomlands in Moiben have poorly drained soil and in the plateau parts, there is well-drained, deep dark red, friable clay. The agro-climate zone is at zone II with ecological and soil characteristics that support wheat, maize and barley farming as well as the rearing of livestock.

A broad diversity of agricultural commodities was grown in the sub-county. Of these commodities, various value chains have been prioritized as being strategic for the county as indicated in the County Integrated Development Plan (CIDP, 2018-2022) and the Agriculture Sector Development Support Programme (ASDSP, 1st July 2017 to 30th June 2022) as well as by government institutions such as the Kenya Agricultural and Livestock Research Organization (KALRO). The main economics activities include both large and small scale maize, wheat, passion fruit and dairy farming.

3.3 Target Population

This study targeted population was 10,869 small-scale farmers from Moiben sub-county who have undergone training carried out by the County Government of Uasin Gishu. This information was obtained from County government of Uasin Gishu Annual development plan (2024-2025) where knowledge transfer inform of training took place. The nature of farming of the small-scale farmers include farmers who practice subsistence farming mainly to attain food security at household level and it is mixed farming system. Population refers to an entire group of individuals, events or objects having a common observable characteristic. Kothari (2004) describes a census as a complete enumeration of all terms in a population. The target population was drawn from selected five wards within Moiben Sub-county. The five wards included Sergoit, Kimumu, Karuna/Meibeki, Tembelio and Moiben. The population of this study was all small-scale farmers of these five wards. Survey on food security was first conducted, the heads of farming families were approached, and the input of these farmers was very instrumental in the findings of the impact of training small-scale farmers on food security.

3.4 Sample Size

The sample size for this study was 385. Yamane' (1967) extended formula for determining the sample size per strata was adopted;

$$n = \frac{N}{1 + Ne^2} = \frac{10,869}{1 + 10,869(0.05)^2} = 385$$

Where: N= Target population
 Sample n= Sample size
 Error of sampling= $e^{(0.05)}$

Table 3.1: Number of Questionnaires per Stratum (KIAMIS, 2024).

Ward	Targeted population in each ward	Sample size for precision € of ±5%
Tembelio	3368	90
Sergoit	2246	80
Meibeki	2345	83
Moiben	2562	90
Kimumu	348	12
Total	10869	385

3.5 Sampling Procedures

The sample size produced adequate data for analysis and making conclusive generation.

It was used to select respondents who were household heads in the five wards of Moiben

sub-county using a simple sampling technique. Gay (2002) identifies random sampling as the best form of sampling because it allows members of a population to have equal and unbiased chance of appearing the sample.

A stratified random sampling technique was used to obtain sample from each cluster at approximately 5% proportionately. The sampled population was stratified into five wards; Karuna- Meibeki, Kimumu, Tembelio, Segoit and Moiben. They were selected to form the sampled population of the study. This procedure was well suited in situations with greater number of the population to ensure equally inclusive strata (Bryman & Bell, 2015; Cooper & Schindler, 2011).

3.6 Data Collection Instruments

The data in this study was collected using self-administered research questionnaires. The researcher used 5-point Likert scale structured questionnaires to collect the information from the small-scale farmers in Moiben sub-county, Uasin Gishu County. Questionnaires are tools for collecting data and provide an efficient way of response collection from a large sample prior to quantitative analysis. (Gupta *et.al*, 2011). The questionnaires were structured as both the open-ended and closed-ended. In open-ended questionnaires, the responses from respondent were not restricted, however, for close ended it was structured in a Likert scale. The questionnaire was able to assess the food security status using Food insecurity experience -based measurement scale.

3.7 Pilot Study

Borg and Gall (2006) recommended research instrument pretesting to check the reliability and validity. A total of 20 questionnaires were administered at Ziwa ward that were not to form study sample where it took fifteen minutes per questionnaire to

complete. Ziwa was preferred because it had similar condition as the study area. This was to check for questions clarity and enable modifications where necessary to allow consistency and viability of the gathered information revisited for corrections before issuing to the study respondents. Questionnaires were issued to 20 respondents (5.2%) of the sample size. According to Gill *et al.*, (2010), sample size for pre-testing will always vary between 5-10 per cent of the main study sample size based on costs involved, period to be taken and real practicality. This includes question modification, how it flows, as well as sequencing patterns. The pilot study helped in identifying deficiencies in study approach and data instruments implementation and gathering processes (Cooper & Schindler, 2011). The pilot respondents were randomly selected in Ziwa ward with similar characteristic to the selected wards in Moiben sub county, Kenya. Validity and reliability test was conducted and cronbach alpha was 0.8.

3.8 Validity and Reliability

Validity of research instruments, measured what it purports to measure. Both construct and content validity was carried out with aim of ascertaining validity of the research instruments. According to Oluwatayo, (2012) content validity aims to ensure the research items sufficiently cover the content of interest and whether it seems relevant and appropriate for assessment. Content validity was achieved by checking the objective captured in the questionnaire item with the help of the supervisor. Face validity was concerned with font size, not causing difficulties in visibility, available space, or presentability. This is done to ensure that the respondent has enough space to react and that the layout of the questions encourages the respondent to respond quickly. The instrument demonstrated both types of validity.

Reliability of the research instruments, measured the level at which a study tool yielded a set of ideas that were consistent after measuring several times (Saunders, Lewis, & Thornhill, 2009). Test-Retest reliability assesses consistency of the results, where Cronbach's Alpha was used to measure this reliability. The criterion used was the Cronbach Alpha of 0.7 and above (Cooper and Schindler, 2008). Cronbach's alpha, α (or coefficient alpha), developed by Lee Cronach in 1951, measure's reliability or internal consistency's of the questionnaire was determined using pilot data from a sample of respondents from Sergoit Ward. The terms were measured by a 5-pont Likert-scale, which ranges from strongly disagree (1) to strongly agree (5). Reliability using Cronbach's Alpha to measure internal consistency. Cronbach Alpha was established for every variable. Following methodical approach, in development and approval of the research tools, the questionnaire was piloted in Sergoit ward, tested for any unlikely yet possible difficult or ambiguous terms. This helped to determine certain terms within a scale measure the same construct. A survey on the effects of training small-scale farmers on food security in Moiben sub-county, Uasin Gishu County was sent to 20 respondents. The survey consisted of 21 terms and the value of Cronbach's Alpha for the survey was $\alpha=.810$

The formula for Cronbach's alphas:

$$n = \frac{N}{1+Ne^2} = \frac{10,869}{1+10,869(0.05)^2} = 385$$

Where:

- N = the number of terms.
- \bar{c} = average covariance between term-pars.
- \bar{v} = average variance.

The reliability Analysis as follows:

Table 3.2 Reliability Statistics

Cronbach's Alpha	Number of Items
.810	21

The results in table 3.2 ($\alpha = 0.810$), means that the internal consistency was acceptable and it was concluded that there were good.

3.9 Data Collection

The respondents were guided the researcher who were trained on how to administer the questionnaire on how to respond to the question asked and it took fifteen minutes in filling in the questionnaire after which the researcher collected the filled questionnaire. This strategy for data collection helped in increasing the response rate to 100% and all the items were dully filled within a period of one month commencing July 2024. It additionally extracted the required data from the respondents and gave the researcher superior comprehension of the outcomes (Creswell, 2003). To enable the data collection procedures, the researcher sought for an introduction letter from University of Eldoret (Appendix IV) and also sought permission to carry out the research on'' assessment of training small-scale farmers on food security in Uasin Gishu county Moiben sub county'' at the University of Eldoret. We also obtained a permit from National Commission for Science, Technology and Innovation (NACOSTI) to conduct research. Ethical consideration was considered such as privacy of information of the respondent.

3.9.1 Data Analysis

The study was expected to generate both qualitative and quantitative data since the questionnaire variables was in a 5-Likert scale and structured. Before analyzing the

feedback from the respondents, the questionnaires were checked to ensure they were completely and accurately filled. The number of questionnaires administered were 385, with 300 being returned as filled while the remainder being blank. The data was then coded, cleansed prior to the analysis. Data from all the objectives was analyzed descriptively using techniques such as frequencies, mean, mode, percentages and standard deviation. The analyzed data was presented using frequency distribution tables, pie charts and bar graphs. All data was analyzed at 95% level of significance or $\alpha=0.05$ and the degrees of freedom depending on the particular case as determined. This value ($\alpha=0.05$) was chosen since the sample size was adopted from the figures calculated based on 0.95 level of confidence. This was done with the aid of Statistical Package for Social Sciences (SPSS) version 25. Regression model was used to determine the strength of relationship between the independent variables and dependent variable. The model was as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Y = Food security

α = Model intercept

β_1 - β_3 = Coefficient of independent variables

X_1 = Training on agricultural methods

X_2 = Financial literacy training

X_3 = Adoption of agricultural technologies

ε = Error Term

All the above statistical tests were analyzed using the statistical Package for social sciences (SPSS), version 27. All tests were two-tailed significant levels were measured at 95% confidence level with significant differences recorded at $p < 0.001$. Qualitative

data was analyzed and presented using frequency tables and charts and correlation analysis.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Overview

This chapter presents the analysis of the data collected and interpretation of the findings of the study. The chapter has been arranged into seven main sub sections. The first sub section presents the demographic characteristics of the small-scale farmers. The second model assesses the quality of the data for food insecurity calculation using the Rasch model. The third section presents findings on the Effectiveness of food production training on food security of small-scale farmers among households in Moiben sub-county, Uasin Gishu County. Sub section four presents the Effectiveness of financial literacy training on food security of small-scale farmers in Moiben sub-county Uasin Gishu County. Sub section five presents the Effectiveness of adoption of agricultural technologies on food security by small-scale farmers in Moiben sub-county, Uasin Gishu County. Sub section six presents socioeconomic factors influencing food insecurity in Moiben sub-county. The last sub section presents the multiple linear regression relationship between the food production training, financial literacy training, adoption of agricultural technologies and food security.

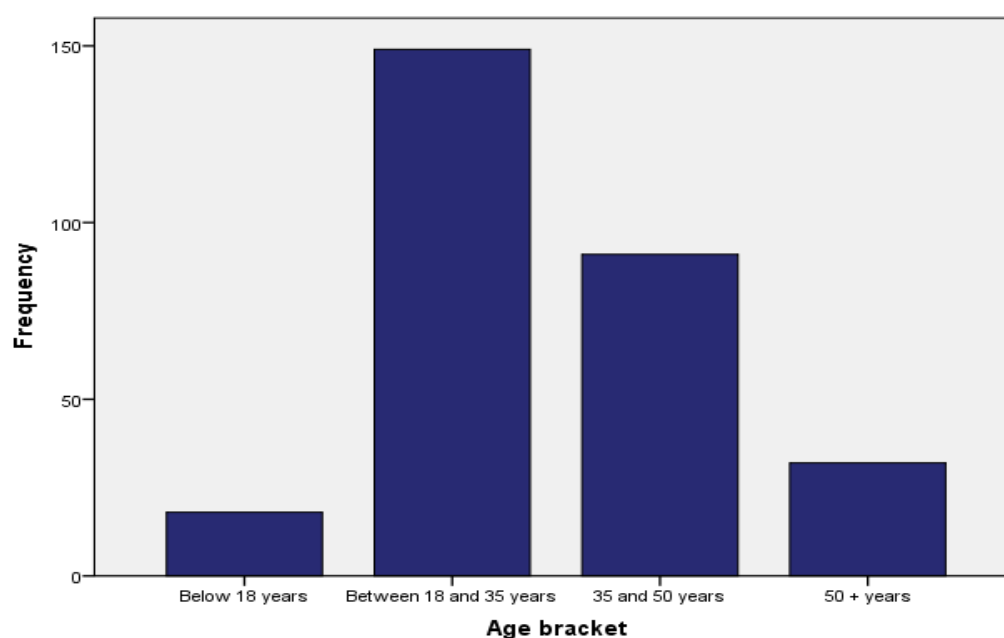
4.1 Demographic characteristics of the Small-scale Farmers.

This study targeted the household heads who were small-scale farmers and residents of Moiben sub-county. The results presented in Table 4.1 show that 146 (50.2%) of the respondents were female and 145 (49.8%) were male. The missing 9 were respondent who didn't attempt to fill in the item on gender. This shows that in Moiben sub-county, there were more female household heads attending trainings who were small-scale farmers.

Table 4. 1. Gender of Respondents

		Frequency	Percent
Valid	Male	145	48.3
	Female	146	48.7
	Total	291	97.0
Missing	.00	9	3.0
Total		300	100.0

After the analysis it was found that out of small-scale farmers who took part in this study, 91(31.4%) were between 35-50 years old, 149(51.4%) of them were between 18-35 years old and 32 (11%) of the small-scale farmers were above 50 years as well as 18(6.2%) small-scale farmers were below 18 years. Figure 4.1 gives the distribution the ages of the household heads who were interviewed.

**Figure 4. 1. Age bracket of the small-scale farmers**

In terms of education level, most 35.2% of the small-scale farmers had secondary education as highest level of education, 38.9% attained College education, 3.4% and 1% had masters and PhD as highest level of education respectively. On the other hand, 14% of the small-scale farmers had primary school as lowest level of education (**Table 4.2**).

Table 4. 2. Highest Education Level

		Frequency	Percent
Valid	Primary school	41	13.7
	Secondary school	103	34.3
	College	114	38.0
	Undergraduate	22	7.3
	Masters	10	3.3
	PhD	3	1.0
	Total	293	97.7
Missing	.00	7	2.3
Total		300	100.0

The findings revealed that majority 40 % of the small-scale farmers had a piece of land equal to approximately 2 acres, while the least represented by 1% and 5.3% had land size of equal to approximately 10 and 6-8 acres respectively as indicated in (**Table 4.3**)

Table 4. 3. Farmland Size in Acres

		Frequency	Percent
Valid	0-2	120	40.0
	2-4	62	20.7
	4-6	72	24.0
	6-8	16	5.3
	8-10	27	9.0
	Greater than 10	3	1.0
	Total	300	100.0

Highest total number persons living in a household ranged between 1-5 persons represented by 58%, while the least number of person in a household was 1 and 0.3% was the percentage that represented them as indicated in Table 4.4.

Table 4. 4 Person Living in the Household

		Frequency	Percent
Valid	1-5	167	55.7
	10-15	5	1.7
	15-20	1	.3
	5-10	113	37.7
	Above 25	2	.7
	Total	288	96.0
Missing	0	12	4.0
Total		300	100.0

Majority of the small scale farmers indicated they earned less than Kshs 10,000 monthly total income, while the least earned total income was at a range of Kshs 50,000 - 60,000. More than 50% of the respondent earned less than Kshs 10,000 as indicated in Table 4.5.

Table 4. 5. Total Monthly Income

		Frequency	Percent
Valid	0-10000	206	68.7
	10001-20000	58	19.3
	20001-30000	19	6.3
	30001-40000	2	.7
	40001-50000	11	3.7
	50001-60000	1	.3
	70001-80000	3	1.0
	Total		300

Majority of the respondents were residence from Moiben ward and were 108 small-scale farmers, the higher turnout in Moiben ward was a result of prior mobilization about training where a higher turnout was experienced and majority being youth the least number of small-scale farmers respondent were 17 and were from Tembelio ward as displayed in Table 4.6.

Table 4. 6. Residence Ward of Respondents

		Frequency	Percent
Valid	Tembelio	17	5.7
	Sergoit	33	11.0
	Meibeki	58	19.3
	Moiben	108	36.0
	Kimumu	78	26.0
	Total	294	98.0
Missing	.00	6	2.0
Total		300	100.0

From the Table 4.7, married respondent formed the highest percentage at 51.9%, followed by single at 39.4%, whereas divorced and widowed constituted the least percentage represented by 2.8% and separated at 3%.

Table 4. 7. Marital status

		Frequency	Percent
Valid	Single	114	38.0
	Married	150	50.0
	Divorced	8	2.7
	Separated	9	3.0
	Widowed	8	2.7
	Total	289	96.3
Missing	.00	11	3.7
Total		300	100.0

4.2 Rasch Model Output on Food Insecurity Experience Scale (FIES)

4.2.1 Infit Statistic

R-Software was used to analyse the Rasch Model for FIES. Infit statistics are normally used to validate the Rasch model by identifying items that did not perform well in a given population. This statistic should lie between 0.7-1.3 if all items are associated with the latent trait and discriminate equally well among respondents. In this study, as indicated in Figure 4.2, the lowest statistical item ‘SKIPPED’, where the respondents skipped a meal because of lack of money, had a value of 0.907 and the highest value was 1.233 for ‘WORRIED’ where an individual was worried to not having enough food to eat because of lack of money or other resources.

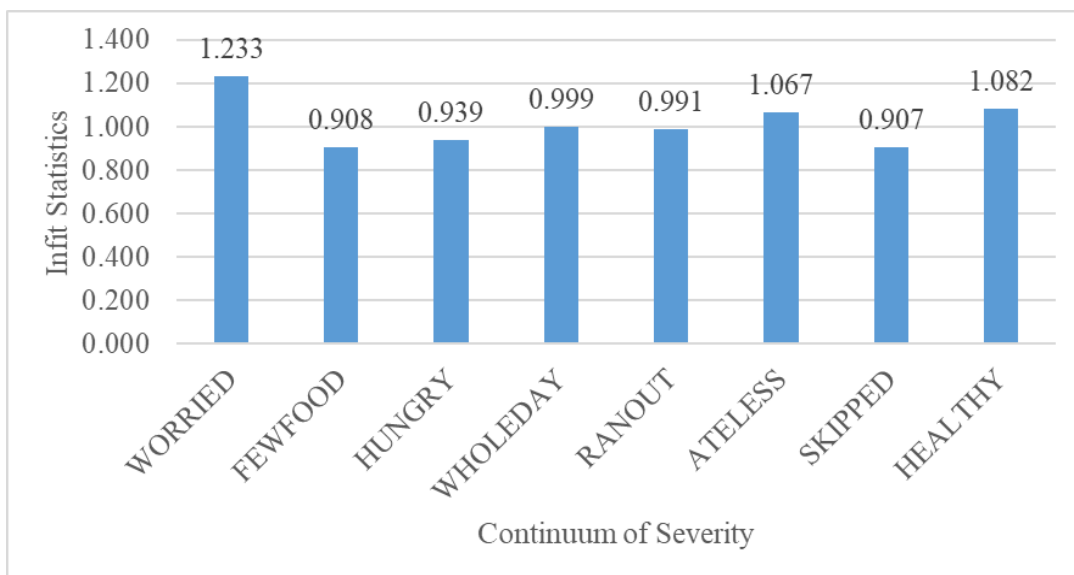


Figure 4.2 Infit statistics of the Respondents

4.2.2 Outfit Statistic

The outfit statistic is sensitive to occurrence of cases with highly unexpected response patterns, hence flagging outliers. A value greater than 2 is considered high and should

be investigated for a few highly unusual respondent response patterns, or a more pervasive set of possible unusual patterns. In this study, as indicated by Figure 4.3, the outfit statistical values from continuum of severity recorded “worried not having enough food to eat because of lack of money or other resources” as the highest value at 1.467. On the other hand, the lowest was determined, as an “individual had to skip a meal because there was not enough money or other resources” at 0.836. Since, all values were below 2, therefore the responses were considered to be free of outlier cases, hence, valid in assessing food security.

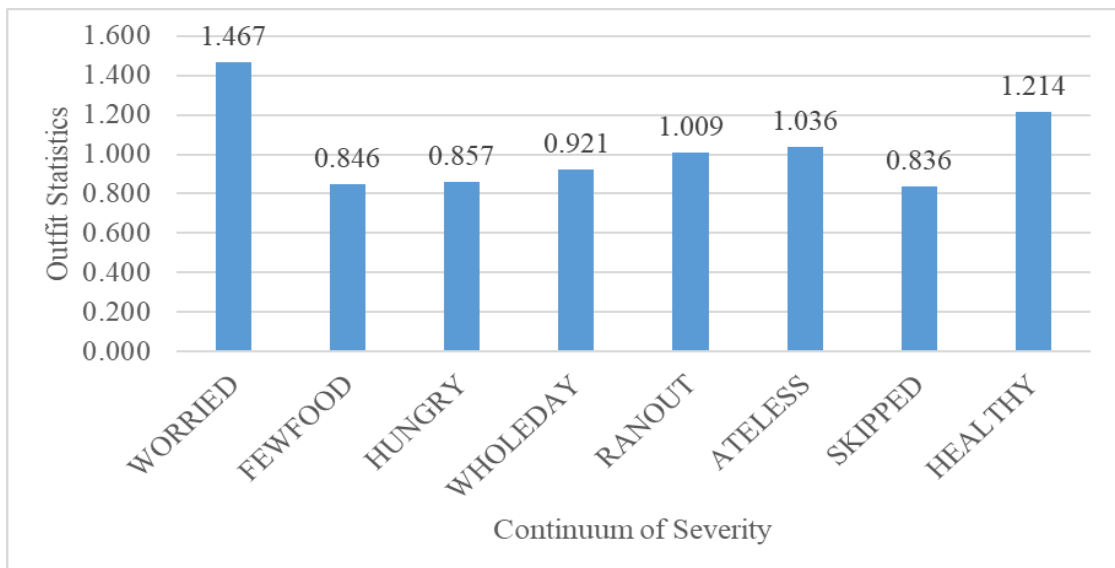


Figure 4. 3 Outfit statistics of the Respondents

4.2.3 Residual Correlations

The Rasch model assumes that all correlations among items should result from their common association with the latent trait. Hence, a residual correlation between a pair of items is high when greater than $|0.4|$. In this study, the absolute highest residual correlation was determined to be 0.261, as indicated by Table 4.8. Therefore, each item captured a unique item on food insecurity, thereby the questions were well formulated

to minimize redundancy thereby being valid to assess the food insecurity according to the Rasch model.

Table 4. 8 Residual Correlations

	WORRI ED	FEWFO OD	HUNG RY	WHOLED AY	RANO UT	ATELE SS	SKIPP ED	HEALT HY
WORRI D	1.000	0.076	0.000	-0.261	-0.104	-0.150	-0.190	-0.157
FEWFO D	0.076	1.000	0.138	0.055	-0.101	0.032	0.092	0.015
HUNGRY AY	0.000	0.138	1.000	0.170	0.012	-0.088	-0.001	0.036
WHOLED AY	-0.261	0.055	0.170	1.000	0.180	-0.114	0.138	-0.104
RANOUT AY	-0.104	-0.101	0.012	0.180	1.000	0.044	0.034	-0.126
ATELESS AY	-0.150	0.032	-0.088	-0.114	0.044	1.000	0.175	0.117
SKIPPED AY	-0.190	0.092	-0.001	0.138	0.034	0.175	1.000	0.095
HEALTH Y	-0.157	0.015	0.036	-0.104	-0.126	0.117	0.095	1.000

4.2.4 Rasch Reliability

Finally, the Rasch reliability index provides the discriminatory power of the overall FIES scale determining the proportion of the variability in the data explained by the Rasch model. A reliability threshold value of 0.7 and above is considered acceptable for an 8-item scale and 0.6 for a 7-item scale. In this study, a reliability value was calculated to be 0.7 for an 8-item scale, indicating that the Rasch model could explain 70% of the variations in the data. Therefore, the results obtained from the data would be satisfactory in assessing food insecurity in Moiben sub-county as per the model.

4.2.5 Food Insecurity Prevalence Rate

Figure 4.4 displayed severity prevalence rate of food insecurity as 40.062% while moderate and severe prevalence of food insecurity as 58.74% from small scale respondents of Moiben sub-county. This information about food security status however contradicts Caroline (2021) study which was conducted for Soy and Turbo sub-county showing majority of respondents 70% of 397 respondents were food secure while 19% and 11% experienced occasional and often food insecurity conducted using household self-assessment survey.

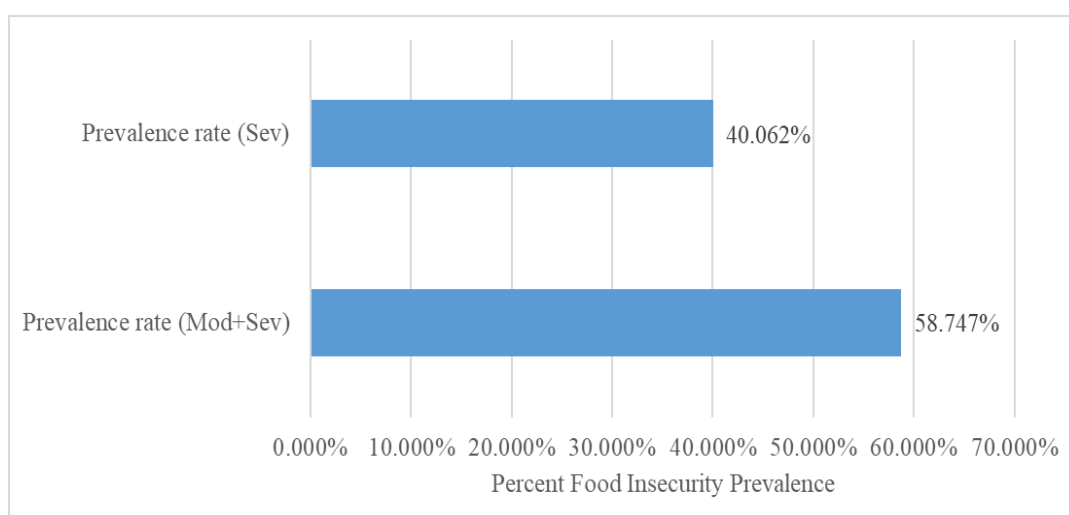


Figure 4. 4 Food Insecurity Prevalence Rate for the Respondents

4.3 Examining relationship between food production training on food security

4.3.1 Descriptive Statistics on assessment of food production training on food security

Table 4.9 indicated that on average small scale farmers agreed all indicators of food production training were effective on food security. The respondents' perception on the

relationship between effectiveness of food production training on food security and from the findings in Table 4.10, majority of the small-scale farmers 213(74.3%) agreed that training them improved the amount of money made. On the other hand, 18(6.4%) of the disagreed that training them improved the amount of money made. From Table 4.11 majority of the respondent were of the opinion that training improves technology utilization as represented by 220(78.6%) while the least disagreed and were represented by 6.8%. The study also revealed that 76.8% as well as 6.8% of the small-scale farmers strongly agreed and disagreed respectively that training them has improved has the social well-being of the community as derived from Table 4.12. Finally, from the findings majority of the small-scale farmers were of the opinion that training them contributed to food security as displayed in Table 4.13 and represented by 86.5%.

Table 4. 9. Descriptive Statistics for Food Production Training on Food Security

	Mean	Std. Deviation
Training of small-scale improves the amount of money that the farmers make	4.0214	.93875
Training of small-scale improves the technology used by the farmers	4.0714	.98113
Training of small-scale farmers has improved has improved the social well-being of the community	4.0000	.99821
Training of small-scale farmers contributes to food security	4.2607	.94275

Table 4.9 indicated that on average small scale farmers agreed all indicators of food production training were effective on food security.

Table 4. 10. Training of small-scale farmers Improves Amount of Money

		Frequency	Percent
Valid	Disagree	18	6.0
	Neutral	39	13.0
	Agree	213	74.3
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

Table 4.10, majority of the small-scale farmers 213(74.3%) agreed that training them improved the amount of money made. On the other hand, 18(6.4%) of the disagreed that training them improved the amount of money made.

Table 4. 11. Training of small-scale farmers Improves Technology

		Frequency	Percent
Valid	Disagree	19	6.3
	Neutral	41	13.7
	Agree	220	73.3
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

Table 4. 12. Training of small-scale farmers Improves Social Wellbeing

		Frequency	Percent
Valid	Disagree	19	6.3
	Neutral	46	15.3
	Agree	215	75.0
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

The study also revealed that 76.8% as well as 6.8% of the small-scale farmers strongly agreed and disagreed respectively that training them has improved has the social well-being of the community as derived from Table 4.12

Table 4. 13. Training of small-scale farmers Contributes to food security

		Frequency	Percent
Valid	Disagree	16	5.3
	Neutral	22	7.3
	Agree	242	80.6
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

The findings revealed that majority of the small-scale farmers were of the opinion that training them contributed to food security as displayed in Table 4.13 and represented by 86.5%.

Farmers who were subjected to training in the last two years reported to have prevalence severe rate of 43.36% and prevalence moderate severe as 62.18% while who were not under training were 27.41% and 45.62% respectively.

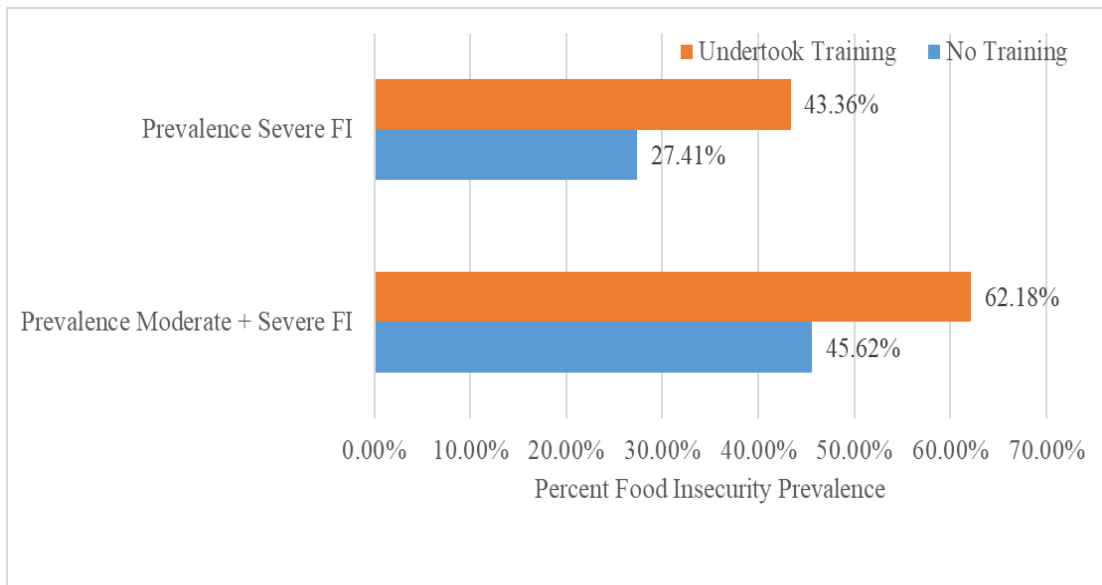


Figure 4.5 Prevalence rate of food insecurity for respondents with and without training

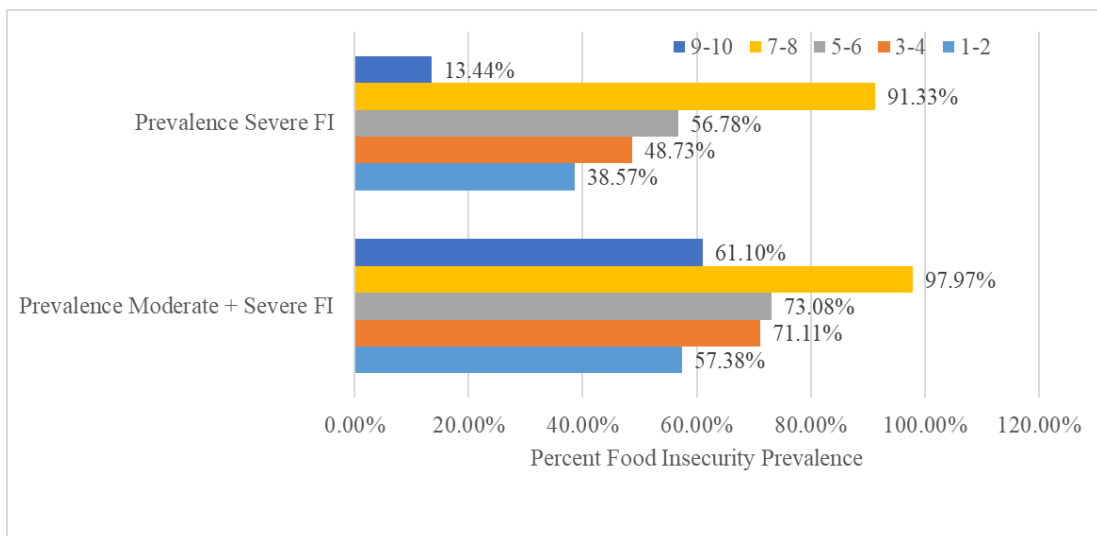


Figure 4.6 Prevalence rate of food insecurity for number of trainings attended in last two years

The least number of training displayed prevalence severity of 38.57% and prevalence moderate rate of 57.38% while the highest number of training individual underwent were 13.44% and 61.10% for severe and moderate prevalence respectively as indicated in figure 4.6.

4.3.2 Correlation Analysis

To compute the strength between food security variable and the effectiveness of food production training the inferential analysis was conducted. In particular, a correlation analysis was conducted, and evaluated the study's correlation coefficient. From the results, it is observed that food production training was not significant but is positively related to food security ($r=0.131$; $P > 0.05$). The correlations was below 70%, which implied weak positive correlations that existed between the food production training techniques and food security (Table 4.14).

Table 4. 14. Correlations between Food Production Training and Food Security

		Food Security	Food Production Training
Food Security	Pearson	1	.131
	Correlation		
	Sig. (2-tailed)		.023
Food Production Training	Pearson	.131	1
	Correlation		
	Sig. (2-tailed)	.023	

4.3.3 Hypothesis Testing

The first null hypothesis (H₀) stated as follows as. There was no significant effect of food production trainings on food security. Hypothesis one sought to establish the effects of food production on food security. This hypothesis was tested by regressing food production training and food security. The results of the Regression are presented in Table 4.33. The results presented in Table 4.33 showed that the effect of food production training was not statistically significant ($p > 0.005$). At p-value greater than 0.05, the analysis was sufficient to support the conclusion that training on food production trainings did not significantly influence on food security. The results indicate that there was no significant relationship between training on food production trainings and food security. Therefore, the null hypothesis that there was no significant effect of training on food production trainings on food security is therefore not rejected.

4.4 Assessing effectiveness of financial literacy training on food security in Moiben

4.4.1 Descriptive Statistics on assessment of financial literacy training on food security

From Table 4.15, averagely, the respondents were neutral on how financial literacy aspects such as budgeted income from farm proceeds, close personal watch on financial affairs and depositing/withdrawal of cash. On the other hand, small-scale farmers strongly indicated neither to have current savings account nor access to financial services and products. Respondents on average were careful to consider something before buying. The findings revealed that, majority of the respondent budgeted their income from farm produce as agreed and represented by (47.9%) and shown by Table 4.16. Saving services enhanced small scale farmers occasionally access and use of financial services at it was indicated by 104(37.0%) of the small-scale farmers as

represented in Table 4.17. Majority 118(42%) of the small-scale farmers occasionally cash enhanced small-scale farmers access and use of financial services by depositing/withdrawing according to Table 4.18. However, loan services enhanced small scale farmers occasionally accessed and use of financial services as revealed by 108(38.3%) of the small-scale farmers as displayed in Table 4.19. Finally, mobile banking (including mobile phones financial services such as M-pesa) enhanced small scale farmers to never access and use of financial services as indicated by 16(5.7%) of the small-scale farmers as indicated in Table 4.20.

Table 4. 15. Descriptive Statistics for Financial Literacy Training Aspects on Food Security

	Mean	Std. Deviation
Budget for my money/income I receive from the farm proceeds	3.4571	1.07010
Keep a close personal watch on my financial affairs	3.5393	1.11934
Extend do financial planning practices enhanced your access and use of financial services	2.4480	1.05768
Do you have a current saving/loan account with any financial institution	1.0158	.12499
Depositing/Withdrawing cash	3.4448	.94754
Loan services	2.5851	1.20860
Saving services	2.4769	1.19538
Before I buy something I carefully consider whether I can afford it.	3.9000	1.14096
I generally achieve my money management goals	3.5536	1.35095
Times do you access financial products/services in a month	1.8071	.97198

Table 4. 16. Financial literacy training on Budget Money and its effect on food security

		Frequency	Percent
Valid	Disagree	57	19.0
	Neutral	55	18.3
	Agree	168	56.0
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

The findings revealed that, majority of the respondent budgeted their income from farm produce as agreed and represented by (47.9%) and shown by Table 4.16. Saving services, while 55(19%) disagreed to have a budget for their money.

Table 4. 17. Financial literacy training on saving services and its effect on food security

		Frequency	Percent
Valid	Never	129	43.0
	Occasionally	104	34.7
	Every time	48	16
	Total	281	93.7
Missing	.00	19	6.3
	300	100.0	

Saving services enhanced small scale farmers farming activities and 104(34.7%) of the farmers occasionally access and use saving services, the least of the farmers utilize saving services as indicated by 48(16%).

Table 4. 18. Financial literacy training on depositing/withdrawing effect on food security

		Frequency	Percent
Valid	Never	34	11.3
	Occasionally	118	39.3
	Every time	129	43.0
	Total	281	93.7
Missing	.00	19	6.3
	300	100.0	

Majority 118(42%) of the small-scale farmers occasionally cash enhanced small-scale farmers access and use of financial services by depositing/withdrawing according to Table 4.18. Respondent who were of the opinion of never use deposit and withdrawing were 34(11.3%) and they were the least.

Table 4. 19. Financial literacy training on loan Services effect on food security

		Frequency	Percent
Valid	Never	119	39.7
	Occasionally	108	36.0
	Every time	55	18.3
Missing	Total	282	94.0
	.00	18	6.0
	300	100.0	

Loan services enhanced small scale farmers farming and farmers who occasionally accessed and use of financial services as revealed by 108(38.3%) of the small-scale farmers as displayed in Table 4.19.

Table 4. 20. Financial literacy training on mobile Banking

		Frequency	Percent
Valid	Almost never	30	10.0
	Occasionally	35	11.7
	Every time	217	72.3
	Total	282	94.0
Missing	.00	18	6.0
	300	100.0	

Mobile banking (including mobile phones financial services such as M-pesa) enhanced small scale farmers access to finance which was supported by majority represented by 72.3% and respondent who agreed to never access and use of financial services were 16(5.7%) of the small-scale farmers as indicated in Table 4.20.

Table 4. 21. Financial literacy training on Close Watch of Finance effect on food security

		Frequency	Percent
Valid	Disagree	54	18.0
	Neutral	65	21.7
	Agree	161	53.6
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

Respondent who were in agreement to have kept close watch of their finance were the majority represented by 161(53.6%) while 54(18%) disagreed to have kept close watch of finance.

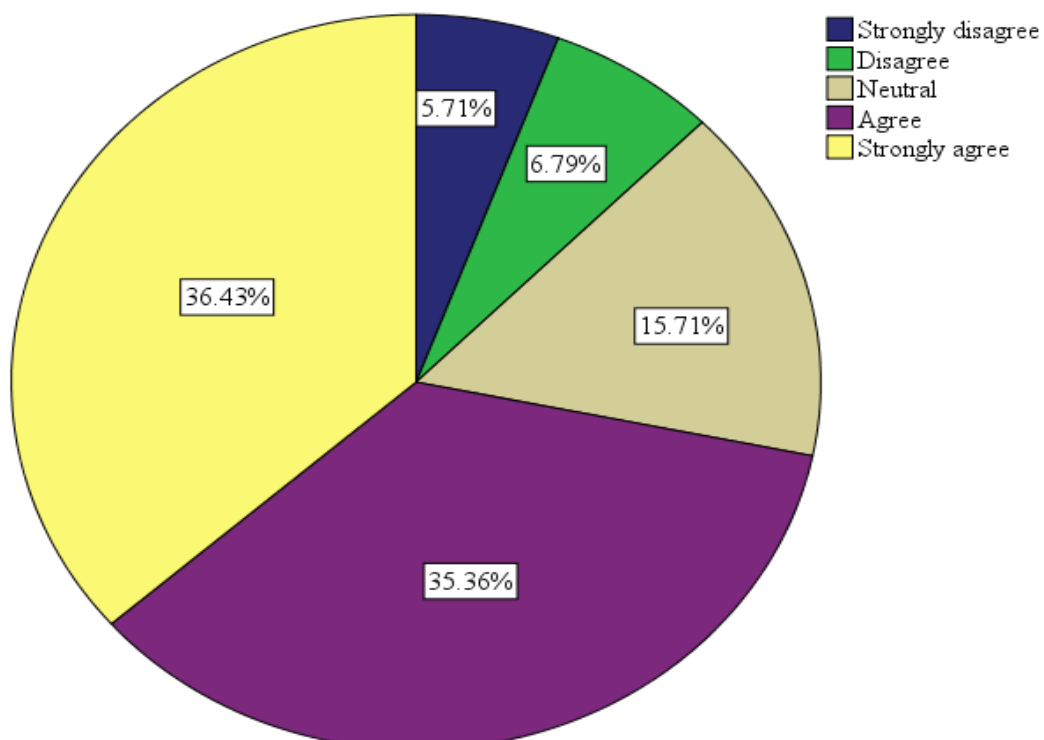


Figure 4. 7. Consider before buying

Figure 4.7 displayed respondent put into consideration before buying and 15.71% agreed to consider while agreed and strongly agreed represented by 35.36% and 36.43% respectively were in agreement that before buying something they consider.

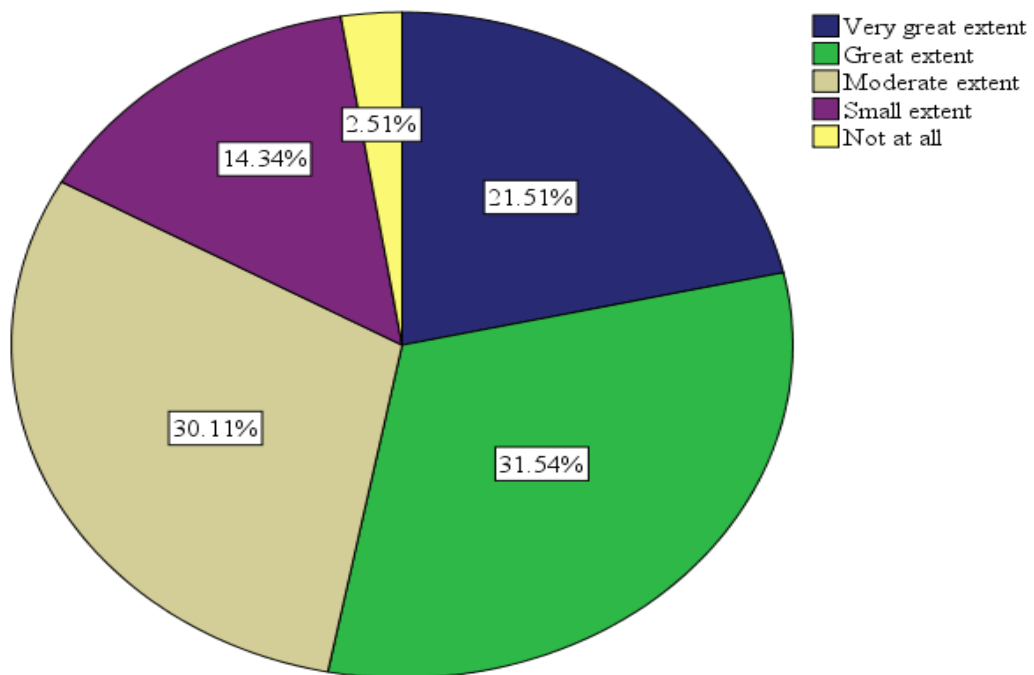


Figure 4. 8. Financial planning

From figure 4.8. Small-scale farmers 2.5% respondent not to have planned their finance, while majority represented by 30.11% plan their finances.

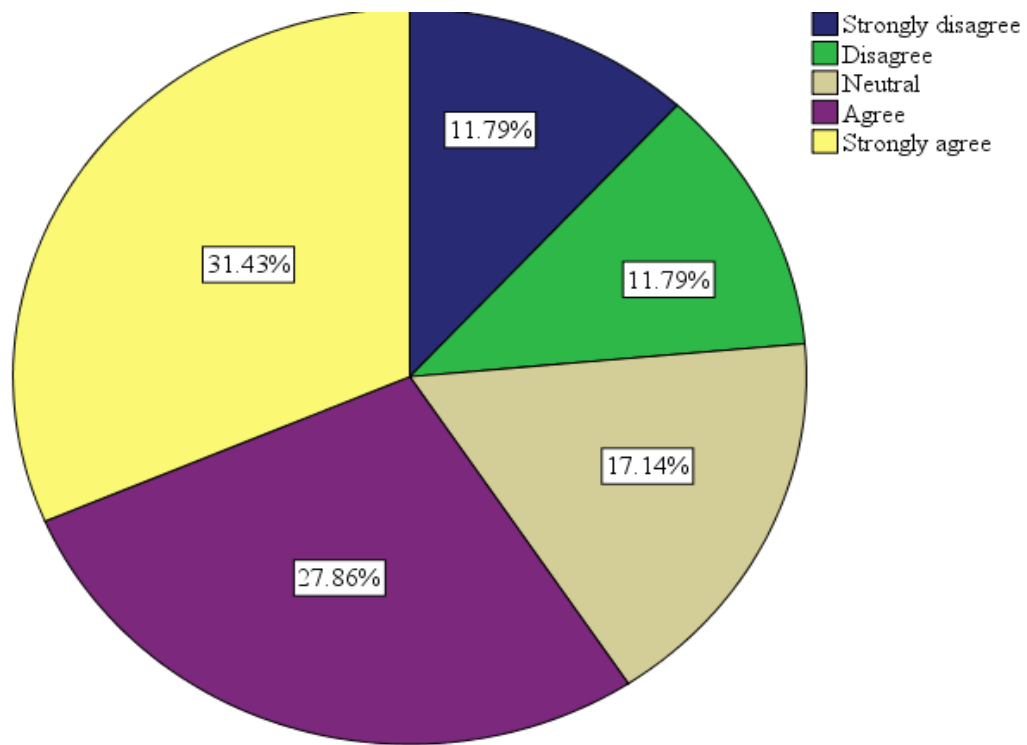


Figure 4. 9. Achieve money management goal

Figure 4.9 indicated that respondents who had the same proportionate of percent were respondents who disagreed and strongly disagreed to have achieved money management goal and the percent was 11.79%, on the other hand, respondent who agreed to have achieved money management goal were represented by 27.86%. Majority represented by 31.43% strongly agreed to achieve money management goal.

4.4.2 Correlation analysis

To establish the strength of the association between the food security variable and financial literacy training, the researcher utilized inferential analysis on the study data. The researcher conducted a correlation analysis and thoroughly investigated the study's correlation coefficient.

According to the findings, training on financial literacy was significant and positively related to food security ($r=0.357$; $P<0.05$), according to the findings as represented in Table 4.29.

Table 4. 22. Correlations Between Training on financial literacy and Food Security

		Food Security	Financial literacy
Food Security	Pearson	1	0.357**
	Correlation		
	Sig. (2-tailed)		0.00
Financial literacy	Pearson	0.357**	1
	Correlation		
	Sig. (2-tailed)	0.000	

4.4.3 Hypothesis Testing

The second null hypothesis (H_0) stated that: There was no significant effect of financial literacy training on food security. This hypothesis was tested by regressing financial literacy training and food security. The results of the Regression are presented in Table 4.33. The results presented in Table 4.33 showed that the effect of financial literacy training was statistically significant ($p < 0.05$). The results indicated that there was significant relationship between financial literacy training and food security. Therefore, the hypothesis that there was no significant effect of financial literacy training on food security is therefore rejected.

4.5 Effectiveness of Adoption of Agricultural Technology on Food Security in Moiben

4.5.1 Descriptive Statistics on assessment of financial literacy training on food security

In general, small scale farmers agreed that all indicators on adoption of agricultural technology were effective on food security as showed in Table 4.23. The use of machines for tilling made land preparation process easier, this was confirmed by 280(81.4%) as well as 23(8.2%) of the small-scale farmers who agreed and disagreed respectively as shown in the Table 4.24. Apparently, 128 (81.4%) and 21(7.5%) of the respondent's farmers agreed and disagreed that fertilizer application significantly improved soil fertility and crop yield as displayed in Table 4.25. However, use of hybrid seeds contributes to food security and it was agreed by majority 116(41.4%) of the small-scale farmers as displayed on Table 4.26. Apparently, adoption of preservation techniques influenced food security as indicated by 227(81.1%) of the small-scale farmers who agreed as shown in Table 4.27. Finally, the use of chemical pesticides helped control insects and pests that damage crop as it was agreed by majority 225 (80.4%) of the small-scale farmers as indicated in Table 4.28.

Table 4. 23. Descriptive Statistics for Adoption of Agricultural Technology on Food Security

	Mean	Std. Deviation
The use of machines for tilling makes land preparation process easier	4.0321	.99589
Fertilizer application significantly improves soil fertility and crop yield	4.0750	.97904
Plant hybrid seeds results in better quality crops and increased	4.0929	1.00105
Good preservation techniques helps extend the quality of your produce	4.1286	.94920
Use of chemical pesticides helps control insects and pests that damage crop	4.0964	1.08822

Table 4. 24. Adoption of Tilling Machine and its effect on food security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	23	7.7	8.2	8.2
	Neutral	29	9.7	10.4	18.6
	Agree	228	76.0	81.4	100.0
	Total	280	93.3	100.0	
Missing	.00	20	6.7		
	300		100.0		

The use of machines for tilling made land preparation process easier, this was confirmed by 280(81.4%) as well as 23(8.2%) of the small-scale farmers who agreed and disagreed respectively as shown in the Table 4.24.

Table 4. 25. Application of fertilizer and effect on food security

		Frequency	Percent
Valid	Disagree	21	7.0
	Neutral	31	10.3
	Agree	128	76.0
	Total	280	93.3
Missing	.00	20	6.7
	300	100.0	

21(7.5%) of the respondent's farmers agreed and disagreed that fertilizer application significantly improved soil fertility and crop yield and 21(7%) disagreed to improve soil fertility and crop yield as displayed in Table 4.25.

Table 4. 26 Utilization of hybrid seeds and its effect on food security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	21	7.0	7.5	7.5
	Neutral	32	10.7	11.4	18.9
	Agree	227	75.7	81.1	100.0
	Total	280	93.3	100.0	
Missing	.00	20	6.7		
	300	100.0			

Use of hybrid seeds contributes to food security and it was agreed by majority 116(41.4%) of the small-scale farmers as displayed on Table 4.26 and disagreed by 21(7%).

Table 4. 27. Utilization of preservation Technique and its effect on food security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	16	5.3	5.7	5.7
	Neutral	35	11.7	12.5	18.2
	Agree	229	76.3	81.8	100.0
	Total	280	93.3	100.0	
Missing	.00	20	6.7		
	300	100.0			

Adoption of preservation techniques influenced food security as indicated by 227(81.1%) of the small-scale farmers who agreed as shown in Table 4.27. While 35(11.7%) and 16(5.3%) became neutral and disagreed respectively.

Table 4. 28. Application of chemical Pesticide and its effect on food security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	25	8.3	8.9	8.9
	Neutral	30	10.0	10.7	19.6
	Agree	225	75.0	80.4	100.0
	Total	280	93.3	100.0	
Missing	.00	20	6.7		
	300	100.0			

The use of chemical pesticides helped control insects and pests that damage crop as it was agreed by majority 225 (80.4%) of the small-scale farmers as indicated in Table 4.28. While 25(8.9%) and 30 (10%)disagreed and became neutral respectively about use of chemical pesticides.

4.5.2 Correlation Analysis

The researcher used inferential analysis on the study data to determine the strength of the relationship between the food security variable and the success of adoption of agricultural technology. The researcher did a correlation analysis and examined the study's correlation coefficient in detail. Adoption of agricultural technology was significant but positively related to food security ($r=0.029$; $P<0.05$), according to the findings of Table 4.29.

Table 4. 29. Correlations between Adoption of Agricultural Technologies and Food Security

		Food Security	Adoption of agricultural technologies
Food Security	Pearson	1	.029
	Correlation		
	Sig. (2-tailed)		0.622
Adoption of agricultural technologies	Pearson	.029	1
	Correlation		
	Sig. (2-tailed)	0.622	

4.5.3 Hypothesis Testing

The third null hypothesis (H_0) stated that: There was no significant effect of adoption of agricultural technologies on food security. This hypothesis was tested by regressing adoption of agricultural technologies and food security. The results of the Regression are presented in Table 4.33. The results presented in Table 4.33 showed that the effect of adoption of agricultural technologies was not statistically significant P is greater equal to 0.05. The results indicate that there was no significant relationship between adoption of agricultural technologies and food security. Therefore, the hypothesis that there was no significant effect of adoption of agricultural technologies on food security is therefore not rejected.

4.6 Determining socio-economic factors influencing food security in Moiben

4.6.1 Descriptive Statistics on assessment of socio-economic factors influencing food security

4.6.1.1 Gender Verses Prevalence of Food Insecurity

From figure 4.10. Female gender had a prevalence severe of food insecurity at 40.97% and prevalence moderate and severe food insecurity of 60.31%. Male gender was 41.04% and 59.97% for severe and moderate severe prevalence of food insecurity respectively.

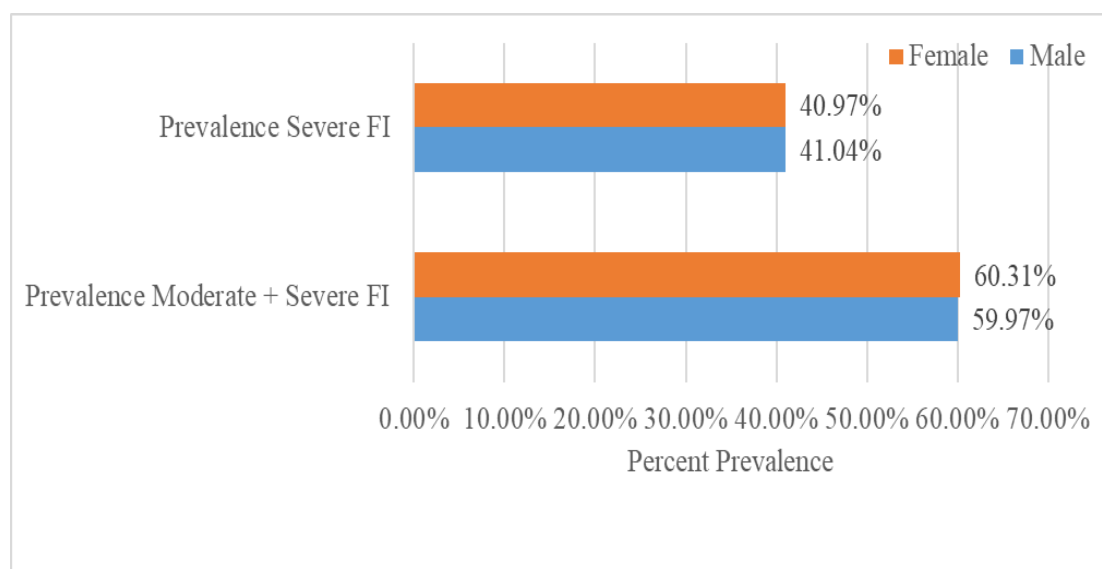


Figure 4. 10 Gender versus food insecurity prevalence rate

4.6.1.2 Age versus Prevalence of Food Insecurity

The highest percentage of prevalence was age bracket of 18-35 years and was recorded as 53.94% and 74.81% for severe and moderate plus severe respectively. The lowest percentage was from age bracket of 35-50 years for severe prevalence of food insecurity was 21.68% and moderate severe was 40.06% as indicated in figure 4.10.

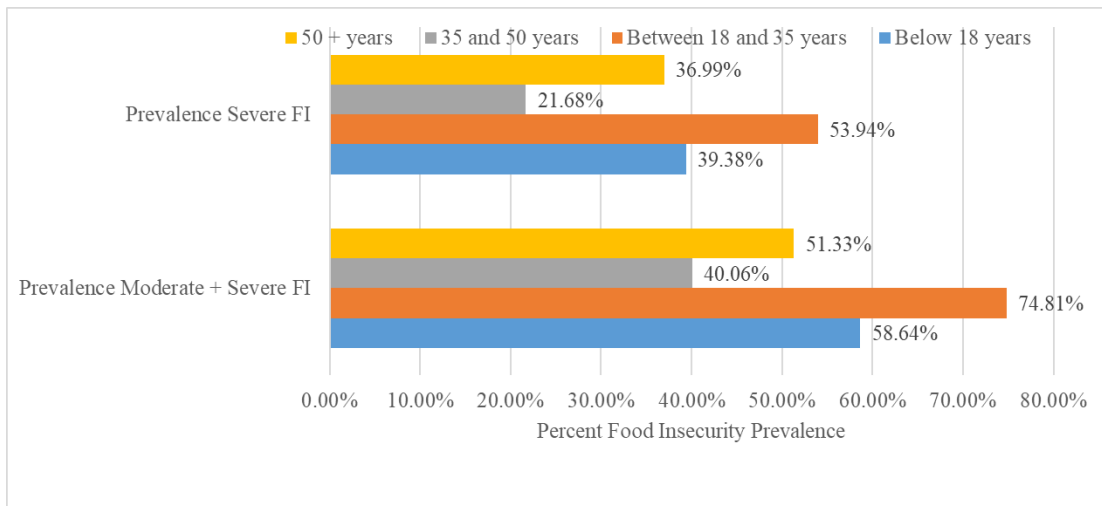


Figure 4. 11 Age versus food insecurity prevalence rate

4.6.1.3 Education Level Verse Prevalence of Food insecurity

From figure 4.12. Respondents who attained college education as their highest education level had the highest percentage of prevalence of food insecurity with severe at 52.68% while moderate plus severe at 74.23%. This was followed by 52.70% as severe prevalence of food insecurity for respondent who had Masters as their highest level of education and prevalence for moderate plus severe food insecurity at 66.31%. The least were respondents whose food insecurity prevalence was 2.44% and 21.86% for severe and moderate severe and their highest level of education was PhD.

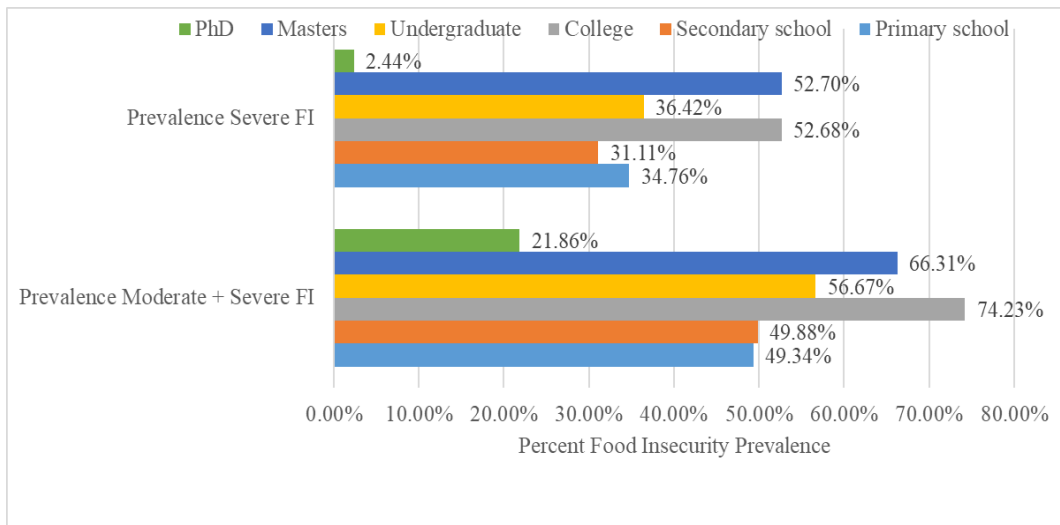


Figure 4. 12 Education level versus prevalence of food insecurity

4.6.1.4 Marital Status Versus Prevalence of Food Security

Figure 4.13 indicate respondents whose were widowed had the lowest percentage of food insecurity prevalence displayed as 35.63% and 47.12% for severe and moderate plus severe respectively. Single and divorced were closer and were 51.23% and 52.32% respectively for severe prevalence of food insecurity while for moderate and severe prevalence of food insecurity was 71.68% and 71.22%.

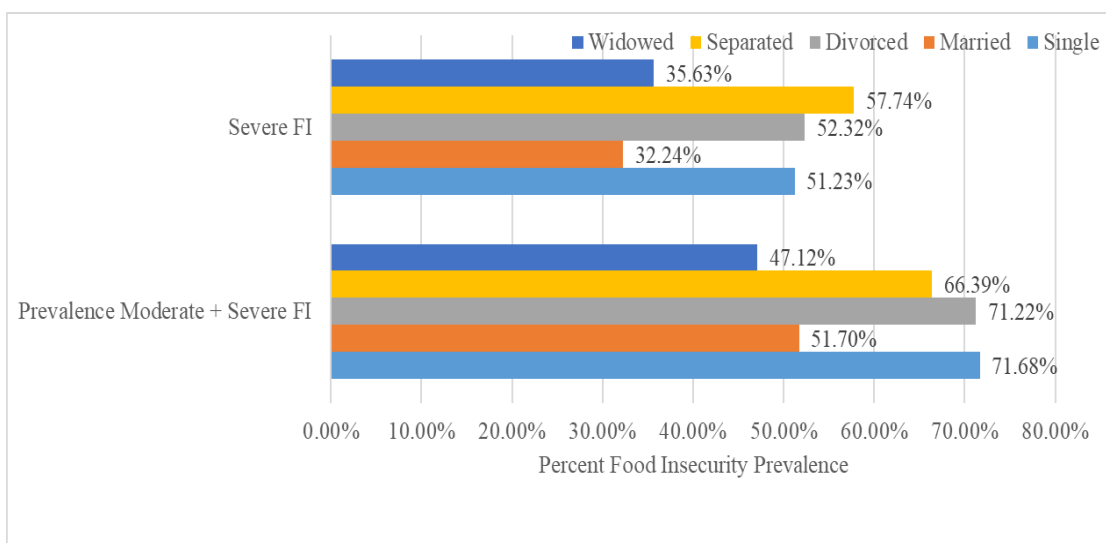


Figure 4. 13 Marital status versus percent food insecurity prevalence

4.6.2 Correlation Analysis

From Table 4.30 results, education level positively correlated with food security with a value of P value being 0.005 positively significant ($P < 0.05$). The higher the education level the more the food secure the individuals are. There is a positive relationship between age of the respondents and food security status with the value of 0.000, with significant value being ($P < 0.05$) implying the youth are more food secured compared to the elderly.

Table 4. 30. Correlation analysis for socio-economic factors on food security

		Food Security
Food Security	Pearson Correlation	1
	Sig. (2-tailed)	
	N	300
Gender	Pearson Correlation	-.022
	Sig. (2-tailed)	.710
	N	291
Ward	Pearson Correlation	.041
	Sig. (2-tailed)	.483
	N	294
Highest level of education	Pearson Correlation	.163**
	Sig. (2-tailed)	.005
	N	293
Age	Pearson Correlation	-.235**
	Sig. (2-tailed)	.000
	N	290
Marital status	Pearson Correlation	-.109
	Sig. (2-tailed)	.063
	N	289
Monthly income	Pearson Correlation	.028
	Sig. (2-tailed)	.624
	N	300
Persons living in the household	Pearson Correlation	-.002
	Sig. (2-tailed)	.975
	N	288
Farmland size in acres	Pearson Correlation	-.132*
	Sig. (2-tailed)	.025
	N	289
Major source of income	Pearson Correlation	.150**
	Sig. (2-tailed)	.009
	N	300

4.7 Multiple Regression Analysis

4.7.1 Coefficient of Determination

A value of R (0.363) indicates a low level of prediction. The coefficient of determination (R Square) indicates that training on agricultural methods, financial literacy training, and adoption of agricultural technologies explained 6.7% of the variability of the food security hence the model was not fitted well as stated in Table 4.31.

Table 4. 31. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.363 ^a	.132	.123	1.84741

4.7.2 Statistical Significance

The *F*-ratio in the ANOVA table tests whether the overall regression model is a good fit for the data. Table 4.32 shows that training on food production, financial literacy training and adoption of agricultural technologies are statistically significantly ($P < 0.05$) predicted the food security. Indicating that the regression model was a good fit of the data.

Table 4. 32. The Analysis of variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	153.563	3	51.188	14.998	.000 ^b
	Residual	1010.221	296	3.413		
	Total	1163.784	299			

4.5.3 Model coefficients

The study findings revealed that an increase in one unit of training small -scale farmers on food production training increased food security by 0.036 units. On the other hand, an increase in one unit of training on financial literacy increased food security by 0.102 units. However, an increase in one unit of the adoption of agricultural technologies decreased food security by 0.00000824 units as displayed in Table 4.33.

Table 4. 33. Coefficients of Multiple Linear Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.059	.370		-5.561	.000
Food Production Training	.036	.041	.050	.888	.375
Financial literacy Training	.102	.016	.355	6.256	.000
Adoption of technology	-8.240E-006	.000	-.055	-.988	.324

The regression model is shown in the equation below;

$$y = -2.059 + 0.036X_1 + 0.102X_2 - 0.00000824X_3 + \varepsilon$$

Where:

y = Food security

-2.059= constant.

x₁= Food production training

x₂= Financial literacy training

x₃= Adoption of agricultural technologies

A multiple regression was run to predict food security from training on agricultural techniques, financial literacy training and adoption of agricultural technologies.

Financial literacy variable was statistically significant ($p < 0.05$) in predicting food security.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarized the study findings, conclusions, recommendations for action and suggestions for further study based on data analysis and subsequent findings. This was in relation to the aim of the study, which was to determine the effects of training small-scale farmers on food security in Moiben Sub County in Uasin Gishu County. This chapter is divided into four sections. The first section presented the research findings, the second part presented the summary of the research findings, and the third contain recommendations and lastly suggestions for more research.

5.2 Summary of Findings

5.2.1: Effectiveness of food production training on food security in Moiben

From the findings, 74.3% of the small-scale farmers agreed that training them improved the amount of money made. On the other hand, training small scale farmers improved the technology used. Training small-scale farmers has improved the social well-being of the community and also contributed to food security. Training of small-scale farmers increased food security in Moiben Sub-County.

5.2.2 Effectiveness of financial literacy training on food security in Moiben

Small-scale farmers budgeted their money/income received from the farm proceeds. The findings revealed that farmers kept a close personal watch on their financial affairs and it was represented by 57.5%.Further, respondents agreed and were represented by

6% to have budgeted their income/ money. Small-scale farmer generally achieved their money management goals as it was indicated by majority 31.43% of the small-scale farmers. On the other hand, small-scale farmers generally achieved their money management goals. Saving services access to small scale farmers majority responded to have never accessed and was represented by 45.9% additional, Majority 129(45.9%) of the small-scale farmers use financial services by depositing/withdrawing. Loan services enhanced small scale farmers farming but the service was occasionally accessed as revealed by 108(38.3%) and 119 (42.2%) responded to never accessed loan services. Finally, mobile banking (including mobile phones financial services such as M-pesa) services majority of respondents recorded to access every time and was represented as 217(77%).

5.2.3 Effectiveness of adoption of agricultural technologies on food security in Moiben

The use of machines for tilling made land preparation process easier. This was confirmed by 81.4% of the small-scale farmers who agreed. Apparently, fertilizer application significantly improved soil fertility and crop yield. On the other hand, plant hybrid seeds resulted in better quality crops and increased yields. Good preservation techniques helped extending the quality produce as confirmed by 229(81.8%) of the small-scale farmers who agreed. Finally, the use of chemical pesticides helped control insects and pests that damage crop.

5.2.4: Multiple linear regression analysis

A multiple regression was done to predict food security from training on food production, financial literacy training and adoption of agricultural technologies. These

variables statistically significantly predicted food security, $F(3,296) = 14.998, P < 0.05$. Financial literacy variable was statistically significant to the prediction, $P < 0.05$. An increase in one unit of training small-scale farmers on food production training increased food security by 0.036 units. On the other hand, an increase in one unit of the adoption of agricultural technologies decreased food security by 0.00000824 units. Increase in one unit of financial literacy increased food security by 0.102 units. The higher the education level the more the food secure the individuals are. There is a positive relationship between age of the respondents and food security status with the value of 0.099, with significant value being ($P < 0.05$) implying the youth are more food secured compared to the elderly in Moiben sub-county.

5.3 Conclusions

While the study zeroed in on the assessment of training small-scale farmers on food security in Uasin Gishu County (a case study of Moiben Sub County). It is clear the food insecurity prevalence is still high and training on various aspects tries to address the situation. It is critical that youth and particularly those who have attained a higher education become a focal point of study because of their contribution in addressing food insecurity. There was no significant effect of food production training on food security. On the other hand, financial literacy increased food security thus positively significant. Lastly, adoption of agricultural technologies had no significant effect on food security.

5.4 Recommendations

Based on the study findings, the study makes the following recommendations:

Food insecurity status in terms of their prevalence severity is an issue and from the study the more the number of times an individual attains training to be informed and become aware of how to improve food production the food security status improves. However, the few numbers of training an individual is exposed the likelihood to improve food security status is minimal. Financial literacy training is key in financial resources management and from the findings most small scale farmers agreed to have a challenge on financial planning and saving of their financial resources and such practices affects farming and eventually food security status. Finally, youth training and their role in attainment of food security to be studied further, additionally, education level and its influence on training uptake to be considered in future study.

5.5 Suggestions for Further Research

There are many other factors that affect the training small-scale farmers on food security in Moiben Sub-county. This study has only focused on a few. The study recommends further studies be done on food security related issues such as Food post-harvest practices, Food security and nutrition in Kenya. In order to suggest more effective and efficient ways to today's small-scale farmer, future study might also look at the extension service delivery process and assessment of farmer learning and behavior change.

REFERENCES

- Akenga, T., Sudoi, V., Machuka, W., Kerich, E., & Bikeri, E. (2018). A Survey on Use of Agrochemicals in Farms in Uasin Gishu and Homa Bay Counties, Kenya. *Africa Environmental Review Journal*, 2(2), 1-11
- Amendah, D. D., Buigut, S., & Mohamed, S. (2014). Coping strategies among urban poor: Evidence from Nairobi, Kenya. *PloS one*, 9(1).
- Ateka, J. M., Onono-Okelo, P. A., & Etyang, M. (2019). Does Participation in Farmer Field School Extension Program Improve Crop Yields? Evidence from Smallholder Tea Production Systems in Kenya.
- Bajagai, Y. S. (2014). Basic concepts of food security: definition, dimensions, and integrated phase classification. *Subat*, 2, 2015.
- Barasa, A. W., Odwori, P. O., Barasa, J., & Ochieng, S. (2019). Technical efficiency and its determinants on Irish potato farming among smallholder farmers in Trans-Nzoia County, Kenya. *International journal of research and innovation in social science*, 235-238.
- Barrett, C. B. (2010). Measuring food insecurity. *Science*, 327(5967), 825-828.
- Bii, B. (2020, January 7). Fear of Looming Maize Shortage Pushes Price Up. *Daily Nation*. Retrieved from: <https://www.nation.co.ke/news/Fear-of-looming-maize-shortage-pushes-price-up/1056-5409050-w1sjfl/index.html>
- Biwott, T. J., & Ngeywo, J. Role of Planning of Planting Maize on Food Production and Security in Moiben Sub-County, Kenya.
- Braun, A. & Duveskog, D. (2011). The farmer field school approach: History, global assessment, and success stories. Background paper for the IFAD Rural poverty report.
- Burchi, F., & De Muro, P. (2016). From food availability to nutritional capabilities: Advancing food security analysis. *Food Policy*, 60, 10-19.
- Cheptoo, C. R. (2014). Factors That Attribute to Decrease in Agricultural Production in Uasin Gishu County, Kenya. *Journal of Biology, Agriculture, and Healthcare*, 4(28), 142-152.
- Chivenge, P., & Sharma, S. (2019, August). Precision agriculture in food production: nutrient management. In *International workshop on ICTs for precision agriculture* (p. 12).

- Clapp, J., Newell, P., & Brent, Z. W. (2018). The global political economy of climate change, agriculture, and food systems. *The Journal of Peasant Studies*, 45(1), 80-88.
- Coleman-Jensen, A., Gregory, C., & Singh, A. (2014). Household food security in The United States in 2013. *USDA-ERS Economic Research Report*, (173).
- County Integrated Development Plan (CIDP 2018 – 2022), Uasin Gishu County Government of Uasin Gishu (2019). <https://www.uasingishu.go.ke/>
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed techniques approaches*. Sage publications.
- Crush, J. S., & Frayne, G. B. (2011). Urban food insecurity and the new international food security agenda. *Development Southern Africa*, 28(4), 527-544.
- Davis, K., Franzel, S., Hildebrand, P., Irani, T., & Place, N. (2004). Extending technologies among small-scale farmers in Meru, Kenya: ingredients for success in farmer groups. *The Journal of Agricultural Education and Extension*, 10(2), 5362
- Davis, K., Nkonya, E., Kato, E., Mekonnen, D. A., Odendo, M., Miiro, R., & Nkuba, J. (2012). Impact of farmer field schools on agricultural productivity and poverty in East Africa. *World Development*, 40(2), 402-413.
- Diao, X., Hazell, P., & Thurlow, J. (2010). The role of agriculture in African development. *World Development*, 38(10), 1375-1383.
- Duhan, J. S., Kumar, R., Kumar, N., Kaur, P., Nehra, K., & Duhan, S. (2017). Nanotechnology: The new perspective in precision agriculture. *Biotechnology Reports*, 15, 11-23.
- Ekins, P. (2017). Ecological modernization and green growth: prospects and potential. In *Handbook on Growth and Sustainability*. Edward Elgar Publishing.
- Fanzo, J., Davis, C., McLaren, R., & Choufani, J. (2018). The effect of climate change across food systems: Implications for nutrition outcomes. *Global food security*, 18, 12-19.
- FAO. 2008. The State of Food and Agriculture (SOFA) 2008 – *Biofuels: prospects, risks And opportunities*. Rome: Food and Agriculture Organization of the United Nations.

- Fischer, E., & Qaim, M. (2012). Linking smallholders to markets: determinants and impacts of farmer collective action in Kenya. *World Development*, 40(6), 1255-1268.
- FURP(The Fertilizer Use Recommendation Project), 1987/1988. Final Report. Annex III: Description of First Priority Trial Sites in the Various Districts. *Ministry of Agriculture*. National Agricultural Laboratories, Nairobi, Kenya.
- Garnett, T., Appleby, M. C., Balmford, A., Bateman, I. J., Benton, T. G., Bloomer, P., ..& Herrero, M. (2013). Sustainable intensification in agriculture: premises and policies. *Science*, 341(6141), 33-34.
- Garibaldi, L. A., Gemmill-Herren, B., D'Annolfo, R., Graeub, B. E., Cunningham, S. A.,& Breeze, T. D. (2017). Farming approaches for greater biodiversity, livelihoods, and food security. *Trends in ecology & evolution*, 32(1), 68-80.
- Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., & Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. *science*, 327(5967), 812-818.
- Gray, L., Guzman, P., Glowa, K. M., & Drevno, A. G. (2014). Can home gardens scaleup into movements for social change? The role of home gardens in providing food security and community change in San Jose, California. *Local Environment*, 19(2), 187-203.
- Hansen, A. W., Christensen, D. L., Larsson, M. W., Eis, J., Christensen, T., Friis, H., ..& Tetens, I. (2011). Dietary patterns, food, and macronutrient intakes among adults in three ethnic groups in rural Kenya. *Public health nutrition*, 14(9), 1671-1679.
- Howes, M. (2018). Joining the dots: sustainability, climate change, and ecological modernization. In *Pathways to a Sustainable Economy* (pp. 15-24). Springer, Cham. International Fund for Agricultural Development, Food and Agriculture Organization of the United Nations, & World Food Programme. (2015). *The State of Food Insecurity in the World: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress. 2015*. FAO.
- Kangogo, D., Lagat, J., & Ithinji, G. (2013). The Influence of Social Capital Dimensions on Household Participation in Micro-Credit Groups and Loan Repayment Performance in Uasin Gishu County, Kenya.

- Kenya Food Security Steering Group. (2024). The 2023 Short Rains, Food and Nutrition Security Assessment Report. Nairobi.
- Kenya Plant Health Inspectorate Service, (2020). Retrieved from:<https://www.kephis.org/>Kenya National Bureau of Statistics (n.d) 2019 Kenya Population and Housing Census Volume I: Population by County and Sub-County
- Kimenyi, M. S. (2002). Agriculture, economic growth, and poverty reduction.
- Kimiywe, J. (2015). Food and nutrition security: challenges of post-harvest handling in Kenya. *Proceedings of the Nutrition Society*, 74(4), 487-495.
- Kiplang'at, J., & Rotich, D. C. (2012). Mapping and auditing agricultural indigenous in Kenya: a case study of the Uasin Gishu and Keiyo districts. *Innovation: journal of appropriate librarianship and information work in Southern Africa*, 2012(44), 81-100.
- Kipruto, K. (2012). The role of Micro-finance institutions in alleviating poverty among small-scale farmers in Kenya: Evidence from small-scale wheat farming in Moiben division, Uasin Gishu County. *International Journal of Current Research*, 4(02), 247-251.
- Korir, L. K. (2011). *Risk management among agricultural households and the role of off-farm investments in Uasin Gishu County, Kenya* (No. 634-2016-41499).
- Larsen, A. F., & Lilleør, H. B. (2014). Beyond the field: The impact of farmer field schools on food security and poverty alleviation. *World Development*, 64, 843-859.
- Lilleør, H. B., & Lund-Sørensen, U. (Eds.). (2013). *Farmers' Choice: Evaluating an Approach to Agricultural Technology Adoption in Tanzania*. Practical Action Publishing.
- Long, H., Yang, B., & Sang, B. (2018). The Value and Design Strategy of Traditional Farming Culture Inheritance.
- Lowder, S. K., Scoet, J., & Raney, T. (2016). The number, size, and distribution of farms, smallholder farms, and family farms worldwide. *World Development*, 87, 16-29.

- Maguire, C.J. 2000. From Agriculture to Rural Development: Critical Choices for Agricultural Education. Rural Development Department, the World Bank. Washington, DC. (Also available at <http://www.fao.org/sd/EXdirect/EXre0029.htm>)
- Marsden, T., Hebinck, P., & Mathijs, E. (2018). Re-building food systems: embedding assemblages, infrastructures and reflexive governance for food systems transformations in Europe. *Food Security*, 10(6), 1301-1309.
- Mbugua-Gitonga, A., Mwaura, F., & Thenya, T. (2016). Biotechnology and Food Security in Kenya-An Assessment of Public Concerns on Biosafety, Public Health, and Religious Ethics. *Journal of Advances in Biology & Biotechnology*, 1-13.
- McKim, C. A. (2017). The value of mixed techniques research: A mixed- techniques study. *Journal of Mixed techniques Research*, 11(2), 202-222.
- Meena, B. P., Shirale, A. O., Dotaniya, M. L., Jha, P., Meena, A. L., Biswas, A. K., & Patra, A. K. (2016). Conservation agriculture: a new paradigm for improving input use efficiency and crop productivity. In *Conservation Agriculture* (pp. 39-69). Springer, Singapore.
- Miruka, M. K., Okello, J. J., Kirigua, V. O., & Murithi, F. M. (2012). The role of the Kenya Agricultural Research Institute (KARI) in the attainment of household food security in Kenya: A policy and organizational review. *Food Security*, 4(3), 341-354.
- Muatha, I. T., Otieno, D. J., & Nyikal, R. A. (2017). Determinants of smallholder farmers awareness of agricultural extension devolution in Kenya. *African Journal of Agricultural Research*, 12(51), 3549-3555.
- Muchena, F. N., Wamicha, W. N., & Njoroge, C. R. K. KENYA SOIL SURVEY.
- Mugenda, O. M., & Mugenda, G. A. (2003). *Research techniques*.
- Mutegi, C. K., Cotty, P. J., & Bandyopadhyay, R. (2018). Prevalence and mitigation of aflatoxins in Kenya (1960-to date). *World Mycotoxin Journal*, 11(3), 341-357.

- Ngele, J.M, Arusei, E., &Saina, C. (2015). Socio-Economic Factors Influencing Farmers' participation in Demand-driven extension services among small-scale farmers: A Case of National agriculture and livestock extension program. *International Journal of Multidisciplinary Research and Development* 2(8), 547-551(NALEP) In Moiben, Uasin Gishu County, Kenya
- O'Donoghue, C., &Heanue, K. (2018). The impact of formal agricultural education on farm-level innovation and management practices. *The Journal of Technology Transfer*, 43(4), 844-863.
- Othuon, V. O., &Oyugi, M. A. (2017). The Impact of Key Macroeconomic Variables on Agricultural Infrastructure Investment and Output in Kenya (2005 to 2016). *Journal of Economics and Sustainable Development*, 8, 22.
- Oluoko-Odingo, A. A. (2011). Vulnerability and adaptation to food insecurity and poverty in Kenya. *Annals of the Association of American Geographers*, 101(1), 1-20.
- Pannell, D. J., Llewellyn, R. S., &Corbeels, M. (2014). The farm-level economics of conservation agriculture for resource-poor farmers. *Agriculture, ecosystems &environment*, 187, 52-64.
- Patel, H. K., Lufafa, A., Joshi, A. K., &Chhetri, A. K. (2019). SUMMARY OF BRAINSTORMING SESSIONS-SSKE Workshop on Climate-Smart Agriculture Nairobi, Kenya.
- Porkka, M., Kummu, M., Siebert, S., &Varis, O. (2013). From food insufficiency towards trade dependency: a historical analysis of global food availability. *PloS one*, 8(12).
- Poulton, C., &Kanyinga, K. (2014). The politics of revitalizing agriculture in Kenya. *Development Policy Review*, 32(s2), s151-s172.
- Recha, J. W., Kapukha, M., Wekesa, A., Shames, S., & Heiner, K. (2014). Sustainable agriculture land management practices for climate change mitigation: a training guide for smallholder farmers.
- Republic of Kenya.2019 Kenya Population and Housing Census. Volume 1: Population by County and Sub-county. <https://sentaokenya.org/wp-content/uploads/2019/03/Volume-1-Kenya-Population-by-County-Sub-County-2019.pdf>

- Rezaei-Moghaddam, K., & Karami, E. (2008). Developing a green agricultural extension theory. *International Journal of Sustainable Development and Planning*, 3(3), 242-256.
- Riungu, C. K. (2011). *Effects of supermarkets on fresh fruit and vegetables small-scale farmers in central Kenya* (No. 634-2016-41497).
- Rivera, W. M., & Qamar, M. K. (2003). *Agricultural extension, rural development, and the food security challenge*. Rome: Food and Agriculture Organization of the United Nations.
- Sahoo, A., Shiferaw, B., & Gbegbelegbe, S. (2016). *Economywide impacts of promising agricultural technologies on food security and welfare in Kenya* (No. 310-2016-5484).
- Salami, A., Kamara, A. B., & Brixiova, Z. (2017). *Smallholder agriculture in East Africa: Trends, constraints, and opportunities*. African Development Bank Tunis, Tunisia.
- Sang, F., & Keror, I. (2012). Influence Of Micro-Finance on Small-scale Wheat Farming Technology In Moiben Division, Uasin-Gishu County, Kenya. *Uasin-Gishu County, Kenya (December 6, 2012)*.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). Research techniques for business students. Essex. *Financial Times/Prentice Hall*, 1-2.
- Shabangu, P. (2016). *Challenges faced by small-scale farmers in Swaziland: A case of Hhohho Region* (Doctoral dissertation, University of the Free State).
- Sheahan, M., Black, R., & Jayne, T. S. (2013). Are Kenyan farmers under-utilizing fertilizer? Implications for input intensification strategies and research. *Food Policy*, 41, 39-52.
- Shelburne, I., Lawver, D. E., Frazee, S., Ulmer, J., Stephenson, C., & Magogo, J. (2017). Adoptive behaviors of farmers after training and their subsequent diffusive behaviors in Uasin Gishu County, Kenya. *Journal of International Agricultural and Extension Education*, 24(1), 74-89.

- Stephens, E. C., Nicholson, C. F., Brown, D. R., Parsons, D., Barrett, C. B., Lehmann, J. & Riha, S. J. (2012). Modeling the impact of natural resource-based poverty traps on food security in Kenya: The Crops, Livestock, and Soils in Smallholder Economic Systems (CLASSES) model. *Food Security*, 4(3), 423-439.
- Stewart, R., Langer, L., Da Silva, N. R., Muchiri, E., Zaranyika, H., Erasmus, Y., & de Wet, T. (2015). The Effects of training, innovation and new technology on African smallholder farmers' economic outcomes and food security: a systematic review. *Campbell Systematic Reviews*, 11(1), 1-224. The World Bank. 2010. *Global Strategy to Improve Agricultural and Rural Statistics*.
- Thomas, H. C. (Ed.). (2006). *Trade reforms and food security: country case studies and synthesis*. Food & Agriculture Org.
- Thompson, P. B. (Ed.). (2019). *Beyond the large farm: Ethics and research goals for agriculture*. CRC Press.
- Tilman, D., Balzer, C., Hill, J., & Befort, B. L. (2011). Global food demand and the sustainable intensification of agriculture. *Proceedings of the national academy of sciences*, 108(50), 20260-20264.
- Timmer, C. P. (2000). The macro dimensions of food security: economic growth, equitable distribution, and food price stability. *Food policy*, 25(3), 283-295.
- Ton, G., de Grip, K., Klerkx, L., Rau, M.L., Douma, M., Friis-Hansen, E., Triomphe, B., Waters-Bayer, A., & Wongtschowski, M. (2013). Effectiveness of innovation grants to smallholder agricultural producers: an explorative systematic review. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- Wheeler, T., & Von Braun, J. (2013). Climate change impacts on global food security. *Science*, 341(6145), 508-513.
- Wabwoba, M. S. N., & Wakhungu, J. W. (2013). Factors affecting sustainability of community food security projects in Kiambu County, Kenya. *Agriculture & Food Security*, 2(1), 9.
- Wakhu-Wamunga, F., Mukabane, D., & Wakhu, D. (2016). Sustainable Household Food Security in Moiben, Uasin Gishu County, Kenya. *Food Studies: An Interdisciplinary Journal*, 6(1), 27-38.

- Wahyuni, D. (2012). The research design maze: Understanding paradigms, cases, techniques , and methodologies. *Journal of applied management accounting research*, 10(1), 69-80.
- Wambua, B. N., Omoke, K. J., &Mutua, T. M. (2014). Effects of Socio-Economic Factors on Food Security Situation in Kenyan Drylands Ecosystem. *Asian Journal of Agriculture and Food Science (ISSN: 2321-1571)*, 2(01).
- Wong, K. C., Coveney, J., Ward, P., Muller, R., Carter, P., Verity, F., &Tsourtos, G. (2011). Availability, affordability, and quality of a healthy food basket in Adelaide, South Australia. *Nutrition & Dietetics*, 68(1), 8-14.
- Youn, A., &Forti, M. (2016). Listening to farmers at One Acre Fund. In *Harnessing the Power of Collective Learning* (pp. 172-189). Routledge.
- Žukauskas, P., Vveinhardt, J., &Andriukaitienė, R. (2018). Philosophy and paradigm of scientific research. *Management Culture and Corporate Social Responsibility*, 121.

APPENDICES

APPENDIX I: QUESTIONNAIRES

INTRODUCTION LETTER

**UNIVERSITY OF ELDORET
P.O. BOX 1125
ELDORET**

Dear Sir/Madam,

RE: INTRODUCTION LETTER

My name is Miss **Margaret Yator**, a master's candidate in Agricultural Extension Education of University of Eldoret. My research topic is '**ASSESSMENT OF TRAINING SMALL-SCALE FARMERS ON FOOD SECURITY IN UASIN GISHU COUNTY: CASE STUDY: MOIBEN SUB COUNTY**' this questionnaire is part of data generating process for my thesis report. The information received will be used for academic purpose **only**. Your co-operation is vital towards realizing the objective of this study. Kindly answer all questions truthfully and objectively. The study is aims at obtaining information on agricultural training method, financial literacy and technological effects of training small-scale farmers on food security. Thank you for accepting to participate.

.....

Margaret Yator

Reg No:.....

Business_____

Civil Servant/public servant_____

Private employment _____

Other_____

b) Total income per month in
Ksh.....

SECTION B: General Information on Food security

- i. You or others in your household worried about not having enough food to eat because of lack of money or other resources? Yes /No
- ii. Was there a time when you and others in your household ate only a few kinds of foods because of lack of money or other resources? Yes / No
- iii. Was there a time when your household were hungry but did not eat because there was not enough money or other resources for food? Yes / No
- iv. Was there a time when you or others in your household went without eating for a whole day because of a lack of money or other resources? Yes / No
- v. Was there a time when your household ran out of food because of lack of money and other resources? Yes / No
- vi. Was there a time when you or others in your household ate less than you thought you should because of money or other resources? Yes / No
- vii. Was there a time you or others in your household had to skip a meal because there was not enough money or other resources? Yes / No

viii. Was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?

Yes / No

SECTION C: Effectiveness of agricultural training uptake on food security of small-scale farmers among households in Moiben Subcounty, Uasin Gishu County.

8. To what extent do you agree with the following statements regarding training of small-scale farmers. Please tick [√] accordingly: 1: Strongly Disagree (**SD**); 2: Disagree (**D**), 3: Neutral (**N**), 4 Agree (**A**), 5 Strongly Agree (**SA**)

	SD	D	N	A	SA
(i). Training of small-scale improves the amount of money that the farmers make					
(ii). Training of small-scale improves the technology used by the farmers					
(iii). Training of small-scale farmers has improved has improved the social well-being of the community					
(iv). Training of small-scale farmers contributes to food security					

9. What effect does training of small-scale farmers have on food security?

.....

10 (a). Did you participate in any farmers' training in the last 2 years?

Yes No

10 (b). If yes, how many times did you participate farmers' training in the last 2 years.....

10 (c). How many days did the training last?.....

10 (d). What did you learn from the program?

New crops , New fertilizer , New farming equipment

Sales information

Other (specify).....

10 (e). Which item of training did you like most?

10 (f). Of what you learned; did you implement what you learned from the training program?

Yes , No

11. Suppose you had an opportunity to be trained this year would you attend

Yes , No

12. Which areas do you think should be covered in the training?

13. What weaknesses did you observe in the training?

Poor coordination , Complex training Poor attendance

Other (specify).....

14. What recommendations would you give to trainers in the future?-----

SECTION D: Effectiveness of adoption of agricultural technologies on food security by small-scale farmers in Moiben Sub County, Uasin Gishu County.

15. Indicate how much do you agree with the following statement on establishing the effect of technology adoption in enhancing Food security.

Rate of 1-5, 5= Strongly agree, 4= Agree, 3= Neutral, 2= Disagree, 1= Strongly disagree

	SD	D	N	A	SA
(i). The use of machines for tilling makes land preparation process easier					
(ii). Fertilizer application significantly improves soil fertility and crop yield					
(iii). Plant hybrid seeds results in better quality crops and increased					
(iv). Good preservation techniques helps extend the quality of your produce					
(v). Use of chemical pesticides helps control insects and pests that damage crop					

SECTION E: Effectiveness of financial literacy training on food security of small-scale farmers in Moiben Sub County Uasin Gishu County.

16. To what extent do you agree with the following statements on financial planning practices?

Use the scale of 1-5 where 5= Strongly agree (SA), 4= Agree (A), 3= Neutral (N), 2= Disagree (D), 1= Strongly disagree (SD)

	SD	D	N	A	SA
(i).I budget for my money/income I receive from the farm proceeds					
(ii).I keep a close personal watch on my financial affairs					
(iii). Before I buy something I carefully consider whether I can afford it.					
(iv). I generally achieve my money management goals					

17.To what extent do financial planning practices enhanced your access and use of financial services?

Very great extent , Great extent , Moderate extent , Small extent ,

Not at all .

18.Do you have a current saving/loan account with any financial institution?

Yes , No

19.How many times do you access financial products/services in a month?

Once , Twice or Thrice , Four-Five , More than 5 times.

20. To what extent do you agree with the following statements on financial services?

Use the scale of 1-5 where 5= Every time, 4= Almost every time, 3= Occasionally, 2=

Almost never, 1= Never.

	Never	Almost never	Occasionally	Almost every time	Every time
(i). Saving services					
(ii). Depositing/Withdrawing cash					
(iii). Loan services					
(iv). Mobile banking (including mobile phones financial services such as M-pesa)					

Thank you for taking your time to respond to the questionnaire.

APPENDIX III: LETTER OF AUTHORITY TO CARRY OUT RESEARCH.



P. O. Box 1125 - 30100, Eldoret, Kenya
 Tel: +254 53 2063257 / 2033712/13 Ext. 2358
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 Website: www.uoeld.ac.ke

**OFFICE OF THE DEPUTY VICE-CHANCELLOR
 (Academic & Students' Affairs)**

Our Ref: UoE/B/BPGS/STU/075

DATE: 11th February, 2022

The Chief Executive Officer
 National Commission for
 Science, Technology and
 Innovations
 (NACOST)
 P.O. BOX 30623 - 00100
NAIROBI.

Dear Sir/Madam,

**RE: REQUEST FOR RESEARCH PERMIT - MARGARET CHERUTO YATOR-
 ADM. NO. SAGR/AGE/M/003/017**

The above subject refers.

The above named is a bonafide Masters student in the **Department of Agricultural Economics & Rural Development, School of Agriculture and Biotechnology**. The applicant has completed coursework and successfully defended her proposal in readiness for commencement of research. Her research is titled **"Effects of training small scale farmers on food security in Moiben Sub County Uasin Gishu County, Kenya."**

By this letter, I request you to issue Ms. Margaret Cheruto Yator with a research permit to enable her proceed with her survey for her to write her thesis.

Your support will be highly appreciated.


Yours faithfully,




PROF. BEATRICE A. WERE
DIRECTOR, BOARD OF POSTGRADUATE STUDIES



APPENDIX IV: PERMISSION LETTER FROM NACOSTI


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **751016** Date of Issue: **25/February/2022**


RESEARCH LICENSE




This is to Certify that Miss.. Margaret Cheruto Yator of University of Eldoret, has been licensed to conduct research in Uasin-Gishu on the topic: EFFECTS OF TRAINING SMALL-SCALE FARMERS ON FOOD SECURITY IN UASIN GISHU COUNTY MOIBEN SUB COUNTY. for the period ending : 25/February/2023.

License No: **NACOSTI/P/22/15833**

Applicant Identification Number: **751016**



Director General
**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION**

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APPENDIX V: SIMILARITY REPORT



University of Eldoret
Certificate of Plagiarism Check for Thesis



Author Name	Margaret Cheruto Yator SAGR/AGE/M/003/17
Course of Study	Type here...
Name of Guide	Type here...
Department	Type here...
Acceptable Maximum Limit	Type here... <input type="button" value="v"/>
Submitted By	similarity@uoeld.ac.ke
Paper Title	AN ASSESSMENT ON TRAINING OF SMALL SCALE FARMERS IN MOIBEN SUB-COUNTY, UASIN GISHU COUNTY AFFECTS HOUSEHOLD FOOD SECURITY
Similarity	15%
Paper ID	4661805
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