A comparative analysis of government farm input support programmes and private sector credit programmes in promoting agricultural growth in Zambia

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DECLARATION

I Herman Lukwesa declare that the thesis, which I hereby submit for the Degree of MSc Agric (Agricultural Economics) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution

Signature: ----------

Date: ----------

DEDICATION

This thesis is dedicated to my dear beautiful wife Sandra Chibuye Lukwesa, my handsome son Chebo Emmanuel Lukwesa, my mom Joy. B. Lukwesa, my late dad Mr Stephen Lukwesa, my late mother in-law Harriet Mary Chibuye, my Brothers and Sisters.

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To God be the glory. "It is not by might nor by power but by the grace of our lord Jesus Christ". May you bless the works of my hands and may others be blessed through my work.

ABSTRACT

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By

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Degree: MSc. Agric (Agricultural Economics)
Department: Agricultural Economics, Extension and Rural Development
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This study assesses the impact on agricultural productivity of the Farmer Input Support Programme (FISP) as well as the impact of credit provided to small-scale farmers by commercial banks. It compares the two strategies by government (i.e. FISP which is a government subsidy programme and government grants to commercial banks for on-ward lending to small-scale farmers). This is to determine which policy intervention is promoting agricultural growth among the targeted farmers. The study hypothesises that subsidies through FISP and credit from private lending institutions allow farmers to have access to production inputs and reduces production costs. This enables farmers to maximise output leading to an increase in productivity and growth.

This study was done by conducting a survey and data was collected using a structured questionnaire. Descriptive statistics and Ordinary Least Square (OLS) criterion are the methods used and the tool for analysis was the Statistical Package for Social Scientist (SPSS).

Simple random multistage stratified purposive sampling was used in selecting household respondents. Multistage in the sense that the farm settlements were not defined in a particular pattern with house numbers. Stratified purposive sampling in the sense that farmers had to be separated according to the kind of institution they benefited from. The sample size for the study was 140 individual household for small-scale farmers.

Major findings of the study showed that loan beneficiary farmers were investing more in productive assets compared to FISP beneficiary farmers. They had even showed elements of diversification as

they were investing more in small livestock such as chickens, goats and pigs unlike the FISP beneficiaries. They had also spent a total of Zambian Kwacha (ZMW) 48, 100 compared to ZMW 28, 462 spent by FISP beneficiaries on productive assets. In terms of investments for assets used in the home, we concluded that both groups had a similar lifestyle but FISP farmers had a higher standard of living compared to loan beneficiary farmers as they had spent 10.6% more in terms of expenditure.

The field plots under cultivation were grouped into three categories, i.e. farmers who cultivated plots below 2.5 hectares, 2.6 hectares to 5.0 hectares and above 5.1 hectares to assess which category of farmers was showing growth in terms of land under cultivation. For the 11% FISP beneficiaries who had graduated from the below 2.5 hectares of land being ploughed to the middle bracket, only 1% of the farmers managed to sustain their increase in ploughed land. There were no farmers who managed to plough above 5.1 hectares of land under the FISP category. As for the loan beneficiary group, we see movement in all three categories indicating growth in terms of productivity. We noticed that from the 4% farmers who managed to graduate from the below 2.5 hectares category to the 2.6 hectares to 5.0 hectares category, a further 3% of the beneficiaries managed to graduate to the above 5.1 hectares of area ploughed.

We determined variability in output by examining its relationship with independent variables such as educational level attained, fertiliser quantity used, maize seed quantity used and access to assets (oxen) *ceteris paribus*. Only fertiliser and hybrid maize seed use were found to be statistically significant with p-values below 5% and 10% significant levels respectively in both cases. A 1 kilogram (kg) increase in fertiliser and hybrid maize seed use would result in a 0.69% and 0.26% increase respectively in the quantity of 50 kg bags harvested for FISP beneficiary farmers. A 1 kg increase in fertiliser and hybrid maize seed use would result in a 0.83% and 0.11% increase in the quantity of 50 kg bags of maize harvested by the loan beneficiary farmers.

Comparing the two beneficiary groups in terms of productivity and income earned through the sale of maize on the market, the loan beneficiary group was found to be doing far much better compared to the FISP group. In the 2009/10 farming season, the loan group sold a total of 6754 bags of maize compared to 3428 bags sold by the FISP group. In the 2010/11 farming season, the loan group sold 7769 bags as opposed to the 4606 bags sold by the FISP group while in the 2011/12 farming season,

the loan group sold a total of 9151 bags of maize on both markets compared to 4822 bags of maize that was sold by the FISP group.

Though it may be difficult to distinguish the real effects of both the FISP and loan programme on its beneficiaries due to lack of baseline information based on regression results alone, and claim that it has made either group better than the other, it is clear that the fertiliser support policy is working better for loan beneficiaries when compared to FISP beneficiaries. This gives them an edge in income over FISP beneficiaries and graduates them into higher brackets of productivity and asset possession leading to higher yields, more income and increased growth in agricultural productivity in general.

It is recommended that educational level attained should be one of the major criteria for farmer selection when introducing new advanced technologies to increase productivity. The other recommendation is that, to invest in improved ploughing methods such as use of oxen, the area under cultivation should not be less than 2.5 hectares. It is also recommended that government should increase service delivery in an efficient manner as it has positive externalities on farmers dealing with the private sector as well other than just those targeted farmers they are servicing under the FISP programme.

Key Words: Subsidies, Credit, Productivity, Agricultural Growth

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LIST OF ACRONYMS

AMIS	Agricultural Market Information System
ANOVA	Analysis of Variance
CLUSA	Common League for United States of America
CSO	Central Statistics Office
CUSA	Credit Union and Savings Associations
DRC	Domestic Resource Cost
FAOSTAT	Food and Agricultural Organisation Statistics
FISP	Farmer Input Support Program
FRA	Food Reserve Agency
FSP	Fertiliser Support Program
FSRP	Farming Systems Research Program
GDP	Gross Domestic Product
Ha	Hectare
IAS	Institute for African Studies
IFDC	International Fertiliser Development Centre
IFPRI	International Food Policy Research Institute
IMF	International Monitory Fund
Kg	Kilo gram
MACO	Ministry of Agriculture and Cooperatives
MAFF	Ministry of Agriculture Food and Fisheries
MMD	Movement for Multiparty Democracy
NAMBOARD	National Agricultural Marketing Board
NGO	Non Governmental Organisation
OLS	Ordinary Least Squares
PF	Patriotic Front
RGB	Rural Group Businesses
R&D	Research and Development
SPSS	Statistical Package for Social Scientists
SSA	Sub-Saharan Africa
UNDP	United Nations Development Program
UNIP	United National Independence Party
USAID	United States of America International Department
ZANACO	Zambia National Commercial Bank
ZCF	Zambia Cooperative Federation
ZCF-FS	Zambia Cooperatives Federation Financial Services
ZMW	Zambian Kwacha Rebased
ZNFU	Zambia National Farmers Union

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Zambia, in which 35 percent of the population of approximately 14 million live in urban areas, is among the most urbanised countries in sub-Saharan Africa. One major reason for the high rate of urbanisation is that the economy used to be heavily dependent on copper mining (Holden, 1997). Sixty-five percent of the population are rural and rely mainly on smallholder agriculture. However, agriculture has contributed only 15-30 percent to GDP in recent years (IMF, 1999; Wichern *et al*. 1999; World Bank, 2006), indicating that agricultural productivity and growth have been only modest.

The Zambian government played a heavy controlling and regulating role in the agricultural sector immediately after independence in 1964 until the early 1990s (Wichern *et al*. 1999). Since the aim of government policy was to ensure the availability of cheap staple food, hybrid maize production was promoted through research, extension, credit, input supply, marketing, and price-subsidy programmes funded by the government and various donors (Holden, 1997).

In this policy environment, maize production was meant to be largely free of uncertainty, which led to a rapid expansion from the 1970s until the early 1990s. Smallholders enjoyed conditions close to contract farming even in the more remote areas, with the government providing them with seed and fertiliser, and guaranteeing marketing, transport and prices through parastatal National Agricultural Marketing Board (NAMBOARD) and later through cooperative channels (Wichern *et al*. 1999). The cost to the government of such agricultural policies was high and the system was considered inefficient (Kydd, 1989). In 1990, 13.7 percent of the government budget was used for producer and consumer subsidies in order to maintain low maize prices for urban consumers (McCulloch *et al.* 2000). There was a decline from the 1980s when the average annual budget share for subsidies was reduced to 20 percent from 40 percent (Deininger & Olinto, 2000). Because of the escalating government budget deficits, the input-distribution system started suffering from severe delays (Seshamani, 1998), thus preventing timely cultivation.

The new Movement for Multiparty Democracy (MMD) formed government in 1991. The liberalisation of the economy gathered pace because of the fiscal crisis, the influence of the international financial institutions, the intolerably high costs to the national economy caused by the agricultural sector, and the more liberalisation-friendly attitude of the new political regime. The main elements of the agricultural reforms included the dismantling or privatisation of the state-owned marketing and processing institutions and the input and credit-distribution systems, the abolition of producer and consumer subsidies, the gradual lifting of export and import restrictions, and the introduction of market-based price determination (Seshamani, 1998). The result of these policy measures was a major decline in the productivity of the small-scale farmers as it become difficult for them to access affordable inputs.

In 2001, it was estimated by the Ministry of Agriculture and Cooperatives (MACO) that just 20% of small-scale farmers had access to fertilizer and only 30% smallholders' households managed to access improved maize seed varieties. It was therefore perceived by government that small-scale farmers were economically too weak to provide sufficient demand for inputs provided by the private sector and this led to problems of low farmer productivity and increases in poverty and food insecurity at household and national level. Input provision programmes that existed previously since liberalisation proved to be unsustainable as they suffered from poor credit recovery rates (World Bank, 2010). Because of these poor credit recovery rates, the private commercial banks were reluctant in providing loans to small-scale farmers because of the poor credit track records. This even made it more difficult for farmers to source income for input purchases which were already proving to be expensive in the liberalised market environment.

The Government of the Republic of Zambia designed the Farmer Input Support Programme commonly known as the Fertilizer Support Programme (FSP) in 2002, which was aimed at improving access of small-scale farmers to inputs and enhancing the participation and competitiveness of the private sector in the timely supply and distribution of agricultural inputs in adequate amounts. The FSP was intended to see government disengaging from the provision of credit by selling inputs directly to small-scale farmers on a cost sharing basis. It was also expected that additional demands for inputs would be created on top of the benefits that would accrue to farmers. With the new market opportunities opening up, it was anticipated that private input dealers would be motivated to supply inputs to rural areas. Thus the conception of the FSP was to build the capacities of both small-scale farmers and private sector input suppliers as a full market liberalisation transition process.

Initially, the programme was intended to run for 3 years until the end of the 2004/05 farming season. Unfortunately, the scale of FSP operations has grown significantly since the programme was launched in 2002, contrary to these expectations with the number of targeted farmers and the level of the subsidy increasing in each following year. The FSP (now renamed as the Farmer Input Support Programme) has been in operation for eleven years in Zambia since 2002/03 farming season. The emphasis is on government slowly withdrawing from the provision of agricultural services in order to allow the private sector to fill the vacuum created. Despite positive developments such as increased out-grower schemes and contract farming being recorded, the private sector still remains constrained in providing input and output marketing services (MACO, 2010).

This study intends to assess the impact on agricultural productivity of the FISP as well as the impact of credit provided to small-scale farmers by commercial banks. It tries to compare the two strategies by government (i.e. FISP which is a government subsidy programme and government grants to commercial banks for on-ward lending to small-scale farmers) to determine which policy intervention is promoting agricultural growth among the targeted farmers. This study was conducted by carrying out a survey which involved three institutions namely, Ministry of Agriculture and Cooperatives (MACO) specifically looking at the FISP programme, and Zambia National Commercial Bank (ZANACO) loans provided to small-scale farmers under Zambia National Farmers Union (ZNFU). The survey took place in Chongwe district of Zambia in Lusaka province. The unit of analysis was the individual households of small-scale farmers.

1.2 PROBLEM STATEMENT

Government designed the Farmer Input Support Programme with the aim to improve access of small-scale farmers to inputs and enhancing the participation and competitiveness of the private sector in the supply and distribution of agricultural inputs timely and in adequate amounts. While on the other hand, the government through the same Ministry of Agriculture and Cooperatives (MACO) has been disbursing grants to Zambia National Commercial Bank Plc (ZANACO) in which it owns 25% shares. These grants are disbursed to small-scale farmers as loans for agricultural inputs and are managed by the institution as a revolving fund.

Despite the government of Zambia's current national agricultural policy being centred and focused towards the liberalisation of the agricultural sector, there has been no clear laid down exit strategy of the government from the market. This is evidenced by the continued increase in the level of subsidies and the increasing number of small-scale farmers benefiting from the FISP each successive year. This is creating a situation where small-scale farmers are becoming heavily dependent on government subsidies and repeatedly look back to government intervention every new farming season.

While government is implementing parallel programmes of promoting financial institutions in providing financing for inputs to small-scale farmers, the continued increase in the level of subsidies being provided to farmers creates a perception of conflict of interest in policies and this crowd out the private sector from entering the market. While it is expected that the levels of subsidies and the number of beneficiary farmers is expected to be reducing as the government pushes towards liberalisation, the situation on the ground is contrary to what is expected.

Although both strategies, i.e. the FISP and loans from private banks aim at increasing productivity among the small-scale farmers and subsequently seeing them graduating to self-dependency. It has been observed that productivity still remains low with no clear indication as to which group of beneficiaries, i.e. those benefiting from subsidised fertiliser or loans from the private sector are moving towards attainment of the government objective. It will be easy to conduct a comparative study of the two strategies despite their different implementation strategies because the products under investigation are homogenous. The core components of both programmes are hybrid maize seed and fertiliser, and all the small-scale farmers benefiting from these programmes face the same market for their output product. The overall effect of the two pro-poor policies with regard to

income generation differs depending on the implementation strategy applied and the transaction costs involved. We can hence expect significant differences between beneficiaries of subsidies when compared to those on credit schemes.

Beside implementation hitches that have been cited by some researchers (Lumba, 2009), no major attempts have been made to evaluate the effect of the programmes on small-scale farmers. However, periodic income based measures of United States Dollars US$1.25/day (Simler, 2007; WDI25, 2010) being carried out by the Central Statistics Office (CSO) indicate high poverty levels among these farmers despite the FISP and other credit schemes being in place. This may suggest that programmes have not been so successful in tapping into the sector's potential and thereby reducing poverty. With asset-based measure, a new insight as to why the programmes may not be achieving their objectives at a desired rate and as to which policy is more effective will be highlighted by this study.

1.3 RESEARCH OBJECTIVES

The main objective of this study is to compare the Farmer Input Support Programme (FISP) which is managed by government through the Ministry of Agriculture and Cooperatives to the agricultural loans managed by private lending institutions (grants provided by government to financial institutions), to determine which strategy is promoting growth among small-scale farmers through productivity, income and asset based measurement.

The following specific objectives guided the study;

- To determine the effectiveness of FISP in promoting agricultural productivity and growth among small-scale farmers;
- To determine the effectiveness of private institution credit programmes in promoting agricultural productivity and growth among small-scale farmers;
- To determine which strategy (government subsidy on inputs or credit from the private sector) is more effective in improving access to inputs and increasing productivity and growth.

1.4 RESEARCH HYPOTHESES

The hypotheses of this study are as follows:

- Subsidies through FISP reduce production cost which allows farmers to maximise output leading to an increase in productivity and growth;
- Credit from private institutions allows farmers to have access to production inputs which allows farmers to maximise output leading to an increase in productivity and growth; and
- The private sector strategy is more effective in promoting access to inputs than the FISP government strategy.

1.5 RESEARCH QUESTIONS

The research questions for this study are as follows:

- To what extent had FISP or credit from commercial banks increased productivity, income and asset base for small-scale farmers?
- Did farmers buy more fertilizer and improved seed by accessing FISP or credit?
- Did the farmers actually apply more fertilizer and use improved seed?
- Did the application of fertiliser and use of improved seed lead to a higher output and reduced cost of production?
- Did the high output and reduced cost lead to higher incomes?
- Did the high income lead to productive asset building and poverty reduction?

1.6 JUSTIFICATION OF THE STUDY

Most of the population in Zambia and sub-Saharan Africa as a whole is rural based and depend on agriculture as a major source of employment and livelihood. With most of the rural population wallowing in abject poverty and hunger, agriculture remains the best avenue and vehicle for promoting economic growth and poverty eradication in the region. With the agricultural sector being dominated by small-scale farmers, governments and donors have tried various strategies to promote growth in the agricultural sector but these efforts have proved to be less effective as the poverty levels continue to worsen.

The agricultural industry is very dynamic and seasonal in nature and is thus affected by global trends such as climate change, global recessions and other various natural and human factors. This entails that the policy environment is continuously changing and policy makers and academicians need to constantly research and revise existing policies to conform to current global trends.

This study intends to highlight the most effective strategies of promoting agricultural growth among small-scale farmers through government interventions. It further provides insights as to why despite numerous efforts by the government and donors to promote agricultural growth, the sector still remains stagnated and the levels of poverty still continue worsening in sub-Saharan Africa, Zambia in particular. It also enlightens policy makers on the most effective means of government intervention in the agricultural sector at the small-scale level, as to whether it is through subsidies or credit through government autonomous lending institutions. The study also enlightens policy makers on strategies by which the private sector can be stimulated to provide effective and efficient services to small-scale farmers to promote agricultural growth.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews literature on the structure and performance of the agricultural sector in Zambia. It further looks at the agricultural subsidies and credit in sub-Saharan Africa and also reviews literature on government intervention in the agricultural sector in Zambia.

2.2 STRUCTURE AND PERFORMANCE OF THE AGRICULTURAL SECTOR IN ZAMBIA

The Zambian agricultural sector is mainly composed of both small-scale and commercial farmers. According to Siegel and Alwang (2005), the dualism is distinguished on different fronts which include:

- Mechanisation and technological use;
- Orientations in markets and practices of cultivation;
- Types of crops produced;
- Location factors such as agro-ecological zones, market proximity and transportation access; and
- Land distribution, human capital and financial assets which differ according to different household.

Majority of the farmers in the agricultural industry are small-scale farmers who account for 85% with commercial farmers accounting for 15% in the sector (MACO, 2010).

Like any other developing country, agriculture plays a significant role in the economy for Zambia. Despite the country being endowed with abundant arable land in comparison to other countries in Africa, it only utilises a quarter of the available land for agriculture. According to (Institute of African Studies) IAS (1996), farming provides for about 60 percent of the population's livelihood and the contribution of agriculture production towards Gross Domestic Product (GDP) has remained in the range of 20 to 30 percent in the past years. Half of the total food crop produced is utilised as seed stocks and for subsistence purposes.

Small-scale farmers rely on simple mechanisation tools such as hand hoe and oxen, and usually employ traditional methods of farming such as fundikila and chitemene. They mainly grow rain fed crops such as maize, pulse, tubers, groundnuts and roots which are usually for home consumption. Family household is usually the main source of labour and productivity is quite low due to non use of improved inputs such as inorganic fertilisers and hybrid seed (Siegel and Alwang, 2005). Small-scale farmers cultivate only a few hectares of land under these prevailing conditions of farming mainly for subsistence use. Excess produce if any is however sold at local markets or to neighbours.

On the other hand, large-scale farmers are highly mechanised and cultivate vast hectares of land using hired labour and modern inputs. They grow crops like maize, soya beans and other cash crops and don't only depend on rain-fed agriculture because they have access to irrigation facilities. They are mostly situated around urban centres with access to good physical infrastructure and trade in local and international input and output markets.

There is pronounced domination of maize produce in terms of cropping patterns. For instance, crop production in 1990 made up 55 percent of the total agriculture output. Of the land devoted to total crop output, more than 50 percent of it is cultivated with maize. This dominance in maize production is in response to pan-temporal pricing and pan-territorial systems adoption to maize production and marketing subsidies provided before the reforms in 1992. Small-scale producers in remote areas in effect had their maize production subsidised through the pan-territorial pricing system. After the mid 1980s, the portion of small-scale farmers involved in maize production rose from 60 percent to 80 percent and also there was a rise in the uptake rate of improved maize varieties from 31 percent in 1985 close to 58 percent in 1990 marking one of the highest adoption rates in sub-Saharan Africa (SSA) (World Bank, 1995). There was also a relative shift in the production of maize away from the line of rail to outlaying rural areas at the same time. For instance, Central Province's share of production in maize declined from 37 percent in 1980 to 25 percent in 1990.

2.3 CONSTRAINTS IN AGRICULTURAL PRODUCTION IN ZAMBIA

This section looks at several constraints on agricultural production in Zambia. Others are a result of market failures and the lack of public goods provision, and some are of technical nature.

2.3.1 CREDIT MARKETS

Traditionally, credit was provided through three main agricultural lending institutions namely Credit Union and Savings Association (CUSA), Lima Bank and Zambia Co-operatives Federation Finance Services (ZCF-FS). The primary target of these three organisation's activities was small-scale farmers through giving credit as seasonal short term loans. Large-scale farmers obtained their medium to long term loans from commercial banks. Despite large-scale farmers not being directly subsidised through cheap loans, the negative real interest rate which prevailed for parts of the period before 1994 as a result of controlled fixed interest rates indirectly subsidised their operations.

There was a slow movement of interest rates upwards from 3 percent in 1964 to 5 percent in 1974. By 1979, they had gradually been raised to 7.3 percent. Between 1983 and 1987, there was a temporal decontrol of interest rates that occurred under the World Bank reforms that saw the lending rates rising to 36 percent high. In May 1987, the lending rates were fixed at 16 percent after abandoning reforms while inflation stayed at 41 percent. Commercial farmers tried taking advantage of the cheap loans thereby over-exposing themselves to debt. They were consequently caught off guard by the financial market liberalisation which was initiated in 1993. In June 1993, interest rates increased to 135 percent suddenly throwing most commercial farmers in a financial crisis due to the shooting up of their debt service requirement overnight. Because inflation stayed between 150 and 200 percent, it made the real interest rate to still remain negative (Wichern *et al*. 1999).

Because of insufficient access to credit and low farm profitability, small-scale farmers' capital investments for intermediary goods and farm improvements were hindered. ZCF-FS, CUSA and Lima Bank who were the small-scale farmers' only source of credit mainly provided short-term loans. For instance in the period between 1988 to 1991, about 91 percent of loans from Lima Bank were disbursed to finance crop production and between 2 to 5 percent was provided for machinery (Kalinda, 1997).

Because of the non-requirement of savings by most credit schemes as prerequisite for acquiring a loan, most small-scale farmers didn't accumulate individual capital for investing. In the 1980s, agricultural assets were estimated at US$1000 per farm household excluding crop inventories and cash/bank deposits. Farm machinery only accounted for 5 percent while animals accounted for most of the amount. Farm equipment accounted for 29 % of total assets in the commercial sector. While about 20 percent had applied, only 12 percent of the farmers received some form of formal loans

(IAS, 1996). There are two ways to interpret the low rate of applicants, either they encountered problems of an unequal distribution (no need for collateral in these programmes) or farmers never recognised the value of credit despite the real interest rate being fixed and negative (Wichern *et al.* 1999).

About 21 percent of governments' expenditure every year was spent giving funds to the agricultural credit institutions. Because of the poor recovery rates, the institutions failed to pay back these funds even though they were expected to do so. The poor recovery rates were as a result of poor farmer targeting, lack of loan security for the extended loans and low levels of profitability among borrowers. CUSA, Lima Bank and ZCF-FS being parastatal organisation were negatively affected from the borrowing attitudes of small-scale farmers who viewed every loan from the government as a grant. They also considered the loans as insurance in drought years and refused to repay it of which the government tolerated this behaviour (IAS, 1996). The government pronounced a stop on the provision of money for agricultural loans as part of on-going reforms. In February 1997, Lima Bank was liquidated and there was a collapse of credit facilities to small-scale farmers as CUSA and ZCF-FS stopped lending to them (Wichern *et al*. 1999).

With the collapse of credit, there was evidence that it had a reduced impact on utilisation of inputs like fertiliser and improved seeds among small-scale farmers. This led to a significant decrease in yields and income for the farmers. Nonetheless, with the demise of traditional credit, two developments had emerged. Due to credit squeeze, contract farming came on the scene and was common for cash crops such as cotton, tobacco and coffee. It also broadened to include other crops such as soybeans, maize, groundnuts, paprika and sorghum in minor cases. The contractor delivered inputs as well as extension services to the contracted farmer anticipating a specified amount of output at harvest in a typical contract.

Through the various forms of these interlocking transactions, it was estimated that over 31% to 42 % of small-scale farmers were covered which was much higher compared to the number that was acquiring loans in the 1990s. However, none provision of medium to long term loans for investing in capital was not resolved through contract farming (Wichern *et al*. 1999).

The second benefit was that of farmers learning the efficient use of inputs which were being misused in the past because of subsidised fertiliser sales and cheap credit. Other soil nutrient sources like animal manure became common in the 1990s (Njobvu & Tembo, 1996)

2.3.2 MARKETS FOR LAND

In Zambia, 17 percent of the estimated 9.1 million hectares of farming land is used regularly while only 6.1 percent of the irrigation land with potential of 3 to 4 million hectares is utilised for irrigation. This is a clear sign that land as a resource can't be taken as a major constraint for further agricultural development. The tenure system in Zambia classifies land in 3 classes: State, Reserve and Trust Land (Milimo, 1994). State land normally comprises of a stretch of land along the line of rail 50 meters on 2 sides and in outlying areas, including a few portions of land. It was earmarked for mining activities and European settlers. It is held under a 99 year lease period and amounts to three million hectares. Reserve land was put aside for the local people and later combined with trust land after land degeneration was noticed in reserve land due to overcrowding. They amount to twenty four million hectares and were both allocated under customary law and now called as traditional land.

Development of land markets in Zambia have been constrained by three factors. According to Wichern *et al*. (1999), first the Land Act which was passed in 1975 from fear of creating a landless society declared all land non-tradable and with no commercial value excluding the improvements on the land. Land was traded effectively through the loophole of land improvements though these improved lands fetched values far in excess of their market value although this provision prevented the establishment of a free land market as subdividing and selling to others by those people with vast land was not allowed.

Second, traditional leaders were responsible for land allocation as the community owned it. Individuals possessed free access to its use though no titles were given for the land. Traditional leaders allocated a piece of land for use to a household and left the rest for community purposes e.g. grazing (Milimo, 1994). This meant that individuals got the rights to use land and keep the harvest but were not allowed to sell the land as they didn't get the whole set of property rights. This provision was efficient in accessing of land to everyone who settled on traditional land. As presents were given to the chief from the people of the community, the land apportioning to individuals could have been considered efficient the fact that the value of a gift weighed proportionally to the increase in the lands marginal utility the household was acquiring. The transition from subsistence to commercial farming could have possibly been made difficult from this division of property rights. It was impossible to obtain medium and long term credit on the pretext of land ownership as

it wouldn't be offered as collateral explaining the reason as to why small-scale farmers possessed low levels of capital assets.

Yet on the other hand agricultural growth may be facilitated by land abundance in principle. Agricultural growth prospects are drawn back due to the low population growth in Zambia and the costly scarce infrastructure and marketing facilities. If this is the case, then complete granting of rights to property by itself can't lead to sufficient increase in production. Large piece of land in Zambia is still left idle due to infrastructure problems (Wichern *et al*. 1999).

The Land Act of 1995 under Section 4 states that "from the commencement of this Act, land in Zambia shall be of value" aims to do away with the "no-value" including communal land" constraints earlier mentioned. This declaration allowed land owners to sell the land even without any development. The liberalisation of the land market started lots of activities where numerous farms were being subdivided and sold. The Act also enabled occupants of traditional land to get title. Chiefs were also able to allocate leasehold titles to persons.

Many government departments have to be consulted although the land administration is centralised in Lusaka. Owners of land have to pay a tax whose magnitude is not fixed overtime making land ownership less attractive due to the uncertain cost land owners face. Access to land for Agricultural use has little to do with the short comings of Zambia's land tenure system. There is no constraint to small-scale farming except the inability to offer collateral and motivate holders to invest in land improvement is critical. Rise in farm investment like irrigation is tied to a precondition of titling land. Improvements as such would lead to increased agricultural growth (Wichern *et al*. 1999).

2.3.3 LABOUR CONSTRAINTS

With the provision of intermediate goods scarce, potential output growth in agriculture is dependent on increased labour supply. Labour and seasonal constraints are usually considered as major constraints to Zambia's agricultural growth. This seems to be plausible as Zambia has one of the highest urbanisation figures in Africa which stands at around fifty percent though low labour productivity seems to be the main problem. On small-scale farms between 1982 and 1994, one farm worker covered on average 0.5 hectares (IAS, 1996). Low level mechanisation (hand-hoe cultivation) certainly cannot be the only attribute to this low level value.

The quality and organisation of labour both seemed to establish the low percentage of land under production in addition to quantity constraint. Partition of labour among women and men was not equal and did not reflect comparative advantages. “Weeding is a female activity” restriction was a hindrance to increases in labour output. Poor health and education status among the rural people influenced the labour quality. Diseases were most common in the rain season when the demand for labour was highest. (Njobvu *et al*. 1995)

According to Keyser (1995) comparing the Domestic Resource Cost (DRC) coefficients for small-scale and large-scale producers shows that small-scale farmers in Zambia are efficient. This is true more particularly for maize production according to calculations. If it is assumed that economic prices in the calculation of the DRCs are correctly calculated, it is necessary to show that these prices are for current prices only. To begin with, the measure depends on opportunity cost of labour, which is assumed very small. Increases in the cost means that farmers with less than 0.5 hectares per worker under production will become less efficient

2.3.4 PRICE AND MARKET INFORMATION

Early in 1993, the Agricultural Market Information System (AMIS) was initiated under the Ministry of Agriculture, Food and Fisheries (MAFF). Its aim was to enhance transparency of the market in maintaining of the arbitration processes and enhancing market incorporation (MAFF, 1995). AMIS started by collecting two processed products and wholesale prices of six major commodities on a weekly basis. A well planned scheme of gathering and passing on data covered all district centres a year later. Nevertheless, this system wasn’t sustainable overtime due to insufficient funding. The time series of prices for most locations and most products were incomplete with provincial centres having the best available information on maize. Apart from the data collection problems, the dissemination was less than satisfactory. There was a lot of radio broadcasting interruptions frequently and local level dissemination was reported to be unreliable. Weekly market bulletins were not hanged at their designated notice boards in many places by district officers.

2.4 AGRICULTURAL SUBSIDIES AND CREDIT IN SUB-SAHARAN AFRICA

The process of reforms initiated in the 1980s was expected to stimulate the economies through agricultural production in sub-Saharan Africa through improved market liberalisation. According to Kherallah *et al*. (2000), growing evidence could be seen that these reforms had led to enhanced fiscal balance, greater market integration; improved exports crop production, increased production and yields in some cases and reduced consumer food prices. Fertiliser to crop price ratios improved significantly after reforms leading to agriculture input use becoming less attractive to farmers on the other hand (IFPRI, 2000). The majority of small-scale farmers in Africa rarely use modern inputs particularly farmers situated in remote areas and those who have specialised in non-tradable food produce are subjected to high inter-annual and seasonal price changes. Despite this, pockets of improved fertiliser use have been reported. This is because poor infrastructure increases input costs while reducing output price (Kherallah *et al*. 2000).

The speed and model of agricultural growth in Asia was inclined more to investment in agriculture credit, research, fertiliser supply and distribution systems than by changes in prices of fertilisers or crops (Desai, 1988). On the contrary, reforms intended to improve agriculture price incentive, with paying no notice to non-price stimulants that influence farm level decision making have been the focus of the African reforms. The non-paying of attention to non-price stimulants such as technology and institutions has depleted the capability of reforms to convey price stimuli to the non-tradable sector which comprises food crops produced for domestic consumption (Barrett and Carter, 1994). A comparison in Asia and sub-Saharan Africa of fertiliser consumption trends outlines the extent of the crisis. There was an annual fertiliser consumption boost of 183 percent in Asia's developing countries between 1981 to 1990 and 1997 to 2000 while 16 percent was the similar growth for sub-Saharan Africa (FAOSTAT, 2003).

Africa has missed many opportunities to increase agricultural productivity and incomes as a result of years of slow growth in the adoption of modern inputs. Growth in income will still remain low if significant efforts are not made to increase acceptance of improved fertiliser responsive seed varieties, fertiliser use and productivity (IFDC, 2001; Westlake, 2002). Slow overall economic development and increased poverty is as a result of slow growth in agricultural productivity and income (Mellor and Johnston, 1984).

2.4.1 FINANCIAL AND ECONOMIC PROFITABILITY

Some studies have used financial and economic profitability to measure the increase in fertiliser use and economic benefit of these programmes to the community. However, the down side of such analysis is that it depends mostly at measuring input use levels and does not tell us the actual impact of the programmes on farmer's livelihood. Increasing input use to areas and farm where there is a reasonable expectation that their use is both financially and economically profitable is of primary concern. Financial profitability is the measuring of financial motivation for a farmer to use inputs and is approximated by using farm gate prices. They can be affected by output taxes or subsidies. Fertiliser recommendation were developed in the past using financial profitability only in the pre-reform period and often intended to achieve yields rather than profit maximising goals. This led to inefficient, expensive input support programmes because it made farmers to use fertiliser application rates which were not economically viable from a perspective of which many of these recommendations are still in force, regardless of recent studies showing that they are not financially profitable to-date (Benson, 1997).

Economic profitability also referred to as social profitability measures input use profitability at national level. This is estimated using output and input prices which prevail in the absence of subsidies and taxes. To avoid the investing of scarce resources towards input promotion programmes which don't yield net benefits to the country, it is essential for government to appraise the economic profitability of that programme (Howard *et al*. 2003).

According to Jayne *et al*. (2007), there is need to make some effort in verifying the economic and financial profitability of input before initiating a programme to stimulate input use. There are four possible combinations of financial and economic profitability that exist and each circumstance requires a different set of solutions:

- Technology research may be needed if inputs are neither financially nor economically profitable;
- The elimination of price policies that keep input prices high and output prices low may increase financial profitability if inputs are economically profitable;
- Governments need to do away with price distortions that add to financial profitability before they become a burden if inputs are not financially profitable but economically profitable; and

- Farmers are not using inputs when both financial analysis and economic analysis propose that input use by farmers will improve profitability.

2.4.2 CREDIT IN SUB-SAHARAN AFRICA

In sub-Saharan Africa (SSA), financial problems are pervasive and affect all economic sectors and all levels of the input sector. SSA governments ran a wide range of input credit programmes prior to reforms. Poor repayment rates in many poor countries led to huge government deficits that led in turn to donors setting conditions in terms of government expenditure. Currently, the agricultural loan problem in SSA is characterised as one of market failure linked with imperfect information in the presence of risk. It is costly to screen input credit applicants and contract enforcing institutions are weak and there is no insurance hence because of this, market failure occurs (Kydd *et al*. 2004).

Currently, the credit agricultural outlook in SSA is characterised by various small-scale donor funded NGOs. They are able to access private source of input credit, market arrangements from pre-reform parastatals to post-reform competitive markets and government managed input programmes through the built farmer group associations.

Collective action is capable of reducing farm level transaction costs of both credit and input acquisition while simultaneously reducing transaction costs for potential input and output buyers. This is the sense behind the farmer group association building approach. In SSA during the early post-colonial period, co-operative movements were often top-down government mandated organisations subject to moral hazard and elite capture. There have been efforts to foster the development of bottom-up associations characterised by self-selection and self-management farmer associations these days even if they are not resistant to these problems (Bingen *et al*. 2003).

According to Gordon (2000), after five years of activities, 1,400 associations were organised out of over 80,000 farm families. A total amount of US$65,000 had been borrowed from commercial companies for input purchase and marketing of outputs by 84 of these associations in just two years of starting. There was a 99 percent repayment rate and on top of maize, farmers cultivated the crops introduced for their commercial value. Maize yields doubled and this increased the income for participating farmers by 20–30 percent. Reluctant banks were encouraged by USAID to provide input credit in Mali's cotton zone through offering guarantees to CLUSAs' associations. To get the credit process started, both trainings and guarantees were necessary. Banks continued to serve many associations while farmers were not aware that the guarantees had been removed (Kelly, 2000).

Access to input credit and repayment in Mali's irrigated rice producing areas where credit defaults were common in the early 1990s substantially improved through the support of savings and loan associations. The programme had a repayment average of more than 91 percent. Since the mid 1990s it was supported by several donors that assisted the banks in training associations in credit management (Traore and Spinat, 2002). CLUSAs' five year programme in Zambia encouraged farmers in forming about 371 Rural Group Businesses. The production of new introduced crops had improved input use and net wealth while maize yields had tripled. An estimated US$198 was earned by participating farmers more than non-participating farmers. RGBs had only managed a 60 percent repayment average because members had an opportunity to side-sell their produce due to favourable market for the produce and avoided loan deductions (Nuebert and Sarda, 2000). In Zambia, issues have arisen as to if the institutional and policy environment is favourable to private credit of any kind due to government continuing providing credit with high default rates (FSRP Zambia, 2002). Despite the important role that associations can play in cutting input and output marketing costs and accessing of credit, the time span of 18 to 24 months and the high costs reported by CLUSA of establishing one legally recognised association have raised questions about scaling up these efforts (Heinemann, 2002)

2.5 GOVERNMENT INTERVENTION IN THE AGRICULTURAL SECTOR IN ZAMBIA

In Zambia, most of the 1.2 million small-scale farmers currently have no access to credit but through Out-grower schemes, perhaps 20 percent of them receive some input supply on credit. Lending by security is the most preferred way of lending by most Zambian commercial banks and their kwacha denominated lending is almost all short term. Small business loans for less than US$10,000 equivalent are not attractive to them due to high transaction costs. Typically, most of the banks are urban based with few branches outside the Copperbelt and Lusaka provinces. Institutions providing Microfinance in Zambia are not very well developed and have little presence in rural areas (Harrison, 2005).

Input credit programmes that are government-run make credit more accessible in situations where high costs prohibit commercial banks. Nonetheless, poor performance of government credit programmes suggests failure in addressing underlying problems. Due to the low repayment rate, Zambia's credit programme has become a virtually give away (FSRP Zambia, 2002).

The argument for government-run credit programmes is that when there is credit market failure, they can still increase aggregate demand for purchased inputs thereby boosting commercial interest

in developing input supply networks. Complexities of the Zambian and Ethiopian input markets make it fully difficult to evaluate the extent to which this is happening, but the programmes are not cost effective means of stimulating commercial input market development from the amounting evidence. The high costs of the programmes are among issues raised by analysts particularly in Zambia where the default rates are high. In Ethiopia, heavy credit administration placed on extension staff, and high levels of rent seeking behaviour to favour politically well placed suppliers in both countries, as a result constraining the development of lower cost, truly commercial input supply networks (Jayne *et al*. 2003).

Agriculture quality spending matters as much as the quantity and spending in some areas clearly proves more productive than in others. Zambia currently spends 60 percent of its distortionary budget on recurrent subsidies of which 12 percent is spent on maize price supports through the Food Reserve Agency and half on subsidizing fertiliser for selected individual farmers. Another 5 percent goes for investment in roads and irrigation and the remaining one-third finances recurrent costs necessary for the administrative functions of the ministry including agricultural research and extension. It is clear however, that the single largest line of spending in the budget for agriculture goes to fertiliser subsidies for individual farmers (FSRP Zambia, 2007)

Chiwele *et al*. (1997 and 2010) outline a political perspective of the large spending on subsidies. They suggest subsidies as tools for winning the rural vote. The population in the urban areas is viewed by the country's politicians as being combative and resistive and unreliable in offering political support, especially to the ruling party in power. The first government post-independence was forced to have subsidies play a dual role as a result. They had to pacify the urban population with cheap staple food on one hand. The removal of subsidies and price controls was met by riots on three occasions. This was not obvious before the introduction of multiparty democracy as it was the rural population that provided the reliable support to the Kaunda regime. Pan territorial pricing for maize together with subsidies which favoured small-scale farmers in remote areas increased rural income and is what won the rural vote.

Subsidies were delivered through state owned companies between 1964 up to 1992. National Agricultural Marketing Board (NAMBoard) was created by the government as a sole buyer of maize in the country. Zambia Cooperatives Federation (ZCF) was created alongside it as the apex for the cooperative movement in Zambia and there were provincial, district and primary cooperatives all over the entire rural landscape. Maize was bought using ZCF structures by NAMBoard. The ZCF was in turn affiliated to the ruling United Nations Independence Party

(UNIP) as a demonstration of how these institutions were meshed up with politics. The Central Committee of UNIP which was the highest governance body in the country had a seat reserved for the Chairman of ZCF.

The start of subsidies was at a low manageable fiscal level. With time as the copper revenues declined and the population increasing, the negative fiscal implications began to show in recurrent budget deficits and rising inflation. It was not until 1992 that subsidies were abolished by the new Movement for Multiparty Democracy (MMD) that took over power in 1991 as part of the new agricultural sector reform programme. This move for agricultural reform had two bearings. Firstly the dismantling of the UNIP linked ZCF and secondly Chiluba who had been overwhelmingly voted by the urban populace saw that there were few political consequences for removing subsidies.

The subsidies were reintroduced in 2002 by the same MMD government after Levy Mwanawasa took power from Fredric Chiluba after his two term constitutional provision expired. The vote count showed that MMD had lost urban votes and besides that, agriculture had underperformed during the 10 years without subsidies and food security was raising on the government top priorities. The reintroduction of subsidies was a way for Mwanawasa to win back the rural vote whose tactic worked despite being rejected by the urban population again in 2006.

The Farmer input Support Programme (FISP) was only meant to last for three years when introduced but not only has it persisted but has grown in both size and coverage. This is owed to the important political attachment associated with it. In 2006 and 2008, there were sharp increases in the programme and these were both election years. Massive commitment has been shown to the FISP programme for the period of 2009/10 as the incumbent heavily lost in urban areas with majority of his votes coming from rural areas. He won the election with a margin of 35,000 votes clearly showing the significance of the rural vote enticed by subsidies play in the political economy.

2.6 REVIEW OF STUDIES ON SUBSIDIES AND CREDIT

Several studies in sub-Saharan Africa have been conducted on the impacts of subsidies and credit on small-scale farmers though we have not come across any studies which look at both strategies at the same time and compare the impact on productivity of the two.

In Malawi, Mkwara and Marsh (2011) conducted a study the Effects of Maize Fertiliser Subsidies on Food Security in Malawi. Their model was based on data from the 2008/09 Annual National

Census of Agriculture conducted by the Ministry of Agriculture and Food Security covering all 246 administrative areas in the country. The log linear production function that was used to estimate how fertilizer subsidies and other factors affect maize production in Malawi was expressed as follows:

$$\ln Y_i = \ln\alpha_0 + \sum \ln\alpha_j X_{ji} + \varepsilon_i$$

Where, Y_i is administrative area i^{th} average maize output in tonnes per hectare. α_0 is a constant while α_j is an estimated coefficient of parameters and ε_i is the error term. X_{ji} is vectors of explanatory variables, namely topography, temperature, fertilizer subsidy, rainfall, access to credit, use of machinery and lagged maize price in administrative area i. Under topography they considered the percentage of farmers that grew maize in plains in each administrative area during the 2008/09 agricultural season. In Malawi, maize tends to do well in plains most of which have fertile loamy soils suitable for maize production. They therefore expected its coefficient to be positive.

Ordinary Least Squares (OLS) results indicated that the effects of topography, subsidy and rainfall on maize production were statistically significant at 1 percent level while use of machinery was statistically significant at 10 percent level. Removal of spatial lag slightly improved results evidenced by an increase in R-squared from 76 percent to 77 percent. Subsidy, topography and use of machinery remained statistically significant at 1 percent (for the subsidy and topography) and 10 percent (for use of machinery) respectively. However, the statistical significance of rainfall dropped to 5 percent level. Furthermore, temperature which was not statistically significant under OLS was now significant at 5 percent level, although with an unexpected sign.

Removal of spatial error also improved results as indicated by an increase in R-squared to 91 percent. Both subsidy and rainfall remained statistically significant at 1 percent level while topography was no longer statistically significant. Lagged price of maize which was not statistically significant under OLS and spatial lag, was now significant at 1 percent level.
The rest of the variables were statistically insignificant. They also acknowledged that their regression analyses were designed mainly to examine the relationship between fertilizer subsidies and maize production in Malawi and they concluded that, indeed, price and fertilizer subsidies have a positive impact on average maize yield in the country. In all cases, a 1 percent increase in the

number of fertilizer subsidy recipients led to 0.2 percent increase in average maize yield per hectare.

Spio (2002) conducted a study on the Impact and Accessibility of Agricultural Credit on small-scale farmers in the Limpopo province of South Africa. He used switching regression for his analysis. In developing the econometric framework for measuring the impact of credit, he let the anticipated output supply (P) be defined as a function of loan size "L" and other characteristics. Thus the analysis was built on the function P=f(L+ other characteristics). The anticipated output values for individual "i" can be written according to one of the 2 production regimes.

$P_i = P_{ic} = (\beta_c^i \ Z_i + \alpha l_i) + (V_{ic} + \varepsilon_{ic})$, if individual is a borrower

$P_{in} = (\beta_n^i \ Z_i) + (V_{in} + \varepsilon_{in})$, otherwise.

In this switching regression specification, the base regime, denoted with a subscript "n" applies when the individual does not receive a loan. The regime denoted with a subscript "c" applies when the individual receives a loan. The right hand side variables are partitioned into those which are observed and Z_i and l_i. l_i is a quadratic expression of the loan amount L. the function αl_i gives the impact of loan on output supply and is non-linear function of L_i which admits diminishing returns of L. The vector Z_i includes market conditions, price and resources. The parameters β_k(K = n,c) give the impact of the observable variables on output supply and allowed to vary between the two regimes in (l). The latent variables "ï" (the Vik) and those which are not (ε_{ik})

The result of the study indicated that productivity differs between borrowers and non-borrowers. The difference of 40% in favour of borrowers was caused both by credit use (21%) and the farmers' inherent characteristics. Thus, credit can increase a randomly selected farmer's output by 21%.

Gilbert (2011) in a study, "What are the Enduring Effects of Fertilizer Subsidy Programmes on Recipient Farm Household", used household panel survey data from Malawi to determine how fertilizer subsidies acquired by recipient households in the current year and up to three consecutive prior years affected current year indicators of their well-being. The four sets of indicators were: production of maize and tobacco, the specific crops which Malawi's input subsidy programmes were targeted to promote; net value of rainy-season crop production; value of livestock and durable asset wealth, and total household income (including off-farm income). The research benefited from

a rich data set with detailed recall data that allowed him to measure how the programme affects recipients' production, assets, and income over time. Moreover, while most previous studies measured impacts on farm input use and/or crop output, he considered the broader impacts of the subsidy programme on household-level incomes and asset wealth.

He used a framework adapted from the research and development (R&D) literature (Pakes and Griliches, 1980) and estimated a distributed lag model where current year and past year quantities of subsidized fertilizer entered as covariates in the models of household well-being. The impact of current and lagged receipt of fertilizer subsidies on these indicators provided a broad understanding of how the policy may have improved the lives of rural households. When evaluating the impacts of fertilizer subsidies, it was essential to understand that they were not distributed randomly, so dealing with this issue was a major part of the paper's modelling effort. It was likely that the quantity of subsidized fertilizer that a household received was endogenous in a model of household production, assets or income, because the amount received was likely correlated with factors in the error term of the model. By addressing endogeneity issues, the paper was a useful application for researchers dealing with non-random programme selections.

$$Y_{ijt} = \alpha + \sum \beta_k S_{ijt-l} + \text{Ϭ}P_{ijt} + \text{ƃ}W_{ijt} + \varsigma X_{ijt} + c_{ij} + \mu_{ijt}$$

Y represents household well-being, S is the quantity of subsidised fertiliser that a household received, P is the output price, W is the input price, X represents other factors that affect well-being such as household demographics, assets, land holding and rainfall, i is individual household, j is district and t is time period. The rest are parameter estimates.

Results indicated that receiving subsidized fertilizer in a given year positively affected household level maize and tobacco production, as well as the net value of rainy-season crop production in that year. Receipt of subsidized fertilizer over the prior three seasons also had a significant positive effect on current year maize production. However, receipt of subsidized fertilizer in the prior three consecutive years had no discernible effect on the net value of rainy-season crop production for households in the current year. Moreover, he found no evidence that prior or current receipt of subsidized fertilizer contributed to off-farm or total household income. He also found no significant evidence to indicate that receiving subsidized fertilizer caused households to increase their livestock and durable asset wealth.

CHAPTER 3

METHODOLOGY

3.1 CONCEPTUAL FRAMEWORK

This section defines the key concepts used in this thesis. Linkages between credit, input subsidy and other social economic factors are explored. The key concept terms are: credit, subsidy, agricultural household model, productive assets and agricultural productivity.

3.1.1 SUBSIDIES AND CREDIT

The concept of credit and subsidy is used to explain the linkage between agricultural productivity and asset base build up for the small-scale farmers. This is because credit is central in the agricultural loans from ZANACO and the subsidy is central to the FISP. This may then be linked to poverty alleviation in rural households.

To start with, we explore the logic behind the use of subsidies or credit, how they are funded and their link to rural assets. We later theoretically analyse the impact they have on cost of production and form expectations.
Theoretically, the argument behind this research in relation to subsidies or credit is that one group of the beneficiaries should possess more assets and income than the other because:

A. They save more due to access to credit or reduced input cost through the subsidy. They both have some added advantages. We can imagine of a situation where the farmer no longer needs to sell an asset in order to invest in maize production but now can get the inputs at half the subsidised price or because they had access to credit to finance their production. This translates in their assets being spared while we expect the asset levels to be different based on which policy promotes real income growth.
B. The farmers would be less risk averse because part of the risk is shared by the lending institution or in the subsidy. This should allow them to engage into more profitable but risky undertakings such as buying of innovative assets or diversifying into high value crops.
C. Whatever the source of money, they should have wider margins of profit and should therefore be able to acquire more asset.

With FISP being government money transfers, they can either be funded through taxation, private and donor funds. Komives (2005) categorises subsidies into two: funded and none funded where funded subsidies are ones where the government uses own resources to finance the programme. With these kinds of subsidies, the author observes that while they may help, one way or the other, they take away from the poor through taxation and the net effect of these funded subsidies may not always be positive. The author observed on the other hand that unfunded subsidies (borrowed funds) may have serious future implications as they transfer the cost of the subsidy burden to the future generations. Even though some of the small-scale farmers treat subsidies as a free gift from government, they are in real essence not since they are financed from government revenues which include money raised from taxes.

3.1.2 RURAL AGRICULTURAL ASSETS

Household assets can be defined broadly to include physical, natural, human, public, financial, household and social capital. These assets are stocks and may depreciate over time or can be expanded through investment. Being a productive sector of the economy, agriculture requires assets in order to be efficiently implemented. This is due to the fact that assets could allow farmers to access credit as they may act as collateral.

Because of tropical agriculture being susceptible to a lot of risks, it is usually not a priority for most insurance companies. A lot of farmers in Less Developed Countries are uninsured due to the risky nature of their business ventures which attracts high premiums. The lack of credit due to market failure also affects asset generation ability (De Janvry and Sadoulet, 2000). This results in asset depletion each time the farmers are faced with risk. With assets being used as a coping mechanism, poverty becomes the order of the day. Majority of the farmers become risk averse and are reluctant to venture out into new technology adoption. Subsidies may at times minimise this risk aversion. Assets play many other important roles in the livelihoods of farmers. They provide a good picture of long term standards of living because they have been accumulated over a long period of time and they are long lasting.

Bebbington (1999) outlines a summary role of assets in rural livelihoods, the diverse assets that rural people draw upon in building their livelihoods, the means by which people are able to access,

maintain and sustain these assets. He also outlines the abilities of people to transform these assets into income, dignity, power and achieve sustainability.

Being able to have access to assets may lead to other capabilities, freedoms and wellbeing of farmers (Sen, 1993). Assets may be converted into other forms of means which could help farmers deal with immediate pressing needs. For instance, oxen can be sold for money or exchanged for other goods the household could desperately be in need of at that present time. Without access to assets, farmers may suffer from chronic poverty.

Some common productive assets for small-scale farmers in Zambia include draft power animals, hoes, ploughs, titled land, storage facilities, educated and healthy labour, concretised floor and iron roofed houses, tractors, farming experience etc. (Jayne *et al*. 2007). Having access to and using these assets is critical to these farmers. We analyse some of these in the research. Income based poverty, which is a flow at times is difficult to capture from small-scale farmers, so understanding asset-based poverty may to a certain extent reflect the poverty levels (Brandolini *et al*. 2010).

3.1.3 THE AGRICULTURE HOUSEHOLD MODEL (AHM)

For policy intervention aimed at alleviating farmers' plight, it is important to understand their behaviour because farmers are no ordinary producers. It is possible, given the prevailing conditions and using the Agricultural Household Model (AHM), to predict the likely outcomes of a policy intervention (De Janvry *et al*. 1991). The AHM explains the behaviour of small-scale farmers both as consumers and producers at the same time (Udry and Bardhan, 1999). Decisions at production may or may not be associated with preferences depending on the market conditions. Separability between household and farm decision breaks down if market failure exists and this entails farmers only producing for consumption. However, when markets are perfect, separability between household and farmer decisions holds. In most cases farmers try to maximise profits before maximising utility but with a breakdown in seperability, allocation of resources may not be optimal. Usually, this also enhances net- selling-net buying behaviour of small-scale farmers. Because of net selling, prices become depressed thereby lowering the value of output. The smaller the agriculture farm holding, the more farmers resort to net buy and this may be further compounded by market failure. Information flow coupled with farmer behavioural considerations is primary for good planning in agriculture.

In Zambian, crop production agriculture is riddled with imperfect markets in that farmers usually don't know the price of maize well in advance before planting. FRA which is a government funded institution and tasked with purchasing maize only announces producer prices after harvesting. Unless agricultural policies incorporate such behaviours of their intended beneficiaries, they will not be effective in the general sense. With the existence of such imperfections in the agricultural market, neoclassical policies are more likely to fail hence the need for more government and stakeholders' involvement in the system.

3.2 ANALYTICAL FRAMEWORK

The framework of analysis touches on the evaluation framework of Dickinson and Prabhakar (2009) also commonly known as the *logic* model. This model is based on community empowerment, an approach which is quite similar to that of FISP and the agricultural loans administered by ZANACO. The model highlights the process of evaluating a project or programmes in a five stage process as outlined below:

1. Contextual conditions analysis;
2. Appraisal of strategic priorities projects and programmes;
3. Targeting and monitoring;
4. Evaluation; and
5. Impact and learning.

The study encompasses all these stages in the quest for solutions to the questions raised.

The primary relationships between the subsidy or agricultural credit, productivity, output and asset levels can be highlighted as shown in the *input-output* relation outlined in figure 3.1. However, there seems to be no direct link between subsidy or credit and assets. This link will only be established through incomes. The first three i.e. government expenditure, private credit and subsidies are inputs while the rest are outputs, outcomes and impacts. The outputs, outcomes or impacts may be characterised by short/long term, indirect/direct consequences on the beneficiaries and the community as a whole. For credit beneficiaries and subsidy beneficiaries, the scenarios would be different and such differences should be significant if the policies have any impact.

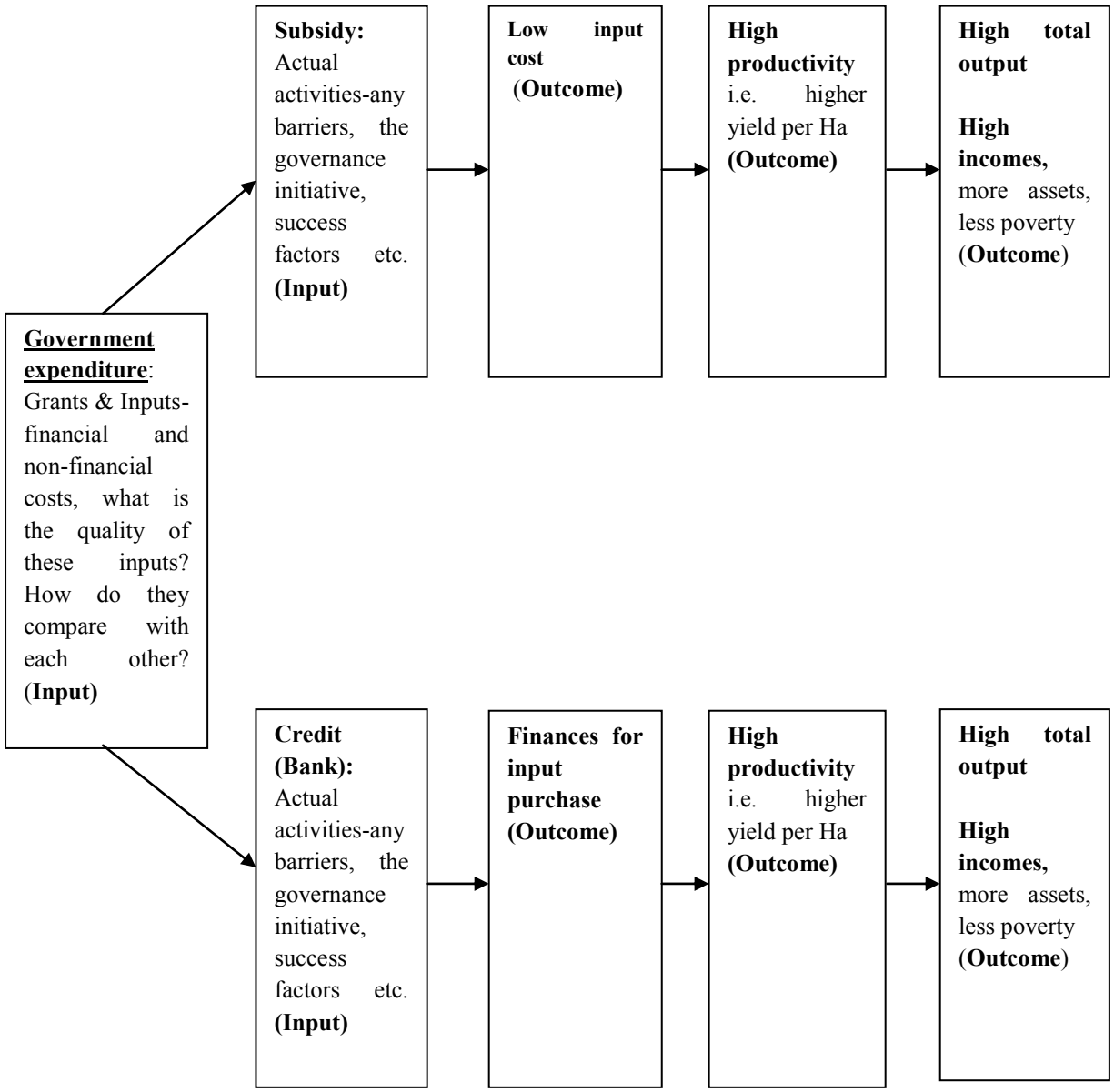

Figure 3.1: Flow chart of Government expenditure using either subsidies or credit

Source: Author

3.3 DESCRIPTION OF INQUIRY STRATEGY AND BROAD RESEARCH DESIGN

The study used both primary and secondary data which consisted market and technological related data. Secondary data were obtained with express permission from the Ministry of Agriculture and Cooperatives (MACO) and Central Statistics Office (CSO) for market and production related

variables. The data obtained included prices of non-subsidised and subsidised inputs and outputs such as fertilisers, maize and seeds. Production output levels were also collected. Data collected were from the period of 2002 to 2012 and averages were used to even out extreme seasonal values. The unit of analysis was the individual household of small-scale farmers.

Secondary data were also got from Zambia National Commercial bank (ZANACO) concerning their loan portfolios to small-scale farmers. Information on loan sizes, quantities and packages was collected. Interest rates and repayment periods were also gathered.

Primary data were obtained through a survey that was conducted by administering a structured questionnaire. The questionnaires were administered to individual small-scale farmers who had benefited from the FISP programme and those who had benefited from loans from ZANACO. Structured one-on-one interviews were conducted with key individuals from MACO and ZANACO to solicit further information and clarifications.

3.4 SAMPLING PROCEDURE

Data were collected from Chongwe District of Lusaka Province. A total of 140 small-scale farmers were interviewed. These respondents were picked randomly from farmer registers obtained from MACO and ZNFU which acted as sampling frames for all beneficiaries. From each sampling frame, 70 households represented FISP beneficiary farmers and another 70 households represented loan beneficiary farmers from the ZANACO/ZNFU. The reason for selecting Chongwe as the study area was because both programmes i.e. the FISP and agricultural loans from ZANACO are running in the same area. This meant that the farmers were facing the same geographical and climatical conditions.

The limited funds available for conducting the research was the reason for choosing a sample of 140 households out of 550 households available for selection, i.e. 300 FISP and 250 loan beneficiary households. Though coupled with a properly planned selection process, this number was a good representation of the farmer population in the area. Simple random multistage stratified purposive sampling was used. Multistage in the sense that the farm settlements were not defined in a particular pattern with house numbers. Stratified purposive sampling in the sense that farmers had to be separated according to the kind of institution they benefited from.

3.5 DATA COLLECTION

Primary data were collected using a pretested structured questionnaire through a survey involving small-scale farmers as respondents. Enumerators were engaged to assist with the collection of data and they were trained on how to use the data capture instrument. Information on demographics, land tenure, agricultural production, input access, market access, credit facilities, owned assets just to mention a few were among some of the information captured. Structured interviews with key personnel in institutions were also conducted. Secondary data were collected from Central Statistics Office, Ministry of Agriculture and Cooperatives, Zambia National Commercial Bank and Zambia National Farmers Union to complement the primary data.

3.6 DATA ANALYSIS

Epidata and Statistical Package for Social Scientist (SPSS) were used for the descriptive analysis part of the study. Demographic characteristics for the study was also analysed using the same software together with econometric analysis. Pie charts, bar graphs and output tables generated from running the regression model in SPSS were some of the statistical tools used for interpretation of the data. The F statistic, P-values, R squared and Adjusted R squared were taken into account to determine the significance of the statistical results. Measures of central tendency such as the mean, median and the mode were also employed in the analysis.

3.6.1 CHOICE OF VARIABLES

Demographic, production, and socio-economic characteristics of the respondents in the areas were addressed. The variables of interest are productivity (dependent), fertiliser, seed and assets (explanatory) and how they interplay on each other. Output per hectare and capital stocks (farm assets and animals) are important indicators of rural household livelihoods (Jayne *et al*. 2007). Fertiliser and seed was central to both the FISP and Agricultural loans provided by ZANACO which are at the core of analysis for this study.

3.6.2 MODEL SPECIFICATION AND ESTIMATION

In most impact studies, there are basically three approaches widely used namely: before and after approach, counterfactual approach and with-without approach (Simatele, 2006). It has been argued that programme performance should be compared with the counterfactual. Counterfactual is here defined as the performance of farmers in the absence of FISP or credit. But due to the fact that counterfactual cannot be measured or indeed be observed, it can only be estimated. This makes it difficult to work with. The before-after approach could also be problematic due to cross sectional nature of data and the fact that small-scale farmers rarely keep records. Due to these short comings associated with the above mentioned methods, this thesis applies the, with-without FISP and credit approach.

A comparison on the performance of FISP beneficiaries and the beneficiaries of agricultural loans was done in various aspects. However, the method may be prone to failure in capturing the effect of other factors on assets, recognising the initial conditions of respondents and the circularity problem between assets and incomes. Changes over time due to individual fixed effects may be lost as well.

In designing the model of this study, we borrowed from (Gilberts, 2011) model and methodology. He used a framework adapted from the research and development (R&D) literature (Pakes and Griliches, 1980) and estimated a distributed lag model where current year and past year quantities of subsidized fertilizer entered as covariates in the models of household well-being. The impact of current and lagged receipt of fertilizer subsidies on the chosen indicators provided a broad understanding of how the policy may have improved the lives of rural households.

The model tried to estimate the relationship between agricultural loans or subsidies and assets using regression analysis. But there is no direct link between either loans or subsidies and asset accumulation. Instead, a three-stage model was used by first estimating the determinants of productivity, then output and finally incomes to the farmers and leading to an indirect estimation of the significance of existing assets on income.

The acquisition of assets was descriptively estimated, i.e. whether the sources of incomes used to acquire these assets was associated with FISP or income from agricultural loans, and how the level of the assets differed between the two groups. Equation (2) was used to estimate the significance of fertiliser, assets and the other determinants of productivity in maize. As in most industries, the

analysed relationships between dependent and independent variables are quantitative rather than value based. Due to compactness of the areas under study, we assumed similar weather and soil patterns and held them constant. FISP and agricultural loans were considered as the only major difference between the two groups (i.e. those who accessed FISP and those who accessed loans). We therefore, concentrated on the variables of interest stated in (2 and 3) based on economic theory, logic and compatibility with *apriory* expectations (Griffiths *et al*. 1993).

Income= f(Y, Pm)..... (1)
Where: Y= maize output
Pm = output price

An increase in both or either output or price of maize has a positive effect on income and vice versa. The output is directly determined by the productivity while price is exogenous and only acts as an incentive to productivity. Therefore, determinants of productivity indirectly determine income. From the linear standard production model, we develop the following relationship between maize productivity and various independent variables explained below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \text{..... (2)}$$

$$Ln(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \text{..... (3)}$$

Where:
Y = Maize Output in kg
X_1 = Education Level
X_2 = FISP/Loan purchased fertiliser in kg
X_3 = Hybrid maize seed used in kg
X_4 = Existing assets proxied by oxen (binary dummy)
$\beta_1 \ldots \beta_4$ = Parameters to be estimated
μ = Random error

Education(X_1): is captured as levels zero to three. Zero represents no education attained, one for primary, two for secondary and three is for tertiary education. A reference point of zero is set in

order to capture different impacts of formal education (1-3). It is expected to have a positive impact on productivity the higher one progresses. This is likely so because education plays a significant role in agricultural productivity indirectly and directly. Directly, it enhances the ability of one to acquire information through experience with technology, it acts as a complement to farm experience (Sharada, 1999). Indirectly, someone can access credit for investing in agriculture by working off farm for a wage and also being able to interact in the credit market, keep proper organised records, improved numeracy skills for simple arithmetic just to mention a few.

Fertiliser(X_2): enhances land productivity and thereby increases crop yields (Mwangi, 1997). Given that the major component of FISP and the agricultural loans is fertiliser, a positive relationship between productivity and fertiliser is expected but the levels will differ depending on membership due to loan size and the fact that FISP fertilizer quantities are fixed. Fertiliser is captured as kg.

Hybrid Maize Seed (X_3): Hybrid seed has a high yielding capacity compared to traditional local recycled seed. It is expected that adoption of hybrid seed by small-scale farmers through either FISP or the loan programme will increase their productivity as we expect a positive relationship between hybrid seed and yield.

Existing assets (X_4): in this case is proxied by oxen. It represents ownership of the assets used in the previous season. It is expected that owners to these assets will be more productive than non-owners. This is because it allows for the cultivation of more land within a short period of time hence facilitating for early planting of maize which is very crucial. Farmers who own oxen are usually highly likely to own implements such as ploughs and ox-carts which facilitate maize production directly. Deininger and Olinto (2000) found that a pair of oxen increased the area cultivated by 25% and had higher returns compared to fertiliser use in Zambia. These farmers who own oxen may also hire out their animals to earn more income and are also found to be less risk averse. They may also cut down on labour bottlenecks that hinder good maize production output.

Error term (ε): represents time constant unobservable factors that affect the well-being of the farmer which may include risk aversion, health shocks and farming experience.

Table 3.1: Summary Table of Study

Objectives	An economic analysis comparing the FISP managed by government through MACO to agricultural loans managed by private lending institutions, to determine which strategy is promoting growth among small-scale farmers through productivity, income and asset based measurement.
Hypotheses	• Subsidies through FISP reduce production cost which allows farmers to maximise output leading to an increase in productivity and growth • Credit from private institutions allow farmers to have access to production inputs which allows farmers to maximise output leading to an increase in productivity and growth. • The private sector strategy is more effective in promoting access to inputs than the FISP government strategy
Variables Analysed	• Maize output in kg as the dependent Variable Independent Variables • Education level • FISP/Loan purchased fertiliser in kg • Hybrid maize seed in kg • Existing assets proxied by oxen (Dummy variable)
Expected Outcome	• Education is expected to have a positive impact on productivity the higher one progresses • Fertiliser is expected to have a positive relationship with productivity as it enhances soil fertility • Hybrid seed is expected to have a positive relationship with productivity due to its high yielding capacity • Existing assets proxied by oxen is expected to have a positive effect on productivity as it facilitates the cultivation of more land and early planting

Source: Author

3.7 ASSESSING AND DEMONSTRATING THE QUALITY AND RIGOUR OF THE PROPOSED RESEARCH DESIGN

To minimise errors and bias during data collection, the questionnaire was pre-tested to ensure that it was user friendly and was able to capture the specific unambiguous required information. Enumerators were trained on how to use the questionnaire in the data collection exercise. Each enumerator was carrying an introductory letter explaining the purpose of the data collection exercise to the respondents. A plain simple to understand structured questionnaire was used to conduct the survey and a checklist for the structured questions was provided for the interviews. Enumerators selected for the exercise were conversant with the local language for the respondents in the target area. This helped in cases where need arose for the questions to be translated in vernacular if further clarification was sought by the interviewee.

The other sources that may have caused bias in the quality of data were the recall errors as respondents were required to provide data from past years. When respondents fail to remember information from past years, this is known as the recall error. Respondents were allowed to consult with their records and other family members to minimise on recall errors. For secondary data, the quality of data were cross checked and cross examined with several sources to ensure consistency in the data collected.

3.8 RESEARCH ETHICS

The data collected were treated with strict confidentiality and was intended to be used only for academic purposes and not for commercial purposes. Under the intellectual property rights, the contents of this research remain the property of the University of Pretoria. The respondents and providers of information were assured that their identity would remain confidential and the research questionnaire would not require them to provide their names as they were identified using codes. Respondents were provided with an informed consent letter which they had to sign indicating acceptance before participating in the survey. No monetary incentives were offered towards the participation in the survey as participation was purely voluntary. The respondent had the right to discontinue with the interview at any point in time if they felt uncomfortable with the questions.
Copyright rules have been observed by acknowledging the original sources of all secondary information that was collected. Institutions were assured that their information provided would be treated with strict confidentiality and would not be passed on to their competitors. Permission was requested from the relevant authorities before any information on their credit database is accessed.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents discussions and analysis of the result findings of the research. We begin with descriptive analysis specifically looking at the demographic and social-economic characteristics of the respondents. We end with econometric analysis where the production characteristics of both sets of farmers i.e. FISP and loan beneficiaries are discussed. This comparative economic analysis is based on data collected for the period starting from 2009/10 farming season all the way to 2011/12 farming season.

4.2 DEMOGRAPHIC CHARACTERISTICS

A total number of 140 households were interviewed of which 70 farming households represented FISP beneficiaries and the other 70 represented farming household who accessed agricultural loans from ZANACO through Zambia National Farmers Union. Of these farmers interviewed, 71% of the FISP respondents were head of household while for the loan category; we managed to capture 89% household heads. It was vital to get most of the responses from household heads as they are in most cases the decision makers and custodians of farming enterprises in the rural settings. A total of 90 respondents were male and 50 respondents were female for the whole survey. Figure 4.1 further shows the gender of respondents by beneficiary category.

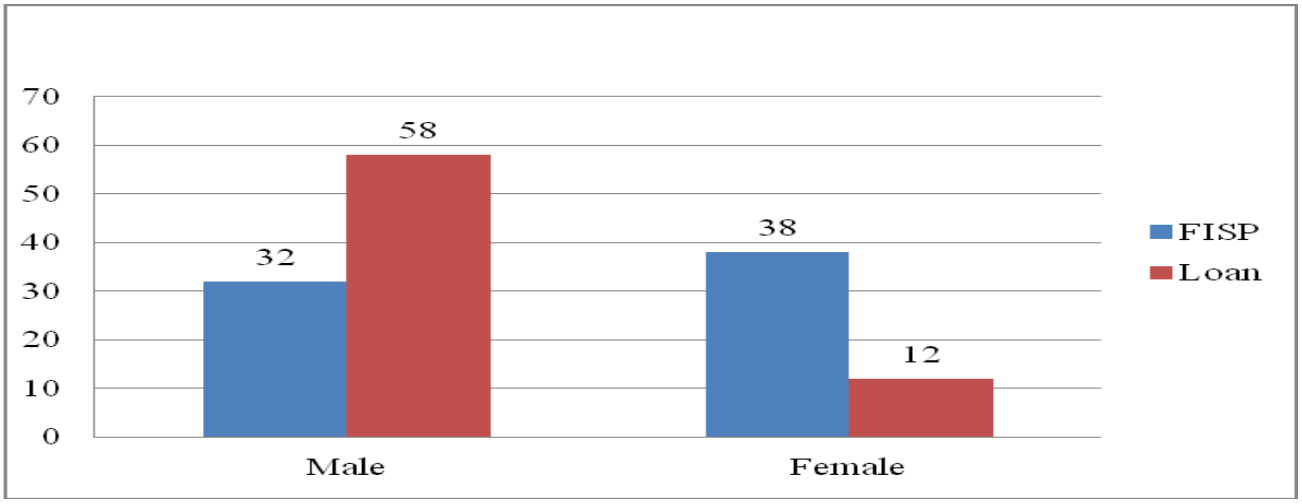

Figure 4.1: Respondents of FISP and loans by gender

Source: Author

There were more female beneficiaries captured under FISP in the survey which represented 54% compared to 17% captured under the loan program. This huge difference in number can be attributed to the targeting and selection criteria employed by the two intervention system. FISP selection criteria are more of welfare inclined where you would find a lot of women groups made up of widows benefiting from such an arrangement while it is not the case when it comes to accessing loans. With loans, the appraisal process is quite rigorous and one needs to have some kind of collateral to pledge in form of assets and in rural areas, its men who have control over such assets. Out of the two sets of respondents, it was found that under FISP, 33% of respondents were made up of widowed and divorced women while for the loan beneficiaries, this group of women only accounted for 7%. With accessing loans, you would expect a high number of men to benefit because they are the custodians of assets and make the final decisions in the household. They have assets to fall back on to use in loan repayment in case they can't offset the loan due to a bad harvest while it is not the case with women. This explains the 83% high number of male beneficiaries compared to 17% female beneficiaries under the loan scheme.

Majority of respondents fell in the middle age group as both categories i.e. FISP and Loan beneficiaries had 63% of the respondents aged between 36 to 55 years. This age group in most cases is considered to be energetic and productive and in Zambia this is before the retirement age. Figure 4.2 shows the age group distribution of respondents for the survey.

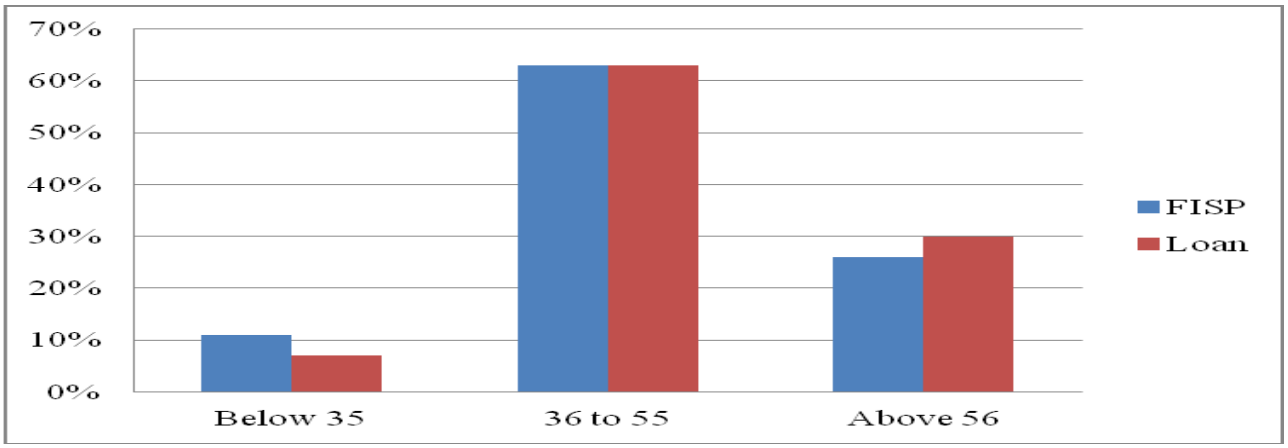

Figure 4.2: Age group distribution of respondents

Source: Author

With regards to education, 87% of FISP beneficiaries had attended formal education while the number of loan beneficiaries that had attended formal education was 91%. Figure 4.3 shows the levels of education attained by each category of respondents.

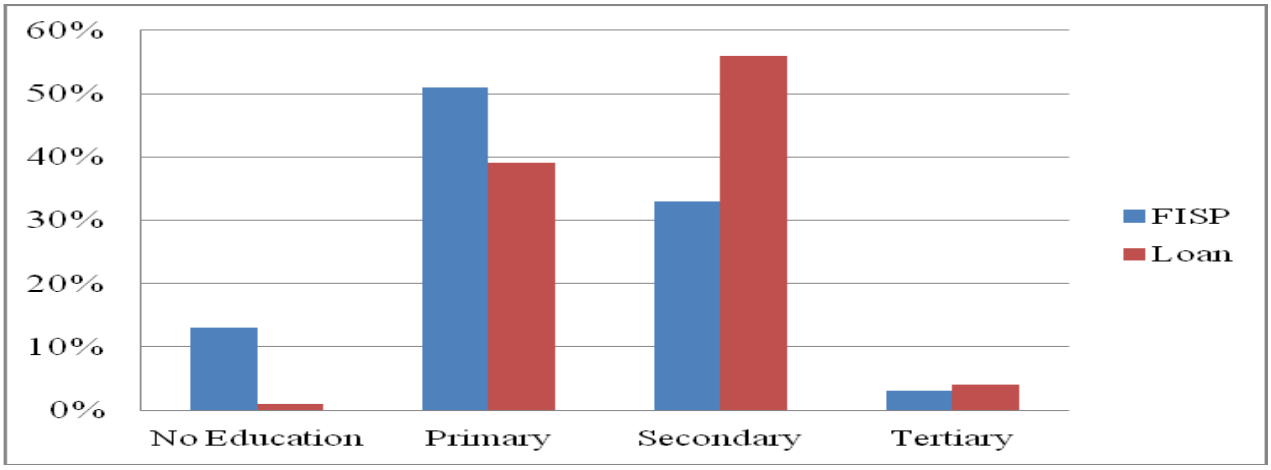

Figure 4.3: Educational level of respondents

Sources: Author

It can be noted from figure 4.3 that a large number of FISP beneficiaries had only attained primary education and 13% had no formal education. For the loan beneficiaries, 56% had attained secondary education compared to only 33% of FISP beneficiary. This goes to show the important role that education plays in accessing credit. This is an indication that an educated farmer has confidence in adopting new agricultural technology and is willing to source extra capital in form of credit to increase their productivity.

4.3 SOCIO-ECONOMIC CHARACTERISTICS

The social standing of the two sets of beneficiaries with regards to their employment status was investigated. It was found that more of the FISP beneficiaries were in wage employment as 13% of them were in formal employment compared to only 4% of loan beneficiaries who were found to be in formal employment. However, 63% of the loan beneficiaries were self-employed i.e. they were running some business of some kind other than just farming as compared to 27% of FISP beneficiaries. For the FISP beneficiaries, 59% of the FISP were unemployed and depended on farming to sustain their livelihood as compared to 31% of loan beneficiaries. This in a way indicates that there was some form of livelihood improvement for farmers who benefited from agricultural loans as they were able to engage in other income generating activities from the extra income they realised from farming. The high number of loan farmers engaging in other income generating activities cannot be attributed to income earned from formal employment as the percentage of FISP beneficiaries in wage employment surpasses that of loan beneficiaries.

Comparison of asset possession was separated into two categories. We looked at productive assets i.e. assets which contribute to the growth of the farmer agricultural wise and we also looked at household assets i.e. assets that contribute to improving the living standards of the farmer. The expenditure of these two groups of beneficiary farmers was assessed by comparing the amount of money each group spent on acquiring the assets. We begin by looking at productive assets. Figure 4.4 compares asset acquisition of both categories of farmers between the periods 2010 to 2012.

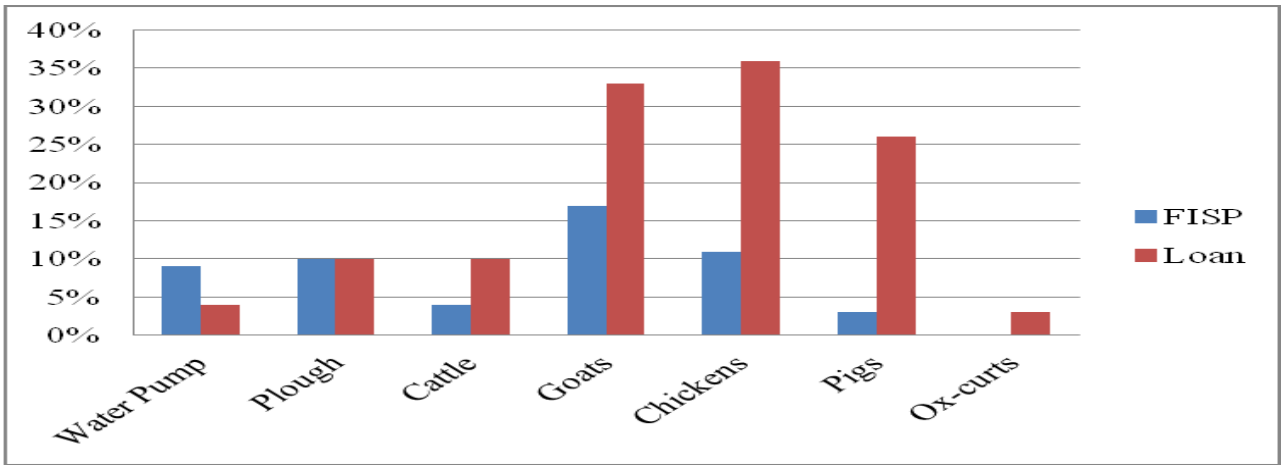

Figure 4.4: A comparison of productive assets ownership between FISP and loan beneficiaries from 2010 to 2012

Source: Author

From Figure 4.4, we can clearly see that farmers who benefited from loans were investing more in productive assets between the periods under review. This is a clear indication of agricultural growth and diversification. More importantly is the diversification part into livestock as they no longer only depended on rain feed maize production to earn extra revenue. This promotes a steady flow of income throughout the whole year which is healthy for loan repayments making this group more credit worthy. The possession of productive assets is further supported by income expenditure between the two groups. Figure 4.5 shows the amount of income each group of beneficiaries spent on acquiring each asset.

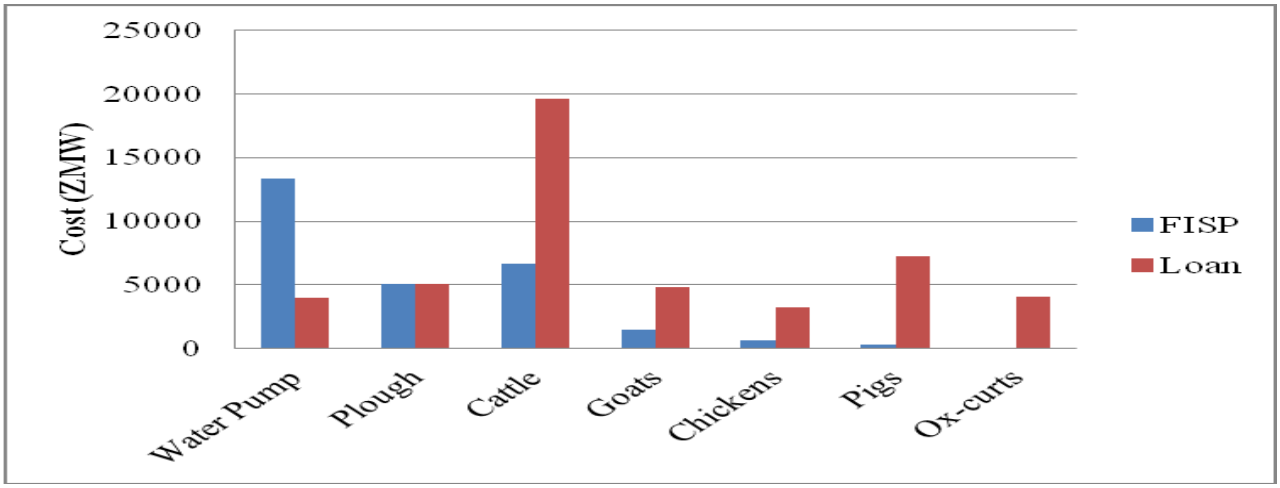

Figure 4.5: A comparison of expenditure on productive assets between FISP and loan beneficiary farmers from 2010 to 2012 in Zambian kwacha (ZMW)

Source: Author

Most of the money used to acquire these assets was proceeds from maize production the farmers obtained during the period 2009/10 to 2011/12 farming season. This further proves that farmers who benefited from loans invested more into asset acquiring as their total expenditure was Zambian Kwacha (ZMW) 48, 100 compared to the ZMW27, 462 expenditure spent by the FISP beneficiaries. The huge difference of 27.3% in expenditure between the two sets of beneficiaries can be attributed to the fact that loan beneficiary farmers invested more in the purchase of cattle and ox-carts which have a direct impact on increasing maize productivity. This translates into increases in yield and hence more income to spend. Almost all the farmers interviewed had no bank accounts and their form of savings was investing in assets, so savings in form of cash had no bearing on the difference in expenditure. This also raises questions as to whether rural farmers are un-bankable or maybe it's just the way theses commercial banks present themselves to these rural farmers which makes them unattractive. Further research has to be done to find out why this is the case.

When it came to expenditure on household assets, the trend was different as it was discovered that FISP beneficiary farmers had invested more than loan beneficiary farmers in this category. Figure 4.6 shows a comparison of household asset possession between the two sets of beneficiaries.

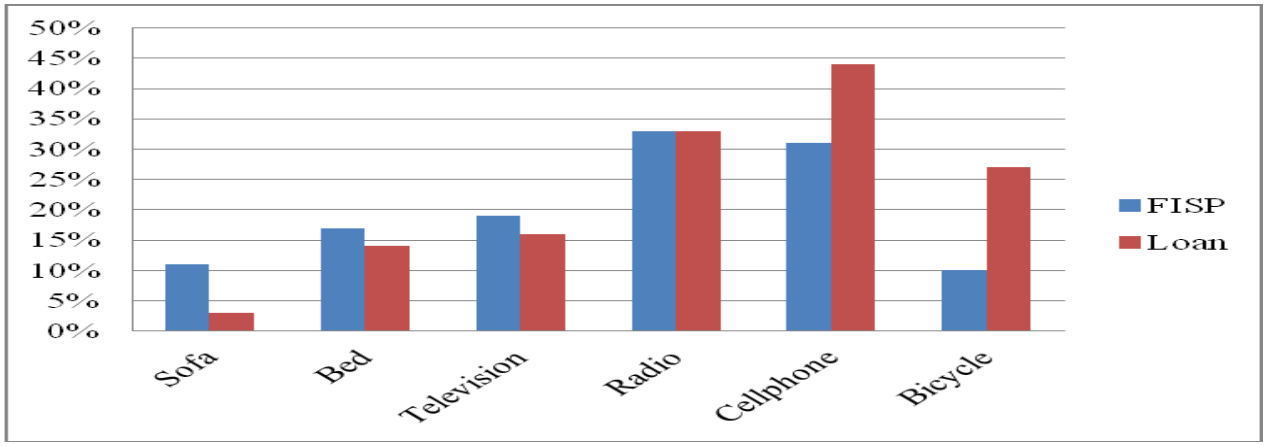

Figure 4.6: A comparison of household asset ownership between FISP and loan beneficiaries from 2010 to 2012

Source: Author

The difference in the investment levels in both categories was not so significant and we can say both groups had a similar lifestyle. The picture of a similar lifestyle can be further made clear by Figure 4.7 which compares the expenditure levels between the two groups.

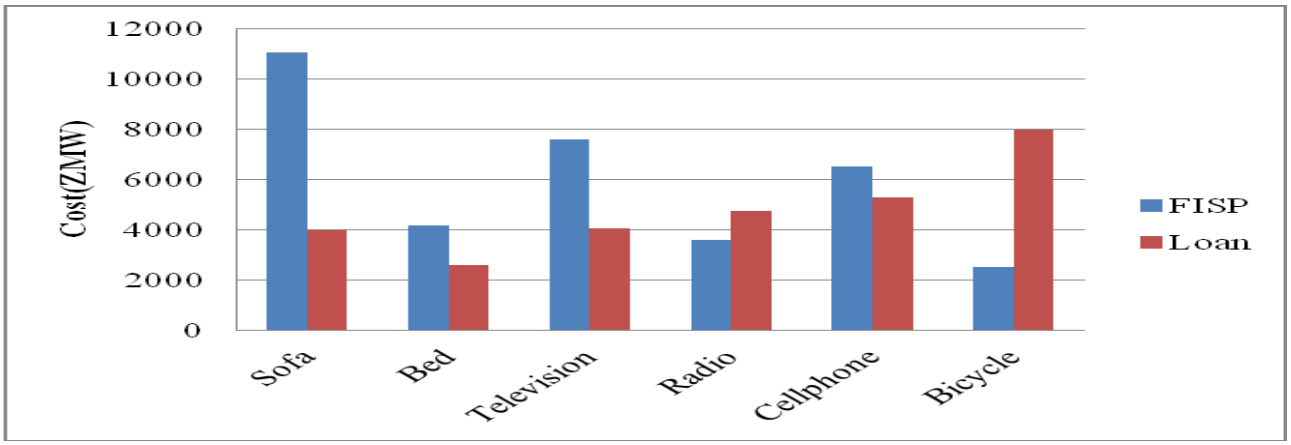

Figure 4.7: A comparison of expenditure on household assets between FISP and loan beneficiary farmers from 2010 to 2012 in Zambian Kwacha

Source: Author

From the expenditure chart, we can see that while there were no much significant differences in the possession of other items except for sofas and televisions sets, the expenditures show a significant difference in the amounts spent by the two groups as FISP beneficiaries spent more money in acquiring almost similar quantities of the same products. This is further highlighted in the purchase of cellular phones. It can be seen that loan beneficiary farmers bought more phones but FISP beneficiary farmers paid more money for the same product. The difference in the expenditure amounts spent between the two sets of beneficiaries was 10.6% with FISP beneficiaries spending

slightly more. This difference in the expenditure pattern may be tied to the 13% FISP beneficiaries who are in formal employment. Since we are talking about household goods, we may tend to relate quality of goods purchased by the working class to be of high value compared to the quality purchased by the non-working class. This means the formally employed FISP farmers may have been buying expensive quality products like expensive phones, televisions and sofas hence bringing about the difference in expenditure values as compared to quantity possession.

4.4 PRODUCTION CHARACTERISTICS

There were two prominent sectors among these farmers and the maize sector was by far the most preferred followed by the livestock sector. This was no surprise given that maize is the staple food and as well a cash crop for many rural farmers in Zambia. Out of all the respondents interviewed, 97% were specifically into maize production while 3% of these respondents were involved into small-scale livestock production. This lack of diversification can be attributed to the implementation of pro-maize support programmes on a continuous basis by government such as FISP and Food Reserve Agency (FRA) on the marketing end. However, the situation may slowly start to change on the ground as government has now also included cassava, rice and soybeans in the FISP and FRA programmes.

When it came to land ownership, 97% of FISP beneficiaries were practicing their agriculture on customary land compared to 95% of loan beneficiaries. Only 3% of the FISP beneficiaries were using rented land while only 2% of the loan beneficiaries were on rented land. None of the FISP beneficiaries had title deeds for the land while 3% of the loan beneficiaries had title for land. Ownership of land is very important in promoting agricultural growth as it provides security to the investments the farmers put up in form of fixed infrastructures such as buildings, boreholes, irrigation equipment etc on their farms. It is also an avenue to access finances in form of credit from financial institution as it acts as collateral for the loans. One can easily attach a value to land on title which is not the same case with customary land. The hectares (Ha) ploughed were not influenced by the farm size as it can be seen from figure 4.8 that both sets of beneficiaries had similar portions of land. Both groups of beneficiary farmers had no land constraints meaning depending on their production technique, there was enough land to cater for the increase in production.

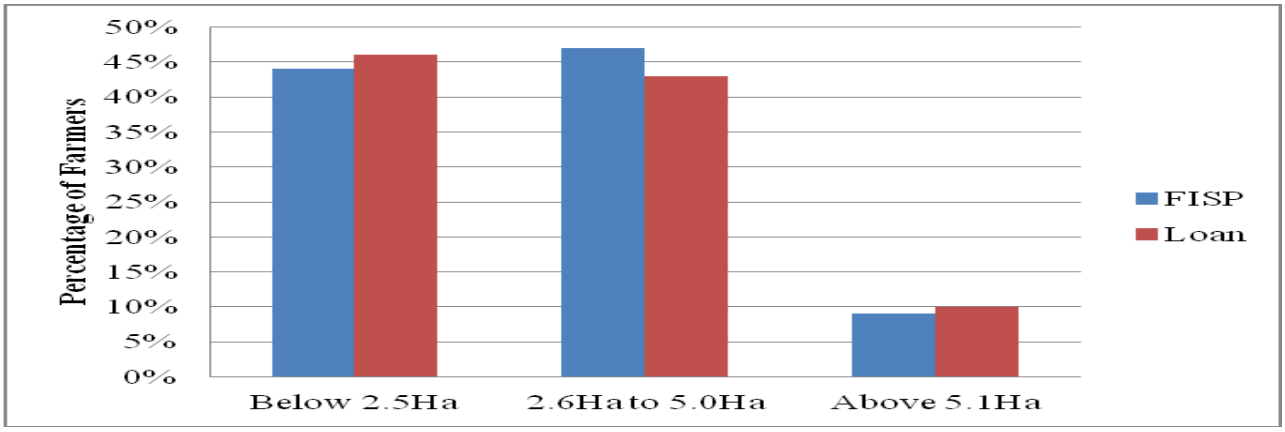

Figure 4.8: A comparison of farm size between FISP and loan beneficiaries

Source: Author

To asses if there was an increase in the size of maize plots being cultivated in each successive year, data was captured on hectares ploughed starting from the 2009/10 farming season all the way to the 2011/12 farming season. The field plots were grouped in three categories i.e. farmers who cultivated plots below 2.5 hectares, those who cultivated plot sizes between 2.6 hectares to 5.0 hectares and finally those farmers who cultivated plots above 5.1 hectares. Table 4.2 tabulates the data findings on hectares ploughed starting from 2009/10 to 2011/12 for the two beneficiary groups.

Table 4.2: Comparison of hectares ploughed by FISP and loan beneficiaries from 2009/10 to 2011/12 Farming Season

Hectares Ploughed in 2009/10 Farming Season			
	Below 2.5Ha	2.6Ha to 5.0Ha	Above 5.1Ha
FISP Beneficiaries	97%	3%	0%
Loan Beneficiaries	68.6%	22.9%	8.6%
Hectares Ploughed in 2010/11 Farming Season			
	Below 2.5Ha	2.6Ha to 5.0Ha	Above 5.1Ha
FISP Beneficiaries	85.7%	14.3%	0%
Loan Beneficiaries	64.3%	27.1%	8.6%
Hectares Ploughed in 2011/12 Farming Season			
	Below 2.5Ha	2.6Ha to 5.0Ha	Above 5.1Ha
FISP Beneficiaries	95.7%	4.3%	0%
Loan Beneficiaries	71.4%	17.1%	11.4%

Source: Author

From Table 4.2, it can be seen that majority of the FISP beneficiaries only cultivate fields below 2.5 hectares and none of them cultivate maize fields above 5.1 hectares. There was a number of farmers who graduated from the below 2.5 hectares tear to the 2.6 to 5.0 hectares tear in the 2010/11 farming season as in can be seen from the 3% to 14.3% increase in the FISP beneficiary group. However, this growth was not sustainable as we see the number drop to 4.3% in the 2011/12 farming season with no change to the above 5.1 hectares. This means the farmers returned to producing below 2.5 hectares category. Only 1.3% of the farmers managed to sustain their growth in the increased area under cultivation as the remainder of the farmers relegated back to the usual below 2.5 hectares area of cultivation. The picture is different with the loan beneficiary farmers. We see a movement in farmers cultivating below 2.5 hectares of maize plots to the 2.6 to 5.0 hectares category as the percentage of this farmer category increases from 22.9% in 2009/10 farming season to 27.1% in the 2010/11 farming season. Although some farmers fail to sustain their growth in 2011/12 farming season as we see them drop back to the below 2.5 hectares category, there is a positive increase in the above 5.1 hectare category as we see an increase from the constant 8.6% farmers who were in this category from 2009/10 farming season to 11.4% in the 2011/12 farming season.

We also checked if the increase in the cultivation area was consistent with the increase in the number of 50 kg bags of maize harvested from these field plots during the period under review. Figure 4.9 compares total hectares and total bags harvested by the two sets of beneficiary farmers starting from the 2009/10 farming season to the 2011/12 farming season.

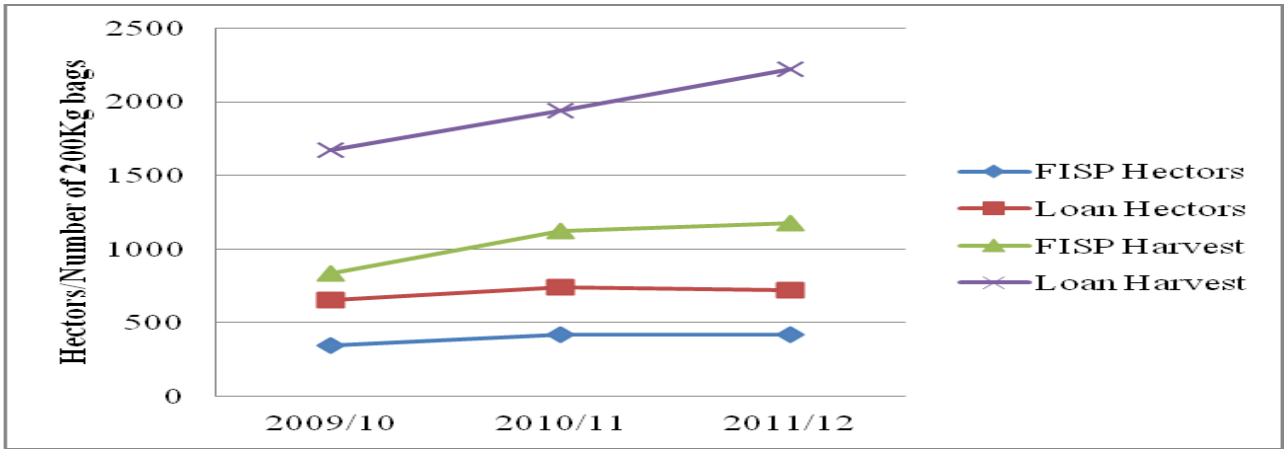

Figure 4.9: A comparison of total hectares ploughed and total number of bags harvested between FISP and loan beneficiaries

Source: Author

It can be clearly seen from Figure 4.9 that loan beneficiary farmers were recording an increase in the harvest which was moving in tandem with the increase in maize plot cultivation. The increase in the harvest can also be seen with the FISP beneficiaries from the 2009/10 farming season to the 2010/11 farming season but there is a drop in the total harvest in the 2011/2012 farming season which may be due to the farmers who could not sustain their increase in the maize plot cultivation area and relegated back to below 2.5 hectares in the 2011/12 farming season. Figure 4.10 compares the yield in kilogram / hectare (kg/ha) of the two beneficiary groups.

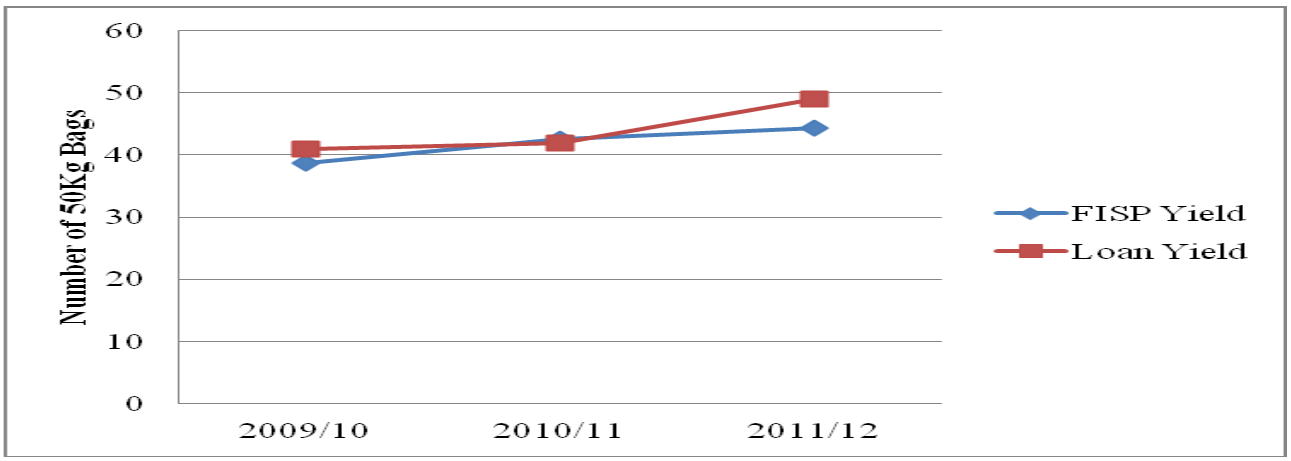

Figure 4.10: A comparison of total yield in kg/ha between FISP and loan beneficiaries

Source: Author

We can tell from figure 4.10 that both groups of farmers were recording some growth in maize productivity in the period under review but the increase was more pronounced with the loan beneficiary group compared to the FISP beneficiary group. The trend of FISP farmers continually remaining in the below 2.5 hectares production tear may be due to the consistently fixed amount of inputs they were receiving and over-dependency on government support during the period under review.

Despite packages of both groups being identical, i.e. two 50 kg bags of basal dress and two 50 kg bags of urea fertiliser accompanied by a 10 kg bag of maize seed, the loan beneficiary farmers have an incentive of working extra hard as qualification for accessing the next loan in the new season depends on the farmer clearing the previous loan which is running. This in itself may make the farmers to be more disciplined in their management practices as compared to their counterparts the FISP beneficiary farmers whose condition of accessing the inputs the following season is dependent on them belonging to a farmer group or cooperative.

The 2010/2011 farming season fell in an election year and inputs in this season were distributed early to try to appease the farmers. This facilitated for the early planting of maize seed and application of fertiliser in good time which promotes good yield. As it is argued that FISP is at times used as a tool to capture the rural vote, this may to some certain extent explain why there was a tremendous shift from the below 2.5 hectares cultivation area to the 2.5 to 5.0 hectares cultivation area for the FISP group compared to the loan group. The FISP inputs during an election period are always delivered on time and Food Reserve Agency (FRA) usually pays the farmers on time. This may have motivated the FISP beneficiaries and motivated them in their production capacities. As for the loan beneficiaries group, we may say they benefited from the externality of FRA making payments to farmers on time it being an election year since they face the same market. This allowed them to clear their loans early and access their inputs on time and also have extra to by more inputs. This result of extra income due to high productivity pushed loan beneficiary farmers from the 2.5 to 5.0 hectares cultivation area to the above 5.1 hectares cultivation area in 2011/12 farming season.

But as for the FISP beneficiary farmers, 2011/12 was a year just like any other. With the elections having passed in September 2011 just before the new farming season and with the change in governments, the new government was not so eager to jump onto the band wagon and continue with FISP with where the previous government had left the programme. There were major inefficiencies in the administration of the programme as inputs were delivered late and FRA delayed in paying the farmers due to delays in funds release by the new government as they were just settling down. It may be argued to a certain extent that the new Patriotic Front (PF) government led by President Michael Chilufya Sata and his administration may have felt betrayed by the rural farmers as they did not capture much of the rural vote. They embarked on re-organising the FISP programme as they perceived it to have been mismanaged by their predecessors the MMD government led by former President Rupia Bwezani Banda and saw it as not serving the interests of all the small-scale farmers in the country efficiently.

This has brought about new reforms in the FISP programme where new crops have been incorporated to include other cash crops which do not belong to the maize-belt so that the programme can be more inclusive and benefit all Zambians. It has also brought about the re-capitalisation of Nitrogen Chemicals of Zambia to produce and supply basal dress fertiliser to FISP beneficiaries with the aim of creating more jobs for Zambians. With these challenges post election period, it further explains why FISP farmers in the 2011/12 season were relegated back to the below

2.5 hectares cultivation segment. The same applies to why some of the loan beneficiary farmers couldn't sustain their stay in the 2.6 to 5.0 hectares cultivation area segment and fell to below 2.5 hectares cultivation area because of the non existence of the externality from FRA which had prevailed during the election year farming season. With FRA widening the range of cash crops to be purchased under the new government, it has brought about adjustments to the loan programme which has also included the new crops in their loan package since their beneficiaries also face the same market as FISP beneficiaries i.e. FRA.

4.5 ECONOMETRIC ANALYSIS

We ran a series of multiple regressions using Ordinary Least squares (OLS) at 95% confidence interval level seeking explanations of variation in productivity and its relationship to quantities harvested among the two beneficiary groups i.e. FISP and loan farmers. These regression analysis results are based on the 2010/11 farming season because it is the time which indicated great productivity within both groups and we seek to understand further the earlier descriptive analysis findings. We determine variability in output by examining its relationship with independent variables such as educational level attained, fertiliser quantity applied, maize seed quantity planted and access to assets (oxen for ploughing), *ceteris paribus*.

We begin our analysis with the FISP beneficiary group where results are presented in the Tables 4.3 to 4.5 starting with the model summary table followed by the Analysis of Variance (ANOVA) table and finally the table showing both un-standardised and standardised coefficients. The same format will be followed when doing the analysis for the loan beneficiary group.

Table 4.3: Model summary for FISP beneficiary farmers for 2010/11 farming season

Model	R	R Square	Adjusted R Square	Std. error of the estimate
1	0.899	0.808	0.797	0.642

Source: Author

Table 4.4: ANOVA for FISP beneficiary farmers for 2010/11 farming season

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	112.995	4	28.249	68.574	0.000
Residual	26.776	65	0.412		
Total	139.771	69			

Source: Author

Table 4.5: Coefficient values for FISP beneficiary regression model for 2010/11 season

Model	Un-standardized coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(constant)	-0.330	0.230		-1.431	0.157
Attained secondary Education	0.156	0.169	0.052	0.920	0.361
Kg of fertilizer used	1.042	0.114	0.690	9.143	0.000
Kg of Maize seed Planted	0.436	0.128	0.258	3.395	0.001
Used Oxen to plough	-0.100	0.188	-0.030	-0.533	0.596

Dependent Variable: Number of 50 kg bags of maize

Source: Author

Beginning with the economical evaluation from the model we estimated, we expected a positive relationship between the explanatory variables and the dependent variable. An increase in any of the explanatory variables will lead to an increase in productivity of the FISP beneficiaries. All of the explanatory variable coefficients are positive except for use of oxen to plough which has a negative sign. The explanation for the negative sign which was not expected with the use of oxen in ploughing could be related to the small fields that were being cultivated by the farmers as majority of them were cultivating fields below 2.5 hectares. With majority of them not owning oxen, they are expected to hire these services and the cost for hiring oxen was found to be around ZMW250 per hectare Zambian Kwacha. With such high costs of hiring, we expect diminishing marginal productivity to set in when these farmers are cultivating small areas.

Coming to the statistical evaluation, quantities of fertiliser and maize seed used are individually statistically significant in explaining the increase in the number of bags harvested at a 5% significant level since their p-values are less than 0.05. On the other hand, use of oxen is found to be statistically insignificant at 5% and hence confirms the negative effect it has on productivity which has already been explained. Education level attained is also statistically insignificant in explaining the increase in the harvest at 5%. This may be due to the fact that at this level, farmers are not expected to adopt complicated technologies as production is kept so basic. But as farmers graduate from small-scale to medium and commercial level, it is expected to play a pivotal role hence we notice in the results it has maintained a positive sign. As for the economic interpretation, a 1kg increase in fertiliser and hybrid maize seed use will result in a 0.69% and 0.26% increase in the number of 50 kg bags of maize harvested.

We also make an analysis of the loan beneficiaries using regression analysis based on the 2010/11 farming season. Tables 4.6 to 4.8 show the model summary, ANOVA and coefficients for the regressors.

Table 4.6: Model summary for loan beneficiary farmers for 2010/11 farming season

Module	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.876	0.767	0.752	0.734

Source: Author

Table 4.7: ANOVA for loan beneficiary farmers for 2010/11 farming season

Model		Sum 0f Squares	Df	Mean square	F	Sig.
1	Regression	114.943	4	28.736	53.367	0.000
	Residual	34.999	65	0.538		
	Total	149.943	69			

Source: Author

Table 4.8: Coefficient values for loan beneficiary regression model for 2010/11 season

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(constant)	-1.634	0.452		-3.616	0.001
Attained secondary Education	0.110	0.180	0.037	0.610	0.544
Kg of fertilizer used	1.534	0.127	0.825	12.075	0.000
Kg of Maize seed Planted	0.225	0.135	0.112	1.670	0.100
Used Oxen to Plough	-0.013	0.282	-0.003	-0.047	0.962

Dependent Variable: Number of 50 kg bags of maize harvested

Source: Author

For the economic evaluation, we also expect the explanatory variables to have a positive relationship with the dependent variable. In exception of the use of oxen to plough, all the explanatory variables have a positive sign thereby indicating a positive relationship *apriori*. Therefore, increases in any of the explanatory variables with a positive sign will lead to an increase in the maize harvested by the loan beneficiaries. Use of hired oxen to cultivate land below 2.5 hectares will result into diminishing marginal productivity because of cost related issues hence the negative sign.

With the statistical evaluation, quantities of fertiliser and maize seed used are individually statistically significant in explaining the increase in the number of bags harvested though at different significant levels. Fertiliser use is at 5% significant level with a p-value of 0.000 which is less than 0.05 while maize seed use is significant at 10% with a p-value equal to the significant level of 0.10. Education level attained and the use of oxen to plough is both insignificant at both 5% and 10% significant level. As for the economic interpretation, a 1 kg increase in fertiliser and hybrid maize seed use will result in a 0.83% and 0.11% increase in the number of 50kg bags of maize harvested by the loan beneficiaries.

The adjusted R^2 for the FISP beneficiary model is 0.81 while the adjusted R^2 for the Loan beneficiary model is 0.75. This indicates that the models explain approximately 81% and 75% of the variations in the number of 50 kg bags of maize harvested respectively by each group of beneficiaries. This is a good fit for both models. The F statistic of 0.000 in both models is statistically significant thereby indicating that the explanatory variables are jointly significant in explaining the dependent variable.

With regards to marketing, the FISP beneficiary farmers were more active on the open market as 49% of these farmers sold their maize on the open market compared to only 6% of the loan beneficiaries. By open market, we refer to any other point of sale for maize other than FRA. For the maize sold on the open market by FISP beneficiaries, the maximum price one 50 kg bag of maize fetched was ZMW90 while the minimum price was ZMW40. The mode price was ZMW65 while the average price for the whole FISP beneficiary farmers who sold maize on the open market was ZMW62. For the loan beneficiaries, the maximum price a 50 kg bag fetched was ZMW64 while the minimum price was ZMW60. The mode price was ZMW61 and the average price for all the loan beneficiaries who sold maize on the open market were ZMW61.

The reason why few loan beneficiary farmers participate on the open market was due to the way the loan program was structured. As long as the farmers had supplied their maize to FRA, the bank (ZANACO) would be guaranteed of their loan repayments by deducting what the farmers owe directly from FRA and the farmers would collect the difference. With this repayment mechanism in place, the bank releases the loans required by the farmers to ZNFU who purchase inputs for on-ward distribution to the farmers in time. In this way, the beneficiaries find it to be more beneficial to sale their maize through FRA as they will receive the inputs for the next farming season early. As

for the FISP beneficiaries, the farmers are expected to start making their first deposits as early as April with the cooperative or farmer group for membership re-registration and consideration for eligibility to receive inputs for that farming season. Coupled with other financial challenges, it is this pressure which leads these farmers to resort to selling their produce on the open market. It was also observed that it was these farmers who are pressured to sale their maize early who was selling a 50 kg bag of maize at the minimum price of ZMW30 under the FISP beneficiary group.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents a summary of the study, draws some conclusions on the findings in the field and makes recommendations to policy makers and industry players dealing with small-scale farmers involved in maize production in the Zambian market.

5.2 CONCLUSION

This study intended to assess the Farmer Input Support Programme (FISP) which is managed by government through the Ministry of Agriculture and Cooperatives to the agricultural loans managed by private lending institutions (grants provided by government to financial institutions); to determine which strategy was promoting growth among small-scale farmers through productivity, income and asset based measurement. A comparative analysis was done between FISP and loan beneficiary farmers. A database of cross sectional data was generated based on the field responses obtained from the survey conducted in Chongwe district for the 2009/10 to 2011/12 farming seasons. This was meant to capture the variables of interest i.e. maize output, maize seed, fertiliser, level of education and assets. This empirical data employed was both inferential and descriptive in nature.

- Comparing the two beneficiary groups in terms of productivity and income earned through the sale of maize on the market, the loan beneficiary group was found to be doing far much better compared to the FISP group. In the 2009/10 farming season, the loan group sold a total of 6754 bags of maize compared to 3428 bags of maize sold by the FISP group. In the 2010/11 farming season, the loan group sold 7769 bags of maize as opposed to the 4606 bags of maize sold by the FISP group while in the 2011/12 farming season, the loan group sold a total of 9151 bags of maize on both markets compared to 4822 bags of maize that was sold by the FISP group.

- Assets owned were divided into two categories i.e. productive agricultural assets and household assets (assets that improve the living conditions of a farmer in a home). Loan

beneficiary farmers were found to be investing more in productive assets compared to FISP beneficiary farmers. They had even showed elements of diversification as they were investing more in small livestock such as chickens, goats and pigs unlike the FISP beneficiaries. They had also spent a total of ZMW48, 100 compared to ZMW28, 462 spent by FISP beneficiaries on productive assets. The reason for the huge difference in the expenditure can be attributed to the investment in cattle and ox-carts made by the loan beneficiary farmers. In terms of investments for assets used in the home, we conclude that both groups had a similar lifestyle but FISP farmers had a higher standard of living compared to loan beneficiary farmers as they had spent 10.6% more in terms of expenditure. This can be attributed to the higher percentage of 13% FISP farmers in formal employment compared to 4% of loan beneficiaries as you would expect them to have a higher standard of living.

- The maize production sector was the most preferred enterprise with 97% of the respondents involved in maize production only. Of these respondents, 3% were involved in both maize and small livestock production. Only 3% of loan beneficiaries had title deeds for their land while none of the FISP beneficiaries had title for their land. The rest of the beneficiaries were using customary land for production and majority of them were cultivating below 2.5 hectares of land. The field plots under cultivation were grouped into 3 categories i.e. farmers who cultivated plots below 2.5 hectares, 2.6 to 5.0 hectares and above 5.1 hectare to assess which category of farmer group showed growth in terms of land under cultivation. For the 11.3% FISP beneficiaries who had graduated from the below 2.5 hectares of land being ploughed, only 1.3% of the farmers managed to sustain their increase in ploughed land. There were no farmers who managed to plough above 5.1 hectares of land under the FISP category.

  As for the loan beneficiary group, we see movement in all three categories indicating growth in terms of productivity. We notice that from the 4.2% farmers who managed to graduate from the below 2.5 hectares category to the 2.6 hectares to 5.0 hectares category, a further 2.8% of the beneficiaries managed to graduate to the above 5.1 hectares of area ploughed. This increase in the land under cultivation is consistent with the quantity of maize harvested by each group of beneficiaries as the loan beneficiary group was recording an increase in the harvest which was greater than that of the FISP group each concurrent year. It can also be

seen that both groups of beneficiaries showed great improvement in productivity when there was great political will and efficiency shown on the part of government on both the input supply side and the output purchasing side as observed during election periods.

We used the econometric model to determine the relationship between productivity and other variables using Ordinary Least Squares (OLS). There seems to be an indication that even econometric results are in support of loan beneficiaries. This may further explain the differences in productivity observed earlier using descriptive analysis between FISP and loan beneficiary farmers. We determined variability in output by examining its relationship with independent variables such as educational level attained, fertiliser quantity used, maize seed quantity used and access to assets (Oxen) *ceteris paribus*.

- All explanatory variable coefficients are found to be positive except for use of oxen to plough which is negative for both groups. The reason for the negative effect when using oxen for ploughing was because the farmers were ploughing small fields below 2.5 hectares resulting in diminishing marginal productivity as the cost for hiring oxen for ploughing was too high.

- Only fertiliser and hybrid maize seed use were found to be statistically significant with p-values below 5% and 10% significant levels in both cases. A 1 kg increase in fertiliser and hybrid maize seed use will result in a 0.69% and 0.26% increase in the quantity of 50 kg bags of maize harvested for FISP beneficiary farmers. A 1 kg increase in fertiliser and hybrid maize seed use will result in a 0.83% and 0.11% increase in the quantity of 50 kg bags of maize harvested by the loan beneficiary farmers. This is a clear indication that additional investment in fertiliser use would yield greater returns if invested with loan beneficiary farmers. However, if you want to pump in more investment by way of promoting usage of hybrid maize seed, greater returns will be realised if this investment is directed towards FISP beneficiary farmers but the increase in yield would not be greater than that which is achieved by investing in extra amounts of fertiliser with loan beneficiary farmers.

Though it may be difficult to distinguish the real effects of both the FISP and loan program on its beneficiaries due to lack of baseline information based on regression results, and claim that it has

made either group better than the other, it is clear that the fertiliser support policy is working better for loan beneficiary farmers when compared to FISP beneficiary farmers. This gives them an edge in income over FISP beneficiary farmers and graduates them into higher brackets of productivity and asset possession leading to higher yields, more income and increased growth in agricultural productivity in general.

5.3 RECOMMENDATIONS

The study makes a number of key policy recommendations for policy makers and industry players in the small-scale maize production sector.

- If government or the private sector is looking at introducing technologies which are relatively advanced to increase productivity and promote growth among small-scale farmers, then educational level attained must be one of the major criteria for selection. This enhances farmer comprehension and application of the new advanced technology introduced.
- If government or the private lending institutions want to invest in improved ploughing methods such as oxenisation among small-scale farmers, they should ensure that the farmers are cultivating areas above 2.5 hectares of farm plots if the investment is to be of any economic value. This is particularly important when structuring loan packages involving oxen for small-scale farmers.
- Government should not only concentrate on providing inputs to small-scale farmers but should be seen to be increasing service delivery in the industry such as ensuring that inputs reach on time and the farmers are paid on time for the produce they sell to government. As it can be clearly seen that with the same level of inputs, farmers recorded great improvement in their harvest due to the efficient role government played in the industry during the election year farming season. Services government can concentrate on to improve efficiency are good infrastructure such as storage, good roads and efficient transportation, good policies on purchases and payments for the farmer's produce. This efficiency on the part of government is seen to have positive externalities even on farmers dealing with the private sector.

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APPENDIX A

Data collection Instrument

TOPIC OF STUDY

A comparative analysis of government farm input support programmes and private sector credit programmes in promoting agricultural growth in Zambia

IS RESPONDENT A BENEFICIARY OF FISP or ZANACO LOAN?

FISP ☐

ZANACO ☐

PID NO	1. USUAL RESIDENTS	2. RELATIONSHIP TO HEAD OF HOUSEHOLD	3. SEX	4. AGE	5. MARITAL STATUS	6. ATTENDED SCHOOL	7. LEVEL OF EDUCATION	8. EMPLOYMENT STATUS
	Please give me the names of the persons who usually live in your household whether present or absent starting from the head of the household	What is the relationship of (Name) to the head of the household? 1 = HEAD 2 = SPOUSE 3 = SON/DAUGHTER 4 = SON/DAUGHTER IN LAW 5 = GRAND CHILD 6 = PARENT 7 = PARENT IN LAW 8= BROTHER/SISTER 9 = AUNTIE/UNCLE 10 = NEPHEW/NIECE 11 = OTHER RELATIVE	Is (Name) male or female? 1 = MALE 2 = FEMALE	How old is (Name)? In completed years. If less than a year, enter Zero	What is (Name's) current marital status? 1 = MARRIED 2=LIVING TOGETHER 3 = DIVORCED 4 = SEPARATED 5 = WIDOWED 6 = NEVER MARRIED	Has (Name) ever attended school? 1 = YES 2 = NO 3 = I DON'T KNOW	What is the highest level of education (Name) has attended? 1 = PRIMARY 2 = SECONDARY 3 = TERTIARY 4 = DON'T KNOW	What is (Name's) usual employment status? 1 = EMPLOYER 2 = IN WAGE EMPLOYMENT 3 = SELF EMPLOYED 4 = NOT WORKING 5 = UNPAID FAMILY WORKER

9. How many members of the family have passed away in the last 3 years? ☐

SECTION 2: HOUSEHOLD CHARACTERISTICS

10. What is the main source of drinking water for members of your household?

    1. Piped water into yard? ☐
    2. Water from well? ☐
    3. Borehole on yard? ☐
    4. Surface water from river/stream? ☐

11. What kind of toilet facility do members of your household usually use?

    1. Flash or pour flash toilet? ☐
    2. Pit latrine? ☐
    3. No facility/Bush/Field? ☐

12. Do you share this toilet facility with other households?

    1. Yes ☐
    2. No ☐

13. Does your household have the items listed below and which of these assets were bought from FISP or Loan money from the last 3 seasons?

	1 Yes	2 No	1 FISP	2 LOAN	VALUE (K,000)
Water Pump					
Radio					
Television					
Mobile Telephone					
Non-mobile telephone					
Refrigerator					
Bed					
Chairs					
Table					
Cupboard					
Sofa					
Clock					
Fan					
Sewing machine					

Cassette Player			
Plough			
Grain Grinder			
Cattle			
Tractor			
Vehicle			
Hammer Mill			
Computer			
Internet			
Microwave			
Stove			
Home theatre			
A bicycle			
A motorcycle			
An animal-drawn cart			
A car			
A truck			

14. What type of fuel does your household mainly use?

1. Electricity
2. Solar Power
3. Liquid Propane Gas (LPG)
4. Charcoal
5. Firewood

Section 3: Production Characteristics

15. What type of land occupancy do you have?

1. Titled
2. Customary
3. Rented

16. How many hectors is your farm size?

17. How many hectors did you use in maize production in the last 3 years?

1. Last 3 years
2. Last 2 years
3. Last 1 year

18. For how long have you been in maize farming?

19. Of your family members, how many worked on your farm in the last 3 years?

1. Last 3 years
2. Last 2 years
3. Last 1 year

20. How many hired labour worked on your farm in the last 3 years? Cost (K,000)

1. Last 3 years
2. Last 2 years
3. Last 1 year

21. What kind of ploughing method have you been using in the last 3 years? 1.Hoe 2.Cattle 3. Tractor

1. Last 3 years
2. Last 2 years
1. Last 1 year

22. Was the kind of ploughing method your own labour/implements or hired in the last 3 years? Skip question 23 if own. 1. Own 2. Hired

1. Last 3 years
2. Last 2 years
3. Last 1 year

23. If hired, how much did it cost you?

1. Last 3 years
2. Last 2 years
3. Last 1 year

24. How many bags of fertiliser did you use in the last 3 years?

1. Basal 2.Top 3. Cost (K, 000)

1. Last 3 years
2. Last 2 years
3. Last 1 year

25. How many bags of maize seed did you use to plant in the last 3 years?

	1. Number	2. Cost (K, 000)
1. Last 3 years		
2. Last 2 years		
3. Last 1 year		

26. How many bags of maize did you harvest in the last 3 years?

1. Last 3 years	
2. Last 2 years	
3. Last 1 year	

27. Did you sell all your harvest to the FRA in the last 3 years?

	1. Yes	2. No	3. Cost/Bag (K,000)
1. Last 3 years			
2. Last 2 years			
3. Last 1 year			

28. If not all was sold to the FRA in the last 3 years, how many bags did you sell in the open market?

29. 1. Number 2. Cost/Bag (K,000)

1. Last 3 years		
2. Last 2 years		
3. Last 1 year		

30. In conclusion, would you say you are benefiting from the FISP/Loan program or how would you want the program to be improved?

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We have reached the end of the interview. Thank you very much for your time.

APPENDIX B
- Informed consent form -

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Economic and
Management Sciences

Informed consent for participation in an academic research study

Dept. of Agricultural Economics and Rural Development

TITLE OF THE STUDY

A comparative analysis of government farm input support programmes and private sector credit programmes in promoting agricultural growth in Zambia

Research conducted by:
Mr. H. Lukwesa. Cell: +260977673541

You are invited to participate in an academic research study conducted by Herman Lukwesa, a Masters student from the Department of Agricultural Economics and Rural Development at the University of Pretoria.

The purpose of the study is to compare the Farmer Input Support Program which is being managed by government and the agricultural loans being managed by private lending institutions (grants provided by government), to see which strategy is promoting agricultural growth, income and food security among small-scale farmers.

Please note the following:

- This study involves an anonymous survey. Your name will not appear on the questionnaire and the answers you give will be treated as strictly confidential. You cannot be identified in person based on the answers you give.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 30 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my supervisor, Dr. L. Rugube at loverugube@yahoo.com if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____ _____

Respondent's signature **Date**