

Determinants of participation in non-farm activities and household food security in rural communities: a case of Mnquma Local Municipality, Eastern Cape Province

By

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**A dissertation submitted in fulfilment of the requirements for the degree
of Master of Agriculture in Agricultural Economics**

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DECLARATION

I, Mvango Siphe, hereby declare that all the contents of this document submitted in fulfilment of the requirements for the degree of master's in agriculture: Agricultural Economics at the University of Fort Hare's Faculty of Science and Agriculture has not been previously written or submitted for degree purposes in any other university and is my original work except where due acknowledgement has been made in the text.

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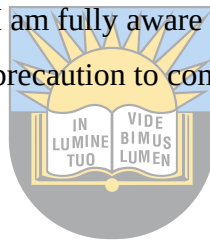
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DEDICATION

I dedicate this dissertation to my parents, sisters, and my friends for their support and unconditional love.

I love you all.



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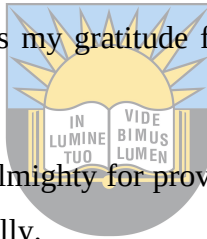
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ABSTRACT

Non-farm income generating activities enable rural households to buy food for subsistence while still allowing their land to be used for food crops. This increases both the number of inputs that are purchased and the number of inputs that are important for enterprise operations, growth and expansion. However, agricultural activities continue to improve rural households' quality of life, especially the poorest, in a way that is sustainable in terms of the economy, society, and the environment of most less developed countries including South Africa. In order to achieve the development of the rural non-farm economy, the involvement of farmers cannot be ignored. The study seeks to analyse the non-farm income generating activities and household food security in rural parts of Mnquma Local Municipality in the Eastern Cape Province. More specifically, the study seeks to analyse various income diversification activities and their contribution on rural households' income, the factors affecting the choice of rural households' participation in income generating (livelihood) activities as well as their effects on household food security.

A multistage random sampling technique was used to select a sample of 398 rural households. Survey participants were dispersed among Butterworth, Centane and Ngqamakwe towns of Mnquma Local Municipality. Two wards in each town were chosen to reflect the range in town standard of living. Five administrative areas that represented the wards average level of living were chosen in each ward. Survey households were selected at random to participate in each administrative area. The dataset represents a well representative sample of households in Mnquma given the administrative areas stratification and household sampling scheme. Data was collected using structured questionnaires. To analyse the data collected on socio-economic and demographic characteristics of households, the study made use of descriptive statistics such as mean, standard deviation, percentages and frequency of occurrence. One-way analysis of variance (ANOVA) was used to analyse the data collected on various income diversification activities. ANOVA was used to test the difference in mean income of the three groups of farmers namely: farm, non-farm and both farm and non-farm income generating activities. Indices on access to infrastructure and rural constraints were constructed using Principal Component Analysis (PCA) and these were variables in the multinomial regression analysis. The factors affecting the income diversification choice decision of rural households were estimated using the Multinomial Logistic Regression (MLR). National Poverty Line was employed to determine whether a household is food secure or food insecure. The effects of

income diversification choice decision on household food security were examined using the Binary Logistic Regression (BLR).

The results reveal an almost equal gender representation with 51% males and 49% females. The average family size was 7, with 40% of the household head having secondary education and having completed at least an average of 10 years of formal education. The average monthly household income was R8 872, 88. The most observed occupation was found to be a combination of both non-farming and farming income activities with (49%); non-farm activities (33%) and farming (18%). Among revenue from enterprises, old age grants, pensions, child support grants, remittances as well as the combination of other sources of income, salaries and wages accounted for 37% of the household heads' non-farm income. Combined income sources represent the largest contributor and pension as the least contributor. The income of surveyed households is primarily derived from a combination of farm and non-farm income-generating activities.

One- way analysis of variance (ANOVA) was carried out to determine if there are significant differences between the mean incomes of farm, non-farm and both farm and non-farm income generating activities. The F-statistic showed a significant difference in the means of the groups compared to the variations within the groups. The findings revealed a statistically insignificant difference in the mean income of farm, non-farm, and both farm and non-farm income-generating activities at the 10% probability level, which was bigger than the significant P-value of 0.05. Therefore, there was insufficient data to conclude that the means of the households' income diversification activities differed in a way that was statistically significant. The study is unable to reject the null hypothesis. The Principal Component Analysis (PCA) model for rural constraints kept three (3) variables with Eigenvalues greater than one. The results showed that the three variables kept in the model explained 62.51% of the variance. These variables are lack of infrastructure, access to markets and lack of productive assets. PCA results on infrastructure accessibility revealed three (3) variables that were preserved, described 82.34% of the variance namely roads, electricity as well as water and sanitation.

The Multinomial Logistic Regression (MLR) revealed that number of years spent in school, employment status of the household head and rural constraints clearly show a significant relationship on the choice of rural households to engage in farming activities. The results reveal a significant relationship between gender, age, employment status, access to extension services, and infrastructure accessibility and rural households' decisions to engage in non-farm income

activities. These variables were statistically significant at $p < 0.05$ level. The marginal effects reveal that male-headed households are less likely to diversify their income through farming and non-farming activities, with a decrease in this likelihood. Age also affects this decision, with higher educational attainment leading to an increase in farming activities. Employment status also affects this decision, with a 26% increase in the likelihood of both income activities. Rural constraints and Infrastructure accessibility also affects this decision of household participation in both farming and non-farming activities.

The National Poverty Line demonstrated that the vast majority of respondents (47%) fall within the upper bound poverty line, food poverty line (38%) and lower bound poverty line (15%). Upper bound poverty line households have access to enough food and non-food products. On the other hand, households with incomes below the upper limit of the poverty level are considered to be food insecure. The poverty line findings reveal that households within the food poverty line and lower bound poverty line account for 53% of the total, indicating a higher level of food insecurity.

The Binary Logistic Regression show that household income and household size have an impact on household food security and are statistically significant at 1% probability level. The marginal effects revealed that household income and household size significantly impact food security, with income increasing by 0.005% and size decreasing by 6% for larger households, thereby affecting food availability to each member.

According to the study, lack of infrastructure, access to markets, a lack of productive assets, government regulations, high competition from other enterprises, job insecurity, insufficient access to credit facilities, and a lack of awareness and trainings all impede the effectiveness of income diversification activities in improving food security in Mquma Local Municipality. Therefore, local, provincial and national governments should invest in the development and evaluation of rural economic development policies that support farm, non-farm, and food security income.

Keywords: Non-farm income, Income diversification, Rural household food security, Principal Component Analysis, Multinomial Logistic Regression, Binary Logistic Regression

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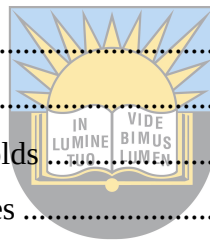
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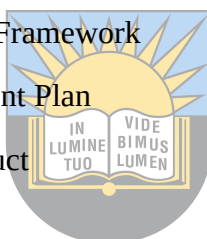
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LIST OF ABBREVIATIONS AND ACRONYMS

WHO	: World Health Organisation
FAO	: Food and Agriculture Organisation
SACU	: Southern African Customs Union
DAFF	: Department of Agriculture, Forestry and Fisheries
STATS SA	: Statistics South Africa
MAFISA	: Micro Agricultural Financial Institution of South Africa
CASP	: Comprehensive Agricultural Support Programme
MLM	: Mnquma Local Municipality
ADM	: Amathole District Municipality
EC	: Eastern Cape
SA	: South Africa
SDF	: Spatial Development Framework
IDP	: Integrated Development Plan
GDP	: Gross Domestic Product
HIP's	: High Impact Projects
SPSS	: Statistical Package for Social Science
ANOVA	: Analysis of Variance
MLR	: Multinomial Logistic Regression
PCA	: Principal Component Analysis
BDS	: Business Development Services
NARYSEC	: National Rural Youth Services Corps
CRDP	: Comprehensive Rural Development Programme
DRDAR	: Department of Rural Development and Agrarian Reform
ECDC	: Eastern Cape Development Corporation
ECRDA	: Eastern Cape Rural Development Agency
NYDA	: National Youth and Development Agency
SEFA	: Small Enterprise Development Agency
WFP	: World Food Programme



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UNICEF	: United Nations International Children Emergency Fund
SSA	: Sub-Saharan Africa
IFAD	: International Fund for Agriculture Development
NGO	: National Governmental Organisations
MSME	: Micro Small and Medium-Sized Enterprises
HDDS	: Household Dietary Diversity Score
HCSI	: Household Coping Strategy Index
HFIAS	: Household Food Insecurity Access Scale
FANTA	: Food and Nutrition Technical Assistance Project
CARE	: Cooperative for Assistance and Relief Everywhere
TANGO	: Technical Assistance to NGO's
RDP	: Reconstruction and Development Programme
ECSECC	: Eastern Cape Socio Economic Consultative Council
UFD	: Ukhanyo Farmer Development

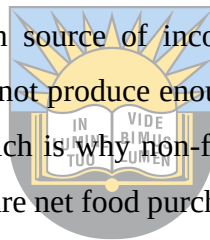


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CHAPTER 1: INTRODUCTION

1.1 Background of the study

Non-farm income has been identified as an important strategic component for livelihood among rural households in developing countries (Nanda et al., 2019). The acquisition of productive agricultural resources by rural households, including land, labour and equipment, but especially land, depends heavily on non-farm income (Nguyen, 2019 and Zereyesus et al., 2017). Rural households can embrace new production technology due to the income they receive from non-farm enterprises, and activities that boost productivity also encourage agricultural growth by creating better investment opportunities. Additionally, rural households' income from non-farm sources acts as insurance against hazards associated with agriculture (Odoh et al., 2019). The income that rural households earn and generate from non-farm activities is invested in raising the farming sector's productivity. Gassner et al., (2019) argued that although agriculture is the main source of income for rural households, agricultural incomes are very low and farmers do not produce enough to feed themselves, leading to food insecurity and income inequality, which is why non-farm activities with higher incomes are needed. As a result, rural households are net food purchasers because they need income to buy food.



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According to Odoh et al., (2019), in the development literature, the non-farm income activities among rural households in developing countries are a topic that has been given a great observation. Rantso, (2016) and Ibekwe et al., (2010) noted that the majority of rural households in developing countries are forced to participate in non-farm agricultural sector activities in order to make a living due to low agricultural production and declining farm income which consequently results to poverty, unemployment and food insecurity. Agro-climatic conditions, crop land abandonment, reduction of agricultural subsidies by government to small scale farmers are some of the causes to the decline of the agricultural sector (Rantso, 2016 and Blair, Shackleton & Mograbi, 2018) as well as the outbreak of the COVID-19 (Tripathi et al, 2021 and Wegerif, 2022).

Nagler and Naudé, (2014) highlighted that emphasized that there is a lack of knowledge regarding Africa's rural non-farm economy. However, although nowadays there is a lot more that is known about the magnitude and contribution of non-farm income activities, most observed and experimental evidence is based on one period, single country and rather limited

data survey. Furthermore, most of the studies have neglected the rural households' entrepreneurship and have focused mostly on urban areas (Dias, Rodrigues and Ferreira, 2019).

Tshabalala and Sidique (2020) and Rantso (2016) defined non-farm income as all income generating activities including income in kind that are not agricultural. Moreover, non-farm income refers to the income that is generated through non-farm activities such as local non-farm wage employment, migration income, remittances and local non-farm self-employment. In some households, the non-farm income is derived so as to supplement the income that is obtained from agricultural activities while in other household the non-farm income is the main source of income. There are several factors that lead rural households and individuals to diversify assets, income and activities. Such factors include better returns in the non-farm sector, inadequate farm output and insufficient markets for consumer credit and crop insurance. These factors are usually classified as either "push factors" or "pull factors". Nmeregini, Nzeakor and Ekweanya (2019) emphasised that some rural households are pulled or pushed to the non-farm income generating activities when the returns to the non-farm employment are less risky and much higher than those in agriculture activities. Consequently, Abdurezak, Zemedu and Belay (2021) argued that rural households may lack the knowledge and expertise to engage in non-farm activities, which results in substantial adjustment costs. Non-farm employment provides additional income that enables households to spend more on their basic needs which include food, education, clothing and health care (Adem, 2018, Meaza 2014 and Nagler & Naudé, 2014). This implies that non-farm employment has a significant role in maintaining household food security.

In South Africa, rural farming households are still locked in low productivity traditional technologies which in turn jeopardise poverty alleviation and food security efforts (Mujuru and Obi, 2020). According to Statistics South Africa (2019), 78.5% of South African households were involved in agricultural activities to supplement food for their household's livelihood. The provinces with the highest proportion of the households that are involved in agriculture are Limpopo (91.4%), Eastern Cape (81.9%) and Mpumalanga (79.0 %). On the other hand, Limpopo has the highest proportion (93,6%) of households with adequate access to food, followed by Gauteng (84,0%). Households in the Northwest (24,5%), Northern Cape (20,5%), Eastern Cape (20,1%), KwaZulu-Natal (18,6%), and Mpumalanga (18,6%) reported having insufficient access to food than the national average of 15,8%. This therefore illustrate that Eastern Cape is among other provinces with fewer households that has access to food. Consequently, the only three provinces with severely inadequate access to food, which was

nearly twice the national average, were the Northern Cape (13%) Mpumalanga (12%) and Northwest (11%) provinces (Statistics South Africa, 2019).

More than half (58.3%) of South African households' source of income are salaries, followed by social grants (19,9%), remittances (8.9%), income from businesses (8.4), pensions (2.2%) and sales of farming products & other services (0.1%). As the majority of households depend on salaries, price volatility and unemployment tend to affect the households' food security (Stats SA, 2019). However, Visagie and Turok (2021) argued that social payments and labour income were the two main sources of income of households in rural areas. The Eastern Cape Province, with the population of 6,498,700 was reported to be the poorest province in 2019 with nearly 60% of households dependent on social grants. The province has a high official unemployment rate of 37.4%, an expanded unemployment rate of 48.3% and an adult poverty rate of 67.3% (Statistics South Africa, 2019).

Food security and poverty alleviation are priority objectives since independence not only in South Africa but also in other Sub-Saharan African (SSA) countries (WHO, 2019). One of the fundamental rights in the constitution of South Africa “Section 27 (1) (b)” is that everyone has the right to have access to sufficient, safe and nutritious food and water (FAO, WFP and UNICEF, 2019; WHO, 2018 and Constitution SA, 1996). WHO (2019) highlighted that the definition of food security is “whereby in a society all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preference for an active and healthy life”. Department of Agriculture Forestry and Fisheries (DAFF, 2019) highlighted the allocation of the Ilima/Letsema projects grant to be used to promote the Food Production Initiative, which forms part of the National Policy on Food and Nutrition so as to promote food security in South Africa. Furthermore, rural households could gain from food production initiatives under the Ilima/Letsema projects award, which is scheduled to receive an estimated R1.9 billion.

Agriculture is typically thought of as a solution to the problem of food insecurity and undernourishment in developing countries since it plays a significant influence in the food security of rural households (Assef, Heerink and Van den Berg, 2015). Most developing countries have prioritised the agricultural sector in their policies and it has been taken as a great solution for food and nutrition problems (Assefa, Heerink and Van den Berg, 2015 and Ncube, 2012). About 820 million people and more were still hungry in 2018 due to an increase in the number of hungry people in the world thus, underscoring the immense challenge of achieving

the Zero Hunger target by 2030 (WHO, 2018; FAO, WFP and UNICEF, 2019). The 2030 Zero Hunger targets is to end hunger and ensure access by all people, in particular the poor and people in vulnerable conditions, including infants, to safe, nutritious and sufficient food all year round, thereby improving food security (WHO, 2018).

As part of the Eastern Cape Province, Mnquma Local Municipality is one of the municipalities with the highest levels of poverty, illiteracy and unemployment. An estimated 11% is unemployed, only 25% is employed while 64% of the municipal population is considered economically inactive. The area has limited employment opportunities and this has huge implications on the increased need for welfare and indigent support in the municipal area. However, the population of Mnquma participate on non-farm income activities through the implementation of High Impact Projects that are facilitated by the municipality so as to generate income, employment and improve their household livelihood (Mnquma Integrated Development Plan, 2020). According to Statistics South Africa (2019), agriculture produced about 57% of the jobs share in the goods producing sectors, followed by manufacturing and mining or quarrying contribution. In the non-goods producing sectors, general government employment and community services sectors provided 64% of the jobs in that sector followed by the wholesale trade sector at 14% respectively (Stats SA, 2019).

1.2 Problem statement

Low food productivity in the agricultural sector negatively impacts on employment, income and food security which consequently results to the unchanging and continuing food insecurity in rural parts of South Africa (Mujuru & Obi, 2020 and De Klerk et al., 2015). Therefore, the goal of ensuring food security for all continues to be one of the pressing agenda in South Africa. South Africa has been identified to have an extremely high level of absolute poverty compared to other middle-income countries in BRICS (Brazil, Russia, India, China and South Africa) (FAO, WFP and UNICEF, 2019). Consequently, the post-apartheid government implemented the majority of strategic projects such as Land reform programme comprising of tenure, Micro Agricultural Financial Institution of South Africa (MAFISA), Comprehensive Agricultural Support Programme (CASP), Massive Food Production Programme in the Eastern Cape and land redistribution and restitution as an attempt to alleviate food insecurity (Christian, 2017). Mnquma Local Municipality is one of the municipalities with the highest levels of poverty, illiteracy and unemployment. Only 25% of people in the municipality are employed, and 11% are reportedly unemployed, while 64% of population are thought to be economically inactive. The municipality's rising demand for welfare and indigent support is directly impacted by the

area's restricted economic options. Therefore, food insecurity among rural households in Mnquma is still a problem, especially due to unemployment and income inequality and ineffective participation in income generating activities (Mnquma Integrated Development Plan, 2020).

Achieving food security is still a challenge due to the global approach (“the 2030 Agenda for Sustainable Development” that was adopted by world leaders during the 2015 United Nations Summit) being employed instead of formulating, processing and implementing solutions based on specific locations with an understanding of the social system and livelihood activities. This approach commits the international community to end poverty, hunger and malnutrition, tackle climate change and achieve equitable and sustainable development by 2030 (World Health Organization WHO, 2018). In fact, food insecurity is no longer seen simply as a failure of agriculture to produce sufficient food at the national level, but instead as a failure of livelihoods to guarantee access to safe, sufficient and nutritious food at the household level (Musemwa et.al, 2015). For that reason, the majority of households tend to participate on non-farm activities so as to improve their household income and overcome the food insecurity status thus reducing poverty. The returns from off-farm activities are necessary for rural households so as to diversify their food intake and achieve nutrition security.

The tendency for rural households to engage in non-farm activities is often noticeable, but few attempts have been made to link this behaviour in a systematic way to rural poverty reduction and food security policies (Amurtiya, 2015). Despite the growing importance of non-farm income activities, very little is known about the role they play in the income generation strategies of rural households in developing economies like South Africa. Moreover, Oyewole (2012) noted that rural households often engage in non-farm income generating activities to meet their household necessities, but despite this, their participation seems to be limited by capital assets such as economic, social, financial, physical, and land property. According to Mretie (2019), households who participate only in non-farm activities diversify their diet less than households who participate both on farm and non-farm activities. Nevertheless, the effects of non-farm sources of income on food security depend on the household strategies and the opportunities available to participating households (Zerai and Gebreegziabher, 2011; Mensah, 2014 and Mretie, 2019). Hence, the involvement of rural households in non-farm income activities are issues that deserve investigation particularly in Eastern Cape Province which is viewed as one of the most food insecure provinces (Statistics South Africa, 2019; Megbowon & Mushunje, 2018).

In spite of the greater concern of Global, National, Provincial and Local government in improving food security, the contributions of non-farm income generating activities on food security status of rural households, especially in Mnquma Local Municipality is not adequately examined and documented. Therefore, in order to formulate effective rural economic development strategies and policies that are in line with the promotion of farm, non-farm income and food security, it is essential to analyse the non-farm-income generating activities and food security status of rural households in Mnquma Local Municipality.

1.3 Objectives of the study

The broad objective of the study is to analyse the determinants of participation in non-farm activities and household food security in rural communities: a case of Mnquma Local Municipality, Eastern Cape Province.

More specifically the study seeks to:

- Identify and analyse various income diversification activities and their contributions on rural household income in the study area.
- Construct rural constraints and infrastructure accessibility indices affecting the choice of rural household participation in income diversification activities in the study area.
- Determine the factors affecting the income diversification choice decision of rural households in the study area.
- Examine the effects of income diversification choice decision on rural households' food security in the study area.

1.4 Research Questions

The questions that this research seeks to answer are as follows: -

- What are the income diversification activities and what contributions do they make towards rural households' income in the study area?
- What are the rural constraints and infrastructure accessibility affecting the choice of rural household participation in income diversification activities in the study area?
- What are the factors affecting the income diversification choice decision of rural households in the study area?
- What are the effects of income diversification choice decision on rural households' food security in the study area?

1.5 Hypothesis

H₀

Income diversification activities does not influence rural households' food security.

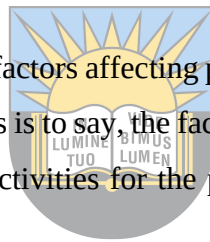
H₁

Income diversification activities affects rural households' food security.

1.6 Delimitation of the study

The study is confined to the rural parts of Mnquma Local Municipality, therefore; the results of the study cannot be generalised for all rural households in other Districts or other Local Municipalities in Eastern Cape. Additionally, the study focused on the income diversification activities through which rural households participate so as to generate their income, improve their livelihood and food security status. This is because even though rural households share some similarities in terms of characteristics but the extent of diversifying their income and other factors may differ.

The study also focused on identifying factors affecting participation of rural households in non-farm income generating activities. This is to say, the factors that pull and push rural households to participate on income generating activities for the purposes of improving their household livelihood and food security status.



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1.7 Justification of the study *Together in Excellence*

This study provides an in-depth understanding of the different farm and non-farm income diversification activities that rural households in Mnquma Local Municipality engage in to generate income for their household needs. The findings of the study are important to all rural development actors to design effective food security programmes by encouraging diverse livelihood income activities increasing economic productivity through innovation, technical advancement, and sectoral focus on high value added and labour-intensive industries. enhancing the ability of nearby communities to pursue chances for sustainable livelihood. Through the successful integration of income diversification activities, the study supports the National Development Plan's objectives and Sustainable Development Goals to end hunger, reduce inequality, and ensure access by all people, particularly the poor and those in vulnerable situations, including infants, to safe, nourishing, and sufficient food all year round by 2030. Findings from the study contributes to existing knowledge on the drivers of change in the rural economy, opportunities and constraints. Finally, the study identifies areas for further research.

1.8 Project outline

The dissertation comprises of five chapters. Chapter 1 outlines the background of the study, problem statement, objectives, the hypothesis, delimitation, and the justification of the study. The second chapter is a critical review of literature on socio-economic characteristics of rural households, various income diversification activities and their determinants, contributions of income generating activities on rural households' food security, rural constraints on households' choice of participation in income-generating activities as well as the effects of income generating activities on household food security among rural households in the study area. Chapter 3 presents the theoretical and analytical framework, wherein the research methodology which consists of the study design, study area, sampling method, method of data collection and data analysis methods are explained. The fourth chapter comprises of the presentation and discussion of the research findings and lastly, chapter 5 consist of discussion, conclusion and recommendations.



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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter consists of the existing literature that is aimed at getting supporting theories and empirical evidence for the study. The chapter gives critical details of non-farm and farm income diversification and rural household food security. The chapter begins by describing the concept of income diversification, its evolution and forms. Secondly, the chapter provides information on the concept of non-farm income, characteristics or features, determinants and motives and the importance of non-farm income enterprises towards rural development. The nexus between farm, non-farm income and food security, determinants of households' participation into non-farm enterprises, rural constraints on households' participation in income generating activities, importance of infrastructure on the development of income generating activities and the effects of income generating activities on rural household food security are also outlined in the chapter. Lastly, the chapter discusses the concept of food security, indicators, determinants, approaches to measurement of food security as well as food security in South Africa.

2.2 Income diversification

Income diversification is defined by Adem, (2018) and Nanda et al., (2019) as a process by which households expand their income base and social support capabilities by adopting new economic activities in order to survive and to improve their standard of living and manage risks. Income diversification enables rural households to obtain better income and thereby enhanced food security and also improved agricultural production owing to the smooth capital flow. Therefore, diversification towards non-farm activities is considered as a safer choice rather than solely relying on subsistence farming for livelihood and food security (Nanda et al., 2019; Nagler and Naude, 2014). Similarly, to the study done by Rantso (2016) on the role of non-farm sector in rural development in Lesotho which highlighted that the majority of farmers in Africa diversify into the non-farm sector because the non-farm income helps to reduce poverty thus improves food security. In addition, people tend to diversify into the non-farm sector when the agricultural sector fails to provide sufficient returns due to unfavourable agro-climatic conditions. Meaning that, non-farm sector provides higher income which is necessary for food security (Osarfo, Senadza, and Nketiah-Amponsah, 2016); employment creation and economic growth in Sub-Saharan Africa (SSA) (Loison, 2015).

Amurtiya (2015) and Mretie (2019) defined income diversification as the process of switching from low-value crop production to high value crops, livestock and non-farm activities. This definition focuses on diversification as a source of income growth and a potential means for poverty reduction. Furthermore, the process stated in this definition of income diversification may well refer to factors that induce people to engage in multiple livelihoods, which ideally, remain core to any livelihoods research. The decision for rural households to be engaged on income diversification strategies besides a purely farm income strategy depends on the capacity and the incentive to diversify. The rural household's incentive to diversify may be activated by push or pull factors (Senadza, 2014).

Ntwalle (2019) also defined income diversification as a strategy whereby productive assets are allocated among different income generating activities. Diversification can be classified into whole rural economy or individual rural households. Rural economy diversification refers to a total sectoral shift from farm economy to non-farm economy, which is income generating activities other than agriculture, for example; transport, commerce and mining. Household diversification refers to the household's expansion of income generating activities from different sectors and locations. It can be farm or non-farm activities, on-farm or off-farm activities and wage employment or self-employment (Loison, 2015). Income diversification is aimed at minimising risk and further raise household income (Amurtiya, 2015). According to Mensah (2014), rural households adopt income diversification strategies for the purpose reducing "income vulnerability". In addition, diversification is a deliberate effort by households to widen their income activities for the purpose of "accumulation of income and investment in the future". The concept of income diversification is defined based on the underlying theme that it is a proactive or reactive strategy that is being adopted by households for their livelihood security especially in rural areas.

Income diversification includes both on and off-farm activities used by households to generate additional income to that income from agricultural activities. The on-farm diversification refers to maintaining a wide spread of crops and livestock production activities that interlock with each other in various ways. Whereas off-farm diversification refers to the process of seeking alternative business or employment opportunities other than traditional crop production and livestock rearing. However, off-farm diversification is interrelated to agriculture because it includes the processing and trading of agricultural produce (Amurtiya, 2015).

For the purpose of this study, the definition of income diversification that includes all farm and non-farm activities, on-farm and off-farm activities, wage employment and self-employment has been adopted.

2.2.1 Evolution and forms of income diversification

According to Asare (2018) income diversification evolved as a response to the failure of the International Monetary Fund and the World Bank's Structural Adjustment Programmes to provide the catalyst for increased agricultural production in most developing countries. Its emergence is grounded on the fact that poverty and vulnerability are highly linked with over-dependence on subsistence agriculture, therefore the need for rural households to diversify into other activities. Ntwalle (2019) mentioned that income diversification includes one of the broad categories of livelihood strategies available to rural households within the sustainable livelihood's framework apart from migration and agricultural intensification/extensification. Although the concept has over the years been studied from the lens of rural development, it is equally important for urban households.

Studies conducted by Loison (2015); Christiaensen and Martin (2018); Maja (2019) and Davis, Di Giuseppe and Zezza (2017) indicated that the rising agricultural productivity, industrialisation and urbanisation have been the major motives towards economic growth in developing countries. In addition, this consequently occurred as a result of the reallocation of economic activities across the broad sectors agriculture, manufacturing and services (Structural Transformation) in Europe and North America. In Asia, the agricultural transformation transpired through Green Revolution which was based upon producing high-yielding grain varieties which in turn resulted in high productivity (Davis, Di Giuseppe, and Zezza, 2017). Consequently, the Sub-Saharan Africa differs in some ways from the path of the structural transformation and economic development. Agricultural farms in Sub-Saharan Africa are generally becoming smaller instead of being combined as it happened in Europe and North America. The decline in farm sizes in the Sub-Saharan Africa occurs as a result of high population which result from high fertility rate. The increasing population consequently results to the shift of unskilled farm labours to low-return non-farm sectors. Urbanisation in Sub-Saharan Africa transpires without industrialisation and high return service sectors. As a result, the provision of skilled non-farm employment opportunities remains limited in urban areas of the Sub-Saharan Africa (Christiaensen and Martin, 2018).

In 2003, the Maputo declaration was signed among the broad range of relevant stakeholders such as local, regional and global states, non-governmental organisations (NGO's), farmers organisations as well as researchers. The major interest was the smallholder-based model of agricultural development. In addition, the smallholder-based model of agricultural development was based on the fact that smallholder farmers are given the right policies to provide for their own food security as well as generate a marketable surplus (Djurfeldt, Isinika, and Dzanku, 2018). Income diversification through farm and non-farm activities, on-farm and off-farm activities, wage employment and self-employment had been given much attention in the 2007 World Development Report on agriculture and the 2011 IFAD Rural Poverty report (Davis, Di Giuseppe, and Zezza, 2017). Furthermore, the 2007 World Development Report envisaged the increasing smallholder productivity through the gradual structural transformation of African economies.

At the World Bank in the late 2013, the participants in the workshop on agriculture, structural transformation and poverty reduction set to modernise and refine the relationship between sectoral growth and poverty reduction (Loison, 2015). Additionally, the workshop further zoomed in on the structural factors and policy environments based on labour reallocation from (rural) agriculture to (urban) non-agriculture.

Income diversification is based upon three forms which are on-farm, off-farm agriculturally based and non-farm or non-agricultural (Loison, 2015). Additionally, Asare (2018) emphasised that self-employment in non-farm activities is mostly preferred due to its potential of stimulating rural economic growth. However, self-employment usually requires initial start-up capital and involves high risk of failure. Be that as it may, to create the enabling environment to mitigate some of the challenges rural households face in venturing into such enterprises, initiatives by international NGOs such as the International Fund for Agricultural Development (IFAD) with support from governments have been facilitated and implemented.

2.3 Concept of non-farm income

Non-farm income refers to the earned and unearned income acquired by rural households from the urban economy through temporary migration, remittances, welfare, interests and pensions as well as the rural non-farm economy which include activities based in rural towns (Osarfo, Senadza, and Nketiah-Amponsah, 2016). Ntwalle (2019) defined non-farm activities as those activities that are practised and undertaken outside the field of agriculture. The definitions of 'non-farm' make sense to follow national accounting classifications. Thus, all secondary

(including manufacturing, processing, construction) and tertiary (including transport, trade, finance, rent, services) sectors are non-farm. Additionally, primary sub-sectors, such as mining and quarrying as well as self-employment activities (handicrafts, bakeries, mechanics, kiosks, and so on) are also non-farm. Crop and animal husbandry are ‘farm’ activities (including silviculture, horticulture, aquaculture, apiculture and sericulture, and wage labour in any of these). Consequently, forestry, fisheries or hunting and gathering on common-property resources are sometimes called ‘off-farm’ (Torres et al., 2018 and Adelekan & Omotayo, 2017).

Zerai and Gebreegziabher (2011) noted that the non-farm sector provides alternative employment for those left out of agriculture, improves household food security through diversification as well as slowing rural-urban migration, thereby, promoting growth and welfare. Nanda et al., (2019) highlighted that 50% of rural income in developing countries comes from non-farm income activities. The non-farm sector might be adaptive (switching to trading possibly in response to drought), coping, or be a survival strategy as a response to livelihood shock. The rural non-farm economy cannot be viewed as homogenous but rather it is categorized by its heterogeneity, incorporating self-employment, micro, small, and medium-sized enterprises (MSMEs) (Asare, 2018).

On the other hand, Senandza (2010) argued that non-farm income increases inequality because non-farm income is more unequally distributed in favour of the rich. In Africa non-farm income constitutes a greater share of total income for richer households compared to poorer households. This observed pattern has been explained in terms of entry barriers to participating in the non-farm sector. Successful participation in non-farm activities requires a minimum amount of capital and education which the poor may not have, and this results in them earning proportionately less from non-farm income sources.

2.4 Characteristics of Non-Farm income enterprises

Adem (2018), Asare (2018), Rantso (2016) and Diao, Magalhaes and Mcmillan (2018) pointed that there are four characteristics of non-farm enterprise which are size, capital requirement, seasonality and technology.

2.4.1 Size

The size of employment in the non-farm sector is a significant characteristic to be considered. The vast majority of non-farm enterprises are very small, with limited empirical work and operate with only one worker depending on their activities (Asare, 2018). Therefore, self-

employment towards generating income is the major element in these enterprises. In the Sub-Saharan Africa, rural non-farm enterprises tend to rely largely on family labour and thus employ few workers. Lambon-Quayefio (2017) reported that the average of 80–90% of non-farm enterprises rely exclusively on family labour. This is to say that the majority of non-farm enterprises operate dependently on family labour for household livelihood and food security. Rantso (2016) argued that in many African countries small-scale enterprises have workers ranging between one and twenty.

2.4.2 Capital Requirement

There are different several sources of capital that are required to initiate non-farm enterprises by rural households in developing countries. The majority of rural households use their own savings as a start-up capital as many rural non-farm enterprises require little capital to get started in business (Nagler and Naudé, 2014). Zuwarimwe (2011) pointed that in Zimbabwe, people used low start-up capital ranging between 3,000 and 380,000 Zimbabwe dollars which was approximately R 54.30 and R 6 878.00 in 2011 and equivalent to R139.249 and R17 634.93 South African Rands in 2020. Consequently, some of the rural households make use of funding agencies to start up their businesses. Funding agencies provide financial resources, monitor and evaluate the technical processes of the enterprise. Furthermore, this is done for the purpose of encouraging partnership as well as to create conducive working and trading environment for rural households. For example, Rantso (2016) mentioned that several African and Asian countries received financial assistance from American Aid for handicraft development. Some of the rural households receive their funding from the micro-credit institutions with the purpose of assisting them in setting up income generating non-farm and farm enterprises (Zuwarimwe, 2011).

In developing economies, government provides support such as Business Development Services (BDS), loans, promotion of the formation of businesses (cooperative, partnerships and companies) to non-farm enterprises in order to increase entrepreneurship (Alemu and Adesina, 2017). For example, the government of South Africa provided rural development programmes such as Agri Parks in rural areas in order to achieve economic transformation and improve market access especially for smallholder farmers. The establishment of National Rural Youth Services Corps (NARYSEC) and Comprehensive Rural Development Programme (CRDP) by government to empower rural youth through employment and skills development thus alleviating poverty. The government also instigated the land development programme called “one household one hectare” that targeted state-owned farms and communal land for the

purpose of establishing rural smallholder producers to ensure food security, employment creation and poverty reduction. Furthermore, the land development programme was set to feed to the Agri Park initiative (DRDAR, 2017 and 2018).

2.4.3 Seasonality

Farm activities in the farm sector are seasonal in nature; therefore, non-farm enterprise shows peak activities during dry seasons (Asfaw et al., 2017). The peak activities of the non-farm enterprise is immediately after harvest in the farm enterprise when there is a surplus of available labour and a high demand for non-farm products in the rural economy. This means to say that many farm workers diversify in the non-farm sector during the off seasons. Consequently, non-farm enterprise activities rarely decline to zero during growing season. This points out that even though many people participate in non-farm activities during the agricultural slack, this does not mean that the non-farm sector suffers from a lack of labour during the peak season in agriculture. For this reason, there are people that are usually working in the non-farm sector but are few in numbers. Additionally, the sustainable supply of raw materials to non-farm enterprises during the off-peak in agriculture is affected by the seasonality of the crops in the farm sector (Rantso, 2016).

2.4.4 Technology

The literature points that rural non-farm enterprises use modest craft technology as against industrial technology (Sackey, 2018 and Rantso, 2016). Through the use of modest technology, non-farm sector employs and absorb skilled, semi-skilled and unskilled labours thus creating employment for rural households. Small scale non-farm enterprises are mostly labour intensive and generate employment per unit of capital than large-scale enterprises. Rural industries in Pakistan for example, use elementary technology that ensures productive employment to a large number of people (Rantso, 2016). Furthermore, rural industries in Pakistan use rudimentary technology that ensures productive employment to the growing labour force. On the other hand, the use of technology among small-small non-farm enterprise is often determined by location.

2.5 Determinants and motives of non-farm enterprise

Non-farm activities could be induced by diminishing or time-varying returns on agricultural labour or on land, market failures, or the need to introduce risk management or coping mechanisms (Adem, 2018). Development economics literature has identified two main factors that drive participation and involvement into non-farm activities among rural farm households

in developing countries. These factors are broadly classified into pull factors and push factors. Pull factors will attract rural households to the non-farm sector when the non-farm activities offer higher returns compared to the farming sector. Reasons why a rural household can be pulled into the non-farm sector include higher returns to labour and or capital and the less risky nature of investment in the non-farm sector (Meaza, 2014; Nanda et al., 2019 and Adem, 2018). Furthermore, the desire to increase income in order to become more food-secure, upgrade housing, educate children, accumulate assets or otherwise improve the household's standard of living are also the pull factors. Voluntary participation in non-farm enterprises is opted with the goal to maximize profits (Adem, 2018; Assefa, Heerink and Van den Berg, 2015).

Push factors (or necessity) are the involuntary reasons to participate into non-farm sector; they include income risk management, coping mechanisms, diminishing or time-varying returns to productive assets, long-term constraints or smoothing household consumption (Nanda et.al, 2019). Moreover, the push factors that may drive rural households to participate into non-farm income activities include: first, the desire to manage agricultural production and market risks in the face of a missing insurance market and second, the need to earn income to finance farm investment in the absence of a functioning credit market. When farming becomes less profitable and riskier as a result of population growth and crop and market failures, households are pushed into non-farm activities, leading to “distress-push” diversification. In other case, however, households are rather pulled into the non-farm sector, especially when returns to non-farm enterprise are higher or less risky than in agriculture, resulting in “demand-pull” diversification (Nagler and Naude, 2014 and Meaza, 2014).

According to Asare (2018), Rantso (2016) and Adem (2018) rural households also participate into non-farm sector due to the following reasons: the seasonal use of labour, differentiated labour markets, household-risk strategies and coping behaviour, credit-market imperfections, and household savings and investment strategies. Non-farm income can thus help in overcoming credit and insurance problems. It could also provide income-earning opportunities outside the growing season, employ the households extra labour, help in managing weather and other risks, and ensure smoother consumption throughout the year. In the absence of credit and insurance markets, the rural poor have to find other ways of spreading their consumption, and for many of them income diversification is a potential option.

Unfavourable agro-climatic conditions also push rural people to participate into the non-farm sector. Meaning that, when the agricultural sector fails to satisfy the returns because of the risks

such as unfavourable agro-climatic conditions, rural households tend to move into the non-farm sector for survival (Rantso, 2016).

2.6 Importance of non-farm income enterprises towards rural development

The following section discusses the importance's of non-farm enterprises in the development and improvement of developing countries. The discussion focuses on employment creating and poverty reduction as well as income distribution. The vast number of developing countries lacks industries for employment, income and wealth and agriculture has failed to improve the economy because of many factors. This therefore makes rural non-farm enterprises the major source of employment, income, wealth and food security (Rantso, 2016).

2.6.1 Employment creation and poverty reduction

According to Imai, Gaiha and Thapa (2015), the importance of the rural non-farm sector in developing countries became very popular in the 1970s, after realising that mainstream industrialisation failed to trickle down to the large numbers of rural poor. In order to make a living, the world's poorest populations resorted to non-farm activities for employment. Therefore, the contribution of non-farm activities to rural development did not decline over time, but rather increased. Mensah (2014) justified that non-farm sector remains fundamental for assuring rural livelihoods in developing countries. Furthermore, non-farm sectors are inversely related to the degree of reliance to agriculture, which means to say that "the more non-farm income portfolio, the better off is the rural household livelihood".

Non-farm enterprises provide food, shelter, entertainment and other households basic needs to rural people who cannot secure employment in the formal sector, thus alleviating poverty and provides employment opportunities (Wei and Balasubramanyam, 2015 and Rantso, 2016). Non-farm enterprise also provides space and job opportunities for the excess labour that cannot be absorbed and employed in the public sector or in large private enterprises (Rantso, 2016). This means to say that non-farm enterprises are considered as sources of employment creation and poverty reduction, thus improving rural households' livelihood and food security. Similar to the study done by Artemyan (2015) shows that the rural non-farm sector employs about 68% of the labour force in Tavush, Republic of Armenia. Therefore, by absorbing a large number of the unemployed people, rural non-farm activities represent a potential route out of poverty.

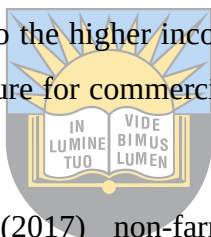
On the other hand, Nagler and Naude (2014) and Quatraro and Vivarelli (2015) argued that non-farm enterprises, especially in small informal businesses, rarely provide employment to

external people. Based on the study done by Asare (2018), out of the 201 responses, the majority (76.6%) did not provide employment in their non-farm enterprises or activities.

As a result, the contribution of the non-farm sector in poverty reduction and employment creation in developing countries is paramount and cannot be ignored (Khatiwada et al., 2017; Rantso, 2016; Odoh and Nwibo, 2016; Awoyemi, 2011).

2.6.2 Income generation

The importance of rural non-farm enterprises in household income generation varies widely between developing countries and cannot be ignored (Rantso, 2016). Rural non-farm activities form an important source of income for many people in rural areas. Non-farm enterprise is associated with higher income and food consumption as well as more stable income and consumption over time (Osarfo, Senadza, and Nketiah-Amponsah, 2016). This is evidenced further by Khatiwada et al., (2017) in a study of household livelihood strategies and implications for poverty reduction in rural areas of Central Nepal. Khatiwada et al., (2017) pointed that connecting poor people to the higher income market through promotion of high value non-farm activities and agriculture for commercial purposes helps in generating higher income.



According to Khatiwada et al, (2017) non-farm sector such as market-oriented businesses/enterprises has increased rural households' income earning and has improved their purchasing power which is crucial for alleviating absolute poverty in rural areas of Central Nepal. Thus, rural households generate 75.2% of the share of their total income from non-farm enterprises. On the other hand, Rantso (2016) stated that rural non-farm income contributes for about 30-50% of rural household income in developing countries. The literature further argued that the non-farm sector does not only contribute to increasing rural households' income, but also provides cheaper consumer goods to rural and urban consumers and finances agriculture (Nmeregini, Nzeakor, Ekweanya, 2019; Alauddin, 2017 and Asfaw et al., 2017).

2.6.3 Income Distribution

Non-farm enterprises are considered to pose a significant role in the distribution of income, particularly in rural areas. Non-farm income activities are also considered to play a crucial role in decreasing income inequality in rural areas (Imai, Gaiha and Thapa, 2015 and Ntwalle, 2019). However, Rantso (2016) pointed out that in the non-farm sector, income distribution is associated with the type of activities. In that case, some non-farm sectors are of high labour productivity with higher returns of income, while others are of low labour productivity with

low returns of income and are taken only as source of employment or a last resort source of income (Rantso, 2016). Based on a study by Senandza (2010), non-farm self-employment income reduces income inequality. On the other hand, non-farm wage income worsens income inequality in rural Ghana.

The literature on rural non-farm economy indicates that higher income households derive a greater share of their earnings from non-farm income generating activities than the poor households. Meaning that, poor households depend more heavily on low return non-farm enterprises and lack access to the better paying non-farm sectors that would alleviate their poverty than wealthy households do (Ahmed and Goodwin, 2016 and Ntwalle, 2019). This is because of the barriers of entry to high return non-farm activities that prevent poor people to participate fairly into the non-farm sector (Senandza, 2010 and Ntwalle, 2019). Therefore, income inequality increases as a result of an increase in income from the non-farm sector (Meaza, 2014).

According to Rantso (2016), poor people in developing countries participate in only small numbers in non-farm activities due to the lack of capital to start up non-farm enterprises, while the wealthy makes a larger percentage.



2.7 Nexus between farm, non-farm income and food security

Non-farm income plays a pivotal role in farmers acquisition of productive agricultural resources such as land, labour and equipment, more especially land (Zereyesus et al., 2017, Nguyen, 2019 and Rantso, 2016). The income earned by rural households from non-farm enterprises enables households to adopt new production technologies; to increase productivity activities induces agricultural growth through improved investment opportunities. In addition, the income derived from non-farm enterprises by rural households serves as an insurance against agricultural risks (Nguyen, 2019). The income earned and generated from non-farm activities by rural households serves as an investment for enhancing productivity in the farming sector. On the other hand, Zereyesus et al., (2017) mentioned that income also flows from farm to non-farm and the majority of reporters believe that the outflow from the agricultural sector is the larger one. Furthermore, farmers use the income generated from the sales of agricultural products to buy non-farm goods and services, thus creating expenditure linkage (Zereyesus et al., 2017, Rahman and Mishra, 2020 and Rantso, 2016).

According to Nguyen (2019) the non-farm sector also supplies agricultural production inputs as well as processed goods and services to the agricultural sector in order to increase

consumption level. Consequently, the farming sector supply raw materials to the non-farm sector in order to foster the expansion of the non-farm sector. Through employment, the agricultural sector employs people so that it can satisfy the high demand of agricultural raw materials by the non-farm sector. During the harvesting period in the agricultural sector, about 80 to 90% of rural households become employed in farm activities and the remaining 10 to 20% of rural labour becomes employed in the non-farm sector. Therefore, the sizeable part of rural households' members moves back and forth between the farm and non-farm sectors (Wei and Balasubramanyam, 2015). The income generated from the non-farm sector can be used as a source of finance to purchase agricultural labour and production inputs. Consequently, the use of inputs increases farm productivity and dietary diversity, which directly contributes to food security (Assefa, Heerink and Van den Berg, 2015 and Rahman and Mishra, 2020).

Poor rural households who participate in rural non-farm activities and generate non-farm income do so not to improve the sustainability of their livelihoods or to invest in improved agricultural production activities but to survive or for stay alive. This, therefore, results to a long-term negative impact on food security. They do not see the non-farm sector as a strategic choice related to wealth accumulation but an involuntary coping strategy. Poor rural households are involved and participate in low productivity, low wage, low growth and unstable non-farm activities due to their lack of access to high productivity, poverty alleviating and better paying non-farm sector (Adepoju and Osunsanmi, 2018). On the other hand, low food productivity in the agricultural sector negatively impacts on employment, income and food security which consequently results to the unchanging and continuing food insecurity in rural parts of South Africa (Mujuru & Obi, 2020).

2.8 Determinants of household participation in non-farm activities

The following section provides the determinants of the participation of rural households into non-farm income generating activities. The non-farm sector has the great potential to provide employment opportunities and alleviate poverty particularly the rural dwellers, however, there are some influencing factors of participating into the more rewarding non-farm activities (Lambon-Quayefio, 2017). These factors include among others education, access to credit, infrastructure access, access/distance to the market, government regulations, competition from other enterprises, access to assets and job security.

2.8.1 Education Level

Education level is identified by Ntwalle (2019) as one of the factors that determines rural households' participation into the non-farm sector. Allocation of rural households' resources between farm and non-farm sector is considered to be improved by education. Rural households with the high level of education are more likely to improve their participation into the non-farm sector through self-employment and stable long-term wage employment. Nanda et al, (2019) discovered that each additional year of schooling increases rural households' participation into non-farm activities by 1% in Jammu and Kashmir, India. Consequently, low level of education makes rural households to be reluctant in improving their participation into the non-farm sector. Rural households with low level of education may not have the required skills and technical knowhow that is necessary for them to participate into the non-farm sector. This is because of high labour adjustment costs that are faced by rural households which requires skilled labourers with relatively high level of education (Demissie and Legesse, 2013 and Ntwalle, 2019).

According to Anang and Yeboah (2019) and Ncube (2012), there is a correlation between education and the non-farm sector. Meaning that, education attainment improves the participation of rural households into the non-farm sector as the better paying non-farm activities requires formal and proper education. Therefore, education enhances non-farm wage and self-employment of rural households into high paying non-farm enterprises (Anang and Yeboah, 2019). In order for rural households to participate productively into the non-farm sector, the provision of basic education and literacy through capacity building approaches is important.

2.8.2 Access to Credit

Inadequate access to institutional credit from banks and subsidies from government institutions and Non-Government Organisations (NGO's) is also considered as one of the problems that non-farm enterprises face in many developing countries. It becomes difficult for poor rural households to start up their own non-farm enterprises due to the lack of credit support from institutional and government agencies (Mretie, 2019; Amurtiya, 2015). Therefore, many rural households non-farm enterprises usually operate with poor equipment which consequently results to low productivity due to the absence of credit support. In the absence of credit support from banks and government institutions, rural households end-up participating in unstable, small self-employment non-farm enterprises with low productivity and low returns. The majority of rural households require financial resources in terms of investment of funding

(subsidies and loans) in order to start up their own non-farm enterprises so as to be able to improve their household livelihood and food security status (Asare, 2018).

On the other hand, adequate access to institutional credit improves the participation of rural households into the non-farm sector. In the availability of credit support from government institutions and banks, rural households are able to start-up their own productive non-farm enterprises. Therefore, due to the high productivity and returns obtained, rural households tend to expand their non-farm enterprises and further employ the majority of people. This therefore improves the non-farm wage employment of rural households in developing countries (Ntwalle, 2019).

2.8.3 Access to infrastructure

Infrastructure access is identified by Mretie (2019) as one of the strong factors determining the participation of rural households into the non-farm sector. The presence of good infrastructure is associated with the availability of low entry barriers and labour-intensive jobs (Amurtiya, 2015). The availability and presence of infrastructure such as roads, electricity and production resources (land, labour and capital) help rural households both directly and indirectly to improve their participation into the non-farm sector in most developing countries (Nagler and Naudé, 2017; Yona and Mathewos, 2017). Provision of infrastructure and public goods by government and private sector increases the gains made in participating into the non-farm sector and also reduces transportation and transaction costs.

On the other hand, the absence of proper infrastructure leads to rural households being reluctant to participate fully into the non-farm enterprises (Bongole, 2016). The quality and utility of infrastructure, institutional and informational facilities make it harder for some non-farm income generating activities to develop in rural areas due to the gap between rural and urban areas. According to Amurtiya (2015) the lack of access to roads, telecommunication and power results to high transaction costs which in turn constrain the development of rural households' non-farm enterprises. Infrastructure constrains the ability of disadvantaged rural households to participate in high return non-farm enterprises.

2.8.4 Access/distance to markets

The quality of roads, access and distance to markets make it harder for poor rural households to participate into the majority of non-farm activities in rural areas (Bongole, 2016). The distance to the market is thus influenced by the lack of transportation which consequently makes it difficult for rural households to reach the marketplace (Yona and Mathewos, 2017).

Therefore, the long distances to the markets constrain poor rural households to participate into the non-farm sector. According to Nmeregini, Nzeakor and Ekweanya (2019) the distance to the marketplace directly influences and determine the cost of fuel to be bought and used by rural households to reach the market. Therefore, the longer the distance to the market, the higher the cost of transportation and the shorter the distance to the market, the lower the cost. On the other hand, the distance to the market is directly influenced by the nature of the road as many rural external roads are mud roads. This in turn influences the process to which the rural households expand their non-farm enterprises.

2.8.5 Access to productive assets

According to Bongole (2016) lack of access to productive assets (Land, Labour and Capital) by poor and disadvantaged rural households limit their ability to participate in more rewarding and lucrative non-farm activities. Lack of machines and other productive facilities hinders rural households' participation into non-farm sector as it tends to be difficult for them to start up their own enterprises without productive assets (Nmeregini, Nzeakor and Ekweanya 2019). Tshabalala and Sidique (2020) on their study based in Ethiopia identified non-productive assets such as household valuables and social capital as variables that lower the opportunity of rural households to participate into the non-farm sector. These assets tend to force rural households to participate into low-skilled, labour intensive and low barriers non-farm generating activities. Furthermore, land ownership also influences the participation of rural households into the non-farm sector. Meaning that, landless rural households find it difficult to participate productively into the non-farm sector while land owning households engage into the wider range of non-farm activities.

Rural households with limited or no access to assets such as land tend to be engaged into non-farm generating activities with low returns in order to earn a living, often tend to migrate due to limited local employment opportunities (Tshabalala and Sidique 2020; Bhuyan and Mitra, 2018; Rantso, 2016).

2.8.6 Government Regulations

Belonwu et al., (2018) pointed that government regulations and policies such as taxes, land zoning, social security and labour markets may impede the participation of rural households into non-farm activities. This implies that, in order for rural households to participate productively into the non-farm sector, they have to go through registrations and declarations for tax and social security purposes. Nmeregini, Nzeakor and Ekweanya (2019) identified

government regulations and policies as factors that influences rural poor household to embark into non-farm generating activities. Furthermore, the majority of rural households find it difficult to expand their enterprises into the non-farm sector due to licences, permits, taxes and other regulatory constraints. Nagler and Naude (2017) in their study based on rural sub-Saharan Africa also identified government regulations as factors that impede the involvement and participation of rural households into high return non-farm generating activities. Government regulations protect urban enterprises from external competition while disadvantaging small-scale rural non-farm enterprises in the process.

2.8.7 High Competition from other enterprises

The majority of rural households become reluctant to participate into the non-farm sector due to the stiff competition from other entrepreneurs as they tend to share similar non-farm income generating activities. In turn, rural households find it difficult to start up their own enterprises that will contribute to their quality of life (Belonwu et al., 2018). Ayambila, Osei-Akoto and Ayamga (2017) highlighted that high competition among enterprises influences the performance and the intensity of participation of rural households into desired non-farm income activities. This implies that rural household participation into high return non-farm income activities is affected by the greater competition from urban suppliers and exports. Participation of rural households into low barrier non-farm sector provides exposure to wider competition which in turn generates treats for them. In Lesotho, the participation of rural households into non-farm enterprises is affected by competition which in turn affects the performance and profitability as some enterprises have to lower their prices in order to compete in the market (Rantso, 2016).

2.8.8 Job Insecurity

Taduvana (2017) described job insecurity as a fear or perception on an employee about the threat of losing a job or job discontinuity. Furthermore, job insecurity is about the fear of losing the most valued attributes of the job such as rank, salary, access to resources and promotion opportunities. Job insecurity is considered as a serious factor influencing the participation of rural households (especially those working as employees) into the non-farm sector (Belonwu et al., 2018; Yona and Mathewos, 2017). The concern of rural households (employees) is based to the point that employers tend to terminate the services of their employees without any form of compensation. Furthermore, job insecurity comes from the point of revenue loss by the enterprise which in turn results to the inability of employees to receive payments and further the retrenchment or job loss (Belonwu et al., 2018).

According to Belonwu et al., (2018) the loss of jobs by rural household occurs as a result of the shrinking economy which further lowers the consumer demand and creating an unhealthy surplus of goods and services. For example, Laborde, Martin and Vos (2020) highlighted that the majority of people around the World had lost their jobs more especially in the tourism, lodging and travel enterprises due to the outbreak of COVID 19. This occurs as a result of a drastic drop of demand by the large number of tourists which further resulted to the dramatic sales losses.

2.9 Rural constraints on households' choice of participation in income-generating activities

According to Bojnec and Knific (2021) rural households find it difficult to engage in income diversification activities because of a lack of time, stringent legal restrictions, and a great distance from the market. Households' engagement in income diversification activities is also hampered by a lack of time, an unfavourable age, a lack of adequate space for expanding farm buildings, a greater distance from markets, a lack of financial resources, and commercial hazards. The primary barriers to engaging in income-generating activities include a lack of finance/credit, rural markets, and rural infrastructure (Eshetu and Mekonnen, 2016). Moreover, Gecho, (2017) mentioned that the most prevalent obstacles to rural households' choice of participation in income diversification techniques are geographical location, population pressure on land, levels of education, lack of market linkage, scarcity of water for both humans and cattle, and limited access to rural finance.

In rural areas, small and large households may lack access to the same technology, information, asset base, input sources, and market channels (Gecho, 2017). Under these circumstances, various households are likely to face dramatically varied amounts of transaction costs including marketing costs while producing and selling the same output mix. Marketing expenses include intangibles like search, monitoring, and enforcement, and they differ depending on the product, the type of agent in the marketing chain, and the individual agent within a category of agents. According to Khatiwada et al, (2017) the possibility of engaging in various income generating activities decreases as households' distance from the market centre increases. The implication of this negative association is that when the distance between households and the market region increases, households are discouraged from engaging in farm and non-farm income generating activities.

Vasco and Tamayo (2017) pointed that the greater the distance between a rural and urban, the lower the level of employment in high-return non-farm jobs, particularly in areas with significant agricultural potential. This is explained by the fact that people who live distant from the market centre have less possibilities to engage in activities other than their typical pastoral pursuits. Farmers are unable to sell items at a higher farm gate price due to the long distance to the market and the road (Kyaw, Ahn and Lee, 2018).

Promoting varied income activities, sustainable business, and micro-enterprises among rural households remain difficult if the situation is not addressed due to insufficient infrastructure and an unstable socioeconomic and political situation (Dai et al., 2019). Household's choice of multiple livelihood strategies are influenced by elements such as access to livelihood capitals (human, natural, financial, physical, and social), infrastructure status, and geography. Eshetu and Mekonnen, (2016) noted that infrastructure constraints, such as a lack of electricity and water, as well as telecommunications, hinder household participation in high rewarding income diversification activities. Due to a lack of infrastructure, poorer rural households are forced to participate in low-return income-generating activities in order to survive, minimize vulnerability, or avoid slipping further into poverty (Khatiwada et al., 2017).

Assets are intangible or physical assets owned or utilized by household members that are crucial in creating a livelihood activity (Khatiwada et al., 2017 and Watete et al., 2016). Aloba Loison and Bignebat (2017) explored that due to economic, social, tangible, and cultural restrictions, rural households frequently lack the productive assets required to undertake high-return activities. As consequently, rural households are more likely to engage in low-return household-based or labour-intensive income generating activities. According to Asfaw et al., (2017), diversified income activities in generally are hampered by substantial barriers to entry, which means that very wealthy households with assets are more likely to engage in them. As a result of constraints such as productive assets, age, education, and sex, poor rural households are hindered from participating in more lucrative activities.

According to Asfaw et al., (2017). inability to acquire funding is a fundamental barrier to rural households participating in income-generating activities. Rural households are unable to obtain credit because of excessive interest rates, apprehension about their ability to repay, a lack of collateral and a shortage of entrepreneurial skills training. Furthermore, Eshetu and Mekonnen (2016) noted that rural households are frequently unable to adopt higher-yielding livelihood alternatives due to a lack of finance, cash liquidity obstacles, and social marginalization. As a

result, the least fortunate and most susceptible households are frequently forced to rely on traditional livelihood techniques that provide low or negative returns in order to maintain their few but vital productive assets. Lack of credit has been observed by Gebru, Ichoku and Phil-Eze, (2018) to prevent people from enhancing their income sources and perhaps engaging in higher-returning livelihood activities.

One of the primary barriers preventing households from engaging in high-return income activities is a lack of technical support, training and skills development through literacy initiatives and formal education (Asfaw et al., 2017). Less educated households without the necessary skills and technological expertise may struggle in engaging in many income-generating activities that necessitate specific skills and experience. According to Anang and Yeboah, (2019) due to a lack of training and skill development, illiterate and undereducated households are obliged to engage in low-wage labour and have even less opportunity to work in high-paying income activities than educated households.

2.10 Importance of infrastructure on the development of income diversification activities

According to Hussain et al., (2022) rural infrastructure development is critical for enhancing the general quality of life in rural areas and ensuring that these communities are capable of participating in the greater economy. Furthermore, rural infrastructure can serve to create job opportunities, boost economic growth, and encourage the establishment of new enterprises in rural areas. Physical infrastructure availability and transportation affordability are critical for connecting producer areas to local urban centres, as well as connecting local urban centres to national and international urban centres (Akkoyunlu, 2015). In addition, market and trade liberalisation, along with infrastructure development, have enhanced the economic worth of agricultural production while also hastening the expansion of non-agricultural industries and resource flows, strengthening the interactions of industrial production between enterprises in cities and rural areas in.

Rural households prefer to diversify to incorporate non-farm businesses as a strategy to raise their incomes as transportation and infrastructure in rural areas improve (Odoh et al., 2019). Later on, with greater incomes and higher standards of living, households either specialized in farming on bigger consolidated farms or migrated into high-return non-farm sectors (Alobo-Loison, 2015). Furthermore, Alobo-Loison (2015) mentioned that there is hope that smallholder agriculture in Sub-Saharan Africa can be transformed with increased government

spending on infrastructure, modern technology, agricultural marketing and agribusiness promotion, and pro-poor nonfarm growth.

According to Asfaw et al., (2017) diversification of rural livelihoods is likely to flourish in places with well-developed infrastructure. Moreover, improved infrastructure and market institutions can stimulate rural-urban links, which can boost growth, create jobs, alleviate poverty, and promote long-term development. Khatiwada et al., (2017) noted that increased connection and infrastructure development in rural areas may have enticed smallholder farmers to engage in market-oriented farm and non-farm activities. Infrastructure improvement can lead to more and longer hours of non-farm activity, strengthening the interconnections between rural communities. However, Delgado and Siamwalla (2018) argued that with inadequate infrastructure and a volatile socioeconomic and political backdrop, encouraging sustainable business and micro enterprises among the rural households poses a significant challenge. In addition, inadequate infrastructure, lack of government cooperation, an inflationary economy, and globalization are some of the primary environmental conduciveness characteristics that make small and medium-size enterprises (SMME) an ineffective alternative for economic growth in South Africa (Bushe, 2019).

2.11 Effects of income generating activities on rural household food security

According to Zereyesus et al., (2017) participation by rural households into various diversification activities results in a positive and significant effect on household food security status and income. In addition, Imai et al., (2015) investigated the impact of non-farm sector employment on rural poverty and vulnerability in Vietnam and India and founded that non-farm income increased consumption per capita, reduced poverty and vulnerability thereby increased household food security. Food access is the basic determinant of food security. Similarly, higher income helps rural households to access health facilities without compromising their food consumption. Cooking and feeding practices of rural households which determine the quality of food intake and nutrition outcome are affected by sanitary conditions. Therefore, higher income can also improve households' access to sanitation facilities and equipment. Higher income also allows households to find and send their children to productive schools which in turn improve food and nutritional security (Mretie, 2019; Nmeregini, Nzeakor and Ekweanya, 2019). According to Awoniyi and Salman (2011) on their study in Nigeria, households that are involved in multiple income activities also accomplished high income returns, high welfare and high food security status.

Income generating activities serves as a significant source of income and are determined as the important and significant factor of food security and nutritional security (Assefa, Heerink and Van den Berg, 2015). On the other hand, non-farm income serves as a source of capital needed by households to purchase production inputs and material that enhances households' labour productivity, yield production and income. Wambugu, Karugia, and Oluoch-Kosura (2018) also examined technology use, gender and impact on non-farm income on agricultural investment and further argued that non-farm income is not used as investment for purchasing agricultural inputs in two regions of Kenya. Furthermore, non-farm income had a negative effect on adoption and intensity of fertiliser use in the study area.

According to Adem (2018) income diversification and its effect on food security of smallholder farmers in Ethiopia indicate that income diversification to non-farm income activities lead to better household food nutrient availability which in turn increases food security status of the respondents in the study area. Furthermore, income generating activities affect food security status positively and significantly at 5% probability level. Income generating activities provides the financial input that enables rural households to spend more on their basic needs such as food, education, health care and clothing (Damena and Habte, 2017). Consequently, Abu and Soom (2016) argued that the impact of non-farm income on food security could be either positive or negative. The negative impact is based on the point whereby the farmer spends most of the time working on non-farm income activities at the expense of working on the farm along with the wage earned on the non-farm income activities being lower than the forgone farm income. However, income diversification activities positively affect food security when the farmer diverts an additional income earned from non-farm activities to stabilise farm inputs, enhances new production technologies thereby increased food consumption and food security (Abu and Soom (2016)).

According to Nagler and Naudé (2017) some rural income activities do not always operate throughout the year due to high demand of seasonal labour in the agricultural sector. Moreover, some enterprises do not always operate fully due to some economic factors such as lack of finance, lack of profitability and idiosyncratic shocks which in turn result to a negative impact to food security. Income enterprises that are located in areas that are exposed to the history of violent conflict experiences lower productivity levels which in turn negatively affect food security. These factors further make it difficult for households to improve their income, purchase food for consumption and farm production inputs for better household livelihood.

Amare and Shiferaw (2017) examined non-farm employment, agricultural intensification and production change in Ghana revealed that non-farm income generating activities were one of the factors that negatively affect food security in the study area. The authors further highlighted the negative trade-offs between non-farm income, productivity change and agricultural intensification which in turn negatively affect food security. In addition, non-farm income may erode stimulus for investing in farm intensification practices that improves agricultural productivity (Amare and Shiferaw, 2017). Similarly, to the study by Senadza (2014) who used the nearest neighbour matching algorithm and revealed that the participation in non-farm income activities negatively impact on food security of households in the study area. The results further showed that the participation of households in non-farm income activities declined the probability of being food secured by 3.37 % factor since the Average Treatment effects on Treated (ATT) is negative (−0.0327).

Income diversification is considered as the most significant strategy for raising income and food security status. Therefore, the access and availability of various income activities determine the ability and need of households to improve their income, purchase food and access health facilities which in turn improve their probability of being food secured (Fentahun, Seid and Biruk, 2018; Nmeregini, Nzeakor and Ekweanya, 2019; Mretie, 2019). According to Mretie (2019); Adem (2018); Fentahun, Seid and Biruk (2018) income diversification is also observed as a risk spreading strategy in a form of self-insurance which in turn enables rural households to re-generate from different shocks which may make them food insecure. The opportunity to spread the risk along various income generating activities increases resilience which in turn helps rural households to smooth out their food consumption and access necessary health facilities. However, households need to be engaged and participate in different activities that do not have similar covariates in order for income diversification through non-farm activities as a risk spreading strategy work (Assefa, Heerink and Van den Berg, 2015).

2.10 The concept of Food Security

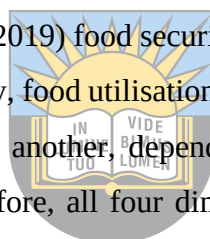
Food security is considered as a basic necessity of life and is important for global reduction of hunger and for economic development (Adem, 2018). Food security as a multidimensional phenomenon is defined by FAO, WFP and UNICEF (2019) as a situation that exist when all people at all times have enough physical, social and economic access to safe, sufficient and nutritious food and water that meets their dietary needs and preferences for an active and healthy life. It is therefore a basic need that food is safe, sufficient and nutritious for household consumption. Meaning that, in order to secure sufficient and nutritious food adequate resources

are required (food access) so as to be able to access a wide variety of available food both at a national and local level, within local markets and enterprises (food availability). It is fundamental to access and gain knowledge on the basic nutrition, care and sanitation practises of utilising food and water (Mtolo, 2016). Therefore, food security is based on how the individual is capable of consuming nutritious and sufficient food.

At household level, food security is a balance between availability and access to sufficient nutritious food (Amurtiya, 2015). This implies that, a household should have a reliable access to available food in sufficient quantity and good quality for all household members in order to enjoy active and desired healthy life. A household is regarded to be food secured if its members do not live in fear of starvation or hunger. The concept of food security is based on four dimensions which are food availability, food accessibility, food utilisation as well as food stability.

2.10.1 Indicators of Food Security

According to Statistics South Africa (2019) food security comprises of four dimensions which are food availability, food accessibility, food utilisation and food stability. The metrics of food security varies from one indicator to another, depending on the data available at national, regional and household levels. Therefore, all four dimensions must be met and achieved in order for food security to exist.



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❖ Food Availability

Food availability is the prerequisite of other dimensions of food security; it captures both the physical existence and quality of food and is achieved when sufficient quantities of food are available to all household individuals (Amurtiya, 2015; Assefa, Heerink and Van den Berg 2015; Kuwornu, Suleyman and Amegashie, 2013). Food availability refers to the physical, adequate food presence that meets the minimum energy requirements for an active and healthy life, at household and national level. Food availability further points out to food production, supply and distribution (Statistics South Africa, 2019). Adem (2018) pointed that the presence of food comes from own production (farming), purchases from domestic markets and/or import from external markets. Food availability is therefore determined by the level of food production, stock level and net trade which in turn addresses the supply side of food security.

❖ Food Accessibility

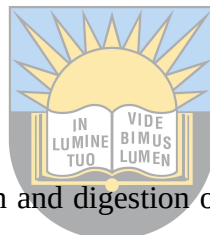
Food accessibility is based on the physical and economic accessibility of food, which is therefore, determined by the food price and household resources (Assefa, Heerink and Van den Berg 2015; Kuwornu, Suleyman and Amegashie, 2013). Food accessibility is acquired and achieved when all people at all times have enough available resources to access sufficient quantity, good quality and diversity of food that meet their nutritious dietary needs (Statistics South Africa, 2019). Meaning that, household individuals need to have sufficient income and production resources in order to produce and purchase so as to obtain food needed to maintain their consumption. Food accessibility is much related household available income, household income distribution, food prices in internal and external markets, social and institutional rights. Physical, economical and socio-cultural dimensions are the elements of food access (Mretie, 2019). Physical access is based on the availability and quality of infrastructure such as roads, communication, ports, railways and storage facilities that facilitates and monitors the functioning of the markets. Economic access is based on household income earned from both farm and non-farm income generating activities that play a primary role in determining food security outcomes (Amurtiya, 2015).

❖ **Food Utilisation**

Food utilisation refers to the ingestion and digestion of adequate, quality and nutritious food (Statistics South Africa, 2019; Kuwornu, Suleyman and Amegashie, 2013). Food utilisation is therefore influenced by the health status, water and sanitation conditions as well as microbiological and chemical safety of food. Meaning that, food utilisation mostly depends on the awareness and practices necessary for food preparation, storage and processing, how food is shared within the household as well as the state of health of each individual within the household. Common practices as it relates to food utilisation include adequate nutritional knowledge, child-feeding practises, food habits and social and physical role of food in the household and in the community (Adem, 2018). Therefore, food utilisation is highly related to nutrition, sanitation and health. If adequate nutritious food is available and accessible, the household need to make decisions as to what food is being consumed and how is it allocated within the household (Amurtiya, 2015).

❖ **Food Stability**

Lastly, food stability is ensured when households and national supply of food remains constant during the short and long run period. Food stability reflects the resilience of individual to shocks and it deals with the permanence of other three dimensions of food security (Statistics



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South Africa, 2019). According to (Adem, 2018; Kuwornu, Suleyman and Amegashie, 2013), production patterns, weather conditions, livelihood resilience, political stability, unemployment and rising food prices are the most common determinants of food stability. Food stability refers to the processes whereby food is available, accessible and adequate utilisation of nutritious food at all times. Therefore, food stability is a cross-cutting dimension. Furthermore, people need not to worry about the possible risks of being food insecure during certain seasons or due to external events. In order to ensure food security at global, national, regional, local and household level, food stability should be maintained (Mretie, 2019; Adem, 2018 and Amurtiya, 2015).

2.10.2 Measurements of household food security

The significance of measuring food security assists in determining if how households are affected by food insecurity and how do they react to the circumstances related to food insecurity (Ndobo, 2013). According to Hendriks (2015) measurement of food security is based on dietary quality (food consumption and dietary diversity) and/or biochemical analysis of the effects of food consumption. In this study, the focus is given to Household Dietary Diversity, Household Coping Strategy Index, Household Food Insecurity Access Scale and poverty line approach.

❖ Household Dietary Diversity (HDDS)

Dietary diversity refers to the process by which households have enough access to diet quality and thus nutrient adequacy (FAO, WFP and UNICEF, 2019). On the other hand, good quality diet is the outcome of variety of food consumed but is not sufficient for healthy eating. The dietary diversity questionnaire is based on categorising different types of food or food groups based on the nutrients they contain within the period that range between one to three and up to seven days. There is no ordinary procedure in which to employ dietary diversity, hence the majority of studies have employed their own version of the score. Therefore, the mostly used indicator is the Household Dietary Diversity Score (HDDS) which was developed by Food and Nutrition Technical Assistance Project (FANTA) and was further supported by FAO (Thornton, 2016).

According to Shelembe (2018), the Household Dietary Diversity Score is the most significant procedure in measuring diet diversity. It measures the number of food groups consumed at the household level over a given time period. Ndobo (2013) mentioned that the Household Dietary Diversity Score helps in indicating how diverse household food baskets are as compared to the standard food basket. It indicates whether a household is capable and has the ability to consume

a variety of foods. Therefore, there is a positive relationship between household dietary diversity and improved nutritional intake in both developed and developing countries (Ndobo, 2013). On the other hand, the HDDS has its own advantages as a measuring tool that it does not include fortified food because the captured information is used for primary use as well as the variability about which food groups to cover or exclude (Shelembe, 2018).

❖ **Household Coping Strategy Index (HCSI)**

The Household Coping Strategy Index is the indicator that is used to measure the degree of vulnerability of household food security as well as the coping strategies that may be used by the household when there is a shortage of food. It is regarded as highly efficient, quick and easy to analyse and was developed by the Cooperative for Assistance and Relief Everywhere (CARE), World Food Programme and Technical Assistance to NGO's (TANGO) (Shelembe, 2018). According to Alnafissa (2017), the Coping Strategy Index was developed to avoid issues of household food procurement data collection and the high data collection costs of 24-hour recalls. It measures the coping strategies by which household cope with the acute shortages of food.

There are four categories of the Coping Strategy Index which are dietary changes, short-term measures to increase household food availability, short-term measures to decrease number of people to feed and rationing or managing a shortfall. The information obtained is weighed and summed to a given index that reflects current and perceived future food security status. The higher the score obtained, the more coping reported and furthermore household food secured (Leroy et al., 2015; Ndobo, 2013). Furthermore, the plan of the Coping Strategy Index was to determine food insecurity causes and consequences by “identifying coping strategies that reflects early onset, rather than very severe forms of food insecurity” and to identify food insecure households. The construction of the CSI is reliant on focus group discussions carried out in each group. The CSI further apply both qualitative and quantitative settings and it helps in offering a fast cross check validity (Leroy et al., 2015, Hendriks, 2015). On the other hand, Hendriks (2015) emphasised that it is deceiving to measure food securing through coping strategies without considering the social, cultural and political context in which they occur.

❖ **Household Food Insecurity Access Scale (HFIAS)**

According to Shelembe (2018), the Household Food Insecurity Access Scale is the measurement that evaluate whether a household has faced problems with food access during the last 30 days. It was developed by Food and Nutrition Technical Assistance (FANTA) to be

useful in measuring food insecurity at a household level in different parts of South Africa. The HFIAS is based on the household food supply which is followed by a decline in the quality and quantity of food which in turn results to household going to sleep on an empty stomach or the entire day and night without food. It also measures the reduced food intake as well as its effects on households (Ndondo and Devereux, 2019).

The HFIAS was developed for the reason that when households experience food insecurity, they tend to react predictable and can be captured, calculated and be presented on a scale of severity (Ndondo and Devereux, 2019). For the purpose of the HFIAS there are two methods that are used to present the outcome of it, namely a food insecurity scale and categories. The food insecurity categories are high food security, marginal food insecurity, low food security and very low food security. The high food security is based on households that do not have problems in accessing food. The marginal food insecurity is based on households' slight problems in accessing enough food with no significant reduction in their food intake (quantity, quality and variety). The low food security is based on the household significant disruption of the quality, variety and interest of food consumed with no disturbance in the quantity and eating patterns of their meals. Lastly, the very low food security refers to the disturbance of the household quantity, quality and variety of food consumed due to the lack of resources or money to buy enough food (Alnafissa, 2017; Leroy, 2015; Shelembe, 2018).

❖ **Poverty line approach**

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Gassner et al., (2019) mentioned that a poverty line separates the population into two categories based on some criterion: underneath the line, a household is deemed food insecure, while above the line, it is considered food secure. Moreover, the number of poor individuals as well as the depth and severity of poverty, can be determined by designating a line that is recognized as some form of minimal living level. Consequently, households that possess greater food security have greater disposable incomes in comparison to the poverty level (Olutumise, Abiodun and Ekundayo, 2021). Determining the number of individuals who reside in households with income and spending less than the 'poverty line' has aided and prompted discussion about the elevated level of poverty, as well as policymakers in relieving poverty (Statistics South Africa, 2019).

In South Africa, the poverty line is typically set at a level that includes persons earning less than 40% of the national average and those earning less than 20% as being severely poor (Ngema, Sibanda and Musemwa, 2018). South Africa has a standardised view of "poverty

lines" as essential tools that consider the statistics report of poverty levels and models, as well as the planning, executing, and evaluating of poverty alleviation projects and policy formulation. South Africa has three poverty lines, according to Statistics South Africa (2022): the upper-bound poverty line (UBPL), the lower-bound poverty line (LBPL), and the food poverty line (FPL). The upper-bound poverty line (UPL) is the amount of money obtained from non-food items in each household wherein food consumption is equal to the food poverty line. According to the April 2022 review, the upper-bound poverty limit was R1417 per person per month. The lower-bound poverty line (LBP) is an amount of money obtained from non-food items in each home, and the food poverty line, by definition, is the total expenditure of families that equals the food poverty line. According to the April 2022 review, the lower-bound poverty limit was R945 per individual per month. The food poverty line is the measured consumption point required for a person to obtain the minimal requirement for a daily meal. According to the April 2022 assessment, the monthly food poverty line was R663 per individual (Statistics South Africa, 2022).

2.10.3 Determinants of Food Security

According to Amurtiya (2015) food security status of households is influenced by the socio-economic characteristics and resources of individual households. Therefore, the following are the main determinants of household food security status.

❖ Education level

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Education level of the household is regarded as the key and critical determinant of diversifying into non-farm income generating activities and thus achieving food security (Amurtiya, 2015; Adeyefa, 2016). The capacity to earn income and the level of efficiency in managing the household food resources are positively correlated to the level of education. Meaning that educated household heads are more likely to be food secured than those household that are uneducated as a result of a positive influence of education on household food security. High educated household individuals possess the capacity to process, implement and monitor the information passed on to them, allowing them to access high return job opportunities thus achieving household food security (Kuwornu, Suleyman and Amegashie, 2013; Ngema, Sibanda and Musemwa, 2018; Ajayi and Oluntumise, 2018). On the other hand, household members that participate into the formal or modern non-farm income activities are more educated than households that participate into traditional rural non-farm income activities (Amurtiya, 2015).

Similarly, to the study done by Adem (2018) based on determinants of income diversification on food security in Asayita Woreda, Ethiopia which states that the probability of the household to achieve food security increased by 1.355 as the households' years of education increased by one year. Reasons for that is educated households members tend to be more technologically innovative, competent and easily diversify their income thus creating a conducive environment for food security status. Furthermore, educated household members have the ability to play a significant role in shaping household members to be involved into various income generating activities (Adem, 2018).

❖ **Household size**

The number of members within the particular household determines the size of the household (Ndobo, 2013; Adeyefa, 2016). Households with few members are expected to consume less food than households with more members, vice versa. There is a negatively correlation between the household size and food security. This implies that when the household size increases, income per head, expenditure per head and food consumption reduces thus decreasing food security (Amurtiya, 2015; Aragie and Genanu, 2017). Food consumption on the other hand increases as a result of the increase in the number of individuals within the household as household size puts more pressure on consumption than it contributes to production. This is because the larger the household size, the higher the demand and consumption of food. When the household has the majority of inactive members, it consequently raises the burden in the provision of food which in turn increases the likelihood of food insecurity (Ndobo, 2013).

Amurtiya (2015) mentioned that the composition of household affects the amount of available labour, determinants of food and nutritional requirements and tends to affect household food security. Households with high number of individuals are more likely to diversify into non-farm income generating activities so as to cope with the needs of the household.

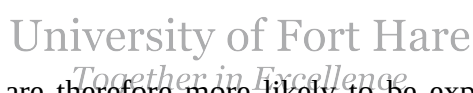
❖ **Household income**

Household income is also identified as the most significant determinant of household food security status (Adeyefa, 2016). The income of the household refers to the total monthly income obtained by the members of the household from various sources of income. It is therefore considered as the most significant determinant of household food security status. Middle- and high-income earning households are more likely to be food secured than low-income households. Meaning that, low-income households are more likely to face and suffer

from food insecurity as they tend to depend on social welfare transfers and food aid programmes in order to consume food. There are also periods by which low-income households end up in debts because of the insufficient income to purchase and consume food (Ndobo, 2013). On the other hand, a study by Sekhampu (2013) conducted in Bophelong, South Africa and Adeyefa (2016) conducted in Tshwane, South Africa founded household income to exert a positive impact on food security in the study area. This implies that household income improves the ability of households to be food secured.

❖ Gender of household head

Gender of the household is based on female-headed and male-headed households and their role in providing household needs such as adequate food for a healthy life. Several studies have argued that male-headed households are more likely to be food secured than female-headed household (Adeyefa, 2016; Aragie and Genanu, 2017; Muhoyi et al., 2014; Sekhampu, 2013; Oyetunde-Usman and Olagunju, 2019; Onosanya and Obayelu, 2016, Ndobo, 2013). According to Amurtiya (2015), male headed households are food secured because of that they have more access to schooling and training due to their high social status. Furthermore, male-headed households are most likely to access resources like land, inputs and support services that contribute significantly towards food security status of their households (Muhoyi et al., 2014).



Female headed households are therefore more likely to be exposed to food insecurity and poverty. This implies that, female-headed households find themselves taking care of their external families as they tend to sacrifice their food so as to feed other external household members that are threatened and vulnerable to food insecurity (Ndobo, 2013). According to Onosanya and Obayelu (2016) on the study of determinants of food security in Southern Guinea Savannah Area of Oyo State, Nigeria established that 90,20% of male-headed household were food secured compared to 9.80% of female headed households. This therefore implies that male-headed households tend to be food secured than female-headed households.

❖ Age of household head

Household age refers to the number of years from the year of birth of the household head. Younger headed households are more likely to be food secured as then tend to more innovative and mostly engage into various non-farm income generating activities than elderly headed household (Onasanya and Abayelu, 2016). The more increase in the age of the household head,

it consequently results to reduced ability to work which in turn result to food insecurity. Meaning that, older heads are more likely to experience food insecurity because of their inability to participate into the labour market such as in non-farm income generating activities (Kuwornu, Suleyman and Amegashie, 2013). According to Ndobu (2013), young and energetic individual are considered to be more economically active and can operate in challenging jobs within the labour market than old individuals.

On the other hand, Adem (2018) on the study of determinants of income diversification on food security in Asayita Woreda, Ethiopia founded out that the probability of the household to achieve food security increases by a factor of 1.14 as the age of the household head increases by one year. This therefore occurs as a result that older households head commits their time by participating into farming and non-farm income activities than younger individuals while on the other hand young individuals prefer to spend most of their time in urban areas than in rural areas (Adem, 2018).

❖ Distance to the market

Distance to the market is determined by the ability and inability of households to access the available marketplace. The ability to access the available market enables households' members to purchase adequate goods and services which in turn contributes towards their food security status (Aragie and Genanu, 2017; Ayaji and Oluntumise, 2018). On the other hand, households that travel long distances to access the market tend to be food insecure than those that travel short distances to the marketplace. Similarly, to the findings of Adem (2018) which highlighted that households' chance of being food secure decreases by approximately 0.018 as households travel one extra hour to the market in Asayita Woreda, Ethiopia. Therefore, long distances to the available marketplace negatively influence the food security status of households. By travelling long distance to the market, being either the consumer or the producer results the loss of more money and time to travel which in turn leads to being food insecure (Adem, 2018).

❖ Access to credits

According to Ngema, Sibanda and Musemwa (2018), access to credits refers to the ability to access funds from government as well as private entities such as commercial banks and NGO's. Informal credits can also be obtained from friends and relatives. Households with enough access to credit services are more likely to be food secured that those that lack access to credit services. Households with enough access to credits possess the ability to invest in farm and

non-farm activities, purchase enough consumption goods so as to sustain members of their household thus achieving food security (Aragie and Genanu, 2017). On the other hand, Adem (2018) pointed that access to credits leads to food insecurity in the long run as the majority of credit lenders require collateral from the borrower and if the borrower is unable to pay the interest rate based on the agreement, the collateral will be required and taken by the lender. This therefore implies that household that take credits from lenders tend to be food insecure in the long run. Adem (2018) proved that from his study based in Asayita Woreda, Ethiopia that the probability of households to be food secured decreased by 0.1103 levels.

2.10.4 Food Security in South Africa

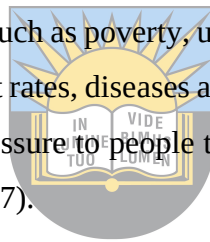
The need for food security in South Africa consequently results to the arrival of the Dutch East Indian Company in 1652 after the company identify the need for fresh fruit and vegetables so as to make certain the significant functioning of its crew members throughout the long trade journey (Hendriks, 2014). The formal agriculture was therefore established in Cape Town as a result of the arrival of the Company. Therefore, due to food security needs, settlers went further afield in search for more fertile and productive land for farming. As the result of the growing demand for food from new mining towns and settlements, farmers ended up increasing their production and over 80% of the nearly half a million hectares of white owned land was farmed by black tenants (Hendriks, 2014). Hendriks (2014) also noted that after 1994, in the Reconstruction and Development Programme (RDP) the need for action to alleviate poverty and achieve food security was identified. The RDP outlined food security as basic human need and food insecurity as the legacy of the apartheid socio-economic and political order. The ideas of the RDP were further elaborated in the Agricultural White Paper and the Agricultural Policy Discussion Document.

South Africa as compared to other middle-income countries ranks among the countries with high rate of absolute poverty and income inequality (Mkhatshane, 2019). The large numbers of rural households within South Africa are regarded as food insecure; however, the country may be food secure at national level. The issues of income inequality and poverty have not been significantly addressed by the increased employment rate in the country. According to Statistics South Africa (Stats SA, 2019) the high rate of poverty in South Africa is as a result of the former policies of the apartheid regime that motivated unstable settlement patterns, racial inequality and segregation. During the apartheid regime, South African farmers were denied access to markets, infrastructure and human capital while they were forced to work under unfavourable climatic conditions which in turn resulted to low farm production. The low farm

production resulted to the reduction of farming by South African citizen which in turn resulted in major loss to agricultural production and capital (Ndobo, 2013). In addition, household food security in South Africa is threatened by Globalisation, climate change, international trade regime, poor storage, inadequate infrastructure, distribution of food and poor access to favourable markets (Mvelase, 2017).

In South Africa, food access has been identified as the main challenge as it relates to household food security. This consequently occurs as a result of low demand and purchasing power. According to Statistics South Africa (Stats SA, 2019), an estimated 20% of South African households experience an inadequate or severely inadequate access to food. Statistics South Africa (Stats SA, 2019) indicated that South African households that reported inadequate access to food were mostly found in Northwest (24,5%), Northern Cape (20,5%), Eastern Cape (20,1%), KwaZulu-Natal (18,6%), and Mpumalanga (18,6%).

According to Mvelase (2017), the South African households that are food insecure faces the vast number of developmental issues such as poverty, unemployment, urbanisation, population growth, increasing prices, high interest rates, diseases and unstable household food production. These conditions tend to put more pressure to people that are already struggling to meet their basic households needs (Mvelase, 2017).



2.11 Chapter summary University of Fort Hare *Together in Excellence*

In conclusion, this chapter reviewed the literature on income diversification, non-farm income generating activities as well as household food security. It begins by describing the concept of income diversification, its evolution and forms as well as the concept of non-farm income, characteristics, determinants and motives; and importance's of non-farm income enterprises towards rural development, nexus between farm, non-farm income and food security, determinants of rural households' participation into non-farm enterprises. Rural constraints on households' choice of participation in income generating activities, importance of infrastructure on the development of income diversification activities and the effects of income generating activities on rural household food security were explored as well. The chapter further discusses food security and its indicators, determinants, measurements of food security and the concept of food security in South Africa.

Rural households currently rely on non-farm income generating activities for household livelihood security. Consequently, this does not mean that rural households do not practice farming activities, it simply means that non-farm income generating activities contribute the

largest towards household income and food security. This on the other hand is different to the past where rural households used to perform farming activities as a major source of income and food security and supplemented it with non-farm income generating activities. Therefore, non-farm income generating activities represent the significant source of income thus improving rural household food security.

Participation of rural household into non-farm income activities is determined by several factors. These factors consequently make it difficult for rural household to participate equally and fairly on non-farm income activities and to achieve their food security status. These factors include among others education, access to credit, infrastructure access, access/distance to the market, government regulations, competition from other enterprises, access to assets and job security.



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CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The first section of this chapter outlines the conceptual framework that depicts the anticipated connection between income generating activities and food security. It explains the study's essential objectives and outlines out how they link together to draw significant outcomes. It further describes the methods that have been used in the study where it summarises research methods applied in income generating activities and rural households' food security status in Mnquma Local Municipality. The chapter also explains the study area into details, the research design used, , sampling procedure, sample size and data collection methods used in the research as well as data required and analysis, delimitations, significance of the study and ethical consideration.

3.1.1 Conceptual Framework

The overall objective of the study is to analyse the determinants of participation in non-farm activities and household food security in rural communities of Mnquma Local Municipality. To achieve the objectives of the study, a conceptual framework is required in order to identify the commonalities and differences between income generating activities and food security. Additionally, conceptual framework helps in comprehending the relationship between income generating activities, economic variables, institutional variables, demographic variables and rural household food security. As a result, the conceptual framework serves as a logical framework for the study. Figure 1 below shows a schematic overview of this framework.

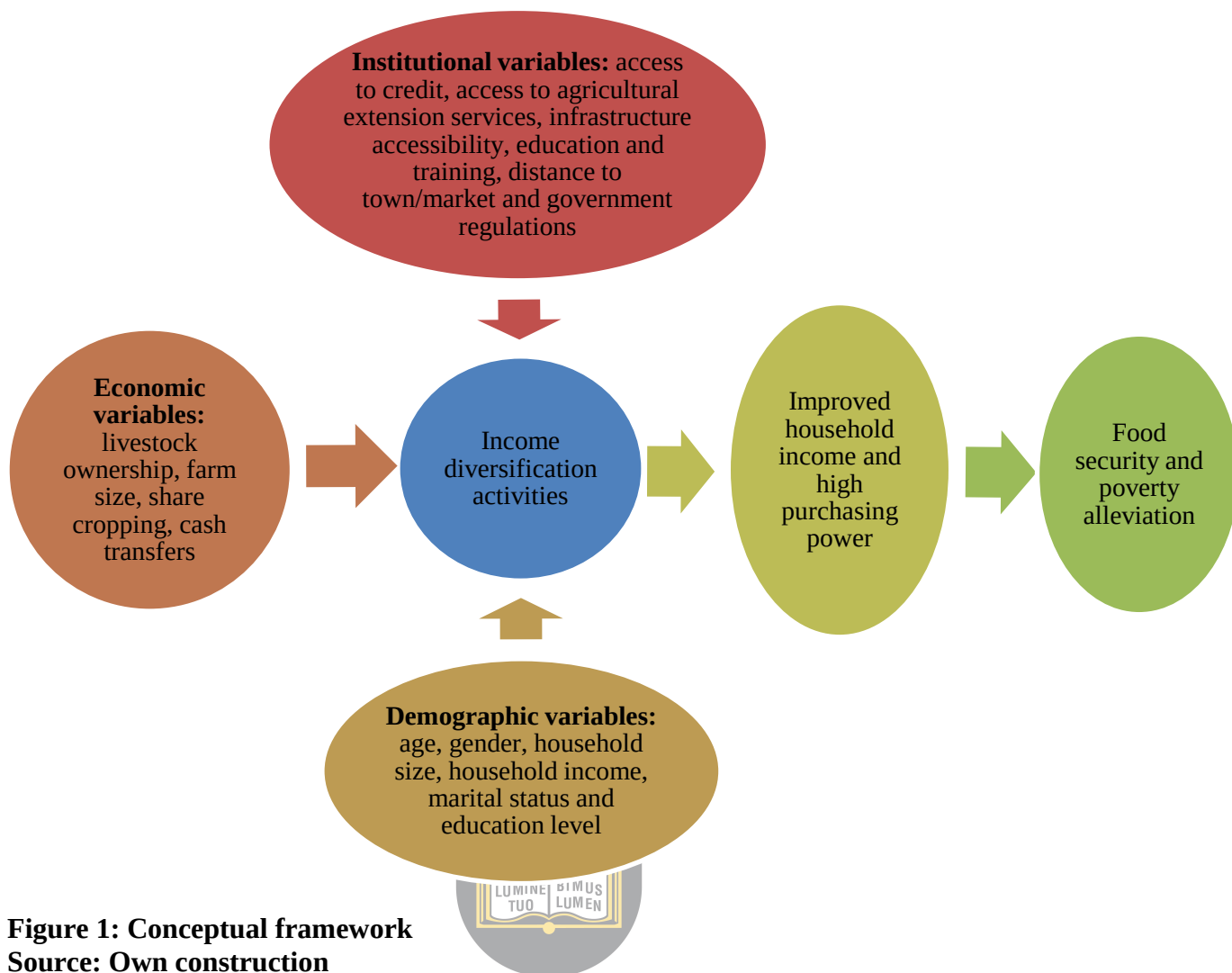


Figure 1: Conceptual framework

Source: Own construction

Income generating activities play an important role in improving the food security status of rural households. They are also regarded as essential elements of poverty reduction, income generation and food insecurity alleviation. In the study, income-generating activities were classified as farming, non-farming, or a combination of farming and non-farming income activities. Participation in a wide variety of income generating activities has been characterized by the study as a strategy that rural households in Mnquma Local Municipality deliberately implement for survival and enhancement of their standard of living, either because of a result of inadequate returns from participating in only one income generating activity or in an effort to tap into emerging possibilities for business. According to Fentahun, Seid and Biruk (2018), the majority of rural households determine to engage in a wide range of income generating activities as a means of increasing their income. Consequently, rural households' participation in income-generating activities revolves around on initiatives to develop various enterprises that can minimize shocks and stress (Assefa, Heerink and Van den Berg, 2015).

As illustrated in Figure 1, households participation in income generating activities is determined by different important factors such as demographic variables (age, gender, family size, marital status and dependency ratio); Economic variables (Livestock ownership, Farm Size, Share cropping cash transfer) and Institutional variables (Access to credit, Access to Agricultural Extension services, Education and Training, Irrigation, Distance to town/market, infrastructure accessibility and government regulations). These determinants serve as a building block by promoting food security on rural households as they participate in various income generating activities for their household needs and income. This in turn makes it easy for rural households to access the available nutritious food for survival so as to alleviate poverty and malnutrition. According to Watete et al., (2016) the access, usage, and adoption of various types of assets determines the enduring viability of rural households' livelihood activities. The aforementioned resources encompass a wide range of capital stocks, including financial, human, social interactions, natural, and physical capital, all of which can be used directly or indirectly to generate income. Therefore, the accessibility and deployment of such resources is critical for rural households' participation in multiple income-generating operations, which leads to increased income and employment, and hence food security (Watete et al., 2016).

3.2 Description of the study area

This section provides a general description of Mnquma Local Municipality in terms of its geographic location, history, economy, employment, land issues, livelihoods, infrastructure and agricultural potential. This study focused specifically on three towns namely: - Butterworth, Ngqamakhwe and Centane of the municipality where the non-farm income generating activities and food security in rural parts of Mnquma are examined.

Mnquma Local Municipality is a category B municipality with municipal executive and legislative authority in its jurisdiction (Mnquma Integrated Development Plan, 2020). The municipality is located in the Eastern Cape Province's south-eastern region. It is governed by the Amathole District Municipality and was formed by the merger of the old Butterworth, Ngqamakhwe, and Centane Transitional Regional Councils. As a result, the major cities or towns of Mnquma Local Municipality are Butterworth, Centane, and Ngqamakhwe. Butterworth is the major economic hub in Mnquma, and it is estimated to contribute about 75 percent to the Gross Domestic Product of Mnquma. The Mnquma Local Municipality occupies an area of about 3 270 km² in which its population was recorded as being 252 390 people which is 10.7 percent of the total population of Amathole District Municipality (Statistics South Africa, 2011). The main language is IsiXhosa spoken by 99% and the remaining 1% of the population

includes English, Afrikaans, Zulu and Sesotho speaking people. This female dominated municipal area comprises of 53.4% female and 46.7% male of the total population and consists of approximately 69 732 households. (Mnquma Integrated Development Plan, 2020; Statistics South Africa, 2011).

Figure 2 depicts a map of Mnquma municipal boundaries in black, with its three towns, Butterworth, Centane, and Ngqamakwe, in red. As illustrated on the map, the Mnquma Municipal area is diverse, stretching from the coastline to rural areas north of Butterworth and Ngqamakwe (Mnquma Spatial Development Framework, 2016).

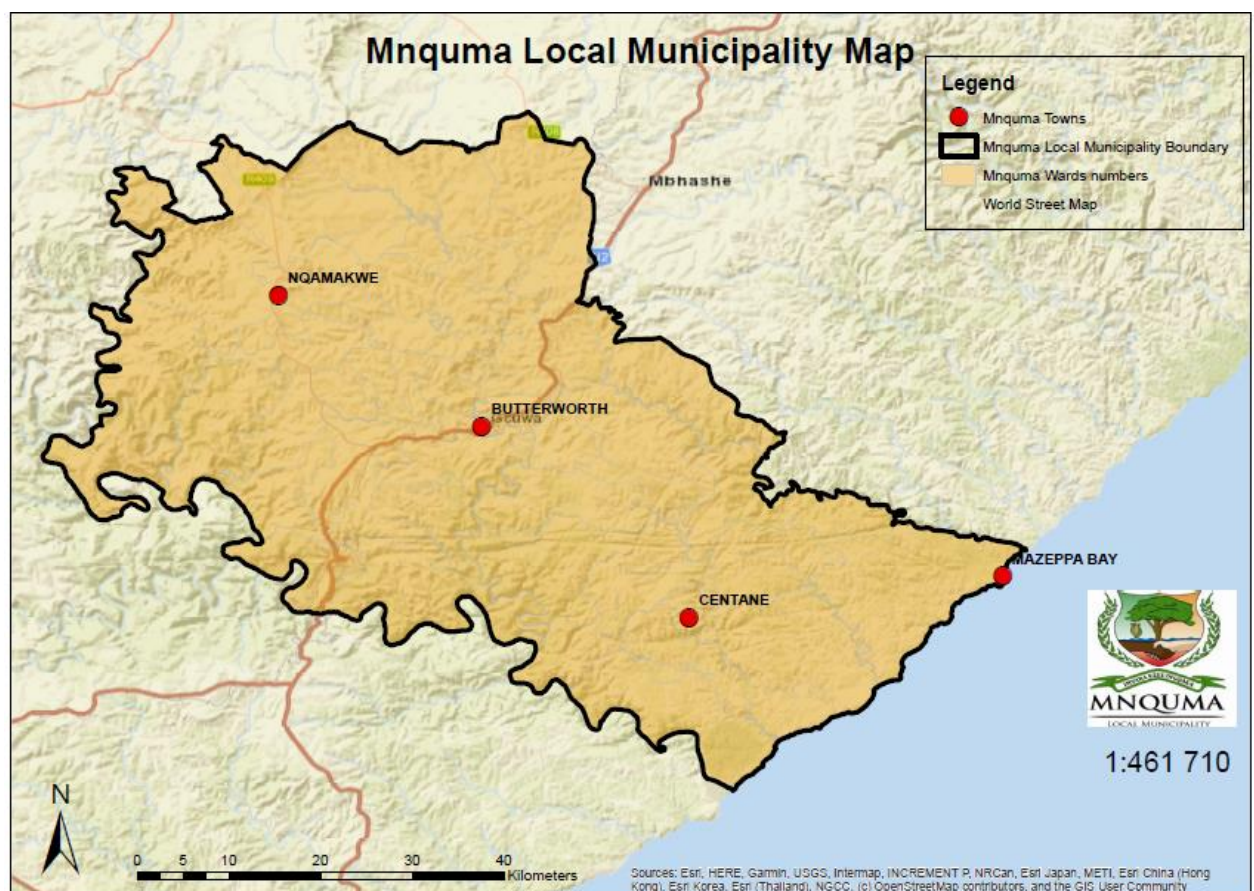


Figure 2: Map of Mnquma Local Municipality
Source: Mnquma Spatial Development Framework (SDF), 2016

3.2.1 Climatic conditions

Mnquma Local Municipality climate ranges from cool, humid and subtropical at the coast to hot and sub-arid inland. Maximum temperatures in summer fall mainly within the 25-27°C range, with the areas on the coast and the north-western regions reaching up to 29°C. Small, isolated regions in Mnquma Local Municipality have maximum temperatures of less than 25°C in summer. Maximum temperatures in winter fall within 16-19°C. The winter minimum

temperatures for coastal region are generally above 8°C, while inland minimum temperature can drop to between 2-4°C in winter. Rainfall varies from between 600-800mm per annum north-western and western regions to higher rainfall between 800-1000mm per annum in the mid central, south and south-eastern and coastal regions. Most of the rainfall (70%) occurs during October-March (Mnquma Spatial Development Framework, 2016).

3.2.2 Economic activities

Mnquma is one of the municipalities with the highest levels of poverty, illiteracy and unemployment (Mnquma Integrated Development Plan, 2020). Only 25% of population in the municipality are employed while 11% are unemployed and 64% are deemed economically inactive. The area has limited employment opportunities and this has huge implications on the increased need for welfare and indigent support in the municipal area. The municipality therefore needs to put priority into service provision, skills and social development. In addition, the municipal geographical area lacks a skills base wherein capabilities can be developed through practice and application. Statistics SA (2018) depict low levels of education in this municipal area. Mnquma has a 7% illiteracy rate, while the municipality's primary school completion percentage has grown from 8% to 31%. In the 10-year period it has been discovered that the municipality has also improved from 10% to 52% that has completed grade 12 while no more than 9% of the population have a tertiary qualification (Mnquma Integrated Development Plan, 2020).



Mnquma Local Municipality experienced a negative growth between 2008 and 2010 as a result of the global recession which was characterized by business cycle contraction. Production as a Gross Domestic Product (GDP) measure was very subdued in many parts of the global economy with the Mnquma municipal economy not immune to this phenomenon (Mnquma Integrated Development Plan, 2020). Furthermore, the negative growth resulted in firms losing market share, particularly in the commodity producing sectors. This resulted in a rise in unemployment, reduction in household incomes, and decline in business profits and generally plunged a lot of people into poverty (Mnquma Integrated Development Plan, 2020). According to Statistics South Africa in (2011), the growth rate at Mnquma was -0.17% which implies that the economy had not emerged from recession and not producing sufficient job opportunities as evidenced by the Employee Assistance Programme analysis. However, the economy of Mnquma LM has improved through the implementation of High Impact Projects (HIPS) which resulted to high level of employment, increase in households' income and the increase in business profits. The main economic sectors are agriculture, community (government)

services, wholesale, retail trade, manufacturing and mining and quarrying (Mnquma Spatial Development Framework, 2016 and Mnquma Integrated Development Plan, 2020).

3.2.4 Employment

In Mnquma Local Municipality employment has been categorized in terms of the sectors that produce goods and sectors that consume such goods. Such sectors are grouped into basic sectors and non-basic sectors (Mnquma Integrated Development Plan, 2020). According to Statistics South Africa (2011), agriculture produced about 57% of the jobs share in the goods producing sectors, followed by manufacturing and mining or quarrying contribution. In the non-goods producing sectors, general government employment and community services sectors provided 64% of the jobs in that sector followed by the wholesale trade sector at 14% respectively. The implication to the municipality is that the economy is vulnerable and not sustainable as long as the goods producing sector produces less jobs than the service provision sector. This economy requires a stronger goods producing sector to produce jobs to at least equilibrium and also to plug economic leaks and ensure a sustainable service producing sector particularly the retail trade, transportation of goods as well as construction.

3.2.5 Settlement Patterns and Land Tenure System

According to Mnquma Spatial Development Framework (2016), Mnquma local municipality falls under the Amatole District, where it is one of the eight local municipalities in the district. Specifically, the study is based in Butterworth, Ngqamakhwe and Centane areas of the Mnquma Municipality, where land ownership is communal. Residential stands are allocated by the headman while grazing land is communally owned. The areas are located on high plateau and are serviced by gravel roads. Furthermore, the rural villages and settlements are scattered over the municipal area and consists of low density and relatively stagnant settlements and pre-urban rural settlements that are reception areas with communal land areas around urban centres along the main transport routes. These settlements experience increasing influx and densification due to rural –urban migration and the main settlements in Mnquma are Butterworth, Centane, Ngqamakwe, Manubi Forest, Mazeppa Bay, Qolora Mouth and Wavecrest. The settlement nature of the area provides a clear focus on rural issues of housing while also dealing with some need in the urban and peri-urban areas (Mnquma Spatial Development Framework, 2016).

Livestock get their drinking water from rivers and small earth dams constructed in the areas. The villages are also benefiting from piped water that is pumped by the local municipality from

Gcuwa dam and Xilinxu dam. Additional water for domestic use is also harvested from house roofs into storage tanks during rainy days (Mnquma Integrated Development Plan, 2020).

According to Mnquma Spatial Development Framework (2016), the greater part of the land area in Mnquma local municipality is clearly owned by the South African state, with its precise ownership status changing from registered to unregistered state land. In most situations, the land is regarded as communal - or "traditional African" - land preserved in trust by the state although practically controlled by traditional leaders acting as representatives of the communities who live in the affected areas. In terms of community land tenure, traditional leaders recognized themselves as custodians and legal proprietors of land (Mkata, 2010).

Certain isolated land parcels were essentially excised from community land through demarcation as government forest, PTOs that are for commercial stations (some of which were converted to title), reservation certificates for schools and hospitals, and demarcation as coastal leisure sites for cottages, camping grounds, and hotels. Freehold ownership is restricted to a few urban locations. Quitrent tenure is prevalent in the relatively small inland areas of Butterworth under Proclamation 174 of 1921 (Mnquma Spatial Development Framework).

3.2.6 General Farming Systems

Mnquma local municipality has approximately 38 300 agricultural households which practices livestock rearing especially cattle, goats, chicken and sheep as well as crop farming (Statistics South Africa, 2011). According to the South African Department of Agriculture, Eastern Cape Province has the largest livestock herd in the country, with 30% of South Africa's cattle, 28% of its sheep, 28% poultry and 46% of its goats. Crop farming is also at subsistence level within the villages currently 30%, characterised by backyard gardens and medium sized plots where terrain permits. Studies on land use patterns in Mnquma Local Municipality shows that any crop can be grown in the rich soils given the stable climate that gradually changes from temperate to sub-tropical along the coasts (Christian et al., 2020). Maize however forms the dominant crop grown under rain fed system.

The farmers within the municipality produce a wide range of crops. These include cabbage, spinach, butternut, pumpkins, potatoes, and green pepper, carrots, beans and maize. Farmers decide on crops to be grown at any given time after a certain crop has been harvested or concurrently depending on land availability. A combination of four crop enterprises at any given period has usually been followed. Livestock farming is done individually by farmers to enhance their livelihoods. These include cattle, goats, sheep and chicken. Both on-farm and

non–farm marketing of produce is done, as farmers try to maximize returns from their enterprises (Mnquma Integrated Development Plan, 2020 and Christian, 2014).

Land preparation is done using a tractor and oxen. More so, there are tractor drawn equipment at the farm, which includes mould board plough, disc harrow and a planter. The projects sites are not well fenced with barbed wire to protect crops against animal damage (Mnquma Integrated Development Plan, 2020).

3.2.7 Infrastructure

Villages in Mnquma Local Municipality are serviced mainly by gravel roads and very little of tar road to the nearby towns (Idutywa, Ngqamakhwe and Butterworth). Due to the steep terrain and high erosion levels, the gravel roads in the area require regular maintenance due to erosion of which that is rare to find (Mnquma Integrated Development Plan, 2020). According to Eastern Cape Socio Economic Consultative Council (2017), four indicators were determined while assessing household infrastructure such as access to residential units, accessibility to good sanitation, running water, electricity and waste disposal. The report indicated that Mnquma Local Municipality had 8 160 highly formal residential units (11.90% of total households), 26 700 formal residential units (38.93% of total households), and 5 540 informal residential units (8.07% of total households). In terms of sanitation, Mnquma Local Municipality had 18 200 flush toilets (28.08% of total households), 22 900 Ventilation Improved Pit (VIP) (35.26% of total households), and 16 200 (25.06%) of total households' pit toilets.

Regarding the accessibility of water, Mnquma Local Municipality had a total of 19 500 (or 26.29%) houses with piped water within the dwelling, 8 870 (11.94%) households with piped water inside the yard, and 27 500 (37.01%) dwellings with no official piped water. Mnquma Local Municipality comprises 5 470 (7.99%) households with only lighting electricity, 45 900 (67.04%) households with lighting and other purposes electricity, and 17 100 (24.97%) households with no electricity. Mnquma Local Municipality possessed a total of 12 500 (19.70%) households that had their refuse collected weekly by the municipality, along with 288 (0.45%) households that had their garbage collected less frequently than weekly by the authority, and 42 700 (67.41%) households that had to remove their refuse themselves (own dump) (Eastern Cape Socio Economic Consultative Council, 2017).

3.3 Study Design

The overall objective of the study is to analyse non-farm income generating activities and food security in rural parts of Mnquma Local Municipality, Eastern Cape Province. A cross sectional research design has been used to conduct this study. Naturally, cross-sectional studies are deeply rooted in explanatory approaches, allowing for causal inferences (Setia, 2016). A quantitative approach to data analysis was followed. Quantitative research is defined as a systematic investigation of phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques. Quantitative research is relatively easy to analyse and the data can be very consistent, precise and reliable (Queirós, Faria and Almeida, 2017).

3.4 Sampling Procedure

A multi-stage random sampling technique has been used to select rural households for interviews from Mnquma Local Municipality. Multi-stage sampling entails two or more stages of random sampling based on the hierarchical structure of clusters within the population. A different type of cluster is randomly sampled at each stage, with the clusters nested within each other at successive stages. The final stage of sampling is to choose a random sample of people in the clusters selected at the penultimate stage. Clusters are natural groupings of people for example, electoral wards, general practices, schools, or households. This sampling technique is easy to implement, flexible and make data collection more practical for large populations. It also requires fewer resources, administrative and travel expenses for the sampling process. Additionally, since each cluster represents the entire population, more subjects can be included in the study (Etikan and Bala, 2017; Gattone et al., 2016). Therefore, two-stage cluster sampling has been used, where random sampling technique has been applied to the selected clusters.

For the purposes of the study, survey participants were dispersed among Butterworth, Centane and Ngqamakwe towns of Mnquma Local Municipality. Two wards in each town were chosen to reflect the range in town standard of living. Five administrative areas that represented the wards average level of living were chosen in each ward. Survey households were selected at random to participate in each administrative area. The dataset represents a well representative sample of households in Mnquma given the administrative areas stratification and household sampling scheme.

3.5 Sample size

To achieve the objectives and answer research questions, the study used primary data collected from rural households in the study area through structured questionnaires. The total sample size for the study was determined using the sample size determination formula as follows:

$$n = \frac{N}{1 + N(a)^2}$$

Where, N is the total number of households in Mquma Local Municipality, n is the sample size and a is the level of significance for the study and it is fixed at 5% (0.05). The total number of households in Mquma is 69 732 (Mquma Integrated Development Plan, 2020). Thus, the above formula gives the following sample size for the study:

$$n = \frac{69\,732}{1 + 69\,732 (0.05)^2}$$
$$= 398$$

Therefore, a total number of 398 rural households were selected for the purpose of the study.

3.6 Data Collection Methods

Structured questionnaire consisting of close-ended and open-ended questions were administered for data collection in the local IsiXhosa language so as to grasp their perception on availability, constraints and effects of income generating activities and food security status. Primary data was collected from sample households using structured questionnaires. Questionnaires were pre-tested first to a sample of 20 rural households so as to determine questionnaire content validity. Following the pretesting phase, the questionnaires were revised and finalised. Additionally, briefing sessions were carried out to make sure that the questionnaire instructions are well understood by all enumerators. Enumerators were employed and trained about field conduct specifically methods of data collection. The field survey consisted of multiple-visit interviews with household heads selected for the study. The period for data collection was three months. Data collected include socio-economic and demographic characteristics of households, various farm, non-farm and the combination of both income generating activities. Data on infrastructure accessibility, rural constraints on household participation in income generating activities was also collected. Additionally, data regarding the factors affecting the income diversification choice decision of rural households was collected. Data was also collected for the effects of income diversification choice decision on



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household food security. The data collected from questionnaires was captured using Statistical Package for Social Sciences SPSS and STATA version 15.

3.7 Data analysis

To analyse the data collected, the study makes use of one-way analysis of variance (ANOVA), Multinomial Logistic Regression (MLR), Principal Component Analysis (PCA), National Poverty Line, Binary Logistic Regression (BLR), and descriptive statistics such as mean, standard deviation, percentages and frequency of occurrence. The data collected for socio-economic and demographic characteristics of the households was analysed using descriptive statistics. Descriptive statistics are important to have clear picture of the characteristics of sample units. To analyse the data collected on various income diversification activities and their contribution on rural households' income, the study made use of one-way analysis of variance (ANOVA). ANOVA was used to test for differences between groups. The null hypothesis states that there is no significant difference between the means among the three groups and the alternative hypothesis that there is a significant difference. Principal Component Analysis (PCA) was used to construct the access to infrastructure as well as rural constraints indices which are important variables in explaining choice of income generating activity. Inferential statistics was employed to determine the factors affecting the income diversification choice decision of rural households in the study area by means of a Multinomial Logistic Regression (MLR). Household food security status was determined using poverty line approach. Households with per capita income below the poverty line of R1 417 were recorded as food insecure (0) while those above were food secure (1). Lastly, the data collected for the effects of income generating activities on rural household food security were analysed using the Binary Logistic Regression. Table 1 gives a summary of data analysis.

Table 1: Summary of study objectives, research questions and analytical tools

Objectives	Data requirements	Analytical tool
1. To identify and analyse various income diversification activities and their contribution on rural household income in the study area.	Farm income, non-farm income and a combination of both farm and non-farm income activities.	Descriptive statistics frequencies, means, standard deviation Analysis of variance (ANOVA)

2. To construct rural constraints and infrastructure accessibility indices affecting the choice of rural household participation in income diversification activities in the study area.	Rural constraints variables include lack of markets, lack of productive assets, government regulations, high competition from other enterprises, job insecurity, inadequate access to credit and lack of awareness and training. Infrastructure accessibility variables included roads, electricity, water and sanitation, shelter, telephone and computer.	Principal Components analysis (PCA)
2. To determine the factors affecting the income diversification choice decision of rural households in the study area.	Data included socio-economic and demographic variables such as age, gender, marital status, number of years spent in school, employment status, household income, household size, land ownership, extension services and the indices of rural constraints and infrastructure accessibility.	Multinomial Logistic Regression (MLR)
3. To examine the effects of income diversification choice decision on household food security in the study area.	Total household income and household per capita income were used to determine whether the households were food secure or not. Variable such as age, gender, employment status, household income, household size and household income generating activities were used to examine the effects of income generating activities on household food security.	National Poverty Line Binary Logistic Regression (BLR)

3.7.1 Analysis of variance (ANOVA)

Analysis of Variance (ANOVA) is one of the most widely used statistical methods for hypothesis testing currently in use. It encompasses a rich field and has the flexibility to cover a larger number of experimental designs (Kozak and Piepho, 2018). It is a statistical tool that is used to detect differences between experimental group means. According to McIntosh (2018), ANOVA is a hypothesis-testing technique used to test the equality of two or more populations (or treatment) means by examining the variances of samples that are taken. ANOVA allows one to determine whether the differences between the samples are simply due to random sampling errors or whether there are systematic treatment effects that cause the mean in one group to differ from the mean in another. Most of the time ANOVA is used to compare

the equality of three or more means, however when the means from two samples are compared using ANOVA it is equivalent to using a t-test to compare the means of independent samples. ANOVA has an advantage of being able to analyse an experimental design with multiple independent variables.

For the purpose of the study, one-way analysis of variance (ANOVA) was used to compare the mean income of three income diversification activities: farm, non-farm, and both farm and non-farm income generating activities. ANOVA compared the mean values of continuous variables in all income generation activities of rural households. The following hypothesis was tested:

H_0 : There are no significant differences in incomes of the three groups under study.

H_1 : There are significant differences in incomes of the three groups under study.

Therefore, the comparison focused on all income generation activities that rural households participate to in the study area.

3.7.2 Multinomial Logistic Regression (MLR)

Multinomial Logistic regression is defined by (Mustafa et al., 2015) as the model that is used when the categorically dependent variable has more than two levels. Senadza (2014) mentioned that the Multinomial Logistic Regression model is a popular econometric model for explaining the selection of an alternative from a set of exclusive alternatives. Multinomial Logistic Regression was determined to be appropriate for this study since it doesn't presume normality, linearity, or homoscedasticity. Multinomial logistic regression was also chosen because of its superior capacity to forecast income generation and detect differences in income generating activities between households. The model succeeds over in terms of predicting income generation and detecting changes in rural households' income generating strategies (Long, 2014). This model is used to estimate the probabilities of the divergent possible outcomes of a categorically dependent variable, with the available set of independent variables. Multinomial logistic regression model also predicts a separate binary logistic regression model for each indicator variable (Aziz et al., 2016) and is the most commonly used model for nominal outcomes, which are frequently employed when there are more than two options for a dependent variable (Long, 2014). Furthermore, the model is said to be the extension for a binary logistic regression. On the other hand (Senyefia, Adams, and Prah, 2019) stated that the multinomial logistic regression deals with one nominal/ordinal response variable that has more than two categories, whether nominal or ordinal variable.

In light of the aforementioned facts, a multinomial logit model was employed in this study to determine the variables influencing the choice of rural household participation in income generating activities. For the purpose of the study, the model was chosen because it provides empirical estimates of how the probability of the dependent variable (farm, non-farm and the combination of both farm and non-farm income generating activities) is affected by variations in independent variables (socio-economic and demographic variables, rural constraints and infrastructure accessibility as factors affecting the choice rural households participation to income generating activities) (Best and Wolf, 2015). In this study, rural households participate in different income generating activities for their food security status with the purposes of improving their livelihood. Therefore, rural households obtain certain level of utility from each income generating activities. The data collected also satisfies the condition of mutual exclusivity. There are three distinct activities; farm, non-farm or a combination of both and each household can only participate in one of them.

The choice of whether or not to engage in income-generating activities by the household will be evaluated using the broad framework of utility or profit maximization (Borges, Foletto and Xavier, 2015). It is considered that households choose particular income generating activities only when they believe the utility or net benefit of doing so exceeds that of the base category. However, the utility of households is not apparent in this situation, but the behaviour of economic agents can be evaluated by means of the decisions they make. According to Gecho (2014), the Multinomial Logistic Regression model is composed as follows:

$$Pro \left(Y_i = \frac{j}{x} \right) = \frac{e^{B_j X_i}}{1 + \sum_{k=0}^j e^{B_k X_i}}, j = 1, 2 \dots j \dots \dots \dots 3.1$$

Let Y_i be a random parameter representing the income generating activities chosen by any sample household in order to define the Multinomial Logistic Regression model.

Where j represents income-generating activities, x represents explanatory factors, and B_j represents estimated parameters. The Multinomial Logistic Regression model parameter estimates reflect only the trajectory of the influence of the explanatory factors on the dependent variable (income generating activities), but not the actual quantity of change or probabilities. To articulate the impact of explanatory factors on probabilities, the marginal effects are stated as follows:

$$\frac{\partial P_j}{\partial X_i} = P_j \left(\beta_j - \sum_{k=0}^j P_k \beta_k \right) = P_j (\beta_j - \bar{\beta}) \dots\dots\dots 3.2$$

3.7.3 Principal Component Analysis (PCA)

According to Hasan and Abdulazeez, (2021) and Paul et al., (2013) the Principal Component Analysis (PCA) is a linear dimensionality reduction technique that converts a collection of correlated variables (p) into a smaller collection of uncorrelated variables (k) (k<p), known as principal components, while preserving as much variation in the original dataset as is possible. The primary purpose of employing principal component analysis was to transform rural constraints and infrastructure accessibility components into indices. Principal Component Analysis is suitable for the study because it is primarily an adaptive exploratory approach that is easily applied to numerical data in multiple forms. Moreover, PCA is particularly well suited due to its ability to condense the data set into smaller, non-correlated dimensions or components.

The first principal component often accounts for the greatest variability in the data being provided (Todorov Fournier and Gerber, 2018). In order to create a new collection of uncorrelated variables, PCA takes advantage of any existing correlations between the input variables in the dataset. Principal Component Analysis (PCA) aims to optimize the variance of a linear combination of the variables by reducing the dimensionality of a data set with a large number of connected variables into fewer "dimensions," with the least amount of information lost (Santos et al., 2019). It is important to note that the Principal Component Analysis approach can be utilized to improve the quality of findings acquired by utilizing various statistical techniques.

Dua and Graff (2019) alluded that since PCA components are very sensitive to the relative ranges of the original features, feature scaling is necessary if there is a large difference in the scale between the features of the dataset. Otherwise, PCA will attempt to capture the variance that happened due to relative ranges rather than the actual variance between the features. For the purpose of the study, Principal Components Analysis was employed in order to reduce high-dimensional data complexity while preserving trends and patterns. Principal Component Analysis was used to create indices on the constraints to rural household participation in income generating activities.

3.7.4 National Poverty line

According to Abrahams et al., (2018) the poverty line is the minimum income thought necessary to maintain an appropriate standard of living in a certain nation. Statistics South Africa (2022) highlighted that the cost of basic needs method, which relates benefits to the consumption of goods and services, was used to create the national poverty lines. Food as well as non-food elements that constitute household consumption expenditure are represented by the lines.

According to Statistics South Africa (2022), the national poverty line is divided into three categories: food poverty line (R663), lower bound poverty line (R945), and upper bound poverty line (R1 417) as of April 2022 pricing. Annual updates to these poverty lines are made using the Consumer Price Index (CPI), which tracks changes in the cost of a basket of goods and services (Francis and Webster, 2019). For the purpose of this study, upper bound poverty line was adopted to determine food security of households in Mquma Local Municipality. According to Statistics South Africa (2022) the upper bound poverty line is comprised of the food poverty line and the average sum generated from non-food items in households with food expenditures that are equal to the food poverty line. Therefore, food security status of the respondents was determined by dividing households' monthly income with number of households' members (household size) in order to be obtain household per capita income. If a household's income in the study area is above the upper bound poverty line (R1 417), it is regarded to be food secure; if it is below the upper bound poverty line (R1 417), it is deemed to be food insecure. A food secure household received a value of 1, while a food insecure household received a value of 0.

The food poverty line (FPL), used to determine how many people are living in extreme poverty, is the amount of money in South African Rands below which people cannot afford to buy or consume enough food to meet their daily energy needs (Mdluli and Dunga, 2022 and Abrahams et al., 2018). World Bank Group (2018) reported that the per capita amount needed to meet basic requirements in a household is estimated by poverty lines. Therefore, households who make less than the poverty line do not have any discretionary income with which to exercise their right to decide what to buy in light of their circumstances. Consequently, households are deemed to be food secure if their income is over the national poverty line and they can afford to buy the essentials for surviving. World Bank Group (2018) and Statistics South Africa (2022) mentioned that the statistical reporting of poverty levels and trends, as well as the

planning, monitoring, and evaluation of programs and policies aimed at reducing it, are all made possible by the use of poverty lines, which are crucial instruments.

The use of a poverty lines allows for the measurement of both the breadth and the depth of poverty, in addition to determining the number of poor individuals (Francis and Webster, 2019 and Abrahams et al., 2018). Furthermore, the significance of poverty line is that they distinguish between the poor and non-poor households' and they also monitor progress in poverty reduction. Table 2 and 3 bellow illustrates South Africa's inflation adjusted poverty lines.

Table 2: National poverty lines modified for inflation for 2022 (per person per month in rands)

Poverty line	2022-line values
Food poverty line (FPL)	R663
Lower-bound poverty line (LBPL)	R945
Upper-bound poverty line (UBPL)	R1 417

Source: Statistics South Africa, 2022

Table 3: Inflation-adjusted national poverty lines from 2006 to 2022 (per person per month in rands)

Years	Food Poverty Line (FPL)	Lower-bound Poverty Line (LBPL)	Upper-bound Poverty Line (UBPL)
2006	219	370	575
2007	237	396	613
2008	274	447	682
2009	318	456	709
2010	320	466	733
2011	335	501	779
2012	366	541	834
2013	386	572	883
2014	417	613	942
2015 (April)	441	647	992
2016 (April)	498	714	1 077
2017 (April)	531	758	1 138
2018 (April)	547	785	1 183
2019 (April)	561	810	1 227
2020 (April)	585	840	1 268
2021 (April)	624	890	1 335
2022 (April)	663	945	1 417

Source: Statistics South Africa, 2022

3.7.5 Binary Logistic Regression (BLR)

Binary Logistic regression is an analytical technique that is used when the dependent variable has two levels (Categorically) (Harrell, 2015). Binary logistic regression is required when the independent variables are categorical or a combination of continuous and categorical, as well as the dependent variable comprises categorical (Abonazel and Ibrahim, 2018; Ngema, Sibanda and Musemwa, 2018). The two categories of binary categorical variables are expressed by numeric values of 1 and 0. For the purpose of this study, the model will determine the effects of income generating activities (independent variable) on household food security (dependent variable). Accordingly, a binary logistic regression model was utilized because it is thought to be the best fit for this type of the examination. The Binary Logistic Regression is appropriate for models with a dichotomous endogenous variable, such as the households with and without access to enough food and water in this scenario, which, in this context, are households who are food secure and those that are food insecure. In this case the two categories represent the probability of being food secure (1) or not to be (0) affected by the income generating activities. Following that, the Binary logistic regression presents a model for determining whether a household is food secure or food insecure (Ngema, Sibanda and Musemwa, 2018).

Mathematically, the model is specified as follows:

$$P_i = \frac{e^{Z_i}}{1 + e^{Z_i}} \dots \dots \dots \text{University of Fort Hare} \dots \dots \dots 3.3$$

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Where P_i represent the probability of food secure and $(1 - P_i)$ is the probability that the household is food insecure. The probability distribution ($Y = 1$ versus $Y = 0$) describe the percentage of a household's likelihood to become food secure (P_i) given the possibility of becoming food insecure $(1 - P_i)$. The projection is shown below in natural logarithm form.

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i \dots \dots \dots 3.4$$

As a result of which the value of:

$$P_i = \left(\frac{1}{1 + e^{-Z_i}}\right) \dots \dots \dots 3.5$$

Z_i can alternatively be defined as the logarithmic value of the probability ratio in connection to a household's food security, as shown in the regression equation below.

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots \beta_n X_n + U_i \dots \dots \dots 3.6$$

Wherein Z_i denotes the food security level of the household (given a numeric value of 1 if food secure and 0 if food insecure), β_0 signifies a vector composed of unidentified parameters (intercept), and U_i represents the value of the error term.

3.8 Ethical consideration

The researcher applied for and successfully received Ethical clearance approval (Reference number MDL011SMVA01) from the University of Fort Hare's Research Ethics Committee (UREC) prior to data collection. Respondents were told about the objective of the study and the basis for their selection during the research. All respondents chosen for this study were asked to sign a consent form as proof that they had willingly participated in the course of the research. The gathering of data was fully accepted. The following were then observed:

❖ Informed consent

- ✓ Respondents were given adequate information about the study before they decide whether to participate or not. No respondents that were forced to participate in the study and they were free to pull out during the collection of data.

❖ Scientific misconduct or fraud

- ✓ There were no making up of data or any plagiarism in this study. All the information presented was exactly what was obtained from the respondents.

❖ Honesty

- ✓ The researcher was honest in designing, carrying out, and reporting research objectives to the respondents.

❖ Confidentiality and Privacy

- ✓ Information that was related to any of the participants of the study and household's privacy was respected.

❖ Respect

- ✓ All the respondents were treated with respect.

❖ Discontinuity

- ✓ All respondents were given the right to discontinue with the study when feeling uncomfortable.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals with the analysis of survey data and the discussion of the results. The first section provides an outline of the study areas socio economic and demographic characteristics. The means of these characteristics were computed to provide an overall view of the study's socio-economic and demographics. The chapter comprises of the data analysis and interpretation of results of various income diversification activities and their contribution on rural households' income. Various farm, non-farm and combined income generating activities were reported as well as their contribution to households' income. Rural constraints and infrastructure accessibility such as lack of markets, lack of productive assets, government regulations, high competition from other enterprises, job insecurity, inadequate access to credit and lack of awareness and training were also discussed.

The data collected for the factors affecting the choice of participation in income generating activities by rural households are also analysed and the results are interpreted in the chapter. Age, gender, marital status, number of years spent in school, employment status, household income, household size, land ownership, extension services, and rural constraints and infrastructural accessibility were all considered. Furthermore, the chapter provides the analysis of survey data and the interpretation of results of the effects income generating activities on rural households' food security. The total household income and per capita income of the households were used to evaluate whether or not the households were food secure. Furthermore, variable such as age, employment status, household income and household income generating activities were used to examine the effects of income generating activities on household food security. Diagrams, figures and tables were used to present data and facilitate the understanding of the findings.

4.2 Summary statistics

The study area's household gender distribution is predominantly male (51%), with females accounting for 49% of respondents. This is due to traditional male-headed households, except in cases of single, divorce, widowed, or separation. Males provide for their families more as they diversify their income (Mensah, 2014). Males provide for their families more by diversifying their income, according to Adem (2018). Asfaw et al. (2017) found male-headed households make up 86% of households and female-headed households made up 14% in North

central Ethiopia. Christian (2017) study found that 66% of irrigator households are male-headed, 34% are female-headed, and 59% of non-irrigators are male-headed, with 41% being female-headed in Eastern Cape.

Age significantly influences rural households' participation in income diversification activities. The majority of respondents (36%) are between 41-50 years old, with 59% under 50 years. Young people-owned enterprises are more successful due to their hard work and dedication, enhancing their livelihood and food security. The majority of households are more energetic and capable of engaging in non-farm income activities and agricultural production, which can improve their livelihood and food security (Amurtiya, 2015). According to Amurtiya (2015) survey in Nigeria, 73% of respondents in non-farm earning activities were under the age of 50.

The study shows that marital status significantly influences rural households' participation in income generating activities. The majority of respondents are married (61%), leading to increased income diversification and consumer spending. This is similar to Adem (2018) study on income diversification and its effects on food security in Ethiopia, where 89.39% of respondents were married and 10.61% were single. Married people make up the majority of household heads in rural areas due to custom and social orientation, potentially encouraging diversification of income sources (Amurtiya, 2015).

Employment is crucial for households as it allows them to purchase farm and non-farm inputs and equipment, diversify their enterprises and improve food security (Christian, 2017). The study area's majority of households 31% were formally employed, followed by 22% self-employed and 14% part-time workers, constitutes 67% of employed household heads. Unemployment rates are 33%, with 18% full-time farmers, 8% part-time farmers, 3% pensioners and 4% permanently unemployed. According to Maziya, Mudhara and Chitja (2017), employment modernizes production and reduces food shortages.

Education is crucial for employment and income in rural areas, with 40% of respondents having secondary education and 33% having tertiary education. Higher-educated individuals tend to work in higher-paying positions, while less educated individuals work in lower-paying jobs. Literacy can increase participation in non-farm income activities, improve food security, and enhance adoption of new technologies and farming practices (Amurtiya, 2015; Mensah, 2014 and Ibekwe, 2010). According to Amurtiya (2015) survey, 70% of respondents were literate, which might increase their engagement in various economic activities and improve their food security.

The study shows that 51% of respondents have a household size between 4-6 members, which increases labour availability for income diversification activities and reduces hiring costs. Larger families participate in various income diversification activities, improving food security. This finding is supported by Mensah (2014) in Northern Ghana and Samuel and Sylvia (2019) in Northwest South Africa, who found that larger households diversify their income sources. Consequently, Wan et al. (2016) argued that rural households with limited children and elderly individuals tend to diversify their income sources.

The results of the study illustrate that 38% of respondents earned between R5 100 and R10,000 monthly, with an average household income of R8,872.88. This indicates a strong link between household income and food security (Mtolo, 2016). In addition, the survey found that 37% of respondents in the study area primarily received income from salaries/wages, followed by 26% from businesses. This aligns with previous study in the Eastern Cape Province, where more income comes from businesses, labour, remittances and social transfers (Mathebula et al., 2017). Additionally, overall, 40% of rural households in Mnquma Local Municipality rely on a combination of various income sources for basic needs.

Table 4: Socio- economic and demographic characteristics of households in the study area

Variables	Frequency	Percentage	Mean
Gender	N	%	
Male	203	51%	
Female	195	49%	
TOTAL	398	100%	
Age			
20 – 30 years	4	1%	
31 – 40 years	93	23%	
41 – 50 years	143	36%	
51 – 60 years	80	20%	
61 – 70 years	48	12%	
70 ≥	30	8%	
TOTAL	398	100%	66.33
Marital status			
Single	84	21%	
Married	245	61%	
Divorced	11	3%	
Widowed	36	9%	
Separated	22	6%	
TOTAL	398	100%	
Employment status			

Full time farmer	77	18%	
Part-time farmer	29	8%	
Formally employed	122	31%	
Part-time employed	56	14%	
Self employed	87	22%	
Pensioner	12	3%	
Unemployed	15	4%	
TOTAL	398	100%	
Education level			
No formal education	34	9%	
Primary	72	18%	
Secondary	160	40%	
Tertiary	132	33%	
TOTAL	398	100%	
Household size			
1 – 3	39	10%	
4 – 6	205	51%	
7 – 9	93	23%	
10 – 12	47	12%	
13 ≥	14	4%	
TOTAL	398	100%	79.60
Household income			
≤R1000	36	9%	
R1000 – R5000	87	22%	
R5 100 – R10 000	151	38%	
R10 100 – R15 000	68	17%	
≥R15 000	56	14%	
TOTAL	398	100%	79.60
Sources of income			
Salaries and wages	147	37%	
Income from a business	103	26%	
Old age grant	20	5%	
Pension	12	3%	
Child support grant	16	4%	
Remittances	72	18%	
Sales of farm products	28	7%	
TOTAL	398	100%	

Source: Field survey, 2022

4.3 Categories of income generating activities

The income generating activities were grouped into three categories as shown in Figure 3.

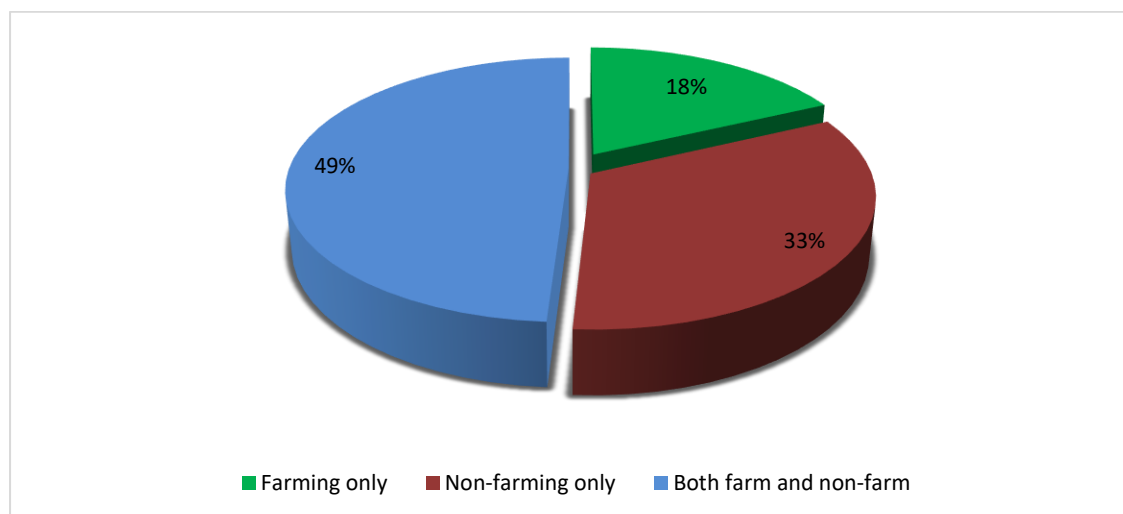


Figure 3: Categories of income generating activities.

Source: Field survey, 2022

Figure 3 depicts that (49%) of the households were engaged in both farm and non-farming activities, (33%) were participating in non-farming only and (18%) of the surveyed households were participating in farming only. Similarly, Bila (2006) discovered that 74% of households are non-farm and 26% are farming, however Nanda et al. (2019) discovered that 7% of farm households are totally dependent on agriculture and 93% work beyond farming. In Mnquma, the high proportion of households that were participating in both farm and non-farm is in accord with Mnquma IDP (2020). The combination of both income activities enables the adoption of new technologies, increased household productivity and greater returns thereby leading to improved household food security. On the other hand, participation in non-farm activities as previously outlined in section 2.6 and 2.7 enables households to employ suitable modern technology and inputs, thus reducing the danger of food shortages during droughts (Nagler and Naudé, 2014). However, this doesn't imply that that rural households do not engage in farming activities; rather, non-farm income generating activities account for the majority of household income and food security in the study area.

Odoh et al., (2019), Nanda (2019), Asfir (2016) and Bila (2006) found that the majority of rural households combined on-farm and non-farm activities to achieve their livelihood objectives, while only a small number of households relied solely on on-farm activities. Odoh et al., (2019) noted that as a result of the unpredictability of the climate and the prevalence of pests and diseases, diversification in both farm and non-farm income activities aims to lower the intrinsic

risk in agriculture. According to Odoh et al., (2019), households that are highly to moderately susceptible to food insecurity combine farm and non-farm activities to guarantee a consistent income. Consequently, Alobo Loison and Bignebat (2017) argued that some households are unable to diversify their sources of income and must depend solely on agriculture to make ends meet. The majority of these rural households do not diversify their non-farm income because there are no prospects of them being able to do so.

4.3.3 Contribution of income diversification activities to household income

The graph below illustrates the overall contribution of farm, non-farm and both farm and non-farm income diversification activities of surveyed respondents to household income.

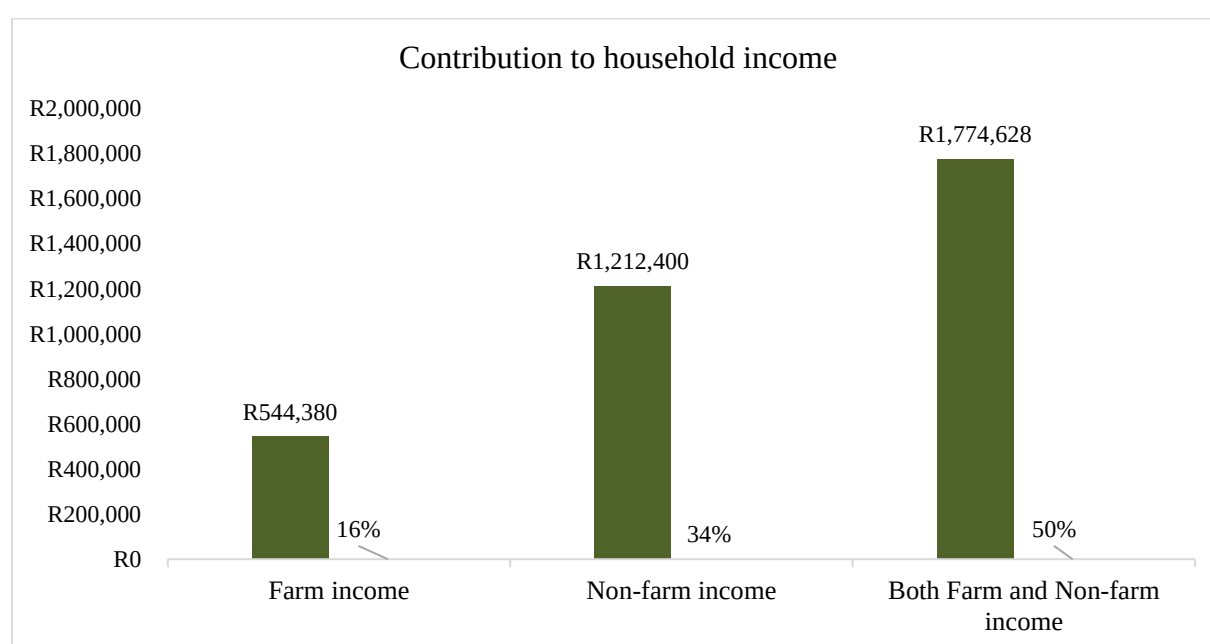


Figure 4: Contribution of income diversification activities to household income

Source: Field Survey, 2022

The results indicate that the combination of both farm and non-farm income generating activities contributes largely to surveyed households' income as represented by 50% (R1 774 628). Therefore, this signifies that households that are highly to moderately susceptible combine farm and non-farm activities to guarantee a consistent income (Odoh et al., (2019).

4.4 Rural to Urban Migration

Rural to urban migration is regarded as a significant aspect of the development and performance of the rural income diversification activities (Mensah, 2014). According to Christian (2017), rural to urban migration occurs mostly on males than females which in turn results to females being the heads of the household and responsible for the enterprise. On the

other hand, Rantšo (2016) highlighted that the migration of the active labour force from rural to urban centres results to the failure of some rural development projects and enterprises.

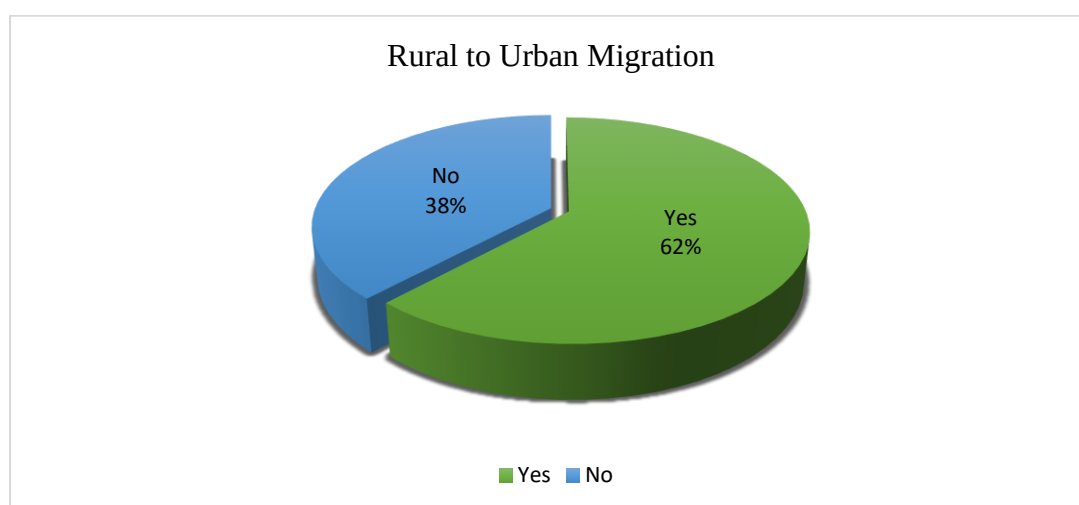


Figure 5: Urban migration

Source: Field survey, 2022

The pie chart above illustrates rural to urban migration of members of the households in the study area. The chart shows that the majority (62%) of the respondents had household members that migrate to urban centres and (38%) had no members that migrated to urban centres. The results from the study reveal that rural-urban migration occurs as a result of seeking employment opportunities and high returning income generating activities (Rantšo, 2016). Furthermore, industrialisation is also the pulling factor of migrants from rural to urban areas. The findings of the study collaborate with that of Rantšo (2016) on non-farm income sector and rural development in Lesotho whereby the majority of youth migrated to South Africa for better living standards and employment opportunities.

4.5 Land size ownership

Land in most cases, is one of the primary assets of rural households, and as such, the analysis of non-farm income and household food security cannot be done independent of the possession of land. Nanda et al., (2019) emphasised that it is more significant for land owning households to cooperate both farm and non-farm income generating activities for improved food security and poverty alleviation. Consequently, Assefa, Heerink and Van den Berg, (2015) reported that land ownership is linked to farm in a positive and meaningful way, thereby encouraging the participation of households in the farming sector. However, the majority of the respondents sampled in the study have access to residential land but not all of them had access to land for farming purposes.

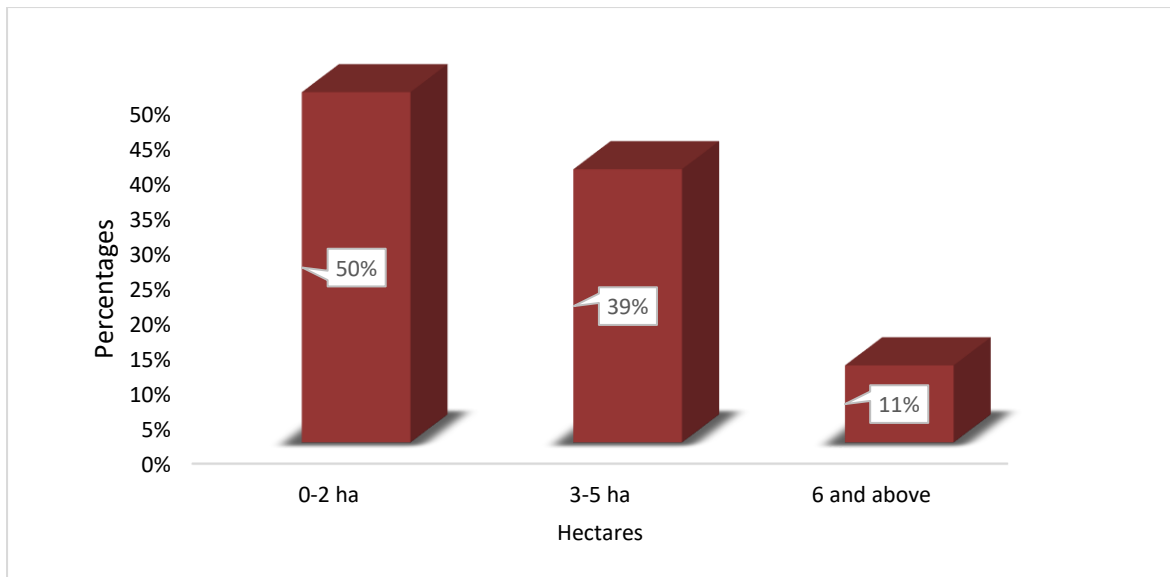


Figure 6: Land ownership

Source: Field survey, 2022

The graph above indicates the land ownership of the surveyed households in the study area. The results of the survey reveal that (50%) of the respondents owns about 0-2 hectares of land, followed by (39%) that owns 3-5 hectares and (11%) of the respondents owns 6 and above hectares of land. This further indicates that the majority of households in the study areas have access to small plots of land which is mainly for producing few crops on a back-yard garden. Hence, the high participation in the non-farm sector for food security and poverty alleviation. These results are in line with Christian et al., (2020) where the surveyed households owned between 0.1ha to 2.5ha of land in their study of land access and livelihood diversification strategies of rural households in Mnquma in the Eastern Cape province.

4.5.1 Land acquisition

Land asset can be acquired through buying, inherit, rent/lease, resettlement by households. Therefore, the study examined the patterns of land ownership of rural households in the study area. Although all of the respondents had acquired the land, not all of them had access to land for farming purposes.

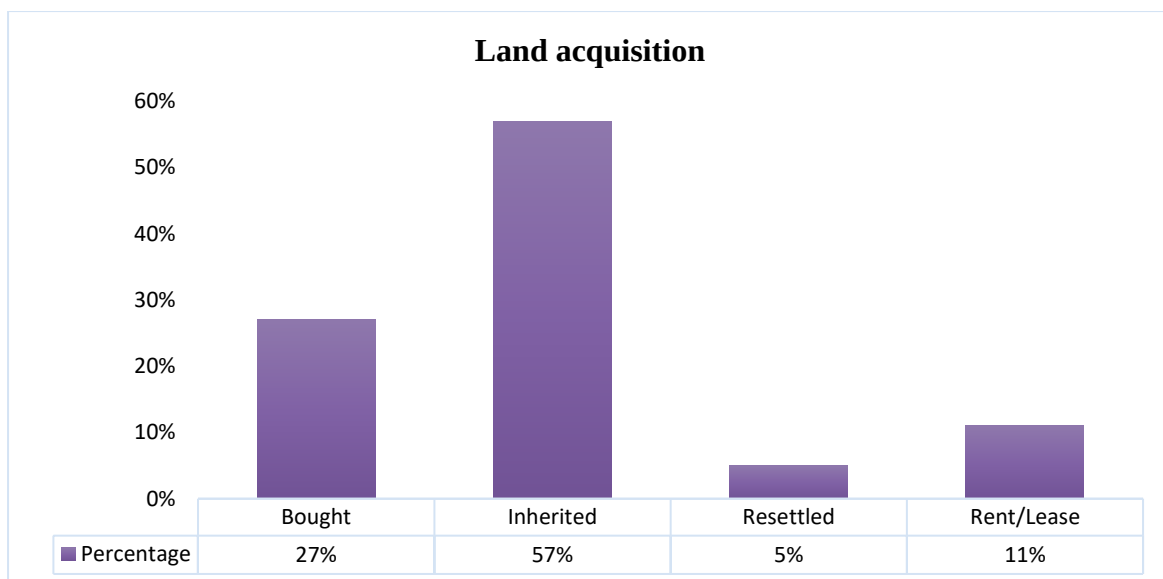


Figure 7: Land acquisition

Source: Field survey, 2022

The above bar graph indicates the means by which the surveyed respondents own land in Mnquma Local Municipality. The results of the survey demonstrate that the majority (57%) of the respondents in the study area inherited the land, followed by (27%) that bought the land, (11%) that rent/lease the land and (5%) that resettled the land. The survey results imply that the majority of respondents inherited the land from their forefathers with the intentions to keep and produce the land. The high proportion of inheritance of land corroborates with the study by Oyewole (2012) where the majority (47.86%) of the respondents in Oyo State of Nigeria obtained their land through inheritance. Consequently, the respondents in the study area bought the land either from the government or the traditional leaders for commercial and residential purposes of utilising the land (Mnquma SDF, 2016). Additionally, the purchase of land is in line with employment status and income sources of households in the study area.

4.6 Farming activities

In spite of the fact that almost all of the surveyed respondents possess the access to land, only a small percentage of them with enough land for farming. Table 4.2 bellow demonstrates the farming activities that surveyed households in the Mnquma Local Municipality were engaged. The farming activities include among others crop production, livestock production, both crop and livestock, poultry and dairy production as shown in table 4.2.

Table 5: Farming activities

Farming activities	Frequency	Percentage (%)
Not farming	133	33
Crop production	20	5

Livestock production	65	17
Both crop and livestock	163	41
Poultry	17	4
Dairy	0	0
Total farming households	398	100

Source: Field survey 2022

The results from the table above illustrates that the majority (41%) of the total surveyed farming households were producing both crops and livestock, followed by (17%) that were producing livestock only, (5%) were producing crop only and (4%) were producing poultry only. The majority of the households in the study area produce crops and livestock as a risk coping strategy for household consumption with no intentions to generate revenue. The results corroborate with land ownership whereby few households that possesses the access to land for sustainable farming practises. Therefore, the majority of surveyed households have access to small plots of land which is mainly for producing few crops on a back-yard garden.

4.6.1 Crop Production

Mathebula et al., (2017) highlighted that households cultivate crops as a risk coping strategy in order to alleviate poverty thereby improving the availability of safe, sufficient and nutritious food for their healthy lifestyle.

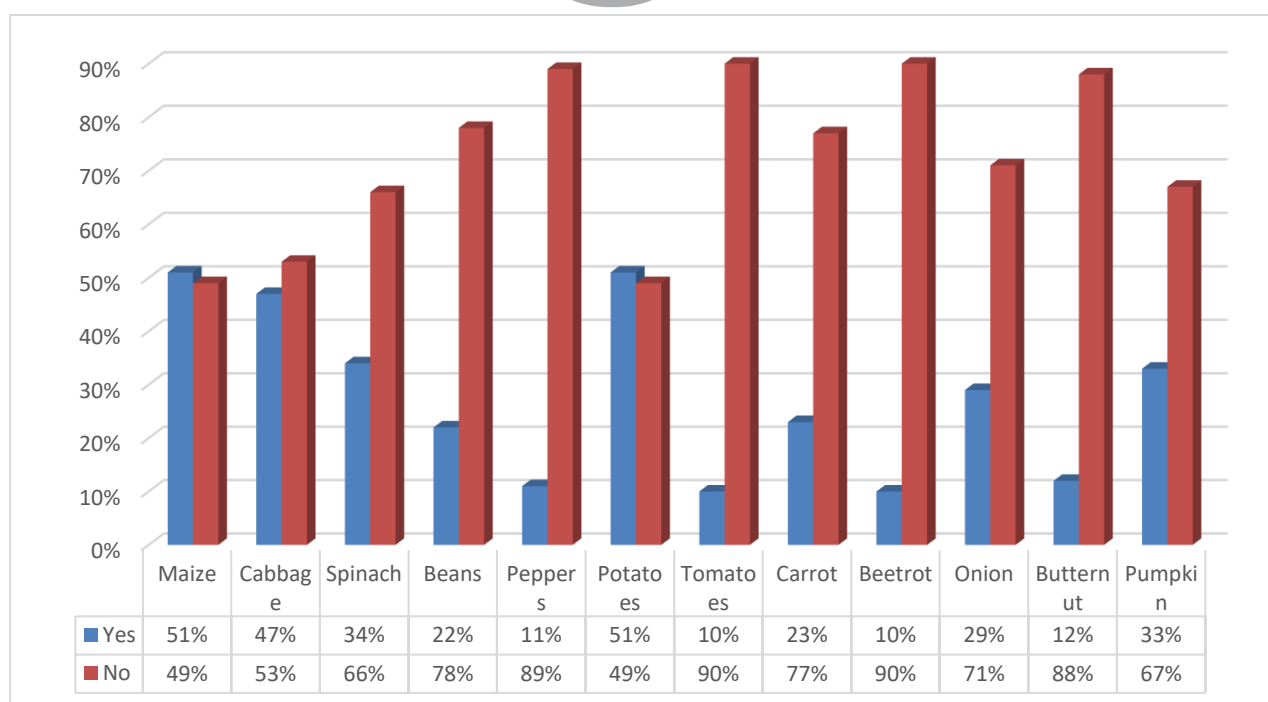


Figure 8: Crop production

Source: Field survey, 2022

The bar graph above illustrates different types of crops that were produced by surveyed households in the study area. The results indicate that maize (51%) and potatoes (51%) were the most produced crop by households in Mnquma, followed by cabbage (47%) and pumpkin with (33%) of production. This is in line with Christian et al., (2020) in their study of land access and livelihood diversification strategies of rural households in Mnquma, where the households produced the majority of maize, cabbage and potatoes. This further justifies that households do produced crops but on a limited quantity and quality due to limited access to land and production inputs.

4.6.1.1 Reasons for not producing crop

When the surveyed households were asked the reasons for not engaging in crop production, a variety of reasons were imposed. These reasons include among others limited access to agricultural land. Lack of start-up capital, lack of inputs and machinery as well as lack of farming skills. The available land for households is not enough for crop production since the majority of households in the study area have limited hectares of land. They further alluded that the available land is for building houses for better living conditions. Lack of start-up capital also impedes crop production by rural households as the majority of households needs to buy inputs and machinery for farming. Some of the households require fencing material in order to kick-start the farming operations. Some households mentioned the cost of hiring tractor and labour for planting, weeding, and harvesting more especially those that did not have larger family size and cattle for production. It was also cited that lack of necessary farming skills was one of the major reasons for not producing crops, mentioning that it is necessary for government to provide farming skills and trainings.

Some of the surveyed households mentioned that migration of youth was one of the other reasons as the majority of educated youth migrate to urban centres. Furthermore, educated youth do not like to stay in rural areas. The older households emphasised the lack of energy for farming operations, further mentioning health issues that are associated with aging. All these reasons further constrain the household's engagement in farming activities, which in turn results to high participation in the non-farm sector. Basically, there are vast number of reasons why households do not practise crop farming in the study area and these reasons differ from one family to another, however some are interlinked.

4.6.1.2 Production inputs and equipment

The households of Mngquma Local Municipality had various inputs and implements for cultivating their crops and the study shows that several households had adopted the use of the recent technology for farming operations. However, some of the implements such as hoe, plough, planter and yoke that were used by households in the study area were indigenous. The results are revealed in the bar graph bellow.

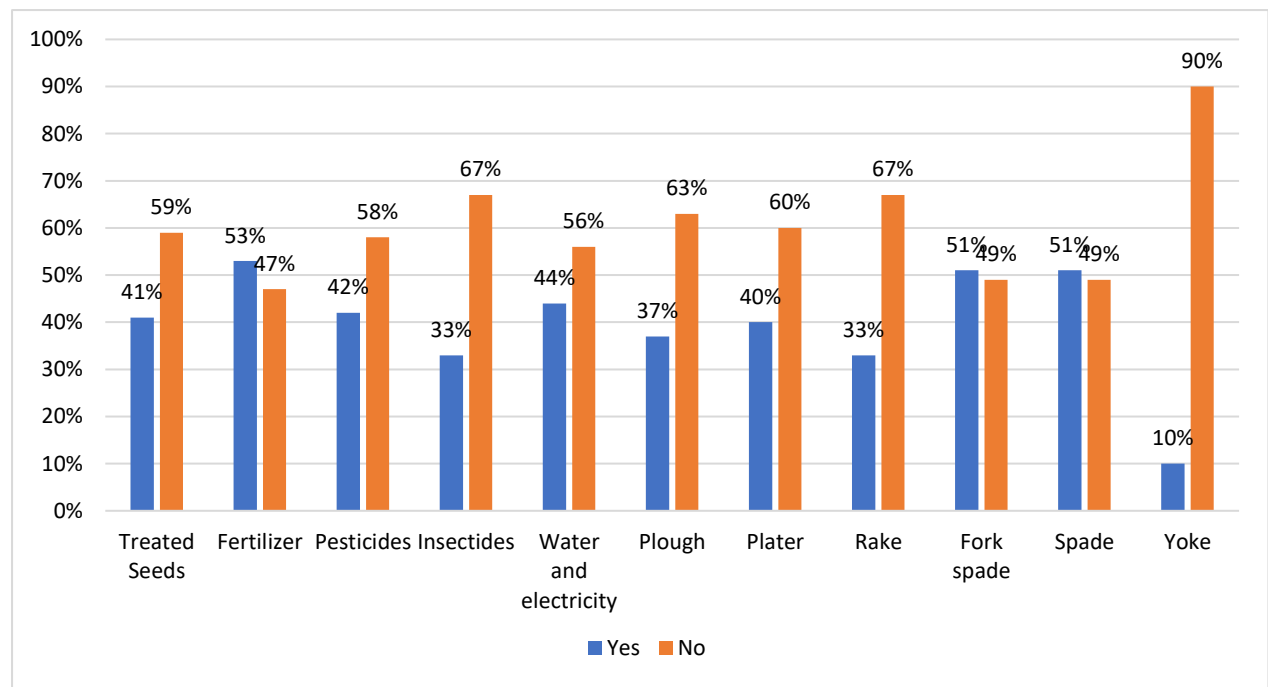


Figure 9: Production inputs and equipment
Source: Field survey, 2022

Figure 9 above illustrate production inputs used by surveyed households in the study area. The results indicate that fertilizer (53%), spade (51%) and fork spade (51%) were the most used inputs by the households. The majority of households claimed to have had these farming inputs and equipment while they were still active in crop production. On the other hand, the most prevalent cause for not owning these implements was the sale of these implements to traders who buy old irons by children and grandchildren. The results also revealed that the least used input was the yoke (10%). The reason behind is that the vast number of households had moved from using livestock draft power to modern technology machinery for farming operations such as cultivation, sowing and bedding, weeding, pest control as well as harvesting (Adenle, Wedig and Azadi, 2019). Furthermore, this results to the adoption of new technology system for sustainable agriculture and household food security.

4.6.1.3 Crop sales

Selling crops is one of the significant aspects of generating household income thus improving household purchasing power and food security. In the study area, surveyed households were asked whether they sold crop of not. The results obtained are showed in figure 10 bellow.

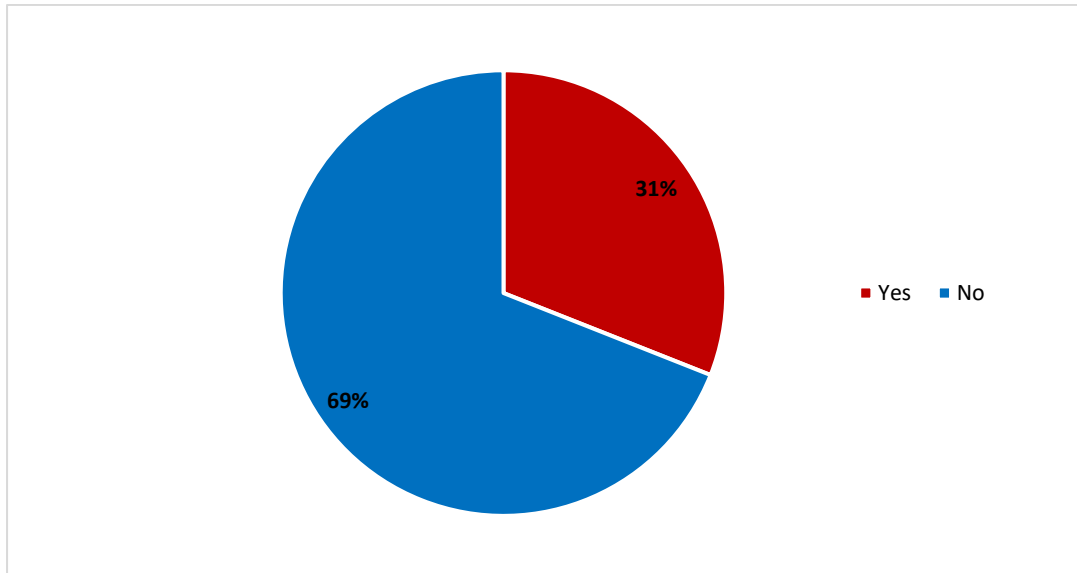


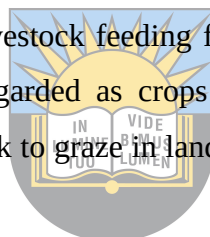
Figure 10: Crop sales

Source: Field survey, 2022

The chart above illustrates that the majority of households (69%) were not selling their crop produce and (31%) of the respondents were selling their produce. The households cited variety of reasons for not selling their produce. The reasons include among others household consumption with the intensions to improve the physical availability of food for household food security. Furthermore, household consumption occurs as a result of large family size which result from the need of large quantities of food to feed the household. Limited produce was also one of the reasons for households not selling their produce. Household limited produce is the result of small land ownership which also results to limited crop production and the high demand of food by the household. The surveyed households also highlighted that their crop produced was also used for livestock feeding, mostly maize to feed poultry. This on the other hand was done to limit the costs of buying more feed for livestock. Lack of accessible market also constrain the households on selling their crop produce as the majority of rural households were residing far from the marketplace. This in turn result to high transportation costs to be incurred by households, hence they ended up not selling their produce.

4.6.1.4 Reasons for not selling

When the surveyed households were asked the reasons for not selling, they cited the variety of factors. These reasons include among others limited produce, household consumption, distance to the market, livestock feeding as well as lack of market information. The majority of households in the study area alluded that they harvested limited produce in the previous year, which in turn resulted to selling on nearby households and villages. The reason for selling on nearby households is caused by long distance to the marketplace. Therefore, households in the study area were exposed to long distances to the marketplace, which in turn results to high costs of transporting their produce to the marketplace. On the other hand, some households emphasised the matter of producing for household consumption. Due to high number of members of households, some households felt that their produce was not enough for selling rather for household consumption so as to maintain household needs for food. Some households emphasised that their limited produce was only enough to cater to household members only, which makes it difficult for them to sell. Lastly, some surveyed households pointed that their produce was for livestock feeding for example maize, pumpkin, potatoes, cabbage, and crop residues were regarded as crops used to feed livestock. Furthermore, surveyed households allowed livestock to graze in land after harvesting so as to provide good nutrition and more productive growth.



4.6.1.5 Challenges experienced in crop production

Crop production is important for rural households in the study area since some households grow crops for their own sustenance while others produce crops for sale. In Mnquma Local Municipality, households have experienced a number of challenges that have had a negative impact on their yield. These obstacles included among others, climate variability, lack of agricultural infrastructure, low level of farming skills, scarcity of water, soil degradation, limited access to production inputs and equipment, limited access to markets, lack of access to credit facilities, poor access to extension services and financial crisis.

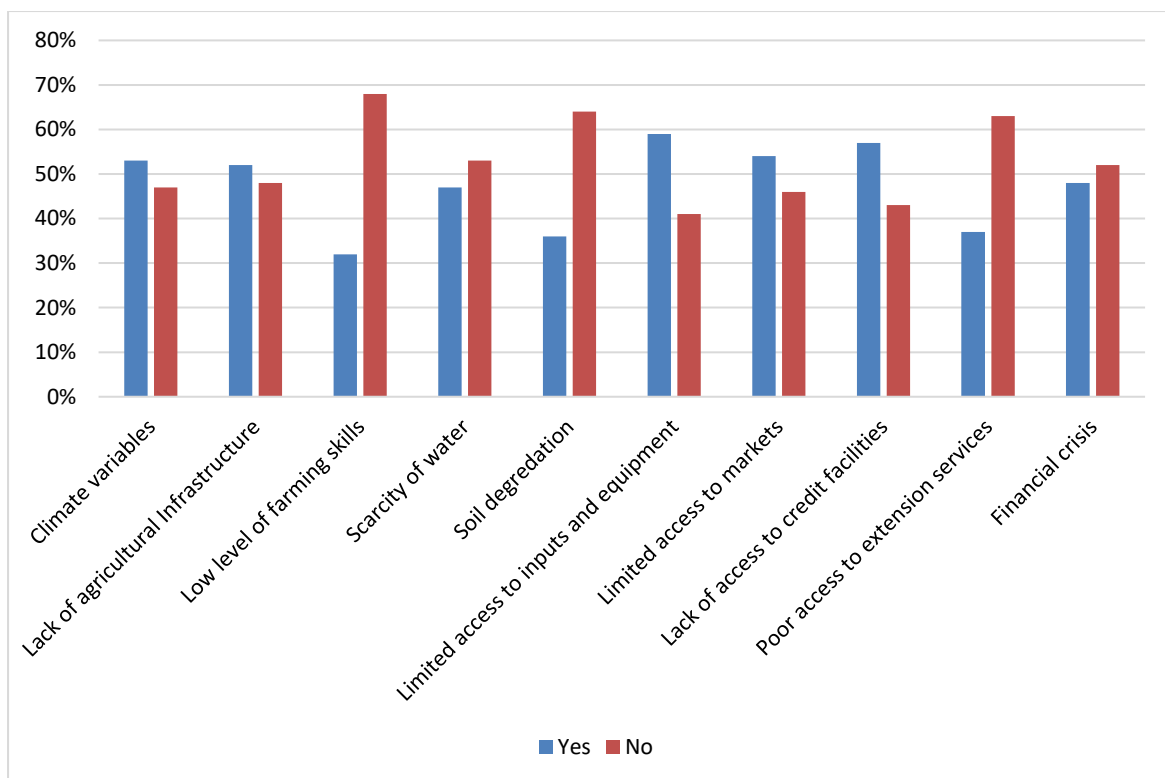


Figure 11: Challenges experienced in crop production.

Source: Field survey, 2022

The above graph illustrates the challenges that were faced by households in producing their crops in the study area. The graph shows that the majority of households (59%) experienced a challenge of limited access to production inputs and equipment, followed by (57%) that had lack of access to institutional credit facilities, (54%) had limited access to markets, (53%) had a challenge of climate variability and (52%) lacked agricultural infrastructure. This depicts that the majority of households in Mnquma were affected by these factors which in turn resulted to low yield production. The respondents emphasised that it was even more difficult to begin the planting stage due to unavailability of seeds, fertilizers and other necessary inputs and equipment. Fewer households (32%) that faced a challenge of low level of farming skills. Meaning that the majority of households in the study area possessed abilities and expertise to perform farming duties. The results obtained are similar to the annual reports of DRDAR (2017/2018, 2020/2021) whereby the majority of farming households in the Eastern Cape are exposed to challenges of lack of farming inputs, credit facilities, agricultural infrastructure, markets, climate variability which consequently results to low productivity.

4.6.2 Livestock ownership

According to the study by Demissie and Legesse (2013), livestock ownership has an important and positive impact on participation in sole self-wage and mixed self-wage activities.

Households with a larger livestock holding have greater opportunities to engage in lucrative non-farm employment activities, putting them in a better position than those with no or a small livestock holding. The types of livestock owned by the respondents were cattle, goats, sheep, chicken and pigs.

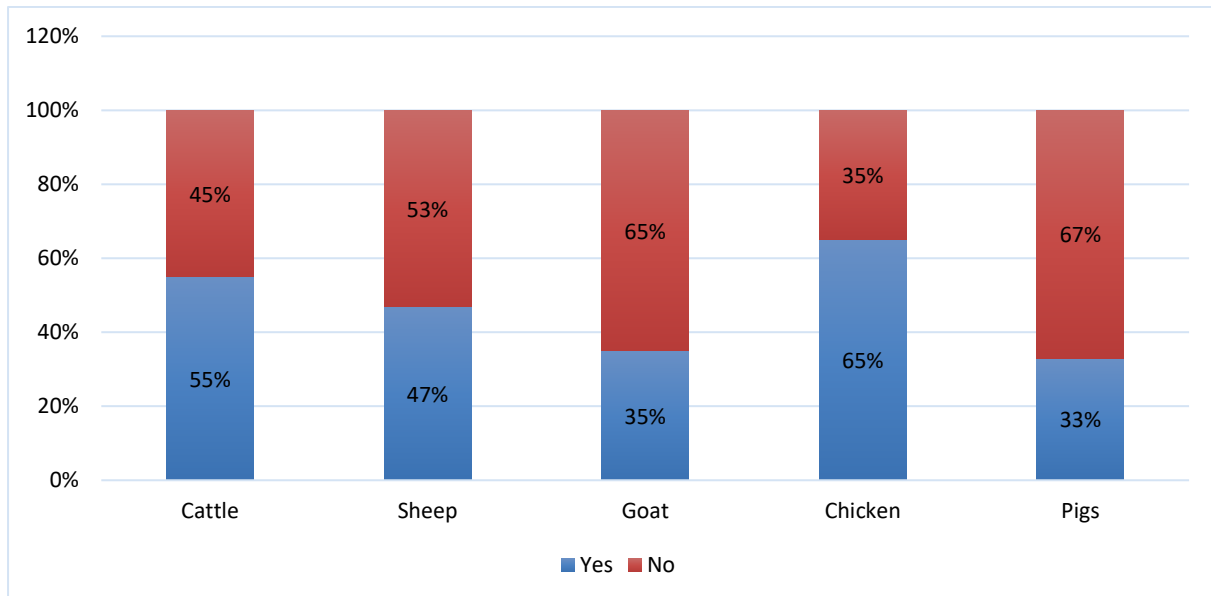


Figure 12: Livestock ownership

Source: Field survey 2022

The graph above illustrates the ownership of livestock by surveyed households. The main livestock that is kept by households of Mquma Local Municipality are cattle, sheep, goat, chicken and pigs. The most owned livestock was the indigenous chicken (65%), followed by cattle (55%), sheep (47%), (35%) of goat and (33%) of pigs. The respondents alluded that chicken farming is prevalent since they are generally inexpensive and easy to obtain. The results obtained are in consonance with the study by Zantsi (2016) whereby the author revealed that chicken was the most owned livestock by the households of Ndabakazi. According to Demissie and Legesse (2013), when compared to households with no livestock holdings, households with large livestock holdings have the ability to accumulate capital, overcome monetary limitations, and receive non-farm self-employment income. The lowest kept livestock in the study area are pigs; this might be caused by the fact that pork is not preferable in some cultures and religions even though it is a highly consumed meat in the world. Therefore, households with no or small livestock holdings are driven towards lower-paying income generating activities such as the Government support programmes, which are targeted at resource-poor households.

4.6.2.1 Livestock sales

Livestock sales is one of the most important parts of earning household income, which in turn improves household purchasing power and food security. Rural households in the research area were questioned if they sold their produce or did not. The results obtained are summarised in the chart below.

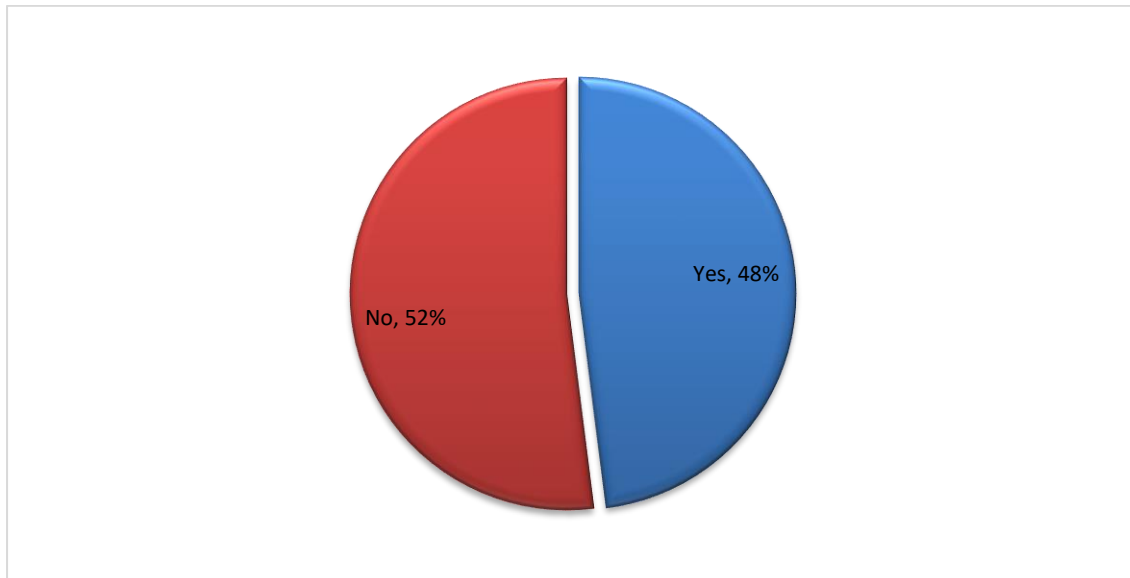


Figure 13: Livestock sales

Source: Field survey, 2022

The majority of the respondents (52%) in the study area outlined that they did not sell their livestock and the remaining households (48%) sold their livestock. The majority of surveyed households emphasised that selling of livestock occurs over a period of time and if it does, it usually happens when the household requires cash for some particular reasons. Some respondents mentioned that they were selling their livestock only to people performing cultural events in their surrounding area over a particular period of time. The results are similarly to Zantsi (2016) whereby the sales of livestock in Ndabakazi contributed a smaller portion of household income due to the long period of selling livestock. Households that were not selling livestock pointed the reasons of keeping livestock for ritual purposes, draft power, household consumption mostly in the case of chicken and small stock and other households had limited livestock to sell.

4.7 Access to credit

Credit is a crucial institutional function that helps households to fund the acquisition of inputs and, eventually, the adoption of new technology for their household livelihoods thus increasing their income and food security status (Christian, 2017). According to Ntwalle (2019), access to credit from different sources such as banks, government institutions, NGO's, own savings, cooperatives, public deposits (donations) and private money lenders helps households to invest in a variety of income generating activities. Therefore, households can be able to invest in enterprises they couldn't before as a result of lack of sustainable capital. Similarly, to the study by Ncube (2012) that the majority of households tend to source out credit for initial start-up capital in Hurungwe District, Zimbabwe.

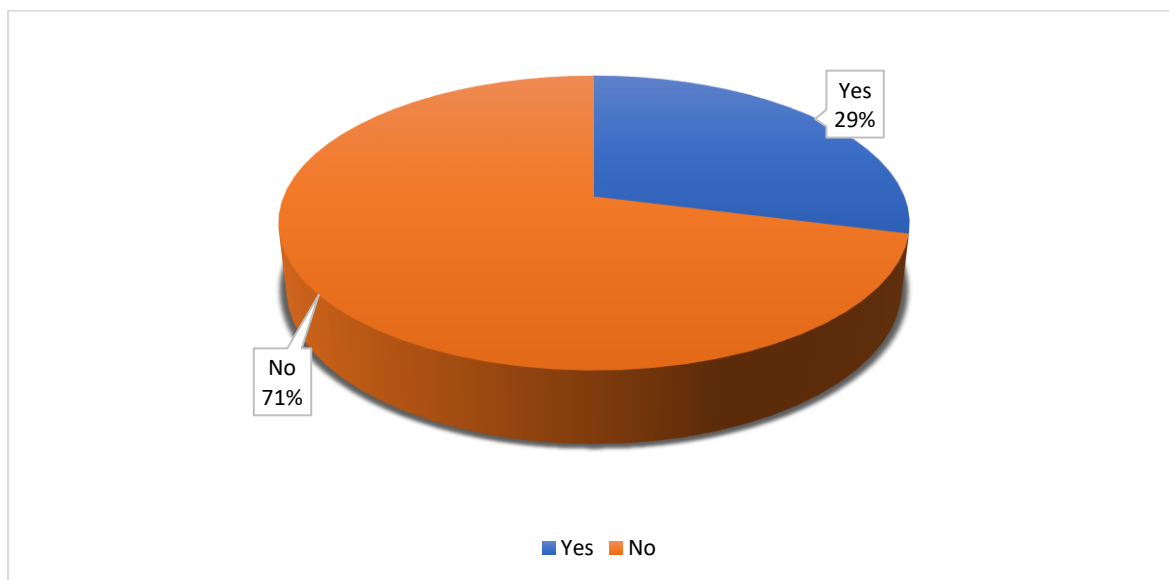


Figure 14: Access to credit

Source: Field survey, 2022

The above chart demonstrates that (71%) of the respondents in the study area had no access to institutional credit and only (29%) of the respondents that had access to credit. The households that did not access credit highlighted the reasons of high interest rates, unavailability of credit institution, poor credit score, some could not even get the credit while they applied and others did not want credit at all. Christian (2017) pointed that some households may lack access to credit due to problems associated with household's high interest rates, poor credit score as well as problem of repayment and down payment. Therefore, in the absence of institutional credit, the household's savings and/or assets are frequently the primary source of funds (Ncube, 2012). Those households that had access to credit managed to improve enterprise productions and

marketing so as to be able to generate more revenue that further ensures the sustainability of the enterprise.

4.7.1 Sources of credit

Sources of credit assist households in overcoming financial constraints and allows them to purchase production inputs and labour for improved enterprise production which in turn contributes to their livelihoods. There are various types of lenders who played an important role in lending households of Mngquma Local Municipality. These sources of credit include banks, government institutions, NGO's, own savings, public deposits (e-g- donations) and private money lenders. The results obtained are shown in the graph below.

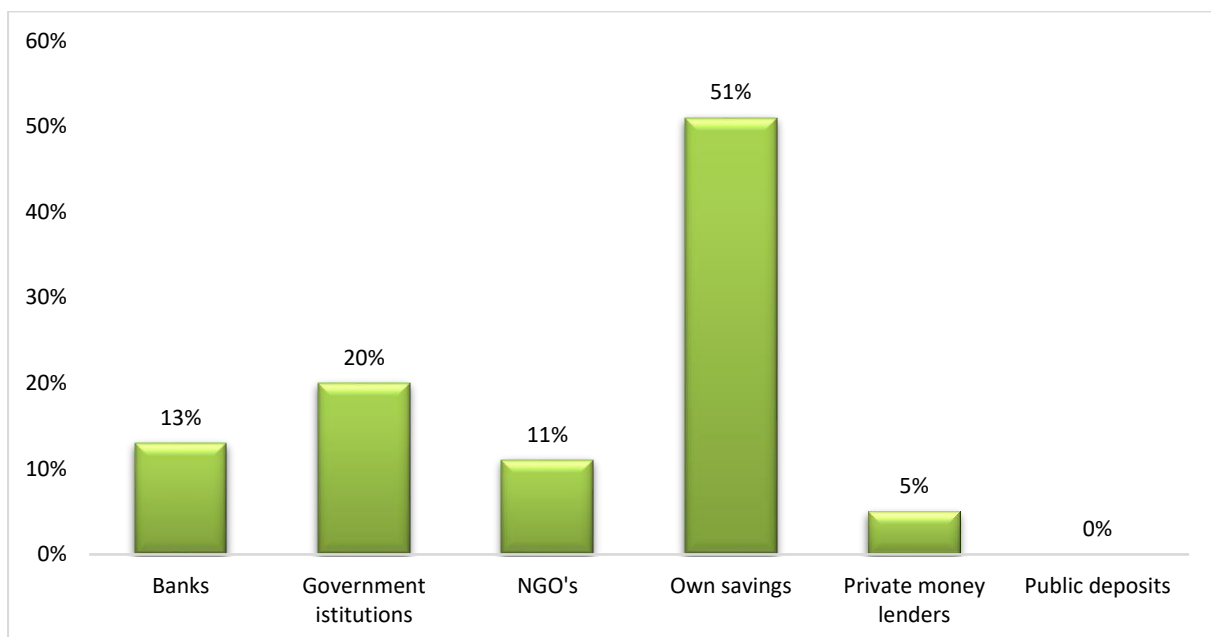


Figure 15: Sources of credit

Source: Field survey, 2022

The results in the graph above indicates that the majority of household's main source of credit in the study area were their own savings (51%), followed by credit received from government institutions (20%), (13%) received from banks, (11%) from National Government Organisation and (5%) obtained credit from private local money lenders. The results obtained are in consonance with Ncube (2012) where the author revealed that personal savings and/or assets are frequently the principal source of cash for households when institutional credit is unavailable. On the other hand, government institutions and NGO's such as Mngquma Local Municipality, DRDAR, Eastern Cape Development Corporation (ECDC), Eastern Cape Rural Development Agency (ECRDA), Small Enterprise Development Agency (SEDA), National Youth and Development Agency (NYDA) and other entities offer credit support to enterprises

so as to boost their production thus improving household livelihood. However, some households pointed that they experience some difficulties in accessing credit from government institution due to high application requirements which in turn resulted to application rejection. Some households highlighted that due to high rate of interest rates from banks, they opted to their personal savings for the operations of their enterprises. Consequently, banks offer a variety of consumer credit services, including credit cards, mortgages and personal loans.

4.7.2 Credit received by households

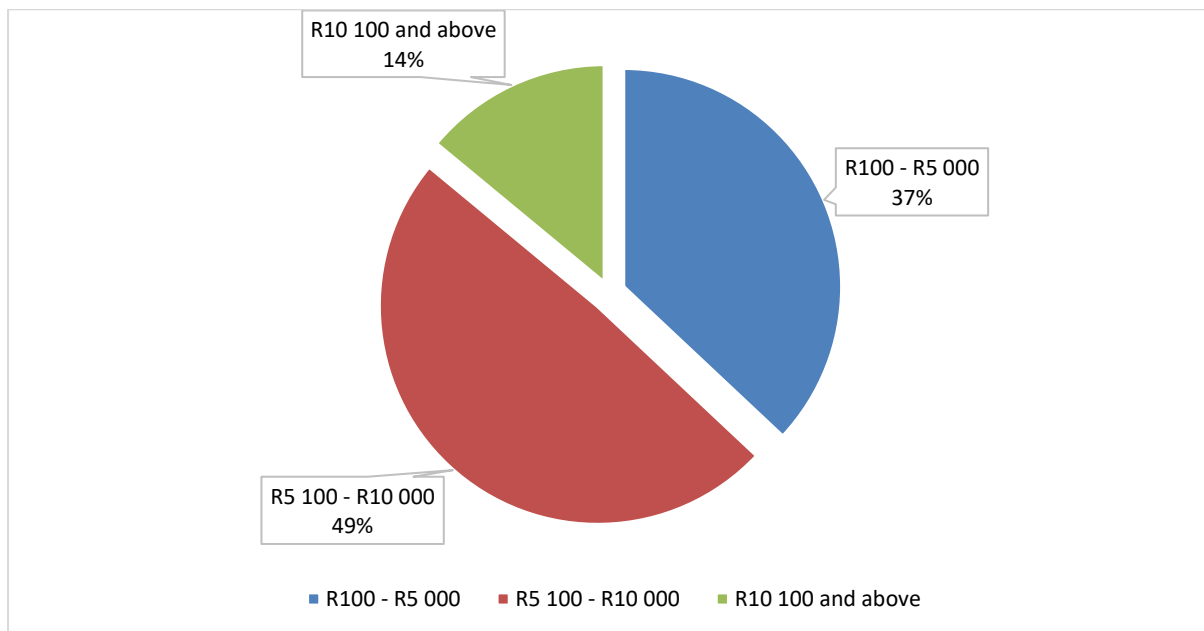


Figure 16: Credit received by households

Source: Field survey, 2022

The above chart illustrates the credit received by households in various credit institutions in the study area. The results indicate that (49%) of the surveyed households received between R5 100 – R10 000 of credit from various credit institutions as well as personal savings, (37%) had access to R100 – R5000 and (14%) had access to R10 100. The credit received by households in the study area is important for their participation on self-employment whether in farm, off farm or the non-farm sectors. Furthermore, the credit received enhances the employment of additional labour and production inputs so as to boost up enterprise production thereby improving household's livelihood.

4.8 Access to extension services

Agricultural extension services are the most common public sector support for knowledge distribution and learning in South Africa. Extension services are important because they assist in giving education and training to farmers, which helps to enhance agriculture by allowing farmers to evaluate new production techniques and the use of new agricultural inputs and practices to boost agricultural production. (Agbugba, Christian and Obi, 2020). Furthermore, these services play a critical role in providing farmers with the knowledge, abilities and practices they need to optimize and boost productivity.

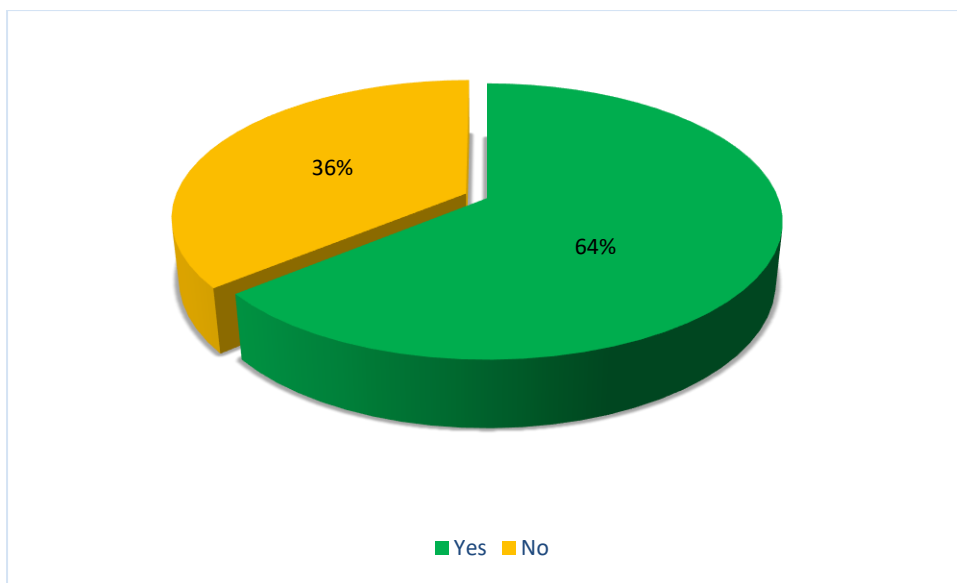


Figure 17: Access to extension services
Source: Field survey, 2022

Results from the chart above indicates that (64%) of the surveyed households had access to extension services and (36%) had no access to extension services. The results obtained are similar to the study by Mdiya and Mdoda (2021) whereby the majority (80%) of the respondents had access to extension services. The availability of extension officers was also assessed and the households who had access to extension services said they had access to a government extension officer who comes at least once/twice a month and once during the production season but limited during the marketing season. Those households with no access to extension services indicated that government extension officers were never available when they were needed. The households further highlighted the problems of instability in the delivery of extension services, lack of digital contacting devices, communication problems and poor knowledge regarding improved agricultural technologies by government extension officers.

The unavailability of government extension officers had bad implication on the yield production of the households in the study area.

4.8.1 Services provided by extension officers

Services provided by government extension officers to households encourages them to adopt new and improved farming methods so as to improve yield and livestock production (Mdiya and Mdoda, 2021). Personal engagement with households on their farms is the most effective technique. Therefore, the services provided by extension officers to households in the study area are planting and harvesting, marketing, record keeping, farm management, and livestock improvement. The obtained results are illustrated in the graph below.

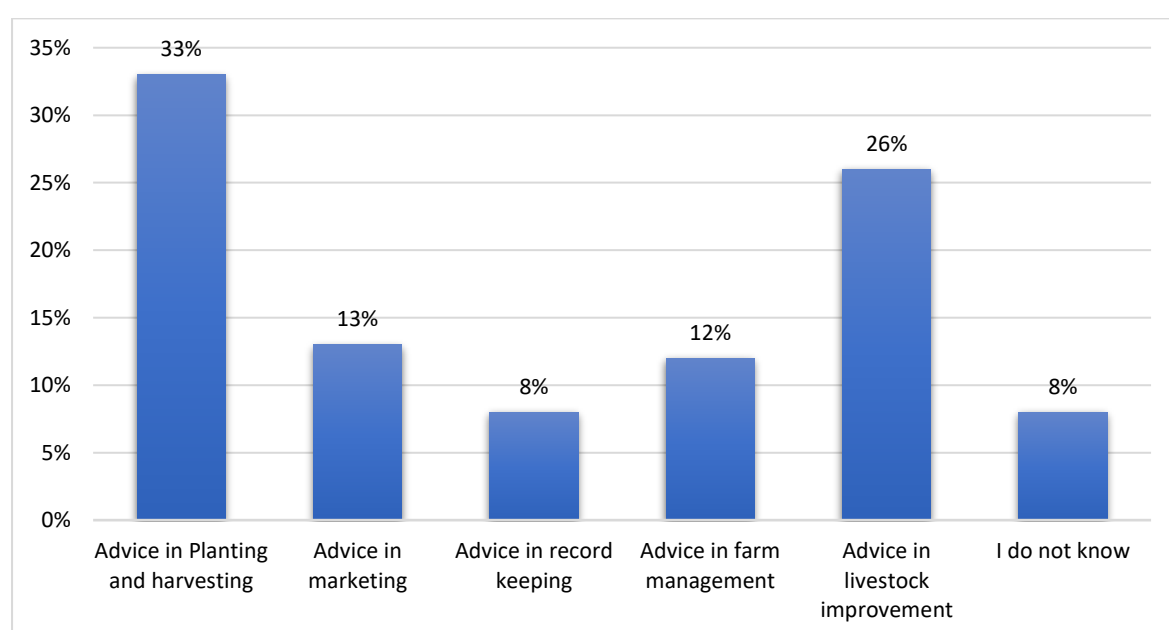


Figure 18: Services provided by extension officers.

Source: Field survey, 2022

The above graph shows services that government extension officers provided to surveyed households in the study area. The results indicate that the major service provide by extension officers to households was on planting and harvesting (33%), followed (26%) advice in livestock improvement, (13%) advice in marketing, (12%) advice in farm management, (8%) advice in record keeping and another (8%) had no idea of the services provided by extension officers. The surveyed households mentioned that the services of extension officers help them to improve their yield and livestock production which in turn improves their food security status. Households that had no idea about the services provided by government extension officers highlighted that the officers were not available when they were needed. More so, the unavailability of extension officers discourages households productive capacity.

4.9 Access to market information

Market information is critical for developing and rural households market involvement. Therefore, households who are willing to offer their produce benefit from the availability of market information. In the study area, households were asked whether they have access to market information or not. As a result, households who are better informed are more inclined to engage in marketing activities, as seen by the large number of households who have access to market information in the below chart.

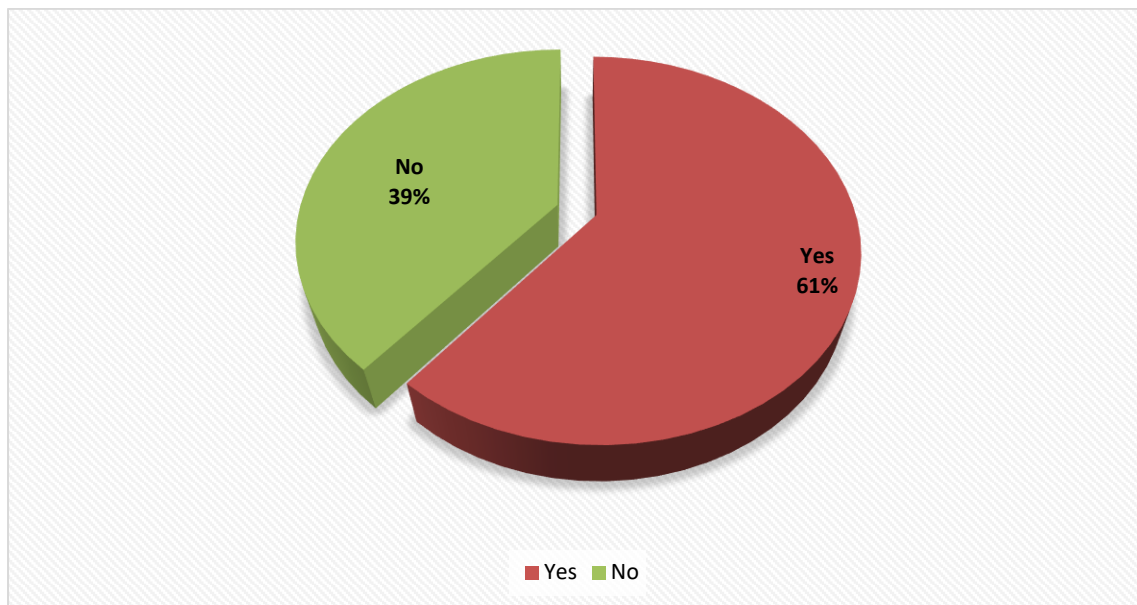


Figure 19: Access to market information
Source: Field survey, 2022

The chart above indicates that the majority of households (61%) in the study area had access to market information while (39%) of the respondents had no access to market information. The results are in consonance with the study by Christian et al., (2020) where the majority of respondents had access to market information on their study. According to Asfaw et al., (2017) households who have access to market and business-related information are more likely to engage in non-farm activities. Consequently, produce waste and low prices are the outcome of households' lack of access to market information (Mtolo, 2016).

4.9.1 Sources of market information

Marketing information can be obtained from a range of internal and external sources. The sources of market information used by households on Mnquma Local Municipality were buyers, co-businesses, extension officers, co-farmers, media and friends as illustrated in the chart below.

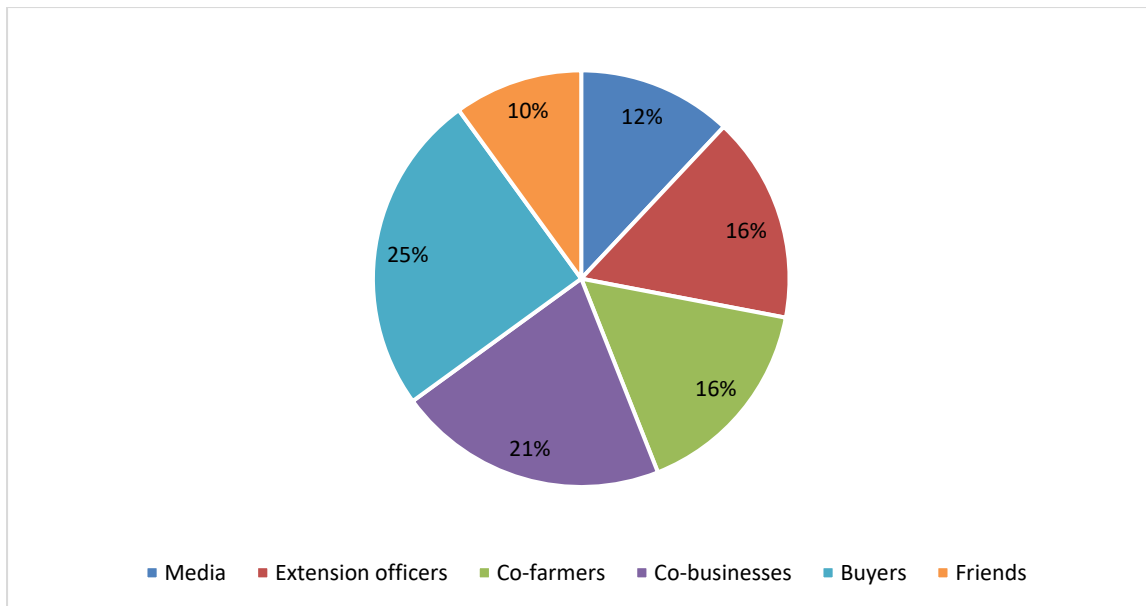


Figure 20: Sources of market information

Source: Field survey, 2022

The above chart illustrates the sources of market information used by surveyed households in the study area. The results indicate that buyers (25%) were major source of market information used by surveyed households, followed by co-businesses (21%), extension officers (16%), co-farmers (16%), media (12%) and friends (10%). The accessibility of reliable sources of market information allows households to market their produce more effectively. Consequently, households that are in remote areas find it difficult to market their produce due to the serious lack of reliable market facilities (Asfaw et al., 2017).

4.10 Non-farm income diversification activities

Non-farm income diversification activities play a crucial role towards rural household's food security and poverty alleviation. Furthermore, households participate in a variety of non-farm income activities, which are mostly dependent on the sort of resources available in the area (Asfaw et al., 2017). The graph below shows various non-farm income diversification activities that rural households in Mnquma Local Municipality engage in.

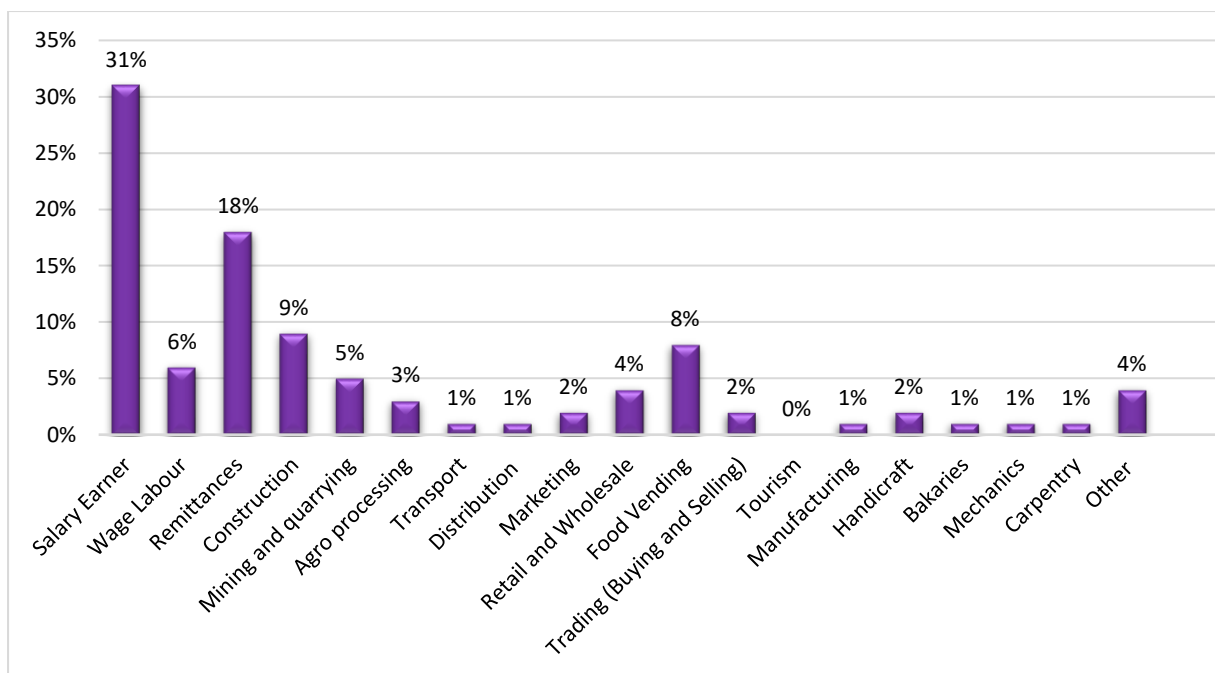


Figure 21: Non-farm income generating activities.

Source: Field survey, 2022

The above graph indicates that the majority (31%) of the surveyed households were salary earners who were employed, followed by (18%) who were into remittances, while (9%) were in construction, (8%) were in food vending and (5%) were in mining and quarrying. Nanda et al., (2019) in their study also showed that the vast number households were also involved in non-farm activities, especially in the job market and government services. Some households indicated that they participate in various non-farm income activities such as shoe repairs, brick laying, welding and events management which is illustrated by (Other, 4%) in the graph. The results are in line with Mathebula et al., (2017) whereby rural households in their study received the majority of non-farm income from social transfers and remittances. According to Mretie (2019), the more the household's income diversification, the greater the contribution of non-farm income generating activities to total household income. Furthermore, households that participate in non-farm income activities are more resilient and food secure than those who rely primarily on subsistence farming.

On the other hand, Adem (2018) reported that in Ethiopia rural households that participates in non-farm income activities invest their non-farm income and profit into their farm production so as to improve their productivity thus improving their household food security. The findings of the study strongly show that non-farm income diversification is pivotal for the surveyed households livelihood.

4.10.1 Motives of starting non-farm income activities

Rural households participate in numerous non-farm income diversification activities for a variety of reasons driven by both push and pull influences. The motives to participate in non-farm income activities is driven by the desire to increase household income so as to become more food secure, educate children, asset accumulation and improving the household's standard of living (Rahman and Mishra, 2020). The graph below shows the motives of participating in the non-farm sector by rural household in Mnquma Local Municipality.

Table 6: Motives of starting non-farm income activities (%)

Motives of starting non-farm income activities	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Higher returns in non-farm sector	19	41	10	24	6
To generate income for household basic needs e- g- food and clothes	58	25	11	4	2
Higher salaries and wages in the non-farm sector	15	40	24	12	9
Accessible infrastructure in the non-farm sector	29	37	21	9	4
Unstable returns from agriculture	36	31	11	8	14
Lack of capital for farming	38	35	7	14	6
Lack of land for farming	16	29	14	32	9
Response to drought in agriculture	13	37	25	14	11
Generate income to support agricultural work	24	34	23	11	8
Market accessibility	30	28	14	9	19
Support from cooperatives and SMME's	16	29	17	27	11
Respond in employment opportunities in the non-farm sector	39	37	14	6	4
The credit market is efficient	10	27	19	25	19
Low farm productivity	21	31	26	11	11

Source: Field survey 2022

The results obtained indicates that the majority (58%) of surveyed households strongly agreed that the motive to engage in non-farm income activities was mainly to generate income for household basic needs such as food, water, shelter and clothing. Some households highlighted that they are pushed to the non-farm sector by the decline in farm income which is affected by agro-climatic conditions, leading to decline in farm produce. On the other hand, some households indicated that they are pulled into the non-farm sector by the high returns which are higher and less risky than in the agricultural sector. Lack of start-up capital for farming and production inputs were also outlined as the reasons that households in the study area engage in non-farm income generating activities. The results are in line with Nanda et al., (2019) whereby respondents were engaged in non-farm income activities to improve household's standard of living, thereby food security.

4.10.2 Rural enterprise dependence on infrastructure

Infrastructure is important in the spread of contemporary technologies because easy access to transportation and communication systems encourage product marketing. In the study area, roads, electricity, water, sanitation, shelter, telephone, and computer are the major infrastructures identified to serve the respondents. Therefore, below is the table which shows household enterprise dependence on these infrastructures in Mnquma Local Municipality. Households were asked to what extent they depend on available rural infrastructure for the operation of their rural enterprises and the results are presented in Table 7.

Table 7: Rural household perceptions enterprise dependence on infrastructure (%)

INFRASTRUCTURE	Highly dependent	Dependent	Neutral	Independent	Highly independent
Roads	28	41	9	13	9
Electricity	32	38	9	11	10
Water and Sanitation	27	26	14	18	15
Shelter	30	39	13	11	7
Telephone	11	21	14	32	22
Computer	14	18	10	19	39

Source: Field survey 2022

The results reveal that the majority of respondents were served by roads, electricity and shelter which allows them to fairly engage into income generating activities. However, the respondents were not satisfied by the state of infrastructure as they are dilapidated and there's a need for revitalisation. The respondents further emphasised the improved access to quality rural infrastructure so as to be able to expand their participation in income activities thus improving food security.

4.10.3 Challenges faced by rural household enterprises in doing business

Rural households' participation in income generating activities is constrained by various factors which in turn makes it difficult to alleviate poverty and improve the standard of living. These factors include among others lack infrastructure, lack of productive assets, government regulations, job insecurity, lack of awareness and trainings, access to the market, high competition from other enterprises and inadequate access to credit. The results are illustrated in the graph below. Convert graph and present information in a table as indicated above

Table 8: Challenges faced by rural household enterprises (%)

Problems of participating in the non-farm sector	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of Infrastructure	25	40	10	10	15
Access to marketing	19	42	13	17	9
Lack of production assets (e-g- Land, capital etc.)	36	32	17	9	6
Government regulations	42	30	10	12	6
High competition from other enterprises	30	39	13	11	7
Job insecurity	28	40	20	8	4
Inadequate access to credit	24	35	20	12	9
Lack of awareness and training	42	33	15	6	4

Source: Field survey 2022

The results obtained illustrates that government regulations (42%), lack of income diversification awareness and training (42%), access to market (42%), lack of infrastructure (40%), high competition from other enterprises (39%), inadequate access to credit (35%) and lack of productive assets (36%) are among the constraints that were faced by households in the study area. These factors thereby limit the participation of the households in income generating activities. As a result of these limitations, the majority of respondents engage in activities with minimal entry barriers in terms of technical skills and capital/equipment. The lack of access to credit implies the majority of respondents were unable to obtain credit to invest in a much more profitable income activity. Similarly, to Adem (2018) whereby the respondents highlighted the lack of initial start-up capital as a constraint of participating in income generating activities.

4.10.4 Perceptions of income diversification on food security

Income diversification is critical for households' food security as it allows the acquisition of productive resources including land, labour, and equipment (Zereyesus et al., 2017, Nguyen, 2019). Furthermore, income diversification can also enhance access to sanitation facilities and equipment for household, thereby improving food security. Below is the graph which illustrates the perceptions of income diversification effects on food security.

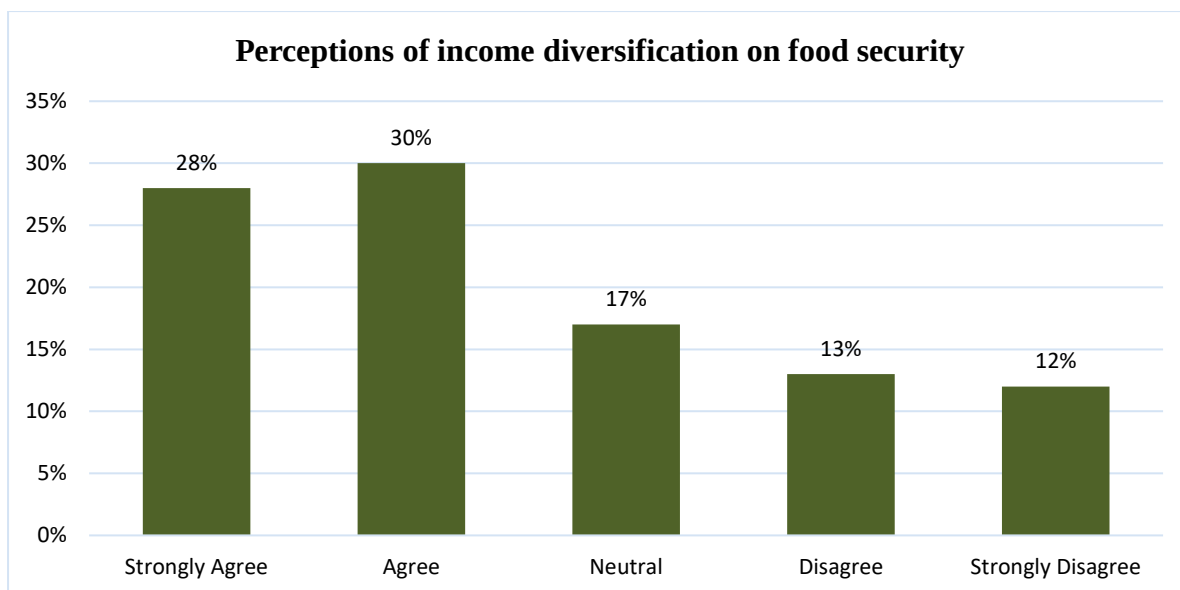


Figure 22: Perceptions of income diversification on food security

Source: Field survey 2022

The results illustrate that the majority (30%) of respondents agreed that income diversification was an essential component of food security, (28%) strongly agreed and the least (12%) strongly disagreed that income diversification contributes towards food security. The results are in line with the literature which states that income diversification improves the standard of living of rural households thereby food security. This is in consonance with Imai et al., (2019) that income diversification improves household food security by increasing consumption per capita, reducing poverty and vulnerability. Furthermore, income diversification allows households to secure food, water and shelter and send their children to productive schools which in turn improve food and nutritional security.

4.10.5 Perceptions of income diversification on poverty alleviation

Income diversification accounts for a large portion of total income and is thus critical for purchasing power and poverty alleviation Zereyesus et al., (2017). Below is the graph which shows the perceptions of income diversification on poverty alleviation.

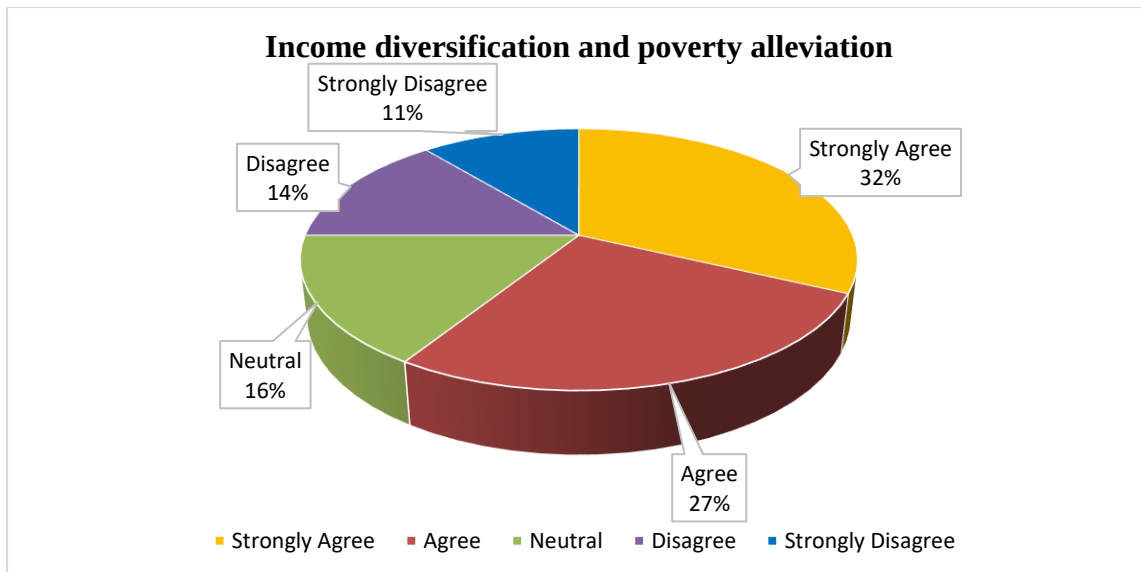


Figure 23: Perceptions of income diversification on poverty alleviation

Source: Field survey 2022

The above chart illustrates household perceptions of income diversification on households' poverty alleviation in the study area. The results indicate that the majority of surveyed households (32%) strongly agreed that income diversification is the essential component of poverty alleviation, followed by (27%) agreed and the least (11%) strongly disagreed. Similarly, to the study by Sinyolo and Mudhara, (2018) whereby income from self-employment and wage employment through public works programmes improves food security and alleviate poverty of rural households in KwaZulu Natal, South Africa.

4.10.6 Interventions for effective contribution of income diversification to food security and poverty alleviation

When the households were asked about the interventions for effective contribution of income diversification to food security and poverty alleviation, they further highlighted various processes and programmes to be implemented. Government subsidies to businesses, skills trainings and development, work related subsidies, provision of additional income, government incentives, awareness campaign, public investments and donations and access to markets were the interventions indicated by household for effective contribution of income diversification to poverty alleviation. These interventions further increase the participation of households to multiple income generating activities which in turn improves households' food security thereby alleviating household poverty. Furthermore, Eshetu and Mekonnen, (2016) mentioned that to alleviate rural poverty, authorities must remove entrance obstacles to various income enterprises and expand income diversification opportunities in rural areas.

4.11 Income diversification activities and their contribution on rural households' income

This section provides different income diversification activities that households in the study area engage to and their contribution on households' income. One-way ANOVA analysis was used to analyse the significant differences between households' income diversification activities and their contribution to households' income. To better understand the link between households' income diversification and their contributions to households' income, households were divided into three different groups of farming, non-farming and both farm and non-farming. Consequently, one-way ANOVA was used to compare the continuous variable means across all income diversification activities of households in the study area.

Table 9: Description of one-way ANOVA (Analysis of Variance)

Household income diversification Activities	Summary of household income		
	Mean	Std. Dev.	Freq.
Farm	8005.5882	6398.4607	68
Non-Farm	9115.7895	5896.5319	133
Both Farm and Non-farm	9008.264	6388.9565	197
Total	8872.8844	6227.3479	398

Source: Results generated from field survey, 2022

Bartlett's test for equal variances: $\chi^2(2) = 1.1159$ Prob> $\chi^2 = 0.572$

Table 10: One-ANOVA (Analysis of Variance)

Source	SS	df	MS	F	Prob > F
Between groups	62607703.8	2	31303851.9	0.81	0.4472*
Within groups	1.5333e+10	395	38817715.6		
Total	1.5396e+10	397	38779862.3		

Notes: ***, ** and * means significant at 1%, 5% and 10% significant levels, respectively

Source: Results generated from field survey, 2022

The tables above show the analysis of ANOVA statistics from the collected data to achieve the first objective. The mean difference shows that income diversification is preferable in households of Mquma Local Municipality than participating in only one income generating activity. The standard deviation in this table gives an idea of what is the average amount of scores within each sub sample.

Table 10 above depicts ANOVA results and for this table F statistic and the P value (significant level) are the important aspects to determine the validity of the results regarding ANOVA

analysis table. Household were categorized as farming (68), non-farming (133), and both farming and non-farming (197). The higher the F score is, the lower the significance level, in this case, the significant level is 0,4 which means the difference of income diversification activities is not statistically significant, the difference should be 0,05 and less for it to be statistically significant. Therefore, the results were statistically insignificant at 10% probability level. The reason for the insignificant difference was due to random sampling errors. The F-statistic was relatively large, meaning that there was a greater variation between the means of the groups relative to the variations within the groups. The P-value was greater than 0,05, meaning that there was no sufficient evidence to say that there was a statistically significant difference between the means of income diversification activities of the households. Therefore, considering that the p-value from the ANOVA results is more than 0.05, the study fails to reject the null hypothesis.

4.12 Constructing indices on rural constraints and infrastructure accessibility using Principal Component Analysis (PCA)

4.12.1 Rural constraints/challenges affecting the choice of participation of households in income diversification activities.

This section provides the results of the Principal Components Analysis (PCA) for the rural constraints affecting the choice of participation of households in income generating activities. According to Alinovi, Mane and Romano (2022), PCA is a method for building an index from a set of variables with informational similarities. This enables maximization of the information retained without utilizing variables that will lead to multicollinearity and without having to select one variable from a large number. Therefore, to produce indices on constraints hindering rural household engagement in income-generating activities, Principal Component Analysis was utilized. PCA is especially well suited since it may break down the data set into more manageable, uncorrelated dimensions or components. In order to minimize the amount of information loss, Principal Component Analysis (PCA) reduces the dimensionality of a data set with many connected variables into a smaller number of "dimensions," with the goal of optimizing the variance of a linear combination of the variables. In this study, rural households participate in various income generating activities for their food security status with the purposes of improving their livelihood. The results are represented by the analysis table below.

Principal components/correlation	Number of obs	=	398
	Number of comp.	=	8

Trace = 8

Rotation: (unrotated = principal)

Rho = 1.0000

Table 11: Analysis through Principal Component Analysis (Eigenvalues)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.5792	1.15975	0.3224	0.3224
Comp2	1.41945	.417293	0.1774	0.4998
Comp3	1.00216	.15604	0.1253	0.6251
Comp4	.84612	.104643	0.1058	0.7309
Comp5	.741477	.171371	0.0927	0.8236
Comp6	.570107	.0481078	0.0713	0.8948
Comp7	.521999	.20252	0.0652	0.9601
Comp8	.319479	.	0.0399	1.0000

Source: Results generated from the field survey, 2022

Table 11 illustrate the results of eight eigenvalues from the PCA Analysis. Numerous correlated variables were broken down into smaller, crucial components using Principal Component Analysis. According to Schreiber (2021), the only requirement of Kaiser's rule is to keep factors whose eigenvalues are greater than 1. Therefore, the model maintained three (3) variables with Eigenvalues greater than one. The results indicate that the three (3) variables that were preserved in the model described 62.51% of the variance. Lack of infrastructure, with an Eigenvalue of 2.5792 was ranked first, followed by access to markets, with an Eigenvalue of 1.41945, and lack of productive assets, with an Eigenvalue of 1.00216. Furthermore, lack of infrastructure expressed the greatest proportion, with 32% of the cumulative percentage in the data, access to markets at 49% and lack of productive assets at 62%. These are the cumulative percentages for the variables that were elucidated.

Table 12: Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Unexplained
Lack of infrastructure	0.4126	0.1203	-0.2996	-0.2547	-0.4527	0.3538	0.5738	0.0361	0
Access to markets	0.3114	0.2105	0.4771	0.5646	-0.2964	-0.3990	0.2478	-0.0617	0
Lack of productive assets	0.3684	0.1948	-0.4105	-0.1303	0.5362	-0.5622	0.1925	-0.0100	0
Government regulations	0.4334	0.1390	0.0395	-0.3656	-0.3847	-0.2095	-0.6661	0.1487	0
High competition from other enterprises	0.2579	0.1276	0.6856	-0.4245	0.4237	0.2613	0.1329	-0.0375	0
Job Insecurity	0.3875	-0.5462	-0.0555	0.0976	0.0387	0.0882	-0.1286	-0.7163	0

Inadequate access to credit	0.3239	-0.6131	0.0357	0.1944	0.1382	0.0590	0.0307	0.6757	0
Lack of awareness and training	0.2960	0.4398	-0.1951	0.4880	0.2675	0.5254	-0.3058	0.0404	0

Source: Results generated from the field survey 2022

Table 12 encapsulates the results of the principal components (Eigenvectors) with variables as factors affecting the choice of rural households' participation in income diversification activities. Principal Component 1 shows that government regulations (0.4334) have a greater influence on rural households' decision to participate in income diversification activities than does lack of infrastructure (0.4126). Principal Component 2 depicts that lack of access to credit (-0.6131) has a greater negative impact on households' choice to engage in income diversification activities than does job insecurity (-0.5462). Moreover, Principal Component 3 demonstrates how households' decisions to engage in income diversification activities are most significantly influenced by high competition from other enterprises (0.6856) and less by the accessibility of the market (0.4771). The findings allowed for the definition of each of the eight components in terms of the variables that each component is most firmly associated with.

When constructing the indices, the study began by selecting rural constraints variables such as lack of markets, lack of productive assets, government regulations, high competition from other enterprises, job insecurity, inadequate access to credit and lack of awareness and training. Secondly, PCA was applied to generate eigenvalues and eigenvectors for the rural constraints variables and arrange the data to minimize dimensionality while preserving as much information as feasible in the overall fluctuation of these variables. Lastly, the interpretation of PCA eigenvalues and eigenvectors whereby the variables with the eigenvalue greater than 1 signifies that Principal Components explain more variation than any one of the original variables.

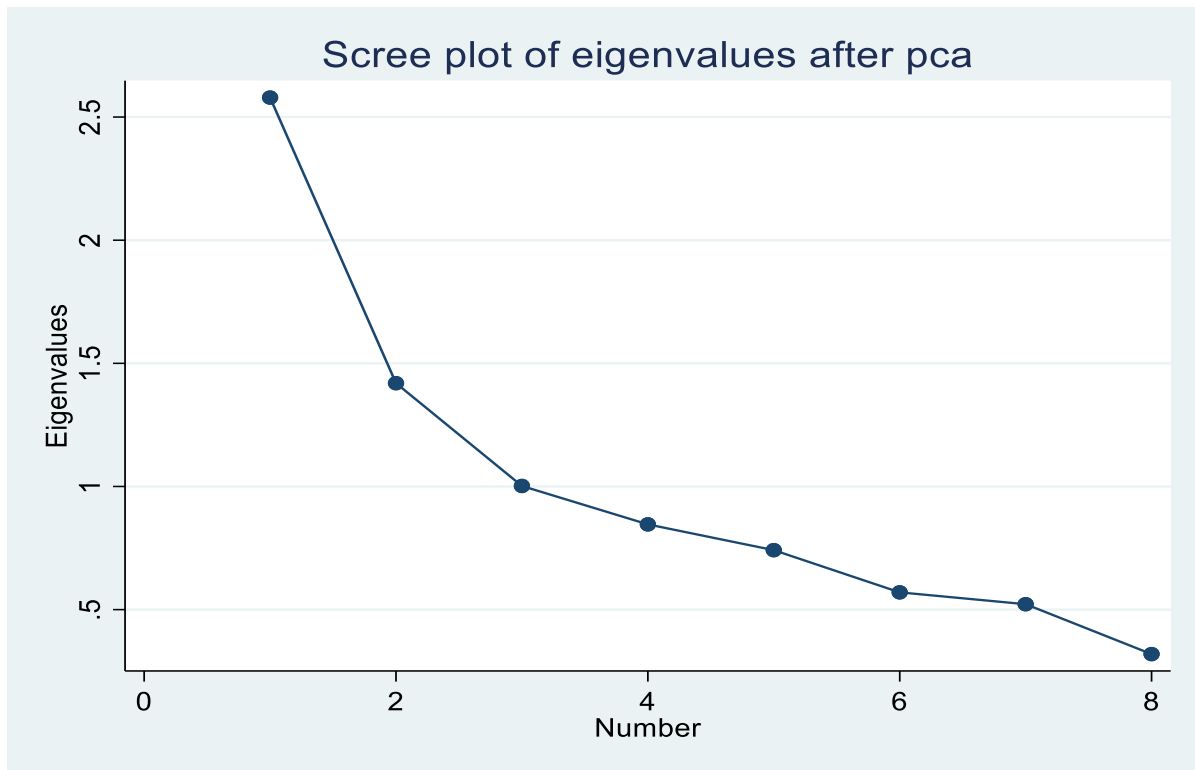


Figure 24: Scree plot of eigenvalues after PCA

Source: Results generated from the field survey, 2022

The Scree Plot of eigenvalues after PCA shown in Figure 26 is generated through the graphing of the principal components in relation to their respective eigenvalues. As a result, it represents the rate of variation in the eigenvalue magnitudes for the principal components schematically. This method enhances in identifying a clear break in the slope of a plot showing the proportion of variance explained by each component. Figure 26 illustrates that it is unclear whether maintaining two or three primary components is preferable. However, if the study decides to retain just two principal components, the original data set's overall variability is reduced from 62.51% to 49.98%. Since one of the objectives of PCA is to preserve as much of the variability of the original data set while reducing the dimensions, the study determines that the three principal components are the most effective way to characterize the data matrix.

4.12.2 Infrastructure accessibility by rural households

This section provides the in-depth analysis of infrastructure accessibility by rural households in the study area through the use of the Principal Component Analysis. According to Adem et al., (2018); Aloba Loison and Bigneat, (2017) and Asfaw et al., (2017), access to economic infrastructure determines the level of participation of rural households to various income generating activities and thus their food security status. Therefore, access to infrastructure for manufacturing/production as well as marketing is one of the key factors of income



Number of obs = 398

Trace = 6

Rho = 1.0000



University of Fort Hare
six eigenvalues from the PCA Analy
Together in Excellence



Shelter	-0.0298	0.6970	-0.0227	0.1020	-0.6986	0.1196	0
Telephone	0.6734	0.0274	-0.1677	-0.1407	0.1031	0.6980	0
Computer	0.6740	0.0548	-0.1633	-0.1205	-0.1062	-0.7002	0

Source: Results generated from the field survey, 2022

Table 14 illustrates the results of the Eigenvectors of the infrastructure accessibility by rural households. The PCA's eigenvectors indicate a significant positive impact of infrastructure accessibility on rural households' participation in income diversification activities. Thus, having access to physical infrastructure such as roads electricity as well as water and sanitation enhances participation of households in variety of income diversification activities. Principal component 1 depicts that access to computer (0.6740) has almost equal representation as access to telephone (0.6734). Principal component 2 illustrates that access to shelter (0.6970) has a greater positive impact on household choice to engage in income generating activities than electricity (0.6944). Principal component 3 demonstrates that household's participation in income generating activities is most significantly influenced by roads infrastructure (0.8581) and less by water and sanitation (0.4549). The results made it possible to define each of the six components in terms of the variables it is most strongly connected with. Figure 25 below shows the scree plot that is produced when the principal components are plotted against each of their individual eigenvalues.

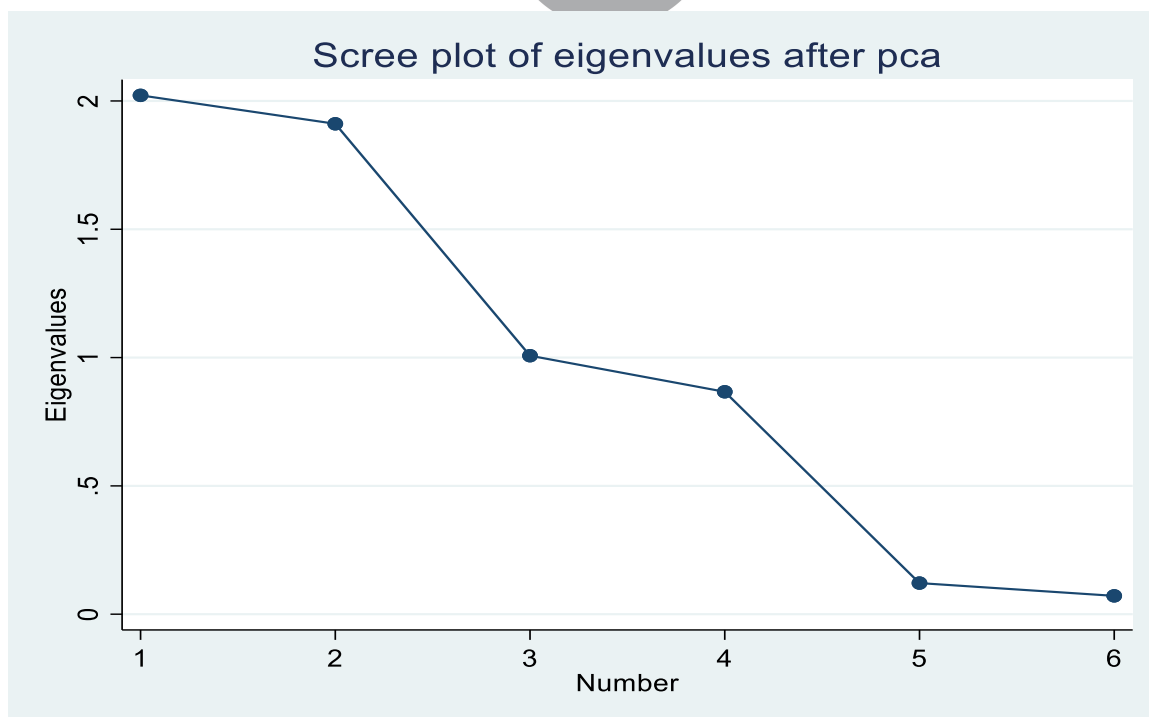


Figure 25: Scree plot of eigenvalues after PCA

Source: Results generated from the field survey, 2022

The Scree Plot of eigenvalues following PCA represented by Figure 25 shows that it is ambiguous whether keeping two or three principal components is desirable. However, if the study decides to retain only two principal components, the overall variability of the original data set decreases from 82.34% to 65.55%. The study identifies the three principal components as the most effective method for describing the data matrix, as PCA aims to maintain as much of the data variability while minimizing dimensions.

PCA indices were generated for rural constraints and infrastructure accessibility in order to maximize information without choosing one variable over another or producing multicollinearity. The rural constraints indices indicated that lack of infrastructure, access to markets and lack of productive assets positively influence the choice of rural households' participation in income diversification activities. On the other hand, indices on infrastructure accessibility illustrated that roads, electricity as well as water and sanitation have positive impact on the choice of rural household participation in income diversification activities.

4.12.3 Multinomial Logistic Regression (MLR) on factors affecting the choice of participation of rural households in income generating activities

This section demonstrates the results from the Multinomial Logistic Regression analysis of the factors affecting the choice of participation of rural households in farm, non-farm and both farm and non-farm income diversification activities. The objective is well suited for multinomial logistic regression because of its exceptional ability to predict income diversification and identify variations in income-generating activities among households. A multinomial logistic regression model is used since the study's dependent variable is polychotomous and the categorical dependent outcome has more than two levels. The assumption is that household heads choose income diversification activities (farm, non-farm, or combination of both farm and non-farm income diversification activities) if the perceived utility or net benefit is significantly greater than without it. While utility is not instantly observed, households' behaviours are observed through the choices they make. The decision of rural households to engage in income diversification activities is influenced by a number of variables, which makes it challenging to reduce poverty and further improve the standard of living. In this study, rural households participate in different income generating activities for their food security status with the purposes of improving their livelihood. Therefore, rural households obtain certain level of utility from each income generating activity. The results are presented in Table 15 below.

Multinomial logistic regression

Number of obs = 398

LR chi2(22) = 406.52

Prob > chi2 = 0.0000

Log likelihood = -201.21615

Pseudo R2 = 0.5025

Table 15: Factors affecting the choice of participation in rural households' income generating activities

Households' income generating activities	Coef.	Std. Err.	z	P>z	[95% Conf.]	Interval
Farming Activities						
Gender	.8588464	.5393496	1.59	0.111	-.1982594	1.915952
Age	-.0142941	.0322331	-0.44	0.657	-.0774699	.0488816
Marital status	-.2977533	.5269928	-0.57	0.572	-1.33064	.7351337
Number of years spent in school	.1504243	.0744334	2.02	0.043**	.0045375	.2963112
Employment status	-1.793651	.6925078	-2.59	0.010**	-3.150942	-.4363608
Household income	-.0000669	.0000402	-1.67	0.095*	-.0001457	.0000118
Household size	.0245414	.1057037	0.23	0.816	-.1826341	.2317168
Landownership	-19.44102	970.1191	-0.02	0.984	-1920.84	1881.958
Extension services	.5703701	.7130726	0.80	0.424	-.8272265	1.967967
Rural constraints	1.270632	.173248	7.33	0.000***	.9310724	1.610192
Infrastructure accessibility	.2914541	.1812069	1.61	0.108	-.0637048	.6466131
_cons	16.47922	970.1222	0.02	0.986	-1884.925	1917.884
Non-farming activities						
Gender	1.7403835	.3565933	2.08	0.038**	.0414734	1.439294
Age	-.0671682	.0211057	-3.18	0.001***	-.1085346	-.0258017
Marital status	-.2031271	.3562397	-0.57	0.569	-.901344	.4950899
Number of years spent in school	.0272167	.0444062	0.61	0.540	-.0598179	.1142513
Employment status	-2.065883	.5601806	-3.69	0.000***	-3.163816	-.9679489
Household income	-1.34e-06	.0000249	-0.05	0.957	-.0000502	.0000475
Household size	-.113924	.0760547	-1.50	0.134	-.2629886	.0351405
Landownership	-18.33771	970.119	-0.02	0.985	-1919.736	1883.061
Extension services	-2.705631	.353683	-7.65	0.000***	-3.398837	-2.012425
Rural constraints	-.0382266	.1521331	-0.25	0.802	-.3364021	.2599488
Infrastructure accessibility	-.2505081	.1194493	-2.10	0.036**	-.4846244	-.0163918
_cons	24.12375	970.1205	0.02	0.980	-1877.277	1925.525
Farming and Non-farming activities	(Base outcome)					

Notes: ***, ** and * means significant at 1%, 5% and 10% significant levels, respectively

Source: Results generated from field survey, 2022

The above table illustrates the results for the factors affecting the choice of participating in rural households' income diversification activities. If P-value is less than alpha (0.05), then the null hypothesis will be rejected and the parameter estimate is considered significant at that

alpha level. The Chi-square statistics show a very significant likelihood ratio test statistic (significance=0.0000), indicating a good explanatory power of the model. The results indicate significant relationship of rural constraints ($p=0.000$), employment status (0.010) and number of years spent in school ($p=0.043$) to the choice of rural households' participation in farming activities. On the other hand, the results illustrate a significant relationship of extension services ($p=0.000$), employment status ($p=0.000$), age ($p=0.001$), infrastructure accessibility ($p=0.036$) and gender ($p=0.036$) to the choice of rural households' participation in non-farm income activities.

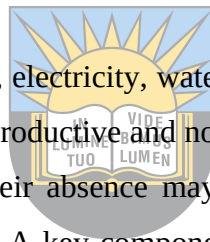
Rural constraints were found with positive correlation with the choice of the household to participate in farming activities and significant at 1 percent probability level. The significance of rural constraints implies that participation of rural households in farming activities is influenced by factors such as access to markets, government regulations, high competition from other enterprises, job insecurity and lack of awareness and training. The aforementioned constraints not only prevent diversification into profitable farming activities, but they also force diversification into low-wage, low-return farming enterprises. Similarly, to the study by Ewebiyi and Meludu (2013) who indicated that rural households faced significant obstacles to diversifying their sources of income, making it difficult for them to live sustainably in the countryside.

The number of years spent in school by the household head was found to be positively correlated with the choice of participation in farming activities and significant at less than 5 percent probability level. The likelihood of a household head engaging in high-reward farming activities increases with the number of years spent in school. Educational attainment proves one of the most important determinants of farm income (Weltin et al., 2017). Averagely well-educated households live comparatively better lives by diversifying their sources of farm income.

The coefficient of the age of household head implies that younger households were more likely than older households to engage in non-farming activities. As a result, younger households depend mostly on variety of income generating activities to maintain their household's livelihood, whereas older households are stuck with farming because they lack skills to engage in other income generating activities. This variable was found with negative correlation with the choice of household participation in non-farming activities and significant at 1 percent probability level. This is in consonance with the study by Zerai and Gebreegziabher (2011)

who indicated that households that were headed by younger individuals tend to participate in non-farming activities.

Gender of the household head was found with positive correlation with the choice of household participation in non-farm income activities and significant at less than 5 percent probability level. The significance of the gender of the household head implies that male headed households were keen to participate variety of non-farming income activities than female headed households. This can be attributed to the fact that female headed households are likely to be single-parent households who may not multi-task, whereas the male headed are the normal nuclear families or it's extension, who have the opportunity to do more. This suggests that households headed by men make a major contribution to the growth of non-farm income activities by looking for alternative sources of income to support the family. The results are consistent with the observations of Alemu and Adesina (2017) who reported that male-headed households are more inclined to diversify their sources of income in order to improve households' livelihood.



Access to infrastructure such as roads, electricity, water and sanitation, shelter, telephone and computer can be viewed as essential productive and non-productive resources for engaging in farm and non-farm activities, and their absence may act as a barrier to entry for income diversification (Alobo-Loison, 2015). A key component of rural households' engagement in non-farm income activities and the reduction of household poverty is better access to basic infrastructure. The choice of the household to engage in non-farm income activities was found to be correlated with infrastructure accessibility, and this correlation was significant at the less than 5 percent probability level. Infrastructure such as better access and electrical supplies, is crucial and investing in useful machinery can increase incomes (Alobo-Loison, 2015).

Credit is a crucial institutional function that helps households to fund the acquisition of inputs and, eventually, the adoption of new technology for their household livelihoods thus increasing their income and food security status (Christian, 2017). Access to credit enhances the level of participation in income diversification activities, which is indicated by the linear link between credit received and income diversification. The results obtained for the access to credit is similar Mretie (2019) who explored that access to credit was positive and significant at 1 percent probability level. According to Ntwalle (2019), access to credit from different sources such as banks, government institutions, NGO's, own savings, cooperatives, public deposits (donations) and private money lenders helps households to invest in a variety of income

generating activities. Therefore, households can be able to invest in enterprises they couldn't before as a result of lack of sustainable capital.

The results illustrated in the above table are in consonance with the study by Eshetu and Mekonnen (2016) whereby the participation of households in income diversification activities was affected by a variety of factors such as age, gender, number of years in school, household size, land size, livestock ownership, distance to the market and access to credit.

Table 16: Marginal effects of factors affecting the choice of participation in rural households' income generating activities

Delta-method						
	dy/dx	Std. Err.	z	P>z	[95% Conf.]	Interval
Gender						
predict						
Farming activities	.0329708	.0279651	1.18	0.238	-.0218397	.0877814
Non-farming activities	.0688255	.0385162	1.79	0.074*	-.0066649	.144316
Farming and non-farming activities	-.1017964	.0414802	-2.45	0.014***	-.183096	-.0204967
Age						
predict						
Farming activities	.0003801	.0016375	0.23	0.816	-.0028294	.0035895
Non-farming activities	-.0073214	.0022214	-3.30	0.001***	-.0116753	-.0029675
Farming and non-farming activities	.0069413	.0024263	2.86	0.004***	.0021859	.0116966
Marital status						
predict						
Farming activities	-.0123376	.0275492	-0.45	0.654	-.0663332	.0416579
Non-farming activities	-.0178304	.0394763	-0.45	0.652	-.0952026	.0595417
Farming and non-farming activities	.0301681	.0419144	0.72	0.472	-.0519827	.1123188
Number of years spent in school						
predict						
Farming activities	.0075099	.0038195	1.97	0.049**	.0000237	.0149961
Non-farming activities	.0005172	.0049067	0.11	0.916	-.0090997	.0101341
Farming and non-farming activities	-.0080271	.0053563	-1.50	0.134	-.0185253	.002471
Employment status						
predict						
Farming activities	-.0600575	.0345453	-1.74	0.082*	-.1277651	.0076501
Non-farming activities	-.2022513	.0569982	-3.55	0.000***	-.3139657	-.0905368
Farming and non-farming activities	.2623087	.0594681	4.41	0.000***	.1457534	.3788641
Household income						
predict						
Farming activities	-3.52e-06	2.10e-06	-1.68	0.094*	-7.65e-06	6.00e-07

Non-farming activities	9.83e-07	2.76e-06	0.36	0.722	-4.43e-06	6.40e-06
Farming and non-farming activities	2.54e-06	2.98e-06	0.85	0.393	-3.29e-06	8.38e-06
Household size						
predict						
Farming activities	.0032298	.0055319	0.58	0.559	-.0076125	.014072
Non-farming activities	-.013244	.008391	-1.58	0.114	-.0296901	.0032021
Farming and non-farming activities	.0100142	.008653	1.16	0.247	-.0069453	.0269737
Land ownership						
predict						
Farming activities	-.7196064	34.97654	-0.02	0.984	-69.27237	67.83316
Non-farming activities	-1.735665	92.81036	-0.02	0.985	-183.6406	180.1693
Farming and non-farming activities	2.455272	127.7867	0.02	0.985	-248.0021	252.9127
Extension services						
predict						
Farming activities	.0760442	.0326217	2.33	0.020**	.012107	.1399815
Non-farming activities	-.3143253	.0246564	-12.75	0.000***	-.362651	-.2659996
Farming and non-farming activities	.2382811	.0356931	6.68	0.000***	.168324	.3082382
Rural Constraints						
predict						
Farming activities	.067977	.0071439	9.52	0.000***	.0539753	.0819787
Non-farming activities	-.0258231	.0149293	-1.73	0.084*	-.0550839	.0034377
Farming and non-farming activities	-.0421539	.0146207	-2.88	0.004***	-.07081	-.0134979
Infrastructure accessibility						
predict						
Farming activities	.0196863	.0092296	2.13	0.033**	.0015967	.037776
Non-farming activities	-.0331442	.0128815	-2.57	0.010***	-.0583915	-.0078969
Farming and non-farming activities	.0134578	.0140037	0.96	0.337	-.0139889	.0409046

Notes: ***, ** and * means significant at 1%, 5% and 10% significant levels, respectively

Source: Results generated from field survey, 2022

The marginal effects show the direction of the dependent variable as well as the actual likelihood and magnitude of the change that will result from adjustments to the independent variables. The choice to participate in both farming and non-farming income activities was significantly influenced by the gender of the head of the household at the 1 percent probability level. The marginal effect results of the model indicate that there was a 10.1% decrease in the probability that a male-headed household would choose to diversify their income through both farming and non-farming activities when all other parameters were held constant. The findings suggest that male headed households are more likely than female headed households to diversify their sources of income into both farming and non-farming livelihoods.

The age of the household head positively and significantly influenced whether or not the members chose to participate in both farming and non-farming activities, at a 1% probability level. The marginal effects suggest that, provided all other variables remain unchanged, there would be a 0.6% increase in the likelihood that household heads would positively diversify by choosing both farming and non-farming economic activities as their age increased. As the head of the household ages, it's likely because they're more educated, have better access to technology and are looking for alternative farming and non-farming sources of income. Conversely, the age of the head of the household significantly and negatively influenced the decision of the members to participate in non-farming activities at a 1% probability level. The marginal effects indicate that as household heads get older, there would be a 0.7% decrease in the likelihood that they would diversify through choosing non-farming economic activities, assuming all other factors remain the same.

The choice of a household head to engage in farming activities is positively and significantly correlated with years spent in school at 5% significance level. According to the marginal effect, the decision of a household head to engage in farming activities increased by 0.7% for households' heads with more years of educational backgrounds. This suggested that households with a higher level of education are more likely to engage in farming activities. The outcomes are in line with the research conducted by Eshetu and Mekonnen (2016), which discovered that income diversification is positively impacted by the household's level of education. Higher educated households are better equipped to carry out variety of income diversification activities than less educated or illiterate households because they possess more knowledge and skills.

The marginal effects for employment status illustrates that there will be a 26% increase in the likelihood that the household head to choose to participate in both farming and non-farming activities, thus keeping the influence of other variables constant. Subsequently, the likelihood that the head of the household will choose to engage in non-farming activities will decrease by 20%. The head of the farming household engages in income diversification by generating income from a variety of non-farm activities, including trading, self-employment, salaried employment, and other non-farm sources.

Extension services have a positive and significant effect on households' decision to participate in both farming and non-farming activities at the 1% probability level, with a negative impact only on non-farming activities. In contrast, extension services have a positive impact on the

household head's likelihood of only participating in farming activities at the 5% probability level. This indicates that households receiving extension services are more likely to participate in a variety of the combination of income diversification activities. The model's marginal effect results demonstrated that, assuming all other variables remained unchanged, households receiving extension services were more likely than households not to receive them to diversify into farming only and both farming and non-farming activities by 7% and 23%, respectively.

Rural constraints such as lack of infrastructure, access to markets, lack of productive assets, government regulations, high competition from other enterprises, job insecurity, inadequate access to credit and lack of awareness and training positively and significantly influence the choice of household participation in farming activities at 1% probability level. On the other hand, the rural constraints have a negative and significant effect on the choice of household participation in both farming and non-farming income activities at 1% probability level. The results of the marginal effects indicate that, while maintaining other variables unchanged, household participation in farming activities increased by 6% whereas participation in both farming and non-farming income activities decreased by 4%. Rural constraints force diversification toward low-return activities in addition to impeding various types of income diversification (Ewebiyi and Meludu, 2013).

Accessibility to infrastructure such as roads, electricity, water and sanitation, shelter, telephone and computer has a negative and significant effect on the choice of household participation in non-farm income activities at 1% probability level. Subsequently, the choice of household participation in farming activities is positively and significantly influenced by infrastructure accessibility at 5% probability level. The results of the marginal effects suggest that, when all other variables are held constant, households' participation in non-farm income activities declines by 3%. Conversely, there is a 1% increase in household engagement in farming activities. Participating in high-return income diversification activities is particularly difficult for households with inadequate infrastructural access (Alobo-Loison, 2015).

4.13 Effects of income generating activities on rural households' food security

This section provides an empirical analysis of effects of income diversification choice decision on household food security. The study employed the use of the National Poverty Lines to derive household food security status and Binary Logistic Regression Model to estimate the effects of income diversification choice decision on household food security.. The results are further interpreted and discussed.

4.13.1 National Poverty Lines for measuring household food security status.

The issue of poverty and food insecurity remains on the agenda of the South African government and is of paramount importance to policymakers, academics and development practitioners (Servaas van der Berg, Leila Patel & Grace Bridgman, 2022). To determine whether a household has access to food or not, the poverty line method was employed. The respondents' level of food security was assessed by dividing their monthly income by the size of their household (i.e., the number of people) to determine their household per capita income. Households that fall on or above the upper bound poverty line (R1 417) are considered food secure while those that fall below the upper bound poverty line are food insecure. A household that is food secure obtained a value of 1, whereas a household that is food insecure earned a value of 0. This section provides the results as presented in the table below.

Table 17: Analysis through National Poverty Line

Poverty Lines	2022 Line			Food security scores
	Values	Frequency	Percentage	
Food Poverty Line	R663	151	38%	0
Lower Bound Poverty Line	R945	60	15%	0
Upper Bound Poverty Line	R1 417	187	47%	1

Source: Results generated from field survey 2022

The results indicate that the majority of respondents (47%) falls within the Upper bound poverty line, followed by food poverty line (38%) and lower bound poverty line (15%). The results suggest that households that falls within the Upper bound poverty line can purchase sufficient amount of both food and non-food items, thereby food security (Statistics South Africa, 2022). On the other hand, households with incomes below the upper limit poverty line are considered to be food insecure. In accordance with the findings, households falling within the food poverty line (38%) and lower bound poverty line (15%) together account for 53% of the total, surpassing the upper bound poverty line share and indicating a higher level of food insecurity. In line with the World Bank (2016) projections, 389 million of the 904 million people in Sub- Saharan Africa (SSA), or 43%, are anticipated to live below the poverty line of US\$1.90 per day (equivalent to R35.14 per day). Elshahoryi et al., (2020) argued that more than half of participants (61.2%) with monthly incomes above the poverty line reported being food secure.

Broadbent, Combrink and Smart (2020) further argued that South Africa is food secure at a national level but not at the household level, with individual and household food security relying predominately upon income. Consequently, the arrival of the coronavirus pandemic in South Africa as well as the lockdown implemented on 27 March 2020 have ushered in a period of economic uncertainty in an already weak economy. It is thus no surprise that food insecurity, poverty and household hunger rose, with sobering consequences for households who experience this reality (Servaas van der Berg, Leila Patel & Grace Bridgman, 2022). Thus, a key concern in tackling food insecurity, poverty, and income inequality is access to employment.

4.13.2 Binary Logistic Regression on effects of income diversification activities on rural households' food security

This sub-section provides the results of the Binary Logistic Regression for the effects of non-farm income activities on rural households' food security using the data collected from 398 households in Mnquma Local Municipality. The results are presented in the table below.

Logistic regression

Number of obs = 398

LR chi2(8) = 415.25

Prob > chi2 = 0.0000

Log likelihood = -67.924988

Pseudo R2 = 0.7535

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Table 18: Effects of income diversification activities on rural households' food security

Food Security	Odds Ratio	Std. Err.	z	P>z	[95% Conf.]	Interval
Age	1.008386	.0372726	0.23	0.821	.9379161	1.08415
Gender	.852889	.4727265	-0.29	0.774	.287807	2.527457
Employment status	1.00487	.6318869	0.01	0.994	.2929905	3.446405
Household income	1.000994	.0001232	8.08	0.000***	1.000753	1.001236
Household size	.2859819	.0596191	-6.00	0.000***	.1900585	.4303183
Household income generating activities	.9691643	.3188582	-0.10	0.924	.5085684	1.846909
Access to credits	2.404147	1.33889	1.58	0.115	.8070858	7.161476
Extension services	.5588359	.2972815	-1.09	0.274	.1970037	1.585237
cons	.4015958	.5580161	-0.66	0.511	.0263662	6.116896

Notes: ***, ** and * means significant at 1%, 5% and 10% significant levels, respectively

Source: Results generated from field survey, 2022

The Binary Logistic Regression results illustrates that households' income and household size are statistically significant at 1% probability level and impact on household food security. The coefficient of the household income implies that households are able to purchase enough food and basic needs for socio-economic survival. Access to food in a household is significantly

influenced by income. Household income gives households the chance to modernize their production by allowing them to purchase the essential supplies and lowers the risk of a food shortage at times of unplanned crop failures through purchasing. The results obtained are similar to the study by Sekhampu (2013) who explored a statistically significant relationship of household income to food security. Moreover, Maloma (2016) investigated the statistical significance of the association between household income and the degree of food security in South Africa.

The results illustrate that household size has a negative and significant relationship with household food security. The coefficient of outcomes of the regression shows that the likelihood of food security in the household decreases with the increase in the number of members. The likelihood of the household being food secure decreases as the number of members rises. This is explained by the possibility that there may not be enough food available to meet the growing household demand for food as a result of rising household sizes. The findings are consistent with the study conducted by Ogunniyi et al. (2021), which discovered that as smallholder maize producers in Nigeria increase in their household size, food security declines.



Table 19: Marginal effects of rural households food security

Delta-method						
	dy/dx	Std. Err.	z	P>z	[95% Conf.]	Interval
Age	.0004308	.001908	0.23	0.821	-.0033088	.0041704
Gender	-.0082091	.0285617	-0.29	0.774	-.0641889	.0477707
Employment status	.0002506	.0324393	0.01	0.994	-.0633293	.0638305
Household income	.0000513	1.76e-06	29.20	0.000***	.0000478	.0000547
Household size	-.06458	.0077204	-8.36	0.000***	-.0797117	-.0494483
Household income generating activities	-.0016158	.0169709	-0.10	0.924	-.0348781	.0316465
Access to credits	.0452533	.0282488	1.60	0.109	-.0101133	.1006199
Extension services	-.0300194	.0271874	-1.10	0.270	-.0833058	.023267

Notes: ***, ** and * means significant at 1%, 5% and 10% significant levels, respectively

Source: Results generated from field survey, 2022

Household income has a positive and significant impact on household food security at the 1% probability level. The marginal effects result show that an increase in household income triggers food security to increase by 0.005% while keeping other variables constant. A household's ability to increase its income diversification activities and overcome financial obstacles is facilitated by an adequate income, which ultimately leads to higher purchasing power and food security. Similar to the findings of the study by Fikire and Zegeye (2022),

which showed that the income of the head of the household's had a positive as well as significant influence on the status of food security. Therefore, household food security rises as monthly income levels rise.

The results indicate that household size has a significant and negative impact on household food security at 1% probability level. The coefficient of household size's marginal effects indicated that a larger household are more likely to endure food insecurity than a smaller household. This suggests that if a household increases by one member, the level of food security would decline by 6% since a larger household has an impact on the amount of food available to each member of the family. One probable explanation is that the need for food rises as family sizes increase. However, the current low levels of household crop production cannot meet this need, and as a result, the family eventually experiences food insecurity. In accordance with a study by Aboaba, Fadiji and Hussayn (2020), the food security status of bigger households declined by 2.48% among rural households in South-western Nigeria.

4.14 Concluding Remarks

This chapter gives an in-depth analysis of the income diversification and households' food security in rural parts of Mnquma Local Municipality in the Eastern Cape Province. The chapter presented the socio-economic and demographic characteristics of the households in the study area. Income diversification in the study area is mostly done by young adults as they are more energetic and have much capacity than older individuals. The major source of income of the household heads was salaries and wages (37%) among income from businesses, old age grant, pension, child support grant, remittances, sales of farm products as well as the combination of different sources of income. Households in the study area participated in variety of income diversification activities, in farm, non-farm and both farm and non-farm income generating activities. Crop and livestock production were identified as farm activities that households were engage to for livelihoods. While non-farm activities include among other remittances, construction, wage employment, food vending as well as mining and quarrying. Therefore, the study highlighted that the combination of both farm and non-farm income activities is the dominant strategy.

The participation of households in income diversification activities was identified to be affected by government regulations, limited awareness and trainings, access to markets, lack of infrastructure, high competition from other enterprises, lack of productive assets as well as the inadequate access to credit. The results of one-way analysis of variance (ANOVA)

indicated the mean difference of income diversification which is preferable in households than participating in only one income generating activity. The results indicated a statistical insignificant difference and therefore the study failed to reject the null hypothesis there is no significant difference.

The Principal Component Analysis (PCA) results on rural constraints indicated that three (3) variables with Eigenvalues higher than one were retained in the model. According to the findings, the three factors that were maintained in the model explained 62.51% of the variance. Lack of infrastructure, with an Eigenvalue of 2.5792 was ranked first, followed by access to markets, with an Eigenvalue of 1.41945, and lack of productive assets, with an Eigenvalue of 1.00216. Principal Component 1 demonstrates that government regulations (0.4334) have a larger impact than the lack of infrastructure (0.4126) on rural households' decision to engage in income diversification activities. Principal Component 2 demonstrates job insecurity (-0.5462) has less of a negative effect on households' decision to participate in income diversification activities than credit access (-0.6131). Principal Component 3 shows how the accessibility of the market (0.4771) has less of an impact on households' choices to participate in income diversification activities than does the level of competition from other businesses (0.6856). According to the Scree Plot of eigenvalues following PCA, the study concludes that the three principal components are the most useful way to describe the data matrix because one of PCA's goals is to preserve as much of the original data set's variability while reducing the dimensions.

The results of the Multinomial Logistic Regression model clearly demonstrate a significant relationship rural constraints, employment status and number of years spent in school to the choice of rural households to participation in farming activities. Conversely, the findings show a significant relationship between gender, age, employment status, extension service and infrastructure accessibility to the decision of rural households to engage in non-farm income activities. The likelihood ratio test statistic (0.0000) for the Chi-square statistics is highly significant, suggesting that the model has considerable explanatory power.

The model's marginal effect results show that, when all other factors were held constant, there was a 10.1% decrease in the likelihood that a male-headed household would decide to diversify their income through both farming and non-farming activities. As household heads age, there is a 0.6% chance that they will choose both farming and non-farming economic activity, assuming all other variables remain the same. The decision to engage in farming activities

increased by 0.7% among households headed by individuals with higher educational attainment. The employment status marginal effects show that, when other factors remain constant, there will be a 26% increase in the possibility that the head of the household will choose to engage in both farming and non-farming activities. Marginal effects for rural obstacles show that household engagement in farming activities increased by 6% while household participation in both farming and non-farming income activities declined by 4%, while other variables remained unchanged. The findings of the marginal effects on infrastructure accessibility indicate a 3% decrease in households' engagement in non-farm income activities when all other factors are maintained constant.

The poverty line approach was used to assess if a household had access to food or not. Households with incomes below the upper bound poverty line of R1 417 were deemed food insecure, while those with incomes above the line were considered food secure. The poverty line findings reveal that households within the food poverty line and lower bound poverty line account for 53% of the total, indicating a higher level of food insecurity.

The Binary Logistic Regression was used to analyse the effects of income diversification choice decision on rural household food security. The findings show that household income and household size have an impact on household food security and are statistically significant at the 1% probability level. According to the results of the marginal effects, food security increases by 0.005% when household income increases while other factors remain unchanged. The level of food security would, however, decrease by 6% if a household increased by one member because a larger household would affect the amount of food available to each member.

CHAPTER 5:

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This is the final chapter of the dissertation. This chapter entails a summary, conclusions and further provides recommendations based findings from the study. The first section provides the summary which briefly outlines the aims and findings of the research. Secondly, the conclusions are outlined based on the research findings as well as the synthesis of the literature review. Lastly, the recommendations are drawn so as to provide a meaningful basis for policy.

5.2 Summary

The study set to analyse non-farm income and households' food security in rural parts of Mnquma Local Municipality of the Eastern Cape Province. The detailed specific objectives of the study were to: identify and analyse various income diversification activities and their contribution on rural households' income in the study area, determine the factors affecting the choice of participation in income generating activities by rural households in the study area as well as examine the effects of income generating activities on rural households' food security in the study area.



In order to achieve the set objectives, a multi-stage random sampling technique was used to select a sample of 398 rural households. Primary data collection was done through the use of structured questionnaires consisting of both open-ended and closed-ended questions. Secondary data was also obtained from different relevant secondary sources. Pre-testing was also done to a sample of 20 rural households so as to determine questionnaire content validity. The data collected from questionnaires was analysed using Statistical Package for Social Sciences SPSS (25), STATA version 15. The data was analysed using one-way analysis of variance (ANOVA), Principal Component Analysis (PCA), Multinomial Logistic Regression (MLR), National Poverty Lines, Binary Logistic Regression and descriptive statistics such as mean, standard deviation, percentages and frequency of occurrence. The data collected for socio-economic and demographic characteristic of the households was analysed using Descriptive Statistics. One-way analysis of variance (ANOVA) was used to analyse and display data gathered on various income diversification activities. Principal Component Analysis was used to determine the rural constraints and infrastructure accessibility indices. The study employed a Multinomial Logistic Regression model to analyse factors affecting the income diversification choice decision of rural households in the study area. Household food security

status was determined using National Poverty Lines and Binary Logistic Regression was employed to examine the effects of income diversification choice decision on household food security in the study area.

The descriptive statistics of the socio-economic and demographic characteristics indicated that the majority of the household heads were males (51%) that were between the ages of 41 – 50 years. This is because the majority of households are more energetic and have the capacity to engage in non-farm income activities and agricultural production that will help improve household livelihood. The most observed marital status was (61%) of the married household heads. The majority (31%) of the household heads were formally employed. The results of the study also indicated that the majority (36%) of the household heads had spent 11 – 15 years in school. The average household size was 7 members. The major source of income for the household heads was salaries and wages (37%) among income from businesses (26%), old age grant (5%), pension (3%), child support grant (4%), remittances (18%), sales of farm products (7%) as well as the combination of different sources of income. The majority (38%) of rural households received a monthly income which ranges between R5 100 – R10 000 and the average monthly household income was R8 872, 88. The results further indicated that the combination of both farm and non-farm income generating activities contributes largely to surveyed households' income.

Rural households in the study area were producing both crops and livestock. The major crops that were mostly produced were maize, potatoes, cabbage and pumpkin respectively. The production inputs and implements that were mostly used by households in the study area were fertilizers, treated seeds, spades, fork spade and water. Cattle, sheep, chicken, goats and pigs were major livestock kept by households. The households indicated that the mostly kept livestock was the indigenous chicken (65%) since they are easy and inexpensive to rear. The majority of households further outlined that they faced challenges in crop and livestock production of limited access to production inputs and equipment (59%), lack of access to institutional credit facilities (57%), limited access to markets (54%), challenges of climate variability (53%) and (52%) lacked agricultural infrastructure. Only (29%) of households indicated that they had access to credit from formal and informal credit institutions and it was distributed as follows: banks (13%), National Government Organisations (11%), government institutions (20%), own savings (51%) as well as private money lenders (5%).

Extension and advisory services were provided by extension officers to assist in giving education and training so as to enhance agriculture by allowing farmers to evaluate new production techniques to boost agricultural production. Therefore, about (64%) of the households indicated that they had access to extension services from government and private agencies such as Ukhanyo Farmer Development (UFD) for agricultural support programmes. The support provided by extension officers were highlighted to be advice in planting and harvesting (33%), livestock improvement (26%), marketing (13%), farm management (12%) and records keeping (8%).

The households in the study area participated in a variety of non-farm income activities for their household livelihood and food security. The majority (31%) were salary earners, followed by (18%) who received remittances, (9%) in construction and (8%) in food vending and (5%) in mining and quarrying respectively. The major motive of participating in non-farm income activities were highlighted to generate income for household basic needs (58%) such as food, water, clothing and shelter, response to employment opportunities in the non-farm sector and the lack of capital for farming. The households further identified government regulations, limited awareness and trainings, access to markets, lack of infrastructure, high competition from other enterprises, inadequate access to credit and lack of productive assets as problems that limit participation in variety of income generating activities. However, the households revealed income diversification as a crucial and essential component of food security and poverty alleviation.

One- way analysis of variance (ANOVA) was used to identify and analyse various income diversification activities and their contribution to household income. ANOVA was used to compare the continuous variable means across all income diversification activities of the households. The results were statistically insignificant at 10% probability level. The F-statistic was relatively large, meaning that there was a greater variation between the means of the groups relative to the variations within the groups. Consequently, since the ANOVA results' p-value is greater than 0.05, the study is unable to rule out the null hypothesis.

The Principal Component Analysis (PCA) results for rural constraints and infrastructure accessibility indicated that three (3) variables with Eigenvalues higher than one were retained in the model. According to the findings, the three factors that were maintained for rural constraints and infrastructure accessibility in the model explained 62.51% and 82.34% of the variance respectively. Regarding rural constraints, principal component 1 shows that

government regulations (0.4334) have a greater impact on rural households' decision to engage in income diversification activities than the lack of infrastructure (0.4126). Principal component 2 shows that job insecurity (-0.5462) has a less significant impact on households' decision to engage in income diversification activities than credit access (-0.6131). Principal component 3 reveals that market accessibility (0.4771) has a lesser impact on households' income diversification choices than competition from other businesses (0.6856). According to the Scree Plot of eigenvalues following PCA, the study concludes that the three principal components are the most useful way to describe the data matrix because one of PCA's goals is to preserve as much of the original data set's variability while reducing the dimensions.

A Multinomial Logistic Regression model was used to determine the factors affecting the choice of participation of households in income generating activities. The likelihood ratio test statistic (0.0000) for the Chi-square statistics is highly significant, suggesting that the model has considerable explanatory power. The results of the Multinomial Logistic Regression model clearly demonstrate a significant correlation between the choice of rural households to participate in farming activities and the number of years spent in school, employment status of the household head and rural constraints. Conversely, the findings show a significant relationship between gender, age, employment status, extension service, and infrastructure accessibility and the decision of rural households to engage in non-farm income activities. The multinomial model's findings showed that the P-values of the identified variables were statistically significant when taken since they were less than 5% (0,05) probability level.

The model's marginal effect results show that, when all other factors were held constant, there was a 10.1% decrease in the likelihood that a male-headed household would decide to diversify their income through both farming and non-farming activities. As household heads age, there is a 0.6% chance that they will choose both farming and non-farming economic activity, assuming all other variables remain the same. The decision to engage in farming activities increased by 0.7% among households headed by individuals with higher educational attainment. The employment status marginal effects show that, when other factors remain constant, there will be a 26% increase in the possibility that the head of the household will choose to engage in both farming and non-farming activities. Marginal effects for rural obstacles show that household engagement in farming activities increased by 6% while household participation in both farming and non-farming income activities declined by 4%, while other variables remained unchanged. The findings of the marginal effects on infrastructure accessibility indicate a 3% decrease in households' engagement in non-farm

income activities when all other factors are maintained constant. The poverty line approach was used to assess if a household had access to food or not. Households with incomes below the upper bound poverty line of R1 417 were deemed food insecure, while those with incomes above the line were considered food secure. The poverty line findings reveal that households within the food poverty line and lower bound poverty line account for 53% of the total, indicating a higher level of food insecurity.

The Binary Logistic Regression was used to analyze the effects of income diversification choice decision on rural household food security. The findings show that household income and household size have an impact on household food security and are statistically significant at the 1% probability level. According to the results of the marginal effects, food security increases by 0.005% when household income increases while other factors remain unchanged. The level of food security would, however, decrease by 6% if a household increased by one member because a larger household would affect the amount of food available to each member.

5.3 Conclusion

Since the objectives of eradicating poverty, generating employment, and guaranteeing food security for all people can never be fully achieved, new research fields, as well as opportunities for policy and capacity improvement must be continuously pursued through academic study. The study sought to analyse the non-farm income and household food security in rural parts of Mnquma Local Municipality with three specific objectives: to identify and analyse various income diversification activities and their contributions to rural households' income; to determine the factors affecting the choice of participation in income generating activities by rural households and to examine the effects of income generating activities on rural households' food security in the study area.

Households in Mnquma Local Municipality engage themselves in a variety of income diversification activities so as to improve their livelihood and further achieve food security. Therefore, every household in Mnquma Local Municipality engages in multiple sources of income such as farm, non-farm and both farm and non-farm income activities. Crop and livestock production are the main farm income generating activities that households engage in to make living. Hence, farmers still depend on primary activities which generate low incomes; farmers do not participate in value chains. Although farming activities still exist, they are of very little relative significance and make up very little of the household income; a situation that could change if farmers engaged in the secondary activities such as processing. The non-farm

income generating activities that households participate in includes among others non-farm self and wage employment in construction, mining and quarrying, remittances, wholesale & retail, food vending, handicraft, mechanics, bakeries, shoe repairs and welding. Consequently, households of Mnquma Local Municipality tend to participate in both farm and non-farm activities so as to diversify their income sources thus contributing positively towards household food security.

The study analysed rural constraints and infrastructure accessibility indices, revealing three factors with higher Eigenvalues. These factors explained 62.51% and 82.34% of variance, respectively. Government regulations, job insecurity, and market accessibility were found to have a greater impact on rural households' income diversification decisions than infrastructure, credit access, and competition from other businesses. These findings were based on PCA's goal of preserving variability while reducing dimensions.

The findings of the study also indicated that the participation of households in income generating activities was affected by variety of factors such as age, gender, number of years spent in school, employment status, household income, household size, extension services, access to credit and land size. These factors determine the means of participation of households in various income generating activities. The model's marginal effect results show that factors such as gender, age, school years, employment status, extension services, rural constraints and infrastructure accessibility significantly influence households' income diversification choice decision. The study indicates that household income and size significantly influence household food security at the 1% probability level. The study revealed that, even when other factors stay the same, household income raises food security by 0.005%. Therefore, the study can conclude that income diversification is the essential component of increasing food security and poverty alleviation in Mnquma Local Municipality.

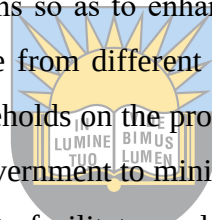
5.4 Recommendations

The study recommends policy action based on the major findings:

Firstly, the study found out that farm incomes remain very low in the study area even though the majority of respondents are youth. The study therefore recommends policies that create enabling environments for youth to engage agribusiness. Youth-led programmes should be implemented to support youth who want to engage in secondary agricultural activities such as processing. Government support has been found to be very instrumental for youth participation in agriculture. Moreover, there should be improvement of the knowledge of youth of

fundamental farming practices through the creation of new and the maintenance of current Agricultural Training Centres. In order to increase youth awareness of agriculture, agricultural science should also be required for secondary school students. However, Geza et al., (2023) found a mismatch between youth aspirations and current support, hence, the need for youth-led programmes.

A common cause of project abandonment in smallholder farming is a lack of funding. Provincial DRDAR ought to assist farmers, keep apprised on developments and offer financial support when needed. The provincial department of Agriculture should focus on improving the current agricultural extension service by increasing the number of extension personnel and providing them with technologically suitable tools. Government should establish rural infrastructure, including markets, roads, electricity, telecommunications, storage facilities, etc., as well as institutional improvements to lower entrance costs and other obstacles for underprivileged livelihood groups. Interventions that enables adequate access of households to credible markets and credit institutions so as to enhance households' capabilities to expand their enterprises and generate income from different sources. The credit institutions should ensure that they further educate households on the procedures, risks and perceptions of credit repayment. It is imperative for the government to minimize rules pertaining to business taxes, licenses, and trading permits in order to facilitate rural households' productive participation in income diversification activities.



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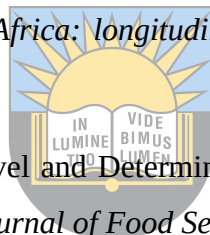
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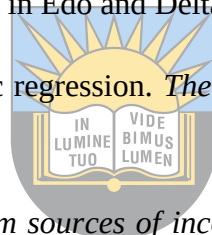
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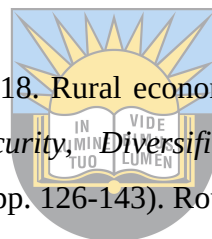
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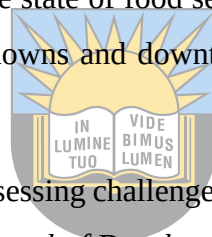
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APPENDIX 1: ETHICS CLEARANCE



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ETHICS CLEARANCE

REC-270710-028-RA Level 01

Project Number: MDL011SMVA01

Project title: Analysis of non-farm income and household food security in rural parts of Mnquma Local Municipality, Eastern Cape Province

Qualification: Masters of Agriculture: Agricultural Economics

Student name: Siphe Mvango

Registration number: 201405754

Supervisor: Mr S Mdletshe

Department: Agricultural Economics

Co-supervisor: Dr N Mujuru

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby grant ethics approval for MDL011SMVA01. This approval is valid for 12 months from the date of approval. Renewal of approval must be applied for BEFORE termination of this approval period. Renewal is subject to receipt of a satisfactory progress report. The approval covers the undertakings contained in the abovementioned project and research instrument(s). The research may commence as from the 23/11/21, using the reference number indicated above.

Note that should any other instruments be required or amendments become necessary, these require separate authorisation.

Please note that UREC must be informed immediately of:

- Any material changes in the conditions or undertakings mentioned in the document;
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research.

The student must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

UREC retains the right to:

Withdraw or amend this approval if

- Any unethical principal or practices are revealed or suspected;
- Relevant information has been withheld or misrepresented;
- Regulatory changes of whatsoever nature so require;
- The conditions contained in the Certificate have not been adhered to.

Request access to any information or data at any time during the course or after completion of the project.

Your compliance with Department of Health 2015 guidelines and any other applicable regulatory instruments and with UREC ethics requirements as contained in UREC policies and standard operating procedures, is implied.

UREC wishes you well in your research.

Yours sincerely

Dr N Taole-Mjimba

Chairperson: University Research Ethics Committee

23 November 2021



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APPENDIX 2: SURVEY QUESTIONNAIRE



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ANALYSIS OF NON-FARM INCOME AND HOUSEHOLD FOOD SECURITY IN RURAL PARTS OF MNQUMA LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

Enumerator: Mr. Mvango Siphe (Student No: 201405754) Cell #: 0717520991

Date of the Interview

Ward

INSTRUCTIONS: Please fill in the relevant information and mark with an “X” where possible.

SECTION ONE: DEMOGRAPHIC AND SOCIO-ECONOMIC DETAILS

1.1 Gender of the household head.

GENDER	Female	
	Male	

1.2 Age of the household head..... (Years)

1.3 Marital status of the household head

1. Single	2. Married	3. Divorced	4. Widowed	5. Separated	6. Other (Specify)

1.4 Number of years spent in school..... (Years)

1.5 What is your employment status? (Mark as appropriate)

Employment Status	Mark with “X”
Full time farmer	
Part-time farmer	
Formally employed	
Part-time employed	
Self employed	
Pensioner	

Unemployed	
Other (Specify)	

1.6 Sources of income

Source of income	Mark with "X"
Salaries/ Wages	
Income from a business	
Old age grant	
Pension	
Child support grant	
Remittances	
Sales of farm products	
Other (e.g. rental income etc.)	

1.7 Household monthly income (in Rands)

.....

1.7 Household composition, structure and occupation

Member of the household	Age	Gender	Years in school	Primary Occupation (e.g. studying, working, unemployed etc.)

1.8 Are there any members of the family that are in urban areas?

YES		NO	
-----	--	----	--

If your answer in 1.8 is "Yes", how many members of the family are in urban areas?

.....

1.9 Do you receive remittances from other family members?

YES		NO	
-----	--	----	--

SECTION TWO: LAND OWNERSHIP, FARMING AND PRODUCTION

2.1 How much land do you own?.....(Hectares)

2.2 Indicate the land tenure system in use and how it was acquired.

LAND TENURE SYSTEM		
Communal	Rent/Lease	Privately owned

HOW YOU ACQUIRED THE LAND				
Bought	Inherited	Resettled	Rent/lease	Other (Specify)

2.3 Household income generating activity

Farming	Non-Farming	Both farm and Non-farm

2.4 If your answer in 2.3 is “farming”, what farming activities do you practise?

Crop Production	Livestock production	Both Crop and Livestock	Poultry	Dairy	Other (Specify)

2.5 Do you produce crops?

YES		NO	
-----	--	----	--

2.6 If your answer in 2.5 is “Yes”, how do you cultivate your land?

Tractor	Animals	Hand	Other (Specify)

2.7 If your answer in 2.5 is “No”, please provide reasons?

.....

.....

.....

2.8 What crops did you produce in the previous year?

Crops Type	YES/NO	If Yes, Land under cultivation (ha)
Maize		
Cabbage		
Spinach		
Beans		
Peppers		
Potatoes		
Tomatoes		
Carrot		
Beetroot		
Onion		
Butternut		
Pumpkin		
Other (Specify)		

2.9 Indicate the production inputs and equipment that you use

Inputs and equipment	Mark with "X"
Treated seeds	
Fertilizer	
Pesticides	
Insecticides	
Water & Electricity	
Plough	
Planter	
Rake	
Fork spade	
Spade	
Yoke	
Other (Specify)	

2.10 Do you sell your crops?

YES		NO	
-----	--	----	--

2.11 What are your total harvested crops, quantity sold, quantity consumed/donated?

Crop Types	Total harvested	Quantity Sold	Where it is sold?	Quantity consumed/Donated
Maize				
Cabbage				
Spinach				
Beans				
Peppers				
Potatoes				
Tomatoes				
Carrot				
Beetroot				
Onion				
Butternut				
Pumpkin				
Other (Specify)				

2.12 If your answer in 2.10 is “Yes”, approximately how much income do you receive from the sales of your crops annually?.....

2.13 If your answer in 2.10 is “No”, please provide reasons for not selling

.....

2.14 What challenges do you face in producing your crops?

CHALLENGES	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Climate variability					
Lack of agricultural infrastructure					
Low level of farming skills					
Scarcity of water					
Soil degradation					
Limited access to production inputs and equipment					
Limited access to markets					
Lack of access to credit facilities					
Poor access to extension services					
Financial crisis					

Other (Specify)					
-----------------	--	--	--	--	--

2.15 What types of livestock do you have currently?

Livestock Type	Mark with "X"	Quantity
Cattle		
Sheep		
Goat		
Chicken		
Pigs		
Other (Specify)		

2.16 Do you sell your Livestock?

YES		NO	
-----	--	----	--

2.17 How many livestock were sold, where they were sold, quantity consumed/donated in the previous year?

Livestock Types	Quantity Sold	Where it is sold?	Quantity consumed/Donated
Cattle			
Sheep			
Goat			
Chicken			
Pigs			
Other (Specify)			

2.18 If your answer in 2.16 is "Yes", approximately how much income do you receive from the sales of your livestock annually?.....

2.19 If "No", please provide reasons for not selling

.....

.....

.....

2.20 What challenges do you encounter when farming your livestock?

CHALLENGES	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Limited access to land					
Lack of investment					
Lack of working Capital					
Limited access to credit facilities					

Poor veld condition					
Climate variability					
Insufficient farm size					
Lack of Infrastructure					
Poor access to extension services					
Poor knowledge of pasture and livestock management					
Other (Specify)					

2.21 What interventions should government do to assist people to farm and produce effectively?

INTERVENTIONS	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Access to agricultural land					
Access to production inputs and equipment					
Access to markets					
Access to credit facilities					
Access to agricultural infrastructure					
Provision of subsidies					
Provision of trainings and Skills transfer					
Provision of drought relief					
Revitalising of Agricultural colleges					
Awareness on the opportunities available for farmers					
Other (Specify)					

SECTION THREE: HOUSEHOLDS INCOME GENERATING ACTIVITIES

3.1 What non-farm income activities do you practise?

Non-farm activities	Mark with "X"
Salary earner	
Wage labour	
Remittances	
Construction	
Mining and quarrying	
Agro processing	
Transport	
Distribution	
Marketing	
Retail & Wholesale	
Food Vending	
Trading (Buying and Selling)	
Tourism	

Manufacturing	
Handicraft	
Bakeries	
Mechanics	
Carpentry	
Other (Specify)	

3.2 What was your motive for starting non-farm income activity?

MOTIVES	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Higher returns in non-farm sector					
To generate income for household basic needs e.g. food and clothes					
Higher salaries and wages in the non-farm sector					
Accessible infrastructure in non-farm sector					
Unstable returns from agriculture					
Lack of capital for farming					
Lack of land for farming					
Response to drought in Agriculture					
Generate income to support agricultural work					
Market accessibility					
Support from Cooperatives & SMME's					
Respond in Employment opportunities in the non-farm sector					
The credit market is efficient					
Low farm productivity					
Other (Specify)					

3.3 What type of infrastructure serves your income generating activity?

INFRASTRUCTURE	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Roads					
Electricity					
Water and Sanitation					
Shelter					
Telephone					
Computer					
Other (Specify)					

3.4 Please rate the accessibility of the following infrastructure to your income generating activity.

	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
--	----------------	-----------	---------	--------------	-------------------

Roads					
Electricity					
Water and Sanitation					
Shelter					
Computer					
Telephone					
Other (Specify)					

3.5 What are the constraints limiting your participation in income generating activity?

PROBLEMS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack Infrastructure					
Access to markets					
Lack of productive assets (e.g. Land, capital etc.)					
Government regulations					
High competition from other enterprises					
Job insecurity					
Inadequate access to credit					
Lack of awareness and training					
Other (specify)					

3.6 How much income do you generate from your income generating activity monthly?

Non-farm activities	Amount (R)
Salary earner	
Wage labour	
Remittances	
Construction	
Mining and quarrying	
Agro processing	
Transport	
Distribution	
Marketing	
Retail & Wholesale	
Food Vending	
Trading (Buying and Selling)	
Tourism	
Manufacturing	
Handicraft	
Bakeries	
Mechanics	
Carpentry	
Other (Specify)	

3.7 How much of non-farm income is invested in the farm and in what forms?

	Amount (R)
Pay for hired labour	

Purchase agricultural inputs	
Rent land	
Purchase food	
Pay back the loan taken from others	
Pay for health expenses	
Hire equipment and Machinery	
Other (Specify)	

3.8 Are income generating activities essential components of food security and poverty alleviation?

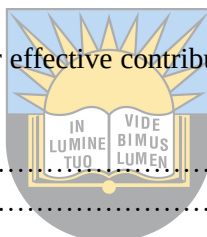
➤ Food Security

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Food Security					

➤ Poverty alleviation

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Poverty alleviation					

3.9 What do you think should be done for effective contribution of income generating activity to food security?



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3.10 What do you think should be done for effective contribution of income generating activity to poverty alleviation?

.....

.....

.....

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SECTION FIVE: MARKET INFORMATION

5.1 Do you have access to market information?

YES		NO	
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5.2 If your answer in 5.1 is “Yes”, what is your source of market information?

SOURCES OF MARKET INFORMATION						
1. Media	2. Extension Officers	3. Co-Farmers	4. Co-businesses	5. Buyers	6. Friends	7. Others (specify)

5.3 If your answer in 5.1 is “No”, what interventions should be done for accessible market information?

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5.4 Are you a member of any farmer organisation?

YES		NO	
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5.5 If your answer in 5.4 is “Yes”, please name the organisation

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5.6 What are the marketing benefits of using an organisation?

BENEFITS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Helps to earn higher income					
Enhances productivity					
Provides market information					
Help to access to credit facilities					
Helps to access production inputs and equipment					
Find best accessible marketing channel					
Set profitable prices					
Skills and trainings					
Other (specify)					

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5.7 If you are not a member of an organisation, why?

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SECTION SIX: GOVERNMENT AND EXTENSION SERVICES

6.1 Do you have extension officers operating in your area?

YES		NO	
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6.2 If Yes, what services are provided by extension officers?

SERVICES PROVIDED BY EXTENSION OFFICERS					
Advice in planting & harvesting	Advice in marketing	Advice in record keeping	Advice in management	Don't Know	Other (specify)

6.3 Are the extension officers available when you need help?

Never available	Available sometimes	Always available

6.4 How many times did you get in contact with extension officers (on-farm or off-farm) in the past 12 months?

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6.5 List the problems that you face in contacting extension officers?

PROBLEMS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Unavailability of extension officers					
Instability in the delivery of extension services					
Lack of digital contacting devices					
Lack of resources					
Poor knowledge regarding improved agricultural technologies					
communication problems					
Other (Specify)					

SECTION SEVEN: CREDIT ACCESS

7.1 Do you have access to credits?

YES		NO	
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7.2 If your answer in 7.1 is “Yes”, please indicate your sources of credit and rank in terms of importance with 1 being most important and indicate how much you received in the past 12 months.

7.2.1 Sources of credit	7.2.2 Rank	7.2.3 How much received
Government institutions		
NGO's		
Banks		
Private money lenders		
Public deposits (e.g. donations)		
Own savings		
Other (Specify)		

7.3 If your answer in 7.1 is “No”, what is the reason?

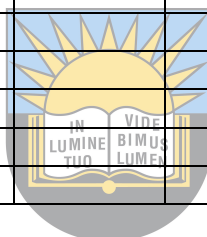
REASONS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
High interest rate					
Unavailability of the credit institutions					
Poor credit score					
Could not get it					
I do not want					
Other (Specify)					

7.4 Did you use credit to(see list in table)? How much credit did you use?

PURPOSE	Yes/No	If Yes, how much? (Amount in Rands)
Purchase agricultural inputs		
Purchase stock for a business		
Purchase food		
Pay back the loan taken from others		
Pay for hired labour		
Start non-farm business		
Pay for health expenses		
Other (Specify)		

7.5 Based on your general knowledge, what is the importance of accessing finance for non-farm income activities?

IMPORTANCES	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Purchase inputs/stock					
Generate profit					
Cash flow management					
Market access					
Facilitate business expansion					
Attaining long term goals					
Debt management					
Other (Specify)					



THANK YOU FOR YOUR PARTICIPATION!!!
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