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The Impact of The Farmer Input Support Program on Crop Diversification Among Small-Scale Farmers in Zambia: A Case Study of Nega-Nega Agricultural Camp.

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Abstract

Agriculture is one of Zambia's economic drivers and a mainstay of the livelihood of a larger proportion of the country's population. Agricultural production is mainly dependent on seasonal rain-fed cultivation with maize as the principal staple food crop. Crop diversification can be used as a tool to augment farm income, generate employment, alleviate poverty and conserve soil and water resources. In striving to improve food security and minimize risks associated with heavy dependence on maize monoculture, the Zambian government has been gradually promoting diversification into high-value crops of late. The Farmer Input Support Program has led to reduced crop diversification rates because of its biased support towards maize production. There is no access to subsidised inputs and government-driven consumption market as well as substantial extension service for non-staple food crops.

Key words: *Crop Diversification, monoculture, small-scale farmers, stakeholders*

1. Introduction

1.1 Background

Agriculture is the mainstay of the livelihood of a large proportion of the population of Zambia. There is correlation in literature that Zambia's potential in agriculture has not yet been fully exploited. If well managed, the sector could contribute to substantial improvements in the Gross Domestic Product (GDP), employment and tax revenue. It is in this regard that the Zambian government seeks to position the agricultural sector as one of the economic spinners that will foster economic growth and poverty reduction in the country. The Agricultural sector is one of the sectors that contribute significantly to the growth of Zambia's economy. The sector's contribution to the Gross Domestic Product (GDP) currently stands at about 18% to 23% (CSO, 2015) [1]. The government has identified this sector as one that has the potential to stimulate the country's economic development. Agricultural activities in Zambia are characterized by the production of food crops that include maize, sorghum, cassava, millet and groundnuts (The IDL Group, 2002) [2]. Although maize is the most cultivated crop in Zambia, efforts are being made to diversify into high value crops (Hazra, 2000) [3]. Maize alone accounted for about 76% of the total value of smallholder crop production in 1990/91 farming season and the subsequent farming seasons, while cassava has been around 10%, and all other crops trailing below 3% (Jayne et' al., 2007) [4]. Successful and profitable participation in the agricultural sector and crop diversification in particular, has always been hindered by the many constraints that smallholder farmers face. Some of these constraints include high cost of inputs, limited access to credit, poor or insufficient market facilities, poor information dissemination, poor infrastructure and many more. As long as these constraints remain present, smallholder farmers cannot significantly improve their income base through agriculture.

For many years, maize has been the commonest crop being produced by almost all small-scale farmers in Zambia. Maize was the first crop to be produced on a large scale in Nega-nega, and being the country's staple food crop, most farmers prefer growing maize to growing any other crops. The over-dependency on maize farming, by the Zambian farming community, has compromised the anticipated growth of the sector due to increasing costs of maize production (Matandiko, 2010) [5]. The inadequacy in crop diversification among the smallholder farmers and the perpetual monoculture of maize has led to the surfacing of several unanticipated challenges to food security and economic development. Some of the problems that have emerged from the inadequate crop diversification include; land

degradation due to the same tillage systems favoured by the same kind of crop being produced every season. The soil has lost its fertility due to continued exposure to the same nutrient-uptake force as a result of producing the same crop season after season. It has been noted that pest infestation has also increased as the constant supply of 'pest food' has been enhanced, for the same crop is being grown on the same piece of land every season. There is guaranteed total crop failure in cases of droughts or complete pest attacks, as the only crop may be wiped out. The additional advantage to increased numbers of crops is that the enhanced biodiversity can reduce incidents of problematic insects and diseases, as well as create new opportunities for innovative weed management through extended crop rotations (Blade & Slinkard, 2002) [6]. The farmers lack or have limited market due to the supply of the same commodity by several producers, as a result, inducing low-price market prevalence. The rise in the cost of farming inputs has been facilitated by the obvious high demand for the same kind of inputs by several farmers every farming season.

Farmers also face risk from bad weather and from fluctuating prices. Crop diversification is thus a logical response to both threats. A diversified portfolio of products should ensure that farmers do not suffer complete ruin when the weather is bad. Similarly, crop diversification can manage price risk, on assumption that not all products will suffer low prices at the same time (Hazra, 2002) [7]. Hazra, 2002 [7], further alludes to the fact that domestic policy influences the adoption of crop diversification. Agricultural production is sometimes undertaken as a consequence of government subsidies rather than because it is inherently profitable. The reduction or removal of those subsidies, whether directly or indirectly, can have a major impact on farmers and provide a significant incentive for diversification or, in some cases, for returning to production of crops grown prior to the introduction of the subsidies.

1.2 Problem statement

The problem that was identified is the inadequate participation in crop diversification by small-scale farmers, following the introduction of the Farmer Input Support Program, which exacerbates food insecurity. The rate of small-scale farmer participation in crop diversification, in Zambia, currently stands at 0.01% (ZNFU, 2016) [8]. The small-scale farmers who do not diversify in crop production seem to face many challenges ranging from threatening food insecurity to compromised economic growth, stability and resilience. In this regard therefore, the falling crop diversification levels among small-scale farmers are a

significant problem whose causes and solutions are worth investigating in order to set up mechanisms for mitigating the associated impacts.

1.3 Objectives

1.3.1 General Objective:

The general objective of this research was to assess the impact of the Farmer Input Support Program on Crop Diversification among small-scale farmers in Zambia.

1.3.2 Specific Objectives:

The specific objectives of the study were:

1. To investigate the effect of uncertain market for non-staple food crops on crop diversification.
2. To establish whether government subsidised inputs have an influence on crop diversification.
3. To determine the impact of agricultural extension service provision on crop diversification.

1.4 Hypotheses

$H_0$1: There is no significant association between uncertain market for non-staple food-crops and crop diversification.

$H_0$2: There is no significant relationship between government-subsidised inputs and crop diversification.

$H_0$3: There is no significant correlation between extension service provision and crop diversification.

1.5 Justification of the Study

This study was important in that the findings would be of help in the efforts to control the perceived problem. The established impacts of the Farmer Input Support Program on successful crop diversification, if availed to all relevant stakeholders in the agricultural sector and the policy makers, may be used, together with the already existing strategies, in the improvement and enhancement of a successful and productive crop diversification practice. The problems emanating from prolonged monoculture, such as land degradation, loss of soil fertility, pest infestation, high cost of production and low ultimate profits (revenue), may be addressed by the shift from the dependency on the sole production of maize and a few minor food crops to full-scale crop diversification. This study may act as a guide and reference in the dissemination of information about practices pertaining to crop diversification, agro-

productivity and advancement of future research. The identified impacts and the possible corrective measures may provide a solution to improved small-scale farmers' income base, thus bringing about food security as well as economic growth, stability and resilience by broadening the sources of income among small-scale farmers.

1.6 Assumptions of the Study

This study was conducted under the assumptions that;

1. All the respondents would cooperate and provide accurate information as it were to the best of their perception.
2. The findings of this study would be meaningful and made available to the relevant stakeholders, in Agriculture, to quicken the implementation and improvement of crop diversification as a pillar for sustainable agriculture and food security.
3. The findings obtained in this study would be a good supplement to the already existing information regarding the constraints and solutions to the conceptual and practical application of crop diversification, to enhance the making of informed decisions.

2. Literature Review

2.1 Introduction

To be precise in this study existing literature, related to the research problem, was reviewed.

2.2 Definition and Scope of Crop Diversification

Diversification may be defined as "the production of a variety of different articles, services, etc., often as a safeguard against the effects of fall in demand for a particular product" (Oxford English Dictionary, 1972). Crop diversification refers to the shift from the regional dominance of one crop to regional productivity of a number of crops, which takes into account the economic returns from different value-added crops with complementary marketing opportunities (Hazra, 2002) [7]. According to Fletcher (2002) [9], crop diversification is the adoption of a new plant in a particular geographic region, for the purpose of production, so that it can be manipulated as a crop for the generation of some commercial product (for consumer satisfaction) that has not previously been successfully produced from that plant in that region. Crop diversification is a collection of all programs of expanding the number of crops in a region in the hope of increasing overall productivity and marketability (Small, 1995) [10]. Diversified farming is the practice of growing more than one crop (or enterprise) in any year to increase financial and biological stability of the farm

(Johnston et' al 1995) [11].

2.3 Global Perspective of Crop Diversification

Crop diversification has been viewed as a practice that has great potential in fostering agricultural productivity, food security, ecological biodiversity, land and soil fertility maintenance and economic growth, stability and resilience world over. It is a pity that despite huge investment in research, crop diversification has generally been neglected throughout the world. A few countries that have taken the challenge to try diversified cropping have enjoyed tremendous economic benefits from the practice. The challenge of agricultural sustainability has become more intense in recent years with the sharp rise in the cost of food, energy and production inputs, climate change, water scarcity, degradation of ecosystem services and biodiversity, and the financial crisis. The expected increase in population and the associated demands for food, water and other agricultural products will bring additional pressures. Consequently, the development community, which includes politicians, policy makers, public administrators, institutional leaders as well as academicians, scientists and agricultural extension workers, has been highlighting the need for the development of sustainable agricultural production systems that are compatible with the management of all ecosystem services and also permit the restoration of degraded agricultural lands. In response to this, action has been promoted internationally at all levels and yet, as witnessed in the Millennium Ecosystem Assessment (MEA, 2005), the World Development Report 2008 (WDR, 2008) and the IAASTD reports (McIntyre et al., 2008) [12], some agricultural systems are still being promoted with unacceptably high environmental, economic and social implications, albeit with the promise of increased production yields. Consequently, business-as-usual with regards to agricultural development is increasingly considered inadequate to deliver sustainable production intensification to meet future needs in terms of food security, poverty alleviation and economic growth and ecosystem services (Friedrich et al., 2009 [13]; Kassam et al., 2009 [14]).

The degradation of agricultural soils in the world, and the consequent loss in soil health and their productive capacity, are the result of intensive tillage-based farming practices that pay inadequate or no attention to managing the soils and the landscapes as part of living biological and ecosystem resource base (Montgomery, 2007[15]; Huggins and Reganold, 2008 [16]).

The severe degradation of the resource base and environment and other negative externalities

associated with monoculture and mainstream tillage-based agricultural practices is occurring in all parts of the world. In the industrialized nations such practices rely increasingly on specialised and less diversified cropping systems supported by genetically enhanced cultivars and high levels of agro-chemical inputs and heavy machinery for high production. In the developing nations, agricultural development and the research, extension and education support services have been pushed by most national institutions, international organizations and donor agencies towards the adoption and spread of similar harmful practices whose long-term economic and environmental sustainability is questionable as well as their ability to adapt to and mitigate climate change and deliver all the required environmental services.

2.4 The Zambian Perspective of Crop Diversification

Crop diversification in Zambia has not yet been fully embraced by most small-scale farmers. There are several perceived factors that may be attributed to this scenario. Matandiko, (2010) [5], noted that Zambia's agricultural sector has continued to record substantial growth in recent years as evidenced by successive bumper harvests. The growth is largely due to various government policies such as the Farmer Input Support Program (FISP), which accords small-scale farmers, across the nation, access to fertiliser and seed for their farming activities. He further recognizes the fact that the sector's growth is coiled around maize cultivation, which should raise concern as there are other cash crops like cassava, sorghum and millet that need to be promoted to ensure sustainable national food security. Matandiko, 2010[5], highlights that farming has become a money-spinner, hence the need for diversification to ensure crops that are required on both the local and international markets are readily available.

There has been a country-wide promotion of maize cultivation without due consideration of agronomic suitability for a long time since independence era, 1960s. Since maize is susceptible to drought, agricultural production can be drastically low in case of adverse weather conditions. Because of this situation, the government formulated the Food-Crop Diversification Support Project (FCDSP) through the Zambia Agricultural Research Institute (ZARI) with a view of enhancing food security by promoting drought tolerate food crops (Ngosa, 2009) [17].

(Chikwanda, 2011) [18], in the agricultural sector, we will extend support to crops beyond maize, strengthen research and extension services, invest in irrigation, develop and rehabilitate livestock infrastructure. The government will reform the agricultural marketing

system; promote agro-processing and forward linkages. Further, it is regrettable that the government policy has encouraged the growing of maize to the detriment of other crops.

2.5 Significance of Crop Diversification

The significance of crop diversification can be divided into three categories namely, agronomic, economic and social significance.

2.5.1 Agronomic Significance

The agronomic significance of crop diversification is coiled around soil improvement (reduced soil erosion, increased soil fertility and increased yields), reduced disease, weed and insect pest pressures as well as reduced need for and dependence on inorganic fertilizers.

For many years, crop growers have used crop diversification to improve soils and increase productivity and profits. Diversification strategies include rotating with other crops, double cropping and intercropping. Crop diversification systems tend to have more agronomical stability and resiliency. Some of the common advantages found in most diverse systems are reduced disease, weed and insect pressures; reduced need for nitrogen fertilizer; reduced erosion; increased soil fertility and increased yields. Diversification also provides habitat for beneficial insects and reduces pest numbers by rendering host crops less apparent for colonization by pests. Crop rotation, a strategy of crop diversification, is the practice of planting a succession of crops in the same field. The practice is used for the management of weed and insect pests, plant nutrition, crop scheduling and so on. One grew a winter cereal often called the rotation crop, to improve the soil characteristics (Johnston et' al, 1995) [11].

Another recent development is in the development of crop rotations, a strategy towards diversification of agricultural systems to increase productivity and crop yields. This involves the insertion of green manure cover crop or other legumes in the cropping systems as seen in several countries (Gunasena, 1999) [19].

2.5.2 Economic Significance

The economic significance of crop diversification is justified by the widening of the income base and profit maximization which create economic growth and stability. The role of the agricultural sector in any developing country is focused on food production and security, gainful employment, revenue earnings, capital accumulation and labour replacement. There are several advantages of crop diversification; comparatively high net return from crops, higher net returns per unit of labour, optimization of resource use, higher land utilization efficiency and increased job opportunities. In order to achieve the above benefits, the process

of crop diversification should be changed from very simple forms of crop rotation, to intensive systems such as relay cropping and inter-cropping or specialization by diversifying into various crops, where the output and processing could be different (Gunasena, 1999) [19].

Johnston, et' al (1995) [11] view crop diversification as an economic engine that gives rise to economic stability and resilience by reducing financial risk, stabilising farm income and increasing choice of farm practices. The variety of farm practices can be achieved by the generation of processing activities of the crop products, which broadens the `revenue track' and stable employment opportunities. Crop diversification is intended to give a wider choice in production of a variety of crops in a given area so as to expand production related activities on various crops and also to lessen risk (Hazra, 2002) [7].

2.5.3 Social Significance

Crop diversification creates more permanent or longer season employment opportunities. The continuous farm activities have a worker-retention power thus stabilising farm workers' social comfort. Maarten and Alarcon (1992) [21], report Kennedy (1988), having said that the need to migrate seasonally to find off-farm employment was likely to reduce when cash crops are introduced in the agricultural system, with positive benefits resulting from more social interaction within the household and lower incidence morbidity.

2.6 Factors Affecting Successful Crop Diversification

Many factors, including policies have the potential to affect crop diversification, some directly yet others indirectly through the creation of fringe benefits. Price support mechanisms for agricultural commodities, which reduce price variability and exacerbate income risk, tend to have some impact on diversification (Woldehanna *et al*., 2000) [22]. Grants aimed at boosting diversification and training increase the propensity to diversify. Research and extension, if directed at diversification, will aid those considering enterprise start-up. When directed towards production, they may reduce production risk and, therefore, reduce the impetus to diversify. Land rights must be secure for investing in non-agricultural on-farm enterprises. Credit schemes influence diversification since investment is often needed for creation of non-agricultural enterprises on-farm. Access to credit at affordable interest rates is, therefore, an important factor. Crop insurance schemes, which may be governmental, reduce risk, and thus the propensity to diversify. Lack of insurance markets and of government insurance schemes may promote diversification as a risk-coping strategy.

Industrial economics literature indicates that diversified enterprises are the strongest entrants in a market, particularly for those enterprises for which new, dedicated plants have been built. These enterprises grew fastest after entry and had the greatest survival rates (Siegfried and Evans, 1994) [23].

2.7 Personal Critique

Sustainable small-scale agricultural systems rely on crop diversification for enhanced food security, prudent land utilisation and economic advancements that ensure reliable access to finances for the purchase of agricultural inputs. The role of the diversified agriculture is to focus on food production and security, gainful revenue earnings, capital accumulation and labour replacement. There are several advantages of crop diversification; comparatively high net return from crops, higher net returns per unit of labour, optimization of resource use, higher land utilization efficiency and increased risk protection in cases of adverse weather and other crop threats. Johnston, et' al (1995) [11] view crop diversification as an economic engine that gives rise to economic growth, stability and resilience by reducing financial risk, stabilising farm income and increasing choice of farm practices. Any deviation from the right course of the standard requirements for crop diversification gives way to a faulty and ineffective agricultural system that has unending impact on food security, economic growth, sustainability and resilience. Any organisation that overlooks the guidelines and expectations of the diversified agricultural approach, procedures and the associated socio-economic implications directly influences food insecurity and economic downfall. An agricultural service management team that is ushered into office and operates without adherence to the implications of diversified cropping will definitely operate without confidence and proficiency in extension service provision thereby exacerbating maize monoculture, land degradation and a downgraded productivity in the agricultural sector. This is a common phenomenon in the Zambian agricultural sector today.

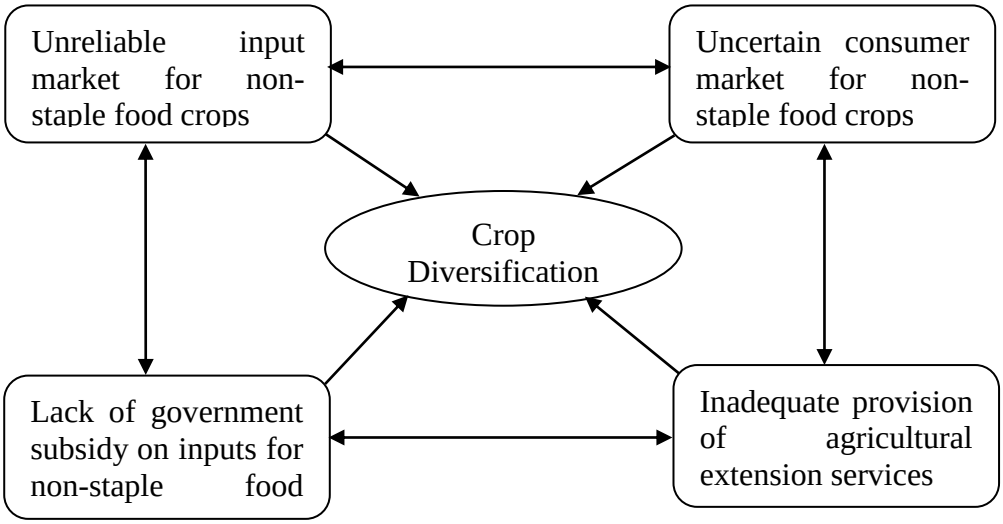
2.8 Establishment of the Gap

There seems to be a widening gap between the number of diversifying small-scale farmers and those practising monocultures. There is no doubt that the economic transformative significance of diversified cropping and agriculture at large has been fully understood world-over. Despite its widespread, the need for sustainable crop diversification seems not to be receiving the attention it deserves. Zambia's agricultural sector has continued to record substantial growth in recent years as evidenced by successive bumper harvests. The growth is

largely attributed to various government policies such as the Farmer Input Support Program (FISP), which accords small-scale farmers, across the nation, access to fertiliser and seed for their farming activities. The agricultural growth pattern is coiled around maize cultivation, and this should raise concern as there are other cash crops like cassava, sorghum and millet that need to be promoted to ensure sustainable national food security (Matandiko, 2010) [5].

Although there has been substantial growth in the agricultural sector in Zambia, food shortages and economic hardships have not spared some sections of society, majorly due to high dependence on rain-fed cultivation where drought usually entails a food crisis. This is particularly common among small-scale farmers. The prevalence of the monoculture of maize production at the expense of crops tolerant to drought which exacerbates the impact of drought on the food situation is quite instrumental. There has been a continued country-wide promotion of maize cultivation without due consideration of its agronomic suitability for a long time. Since maize is susceptible to drought, agricultural production can be drastically low in case of adverse weather conditions. (Chikwanda, 2011) [18], in the agricultural sector, we will extend support to crops beyond maize, strengthen research and extension services, invest in irrigation, develop and rehabilitate livestock infrastructure. It is regrettable that the government policy has encouraged the growing of maize to the detriment of other crops. These constraints mean that the benefits of improved agricultural output have often not reached the poorest rural households. As a result, the sector's potential to significantly reduce poverty has not yet been tapped. In order to address these constraints, the government will re-design the Farmer Input Support Program, refocus market guarantees and differentiate extension service provision to support the production of crops which are appropriate to each agro-ecological zone. Despite these policies and efforts, crop diversification has still not been fully exploited. There is a big gap between the ideal situation and the reality. This gap is what this study intends to fill up.

2.9 Conceptual Framework



The above framework proposes that the adoption and practise of crop diversification among small-scale farmers has some negative influence from the Farmer Input Support Program (FISP). The inadequate small-scale farmer participation in crop diversification may be influenced by four major variables. These variables include; unreliable input market for non-staple food crops, uncertain consumer market for non-staple food crops, the lack of government subsidy on inputs for non-staple food crops and inadequate provision of agricultural extension services.

3. Materials and Methods

3.1 Introduction

This chapter presents the details of the way the study was designed. The information hereunder includes; the description of the study area, the study population, sample size and sampling procedures, data collection instruments and procedures, validation of the data collection instruments, data analysis and an account of the variables and their effects, if any.

3.2 Research Site: Description of the Research Area

The study was conducted in Mazabuka district of Southern province, Zambia. The targeted area was Nega-nega Agricultural Camp, located about forty-two kilometres to the north-east of Mazabuka town. The research area lies in zone 2 of the Zambia's three distinct agro-ecological zones. The area has an average altitude of 950 m above sea level, with annual temperatures ranging from 0^0C to 38^0C, and average annual rainfall of 850 mm. The soils of this area are reddish loamy clay, deep well-structured and well drained, with a sandy clay top soil of pH 5.5 to 6.0 (ZARI, 2015) [26]. The district's population is 261, 268 (CSO, 2010) [27].

Nega-nega Agricultural Camp covers an average of 150 km^2 and has a total registered farmer population of Six hundred thirty-eight (638), 289 females and 349 males. The camp's farmer population is divided into five (5) zones of uneven population (AEO, 2016) [28].

3.3 Methodology and Research Design

The research design used in this study is a survey.

3.4 Target Population

The target population summed up to 638 farmers (AEO, 2016) [28].

3.5 Sample Size and Sampling Procedures

The selection of the camp was done using purposive or non-probability sampling, owing to the observations made. Proportional Stratified Sampling was used in the selection of the sample to ensure that every stratum or sub-group of the entire target population was represented. To this effect, each of the five zones provided an average of forty-nine (49) respondents. The sample that was selected comprised two hundred forty-five (245) farmers out of the six hundred thirty-eighty (638). The sample size was determined as follows;

$n = N / 1+N(e)^2$

Where n = sample size, N = population and e = margin of error.

Total camp sample: $n = N / 1+N(e)^2 = 638 / 1+638\ (0.05)^2 = 638 / 1+638 \times 0.0025$

$n = 638 / 1+1.595 = 638 / 2.6 = 245.38 =$ **245**. Eq. (1)

Total zone sample: $n = [N/1+N(e)^2] / 5 = [638/1+638\ (0.05)^2] / 5 = [638/2.595] / 5$

$n = 245 / 5 =$ **49**. Eq. (2)

Sampling factor $= N / n = 638 / 245 = 2.6 =$ **3**. Eq. (3)

This indicates that every third farmer in the register of each zone was sampled for a respondent.

3.6 Data Collection Instruments

The study relied on questionnaires and interviews to gather primary data. Secondary data was obtained from the local Agricultural Extension Office (AEO), Farmers' Training Centre (FTC), Zambia National Farmers' Union (ZNFU) and other sources that were deemed relevant, including publications.

3.7 Validation of the Data Collection Instruments

The data collection instruments were both face and content validated. They were submitted to the research supervisors for scrutiny and authentication. All recommendations from the supervisors were effected before administering the instruments. The research instruments were further validated by means of a pilot study.

3.8 Data Collection Procedures

Data was collected within a period of 20 days. The researcher involved personally trained research assistants (enumerators) to collect the data from the illiterate respondents.

3.9 Data Analysis

The gathered data was systematically coded in Microsoft Excel spread sheets and then subjected to statistical analysis using STATA to generate tabulations, cross tabulations and charts for easy data representation. The hypotheses were tested using the Chi Square test of association.

3.10 Triangulation

To facilitate validation of the data, the collected data was cross-verified by comparing it to the data that was obtained from a parallel source (pilot study) that involved respondents that were not part of the actual target population.

3.11 Ethical Considerations

The researcher assured the respondents that their identity would not be disclosed by both parties and the feedback would equally be treated with high confidentiality. The findings of the study would only be used for this academic undertaking and any purposes of implementing change in and for the improvement of the agricultural system, should there be need.

3.12 Limitations of the Study

This study was conducted under the following constraints: the financial challenges hindered the production of better work as the study was not externally funded and all expenses were met by the researcher. There may also be alterations in the actual intent of the respondents in the process of interpreting and translating the information contained in the questionnaires as some of the respondents dealt with were not literate.

4. Research Findings

4.1 Demographic Characteristics of the Respondents.

Table 1: Demographic Characteristics of the Respondents.

Characteristic	Classification	Frequency	Percentage
Camp	Nega-nega	245	100.00
Zone	1	49	20.00
	2	50	20.41
	3	45	18.37
	4	52	21.22
	5	49	20.00
Gender	Female	111	45.31
	Male	134	54.69
Age	26 - 35	41	16.73
	36 - 45	42	17.14
	46 - 55	80	32.65
	56 +	83	33.88
Marital Status	Single	6	2.44
	Divorced	35	14.29
	Widowed	40	16.33
	Married	164	66.94

Table 1 shows that all respondents were drawn from the same agricultural camp, Nega-nega. It further shows that all the five zones of the camp were represented. Zone 3 had the least representation of 45 (18.37%), zones 1 and 5 had an equal representation of 49 (20.00%), zone 2 was represented by 50 (20.41%) while zone 4 had the largest representation which stood at 52 (21.22%) of the 245 study units. There were more males than females that participated in the study with representation of 111 (45.31%) females and 134 (54.69%) males. Only 6 (2.44%) respondents were single. 35 respondents (14.29%) had been divorced while 40 (16.33%) had been widowed. The largest representation was by married respondents which stood at 164 (66.94%). Further, the age pattern of the respondents was in ascending order with none below 26 years, 41 (16.73%) between 26 and 35, 42 (17.14%) ranged between 36 and 45 while those between 46 and 55 were 80 (32.65%). 83 (33.88%) respondents of the total 245 were above 55 years of age.

4.2 Crop Diversification Adoption Rates.

4.2.1 Crop Diversification Adoption Rates before the Farmer Input Support Program.

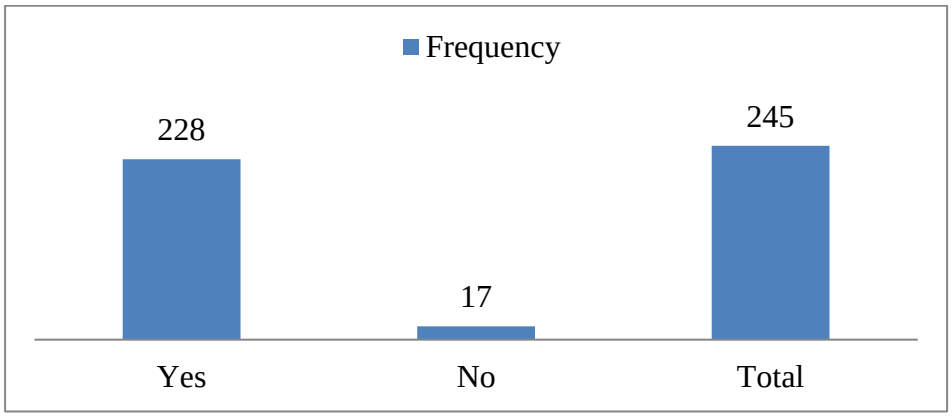


Fig. 2: Crop Diversification Adoption Rates before the Introduction of FISP.

Fig. 2 shows that out of a total of 245 valid responses, 17 (6.94%) respondents were not practising crop diversification before the introduction of the Farmer Input Support Program. The majority of the respondents in the camp, 228 (93.06%), were practising diversified cropping prior to the introduction of the Farmer Input Support Program.

4.2.2 Crop Diversification Adoption Rates in the Past Five Seasons.

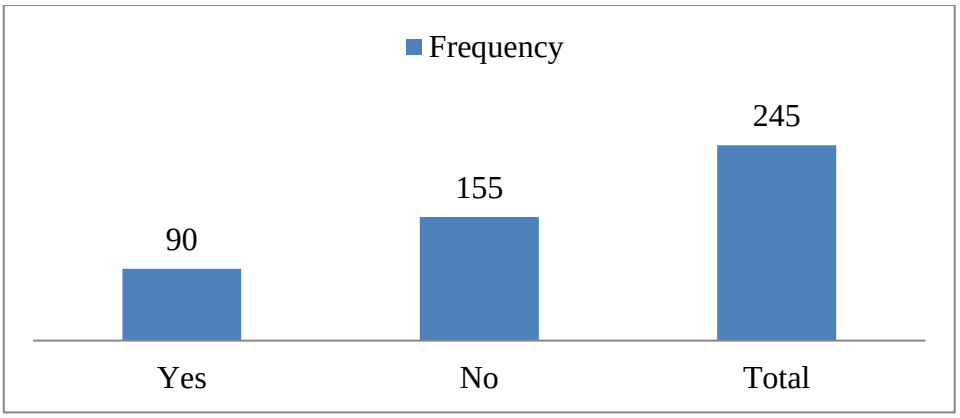


Fig. 3: Crop Diversification Adoption Rates in the Past Five Farming Seasons.

Fig. 3 shows that out of a total of 245 valid responses, 90 (36.73%) respondents had been practising crop diversification in the recent past five farming seasons. 155 (63.27%) of the respondents have not been practising diversified cropping in the past five farming seasons.

4.2.3 Crop Diversification Adoption Rates in the 2016-2017 Farming Season.

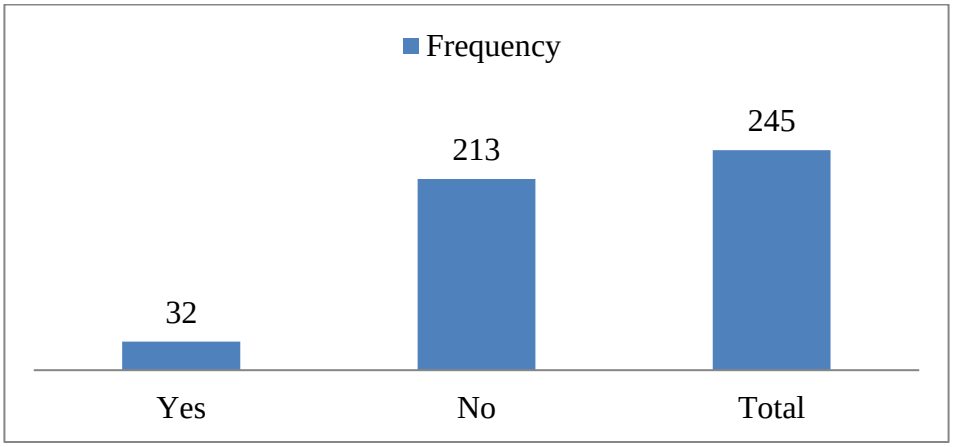


Fig. 4: Crop Diversification Adoption Rates in the 2016-2017 Farming Season.

Fig. 4 shows that out of a total of 245 valid responses, only 32 (13.06%) respondents were practising crop diversification in the 2016-2017 farming season. The majority, 213 (88.94%) of the respondents were found not to have diversified cropping in the 2016-2017 farming season.

4.3 Crops Grown in the Camp.

4.3.1 Crops Grown in the Camp before the Introduction of FISP.

Table 5: Crops Grown in the Camp before the Introduction of FISP.

Crop	Frequency	Percentage
Beans	104	42.45
Cotton	167	68.16
Groundnuts	209	85.31
Sunflower	116	47.35
Irish potatoes	26	10.61
Maize	245	100.00
Sweet potatoes	134	54.69
Cassava	98	40.00
Cow peas	121	49.39

Table 5 shows that a number of high-value crops were being produced prior to the introduction of the Farmer Input Support Program. The least produced crop was Irish potato which stood at 10.61%. Cassava was at 40.00%, beans at 42.45%, sunflower at 47.35% and cow peas stood at 49.39%. The rest of the crops produced were above 50% in reference to the

total number of respondents. Sweet potatoes had a percentage of 54.69%, cotton was at 68.16%, and groundnuts were highest in terms of the production percentage among all non-staple food crops at 85.31%. Maize, the staple food crop stood at 100.00%, indicating that the crop was being produced by every respondent.

4.3.2 Crops Grown in the Camp over the Past Five Farming Seasons.

Table 6: Crops Grown in the Camp in the Past Five Farming Seasons.

Crop	Frequency	Percentage
Beans	26	10.61
Cotton	11	4.49
Groundnuts	72	29.39
Sunflower	17	6.94
Irish potatoes	0	0
Maize	245	100.00
Sweet potatoes	30	12.24
Cassava	0	0
Cow peas	21	8.57

Table 6 shows that Irish potatoes and cassava were not being produced in the past five farming seasons. The least produced crop was cotton which stood at 4.49%. Sunflower was at 6.94%, cow peas at 8.57%, beans at 10.61% and sweet potatoes stood at 12.24%. Groundnuts were highest in terms of the production percentage among all non-staple food crops at 29.39%. Maize, the staple food crop stood at 100.00%, indicating that the crop was being produced by every respondent.

4.3.3 Crops Grown in the Camp in 2016-2017 Farming Season.

Table 7: Crops Grown in the Camp in the 2016-2017 Farming Season.

Crop	Frequency	Percentage
Beans	15	6.12
Cotton	0	0
Groundnuts	44	17.96
Sunflower	0	0
Irish potatoes	0	0
Maize	245	100.00
Sweet potatoes	25	10.20
Cassava	0	0
Cow peas	16	6.53

Table 7 shows that Irish potatoes, sunflower, cotton and cassava were not produced in the 2016-2017 farming season. The least produced crop was beans which stood at 6.12%. Cow peas were at 6.53% and sweet potatoes stood at 10.20%. Groundnuts were highest in terms of the production percentage among all non-staple food crops at 17.96%. Maize, the staple food crop stood at 100.00%, indicating that the crop was being produced by every respondent.

4.4 Input Supply by the Farmer Input Support Program.

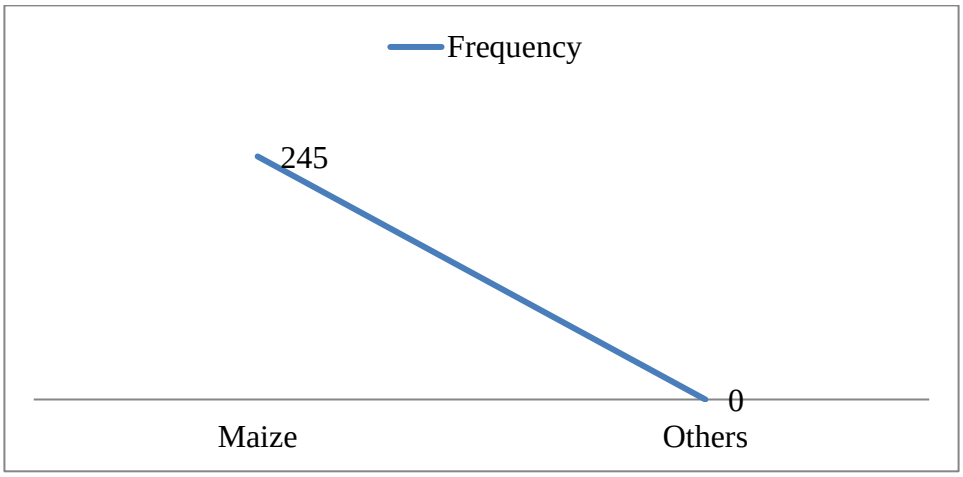


Fig. 8: Input Supply by the Farmer Input Support Program.

Fig. 8 depicts that the Farmer Input Support Program does not and has never supplied inputs for any non-staple food crop from its inception. This was evidenced by no 'yes' response from all the 245 respondents. All the 245 respondents, representing 100.00%, indicated that the Farmer Input Support Program has only been supply inputs for maize since its inception.

4.5 Annual Income from Crop Sales.

Table 9: Average Annual Income from Crop Sales in Past Five Farming Seasons.

Annual Crop Sales Income	Annual Income Non-staple Food Crop Sales				
	0	**1-500**	**501-1000**	**1001-5000**	**Total**
6000-10000	0	41	41	0	**82**
11000-15000	42	0	0	0	**42**
16000-20000	81	0	0	40	**121**
Total	**123**	**41**	**41**	**40**	**245**

Table 9 shows that 40 (16.33%) respondents were getting between K1001 and K5000 from

sales of non-staple food crops. This was the highest earning group from non-staple food crop sales. Those earning between K501 and K1000, and also those between K1 and K500 were both represented by 41 (16.73%) respondents, each. 123 (50.20%) respondents did not earn any income from non-staple food crop sales. With regard to the overall annual crop sales earnings, 42 (17.14%) of the total respondents had their annual earnings ranging from K11000 to K15000. Those that earned between K6000 and K10000 were 82 (33.47%). 121 (49.39%) have had their annual earnings between K16000 and K20000.

4.6 Government Subsidy on Inputs.

Table 10: Input Outlets and Government Subsidy for Non-staple Food Crops.

Non-staple Food Crop Input Outlets	Government Subsidized Non-staple Food Crop Inputs		
	Yes	**No**	**Total**
Yes	0	122	**122**
No	0	123	**123**
Total	**0**	**245**	**245**

According to table 10, 122 (49.80%) responses indicated that there were outlets for non-staple food crops in their area while 123 (50.20%) claimed that outlets for non-staple food crops were not present in the area. All the 245 respondents indicated the absence of government subsidised agricultural inputs in the area.

4.7 The Crop Diversification's Hindrance by the Farmer Input Support Program.

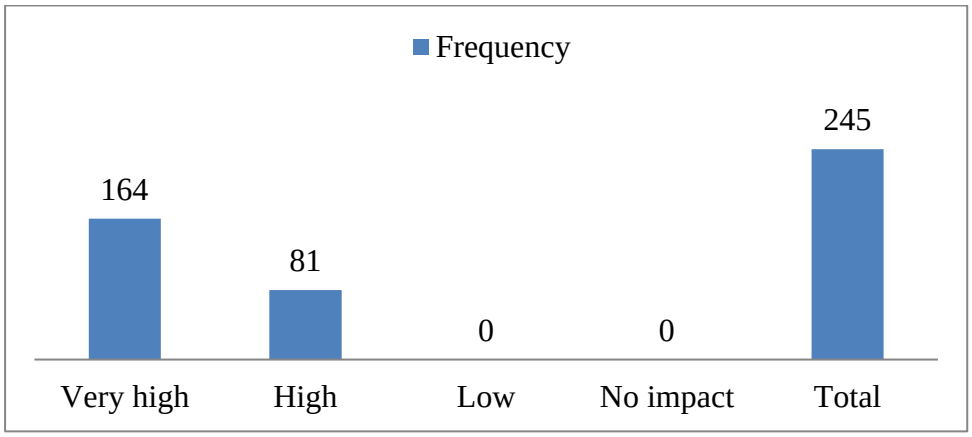


Fig. 11: FISP's Hindrance to Crop Diversification.

Fig. 11 shows that 0 (0%) respondents indicated that the effect was either low or not there at all. 81 respondents, representing 33.06%, rated the program's negative impact on crop

diversification as very high while 164 (66.94%) rated it as high. The table further alludes to the fact that the negative impact of the Farmer Input Support Program was perceived by all the respondents and that the impact was high.

4.8 Government Market for Crop Produce.

4.8.1 Government Market for All Crop Produce.

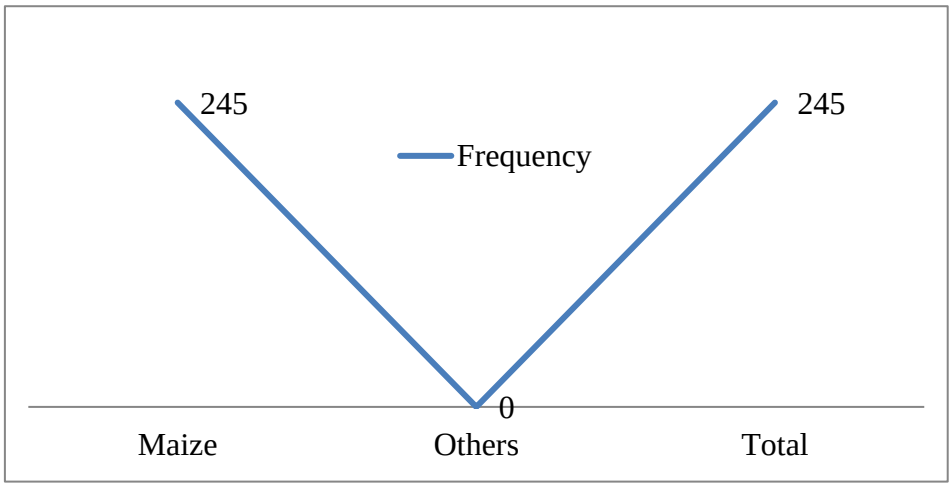


Fig. 12: Government Market for All Crop Produce.

Fig. 12 shows that no respondent indicated that the government had a marketing system for non-staple food crop produce while all the 245 (100.00%) responses showed that the government provided small-scale farmers with market for the staple food crop, maize.

4.8.2 Government Market for Non-staple Food Crop Produce.

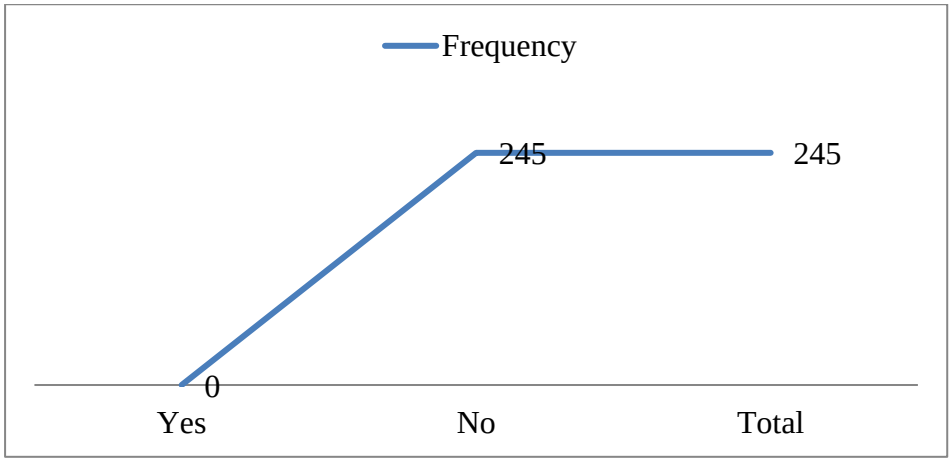


Fig. 13: Government Market for Non-staple Food Crop Produce.

According to fig. 13, 0 (0%) responses indicated the presence of a government market or marketing framework for any non-staple food crop. According to the responses obtained, 245

(100.00%) responses showed that there was no government-provided or initiated market for non-staple food crop produced.

4.8.3 Guarantee or Reliability of Market for Non-staple Food Crop Produce.

Table 14: Guarantee or Reliability of Market for Non-staple Food Crop Produce.

Guaranteed Market for Non-staple Food Crop Produce	People/Orgs Buying Non-staple Food Crop Produce		
	Yes	**No**	**Total**
Yes	0	0	**0**
No	222	23	**245**
Total	**222**	**23**	**245**

Table 14 shows that 23 (9.39%) responses said that there were no people or organisations that bought produce from non-staple food crops while the rest, 222 (90.61%) indicated the presence of people or organisations that visited the area to purchase agricultural produce from non-staple food crops. The table further shows that none of the respondents supported the reliability or guarantee of the non-staple food crop produce. All the 245 (100.00%) responses indicated that the available market for non-staple food crop produce, if any, was not guaranteed or reliable.

4.9 Willingness to Diversify in Cropping.

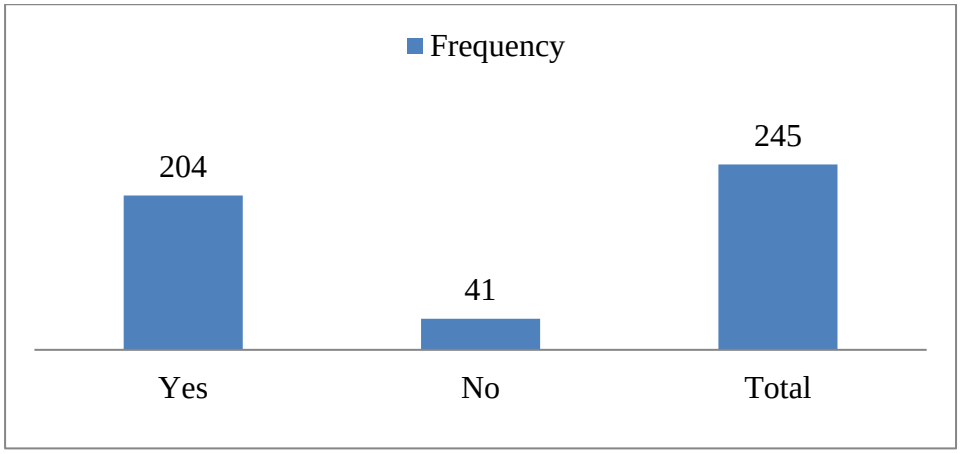


Fig. 15: Willingness to Diversify in Cropping.

According to fig. 15, only 41 responses, representing 16.73% of the total valid responses showed unwillingness to adopt crop diversification even after the establishment of a reliable and subsidised market for non-staple food crop inputs and the existence of a well supported

consumer market for produce from non-staple food crops.

4.10 Suggested Changes to the FISP and Marketing Framework for Crop Produce.

The respondents suggested the following changes or adjustments in the way the Farmer Input Support Program (FISP) and the marketing framework of agricultural produce, crop produce in particular, are currently being run.

1. The Farmer Input Support Program to extend its input supply to non-staple food crops that are high-value in themselves as this will boost annual revenue for the farmers.
2. The current government marketing framework (food reserve creation), spearheaded by the Food Reserve Agency (FRA), to be restructured and extended to the purchase of non-staple food crop produce as well as stretching it to some significant high-value crops that are non-food crops.
3. Both the input supply and the produce purchase strategies are currently highly segregative and a preserve of the social high class. Only a few individuals of high social standing and influence are benefitting fully from the two programs. Measures should be put in place to make the two programs universally and fairly accessible.
4. The government should acknowledge and accept its responsibility of providing or fostering competitive market for both inputs and produce in the agricultural sector so that small-scale farmers can realise the benefits of their agricultural undertakings.

4.11 Agricultural Extension Service Provision.

4.11.1 Presence of Agricultural Extension Officer in the Camp.

Table 16: Presence of Agricultural Extension Officer in the Camp.

AEO Present this Season	AEO Present in Camp throughout the Past 5 Years		
	Yes	**No**	**Total**
Yes	245	0	**245**
No	0	0	**0**
Total	**245**	**245**	**245**

Table 16 shows that the camp had had an agricultural extension officer throughout the past five farming seasons as well as during the current season, 2016-2017. No respondent refuted the presence of an agricultural extension officer in the camp over the period while all the respondents, 245 (100.00%) indicated that they have had an agricultural extension officer

throughout the past five farming seasons and also during the present season, 2016-2017.

4.11.2 Provision of Agricultural Extension Services in the Camp.

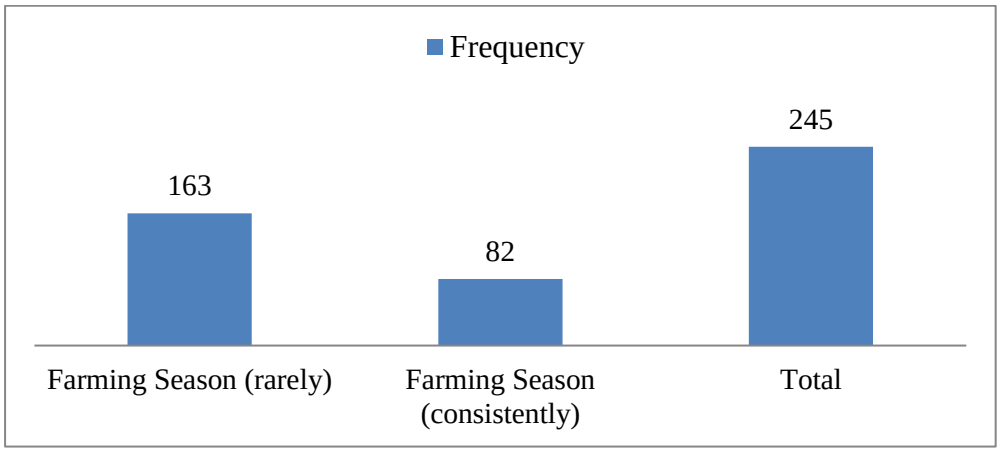


Fig. 17: Provision of Agricultural Extension Services in the Camp.

Fig. 17 shows that the provision of agricultural extension services by the extension officer was only done during the farming season. Of the total 245 valid responses, 82 (33.47%) indicated that extension services were only provided during the farming season and on a consistent basis. The rest of the respondents, 163 (66.53%) also said that the provision of extension services was only done during the farming season though rarely.

4.11.3 Provision of Extension Services and Promotion of Crop Diversification.

Table 18: Extension Services/Promotion of Crop Diversification.

Agricultural Extension Provision by AEO	AEO Promoting Crop Diversification		
	Yes	**No**	**Total**
Farming season (rarely)	122	41	**163**
Farming season (consistently)	82	0	**82**
Total	**204**	**41**	**245**

Table 18 shows that the provision of agricultural extension services, by the extension officer was restricted to the farming season. Of the total 245 valid responses, 82 (33.47%) indicated that extension services were only provided, by the extension officer, during the farming season and on a consistent basis. The rest of the respondents, 163 (66.53%) also said that the provision of extension services by the extension officer was only done during the farming

season though rarely. The table further shows that 41 (16.73%) responses indicated that the extension officer did not promote crop diversification. 204 (83.27%) responses indicated that the extension officer actually promoted diversified cropping.

4.11.4 Farmers' call on AEO and the Subsequent Response.

Table 19: Farmers' call on AEO and the Subsequent Response.

Call on AEO	Response by AEO to call			
	Very good	**Good**	**Not sure**	**Total**
Yes	82	122	0	**204**
No	0	0	41	**41**
Total	**82**	**122**	**41**	**245**

Table 19 indicates that 41 (16.73%) respondents had not called on the agricultural extension officer for any technical advice while 204 (83.27%) respondents had called on the extension officer to offer technical guidance. On the rating of the extension officer's response to call, the 41 (16.73%) respondents, who had never called on the extension officer, said they were not sure and could give a rating. 82 responses, representing 33.47%, rating the extension officer's response to call as good while 122 (49.80%) responses said the extension officer's response to call by the farmers was good.

4.12 Farmers' Sources of Agricultural Information.

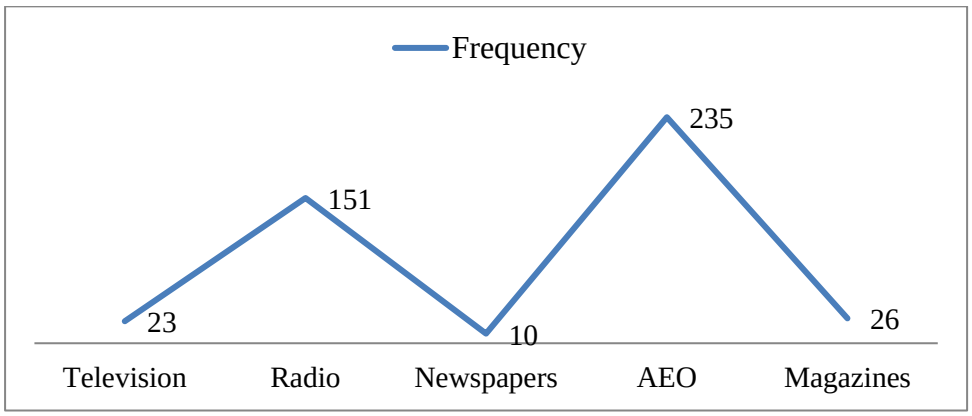


Fig. 20: Farmers' Sources of Agricultural Information.

Fig. 20 displays the five major sources of agricultural information for the farmers. The five main sources are television, radio, newspapers, magazines and the agricultural extension

office. Only 10 (4.08%) respondents accessed agricultural information through newspapers. 23 (9.39%) and 26 (10.61%) respondents accessed agricultural information through television and magazines respectively. Those that got agricultural information through radio were 151, representing 61.63% of the total valid responses. The majority respondents (235; 95.92%) accessed agricultural information through their local agricultural extension office.

4.13 Effectiveness of Extension Service in Improving Crop Diversification.

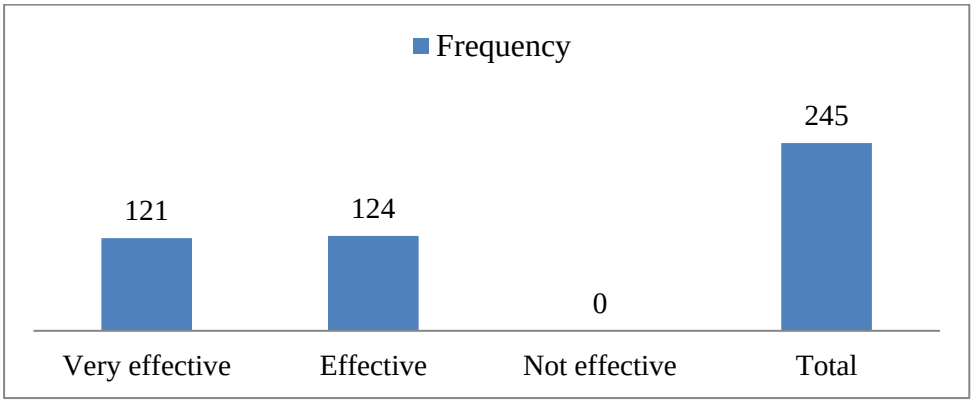


Fig. 21: Effectiveness of Extension Service in Improving Crop Diversification.

Fig. 21 indicates that the role of extension service in improving crop diversification was perceived by all the respondents as none of them suggested that it had no impact. 121 (49.39%) responses rated the impact as very effective while 124 (50.61%) rated it effective.

4.14 Suggestions on the Improvement of Extension Service Provision.

The respondents suggested that there was need to recruit and deploy more Agricultural Extension Workers in order to improve the efficiency and effectiveness of service provision. This would be achieved by reducing the size of catchment areas thereby improving easy reach to individual farmers.

4.15 Statistical Tests of the Hypotheses.

4.15.1 Chi Square Test of Association.

$H_0$1: There is no significant association between uncertain market for non-staple food crops and crop diversification.

Table 22: Chi Square Test of Association; $H_0$1

(Uncertain Market) **Response**	(Crop Diversification) Yes	No	**Total**
High	204	0	204
Low	0	41	41
Total	204	41	245

Pearson chi 2 (1) = 245.0000 Pr = 0.000

The statistics showed that the calculated Pearson Chi-Square result was at p = 0.000, measured with the assumed α = 0.05 (at 95% level of significance). The calculated probability is less than α = 0.05, we reject the null hypothesis and accept the alternative hypothesis. Therefore, there is a significant association between uncertain market for non-staple food crops and the success of crop diversification.

4.15.2 Chi Square Test of Association.

$H_0$2: There is no significant relationship between government-subsidised inputs for non-staple food crops and crop diversification.

Table 23: Chi Square Test of Association; $H_0$2

(Govt. Subsidised Inputs) **Response**	(Crop Diversification) Yes	No	**Total**
Very High	81	123	204
High	41	0	41
Total	122	123	245

Pearson chi 2 (1) = 49.6438 Pr = 0.000

The statistics showed that the calculated Pearson Chi-Square result was at p = 0.000, measured with the assumed α = 0.05 (at 95% level of significance). The calculated probability is less than α = 0.05, we reject the null hypothesis and accept the alternative hypothesis. Therefore, there is a significant relationship between government-subsidised inputs for non-staple food crops and the success of crop diversification.

4.15.3 Chi Square Test of Association.

$H_0$3: There is no significant correlation between extension service provision and crop diversification.

Table 24: Chi Square Test of Association; $H_0$3

(Extension Service) **Response**	(Crop Diversificat.) Yes	No	**Total**
Very High	121	0	121
High	83	41	124
Total	204	41	245

Pearson chi 2 (1) = 49.6438 Pr = 0.000

The statistics showed that the calculated Pearson Chi-Square result was at p = 0.000, measured with the assumed α = 0.05 (at 95% level of significance). The calculated probability is less than α = 0.05, and in this regard, the corresponding specific objective was achieved and we reject the null hypothesis and accept the alternative hypothesis. Therefore, there is significant correlation between the provision of extension service for non-staple food crops and the success of crop diversification.

4.16 Discussion

The study findings show that the government does not provide market for both produce consumption and inputs for non-staple food crops. Further indications are that the introduction of the Farmer Input Support Program, whose input supply is coiled around maize, led to drastic reductions in crop diversification and the provision of extension services is equally inadequate. The findings of this study revealed that the provision of consumer market and the supply of inputs for non-staple food crops by government have a significant influence on the participation of small-scale farmers in crop diversification. The other factor that was found to be compromising the involvement of small-scale farmers in crop diversification is the inadequacy in the provision of extension services.

The results of the statistical tests conducted on the hypotheses fostered the coming up of the above facts. With reference to specific objective number one, to investigate the effect of uncertain market for non-staple food crops on crop diversification, the research findings have shown that uncertain market hindered the practice of crop diversification. $H_0$1: There is no significant association between uncertain market for non-staple food crops and crop

diversification, had all the 245 responses in support, with 204 and 41 responses rating the influence of a stable and guaranteed consumer market for non-staple food crops as high and low respectively (table 22). The findings from these responses indicated that government had not provided market for non-staple food crops. The Pearson's Chi Square Test of Association result was at p = 0.000 (table 22). The second specific objective, to establish whether government subsidised inputs have an influence on crop diversification, was investigated and findings suggested the presence of a significant influence. $H_0$2: There is no significant relationship between government-subsidised inputs for non-staple food crops and crop diversification, obtained 245 responses out of 245 valid responses against, with 204 giving a 'very high influence rating' and the other 41 rated the influence as just high (table 23). These results indicated that government had not provided inputs for non-staple food crops and still did not subsidise such inputs despite the recorded availability of outlets. The Pearson's Chi Square Test of Association result was at p = 0.000 (table 23). According to investigations on specific objective number three, to determine the impact of agricultural extension service provision on crop diversification, it was revealed that extension service influenced crop diversification. $H_0$3: There is no significant correlation between extension service provision and crop diversification, had 121 'very high' ratings and 124 'high' ratings, giving a total of 245 valid responses (table 24). The findings indicated that the camp had had an Agricultural Extension Officer throughout the current season and the past five farming seasons. The point of contention was the quality and frequency of the provided extension services. The Pearson's Chi Square Test of Association result was at p = 0.000 (table 24). Although all the respondents (245) confirmed the presence of an Agricultural Extension Officer during the 2016/2017 farming season and beyond, their access to information through the extension office was confirmed to have been poor. All the 245 responses indicated that they only accessed extension services from the Agricultural Extension Office during the farming season. 82 responses suggested consistence of extension service provision during the farming period while 163 other responses indicated that they only accessed agricultural information, through the extension office, during the farming season and on rare occasions.

According to Matandiko, (2010), Zambia's agricultural sector has continued to record substantial growth in recent years as evidenced by successive bumper harvests. The growth is largely due to various government policies such as the Farmer Input Support Program (FISP), which accords small-scale farmers, across the nation, access to fertiliser and seed for their

farming activities. He further recognizes the fact that the sector's growth is coiled around maize cultivation, which should raise concern as there are other cash crops or high-value crops like cassava, sorghum and millet that need to be promoted to ensure sustainable national food security. It is indeed true and evident in the findings that the current cropping system is not diversified. The many high-value crops have been neglected. Such crops, which might not be food crops, have the potential to give farmers substantial marginal earnings.

Matandiko (2010), further highlights that farming has become a money-spinner, hence the need for diversification to ensure crops that are required on both the local and international markets are readily available. The researcher found it prudent to be in tandem with Matandiko on his observations about the nature of the growth of Zambia's agricultural sector and the state of the market and marketing infrastructure for non-staple food crops. It is true that crop diversification has not been supported in terms of the creation and provision of consumer market as well as the supply of inputs for non-staple food crops. According the generated statistics, there is need for huge investment in subsidised inputs and market establishment for non-staple food crops if crop diversification is to be enhanced.

For meaningful and sustainable agricultural development and food security to be attained, support should be extended to crops beyond maize (non-staple food crops), in terms of the provision of consumer market and inputs. The support for and improvement of the production of a variety of crops, majorly, non-staple food crops which are of high value, would foster the decongestion of the maize market, thus giving rise to market prices for maize and its products, which would consequently lower the cost of production of the staple food crop.

Maarten and Alarcon, (1992), reported that in spite of higher economic returns to household resources (land and labour) from cash crops than from basic staple food crops, a number of risks for smallholder farmers are associated with increased diversification and commercialisation. These include; income loss from crop failure, market price variability over time, weak and inefficient marketing institutions, higher input requirements, and thus greater need for credit and extension services, which are typically lacking for small-scale farmers. Zambian small-scale farmers are no exception. The two writers justifiably put to light the fact that income loss due to crop failure, market price variability, weak and inefficient marketing institutions, higher input requirements and the increased need for credit and extension service provision, are great risks to and are lacking among small-scale farmers. These factors need to be addressed so as to create a stable environment for agricultural

production and profitability through diversified cropping.

In the history of agricultural advancement, we see India emerging vigorously from poverty and persistent food shortages to self-sufficiency and 'economic power-house'. India's performance during the post-independence period has been a matter of pride and satisfaction. The agricultural sector has left behind the era of food shortages and dependence on imports and arrived at a stage of self-sufficiency and occasional surpluses. India has not only become self-reliant in food grains but has also acquired sufficient resilience to tide over the adverse conditions. These achievements are the result of a successfully implemented policy framework of improving rural infrastructure including irrigation, research, extension, provision of agricultural inputs at reasonable prices and marketing support through minimum price mechanism (Hazra, 2002).

The researcher agrees with Hazra that the designing and implementation of good policies that can sufficiently address matters of input supply, market and marketing framework, land tenure and adequate provision of extension services, among others, can spearhead and quickly transform the 'face' of agriculture in Zambia and enhance economic growth, stability and resilience. If this was successfully achieved by India, it is therefore achievable by any other nation, provided essential policies are identified and supported sufficiently.

4.17 Conclusion

The study revealed that the area (Nega-nega Agricultural Camp) is dominated by small-scale farmers of low economic status. This was vindicated by the low average annual income for the farmers in the area. The participation rate of small-scale farmers in crop diversification is very low and it is affected by the lack of government initiated and supported market and input supply mechanisms for non-staple food crops. It was also revealed that the provision of extension services was not adequate. Poor quality extension services, given only during the farming season, do not favour or support the competitive involvement of small-scale farmers in crop diversification.

4.18 Recommendations

Having successfully conducted the study and understood the interpretations of the findings, the researcher recommends that;

1. Individual farmers take keen interest and initiative in adopting crop diversification.

2. The government initiates the designing and creation of consumer market and input supply mechanisms for non-staple food crops, in order to encourage small-scale farmers' involvement in crop diversification.
3. The government, in partnership with other stakeholders, re-designs the extension services provision framework such that there will be an improvement in the extension officers' attitude towards work, which may facilitate the delivery of good quality and up-to-date technical information on agriculture to farmers.
4. The government introduces and improves agricultural media programmes and facilitate farmers' access to information.
5. The government reforms and restructures the Farmer Input Support Program (FISP) and the Food Reserve Agency (FRA) into full-scale government entities that will supply subsidised inputs for high-value crops and provide market for all crop produce beyond the staple food crop.
6. Other academicians conduct similar or related studies in various areas in order to fully justify the authenticity and credibility of the findings of this study, as well as to provide evidence, whether or not crop diversification is essential for food security and economic improvement, stability and resilience.

5. Acknowledgment

A project of this nature and magnitude is impossible without the intellectual, editorial and practical assistance from other people. As a result, I would like to take this opportunity to acknowledge the input of the following people: Mr. Muvwanga, M.C., the Thesis Advisor and Lecturer at Information and Communications University, Dr. William Phiri, PhD, Lecturer and Coordinator of the School of Education at Information and Communications University and Ms. Kalinda Chiputa, Lecturer in the School of Education at Information and Communications University for their invaluable guidance and supervision. I further extend my gratitude to Mr. Mweemba Hibajene, Dean of the School of Education at Rusangu University, for his intellectual contribution, Ms. Charity Monde for her technical and moral support and Mr. Urgent Cheelo, Teacher of Languages and Literature at Kapululira Secondary School, in Chirundu district, for proofreading my work.

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