IMPACT OF THE INPUT SUBSIDY PROGRAMME IN MALAWI ON THE FOOD SECURITY STATUS OF SMALLHOLDER HOUSEHOLDS

by

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Dedication

To God the Almighty, who gave me the courage to keep going and courage to fight my inner wars, without you l would not have made it this far.

Declaration

I **Elizabeth Tendai Mukozho**, declare that

i) The research reported in this thesis is my original work unless stated otherwise

ii) That this thesis has not been submitted to any other University for any degree or examination

iii) That this thesis does not contain other people's data, pictures, graphs or any other information unless specifically acknowledged as being sourced from other people.

iv) That this thesis does not contain other author's writing unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted:

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Signed..... Date.....

As candidate's main supervisor, I **M. Mudhara** agree to the submission of this thesis

Signed..... Date.....

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Abstract

The Farm Input Subsidy Programme (FISP) of Malawi has received international recognition for improving the national food security in Malawi but limited information is available on the effect of this programme on household food security (HFS). The need for greater understanding of the effect of such programmes on food security at household level remains. This study employed the Household Food Insecurity Access Scale (HFIAS) to measure the food security status of 200 randomly selected households, 100 of whom were beneficiaries of the programme and the other 100 were not. The study also assessed the impact of the programme on the maize production levels during the 2013/2014 season. Results of the OLS model conducted showed that the number of fertilizer bags used had a significant effect on the maize production levels in the 2013/14 growing season together with the age of the households head, household income (MKW) and ownership of at most pigs or a wheelbarrow as physical assets. Probit regression results showed that marital status, household size, total arable area available to a household, regular area cultivated by a household, area allocated to maize production, receipt or non-receipt of inputs through FISP and the production during the 2013/2014 agricultural season had a significant effect on the HFS. Receipt or non-receipt of inputs through FISP had significant coefficients in the regression model, showing that the programme had a positive impact on the HFS. However, the severity of household food insecurity is a cause for concern as 61% of the population was severely food insecure. At a household level therefore, the impact of this programme is not as the impact at a national level given the high proportion of severely food insecure households from this survey. Hence, the FISP on its own cannot ensure food security at a household level.

List of Acronyms

ANOVA	Analysis of Variance
FA	Future Agricultures
FD	Future Directions
FAO	Food and Agriculture Organization
FISP	Farm Input Subsidy Programme
FSNWG	Food Security and Nutrition Working Group of Southern Africa
GDP	Gross Domestic Product
GMB	Grain Marketing Board
HFS	Household Food Security
HFIAS	Household Food Insecurity Access Scale
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IRIN	International Regional Information Networks
MKW	Malawian Kwacha
MVAC	Malawi Vulnerability Assessment Committee
OPCDAAD	Operations Policy and Compliance Department Agriculture and Agro-Industry Department
OLS	Ordinary Least Squares
OPV	Open Pollinated Variety

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CHAPTER 1 : INTRODUCTION

1.1 IMPORATANCE OF THE STUDY

One in eight people of the world is reported to be suffering from chronic hunger. Eight hundred and sixty two million people translating to12 percent of the world population (FAO, 2013). In Africa, chronic hunger is experienced in one in four people, with the greatest of the malnourished being located in Sub Saharan Africa, showing the extend of food insecurity in the continent and its contribution to the overall food insecurity in the world (FAO,2013). The regional Food Security and Nutrition Working Group of Southern Africa (FSNWG) (2012) stated that 5.48 million people will be food insecure in the Southern African region in 2012/2013 consumption year, a 39% increase from the previous year. Malawi was the third most food insecure country in Southern Africa with 11% food insecurity according to this report, showing food insecurity as a problem in the Southern African region as well as in Malawi (FSNWG 2012).

Poor soil types, climate change and lack of agricultural inputs pose as some of the causes of poor crop productivity (Sanchez *et al.* 1997, Breman & Debrah 2003, AGRA 2007). In addition, Sub-Saharan Africa's population is ever increasing creating a pressure on its land which has resulted in nutrient mining of soils as traditional practices (fallowing, opening new lands) which help keep nutrient balances in the soil are not easily implemented given the high demand for food (Sanchez *et al*. 1997). Malawi was once highly food insecure but managed to shift from a 43% food deficit in 2005, to food self-sufficiency, and even recording a 53% surplus in 2007 (Denning *et al*. 2009).

This has been accredited to the Malawian government's Farm Input Subsidy Programme (FISP) which made agricultural inputs more available for use by the resource poor farmers (Dorward & Chirwa 2011). This would increase the amount of fertilisers added to the soil, replenishing it and improving soil fertility as well as the availability of quality seed that would be used by these farmers to improve productivity (Dorward & Chirwa 2011). A Malawian Green Revolution or a step towards the march to an African green revolution, as it has been termed, defines this agricultural change (Denning *et al*. 2009).

Green revolution, in this context refers to the occurrence of a significant change in agricultural production, a term which originated after marked increases in the yields of cereals, particularly rice and wheat, recorded in Latin America and Asia after 1968 (IFRPI 2002). This was the case

after the FISP of 2005/2006 was implemented in Malawi. The increased yields during the Latin American and Asian revolution were accredited to good fertilizer use, increased irrigation and increased chemical input among other agronomic practices on the developed and widely adopted genetically improved high yielding varieties of the cereals (Negin *et al.* 2009). The FISP of Malawi draws around the same principles.

Of late however, the programme has proven to be costly, and for a poor country like Malawi, which has 40% of its budget from the donor community, the costs have been a cause for concern (Wroe 2012). Some donors have withdrawn from the programme and this left some previous beneficiaries as non-beneficiaries (IRIN 2011). However, the termination of the program can be a political and social suicide and hence the programme continues in 2014 (Pauw & Thurlow 2014).

Research has been carried out on the FISP, and it has been internationally agreed that it had an impact on the food security at a national level, but the link between the FISP and household food security has not been formally established and studied to the best of the researcher's knowledge. The results of this study will inform the policymakers in Malawi, on the impact of FISP on household food security, and also informs on what needs to be done for the future, given the possible current crop production constraints faced by the targeted smallholder farmers.

1.2 RESEARCH PROBLEM

Henao *et al*. (1999) questions Africa's ability to grow enough food given its ever increasing population, a major reason why food security has become important in Africa. In Malawi, the same sentiments have been echoed over the years, and interventions have been made by the government to ensure food security, and the latest of these is the FISP (Dorward & Chirwa 2011). However, of late, the Famine Early Warning Systems Networks (2014) indicated that two million people in Malawi were receiving humanitarian aid until the end of March 2014.

This, from a country which had surplus after 2005 season and which is believed to be food secure due to the implementation of the FISP, leaves a lot of questions unanswered. Is there an impact at the household level on food security? Are these people who require humanitarian aid, part of the people who received inputs or did not receive people? Is there a difference between those who received inputs and those who did not?

If there is an improvement due to the FISP, has it brought the smallholder farmers to a state of being food secure or has it only reduced the severity? It is therefore important that a research is contacted to answer the above stated questions and concerns.

1.3 OBJECTIVES

1.3.1 General Objective

To determine the impact of the FISP on the household food security status of smallholder farmers

1.3.2 Specific Objectives

- To determine the effect of the access to agricultural inputs through FISP on crop production and productivity of smallholder farmers
- To compare the effect of access to agricultural inputs through FISP on household food security

1.4 HYPOTHESES

The FISP did not cause a significant difference in the crop production and productivity levels of smallholder farmers.

There is no significant difference between the effects of access to agricultural inputs on recipients and non-recipients of FISP on household food security.

1.5 STUDY LIMITS

The limits of the study are that the study areas that are to be used are not true representatives of the smallholder farmer population of Malawi.

1.6 DEFINITION OF TERMS

Food Security

A condition in which all people at all times have physical and economic access to safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle (FAO 2002).

Agricultural Input

Anything that is used in an agricultural system, during the production of an agricultural commodity, in the Malawian context of the subsidy, being mainly seeds and fertilizers

Subsidy

"A payment that is made from public resources, that reduces the price that a buyer pays for a good or service below the price at which the seller provides it" (Takeshima & Lim Lee 2012).

Smallholder households

Households that produce agricultural commodities on relatively small pieces of land relying chiefly on family labour, producing for subsistence and in some cases surplus for sale.

1.7 ASSUMPTIONS

The study assumes that all the people that will be involved in the study will be willing to participate, will give true information and will not withhold any information that will be useful for the study. It also assumes that the sample used is a representative sample.

1.8 ORGANISATION OF THE STUDY

This thesis is made up of six chapters. This chapter, which is the first, has given the problem and its setting whilst outlining the main objectives of this study. Chapter two is a review of literature. Chapter three presents the results showing the socio-economic characteristics of households in Malawi whilst chapter four presents the effect of the FISP on crop production levels. Chapter four focuses on the effect of the FISP on the household food security. Chapter six gives the conclusions, recommendations and points out areas of further research.

CHAPTER 2:LITERATURE REVIEW OF IMPACTS OF AGRICULTURAL INPUTS

2.1 INTRODUCTION

African Union member states sat in Abuja in 2006, to come up with what was termed the Abuja Declaration, the first African Fertilizer Summit which chiefly stipulated that signatory countries should by 2015, use at least 50kg/ha of mineral fertilizers on their soils, to improve its fertility and increase agricultural productivity for Sub Saharan African countries (OPCDAAD 2007). This came, as one of the many responses to such calls as the one made by the then United Nations secretary general, Kofi Anan in 2004, for a "uniquely African green revolution" (FA 2008).

Sub-Saharan Africa, was bypassed by the green revolution of the 1960's of Latin America and Asia which saw quantities of fertilizers as high as 115kg/ha being used in these countries, whilst Sub Saharan Africa used an average of 8kg/ha (Fitzgerald-Moore & Parai 1996). The use of fertilizers in this era resulted in increased yields of cereals such as rice and wheat, with English wheat realizing yields of 6metric tonnes per hectare from the usual 2 metric tonnes per hectare farmers would normally expect (IFPRI 2002). The continued use of these high quantities of fertilizer in Asia was attributed to input subsidies which increased farmers' access to inputs in the 1990's (Fan *et al*. 2004).

A subsidy, according to Takeshima and Lim Lee (2012), can be viewed as negative tax, or by definition "a payment that is made from public resources, that reduces the price that a buyer pays for a good or service below the price at which the seller provides it." This was the case in Asia, making fertilizers and other inputs to be available at cheap prices (Fan *et al*. 2004). According to Future Directions (FD) (2013), apart from reducing the cost the farmer pays for inputs as in Asia, subsidies can also be used to make food more available at a household level through the assurance of a certain floor price for farmers produce. This reduces the risk of producing food without a guaranteed market for the farmer thereby encouraging production. With a projected 9 billion people in the year 2020, issues pertaining to food security have risen top of the agenda all over the world (Godfray *et al.* 2010). Input subsidies form part of policy instruments which governments use to ensure food security within their countries.

However, Fan *et al*. (2004) highlights an opportunity cost in agricultural research and development, extension and education as a result of the high use of public resources on input subsidies in Asia which poses as a disadvantage. Shively and Gilbert (2013) also point out this

disadvantage whilst referring to input subsidies in Sub-Saharan African countries, stating that the use of input subsidies has proven to be costly and may jeopardize agricultural development by lessening the funds available for agricultural research and development from the already competing scarce public resources within budgets of most Sub Saharan African countries.

Takeshima and Lim Lee (2012) further highlight how the recent Malawi Farm Input Subsidy Programme (FISP), from a Sub-Saharan country, created a deadweight loss to society of US$1.2 million in the 2006/2007 agricultural season. However, the FISP which was implemented in the 2005/2006 agricultural season, as a way to increase agricultural productivity and food security for a country relying on the donor community to meet their food needs, managed to achieve these goals and was internationally applauded for doing so, making it a gateway to food security (Dorward & Chirwa 2011).

Historically, it is clear thus that inputs subsidies became an answer to poor agricultural productivity, being used to overcome the challenge of food insecurity as stated by FD (2013) and as the cases noted in Asia, Latin America and Malawi were input subsidies were used amongst others. To overcome the disadvantages of input subsidies, some of which have been stated, Baltzer and Hansen (2012) explain the concept of "smart subsidies", aimed at harnessing the good effects of subsiding inputs at the lowest cost which has been advocated as the best way to subsidize, as the concept of subsidy has been difficult to phase out of the international agricultural community. Zambia, Malawi, Tanzania, Burkina Faso, Nigeria, Rwanda, Senegal and Chana, are amongst some of the Sub-Saharan African countries that have tried to adopt the use of input subsidies (Wanzala-Mlobela *et al.* 2013). Malawi is one country that has tried to adopt "smart" subsidy (Baltzer & Hansen 2012).

This chapter will focus on pointing out the different subsidy programs, focusing on the concept of "universal" and "smart subsidies" that have been implemented in these countries, highlighting the advantages and disadvantages. The chapter starts with discussing the inputs subsidies behind the Asian and Latin American green revolution, then the input subsidies in Sub Saharan Africa.

2.2 INPUT SUBSIDIES IN THE ASIAN AND LATIN AMERICAN GREEN REVOLUTION

Fertilizer use in the rice paddies of Indonesia increased from 25kg/ha to a staggering 150kg/ha during the period 1975 and 1990 (Fitzgerald-Moore & Parai, 1996). In India the increases were

much less but significant reaching 75kg/ha from 15kg/ha during the same period (Fitzgerald-Moore and Parai, 1996). Food production increased by over 50% in China between 1970 and 1985 when China increased their fertilizer use which reached the US level of 115kg/ha, the highest fertilizer consumer in 1983 (Fitzgerald-Moore & Parai, 1996). Comparisons of these countries with Africa both pre and post revolution eras shows a vast difference. In 1960, there was only a small difference in fertilizer use for India and China compared to that of Africa utilizing 10kg/ha and 5kg/ha respectively (Breman & Debrah, 2003). However, by 1995, African fertilizer use had increased by only 60 per cent whilst the Chinese and Indian use had risen by 2300 and 1100 per cent respectively (Breman & Debrah, 2003).

The increase in the use of fertilizer and other agricultural inputs such as power and the use of irrigation in countries like India, can be accredited to the availability of these at a cheap price due to subsidies by the government over the years (Fan *et. al.* 2008). This, the Indian government did to increase crop productivity for their population, which was what was achieved, higher yields which characterized the green revolution (Fan *et al.* 2008).As already stated, the Indian government did not only subsidize fertilizers as is the norm in other subsidies, but Fan *et al.* (2008) states government subsidies on irrigation, power in addition to fertilizers, as depicted in Figure 2.1.

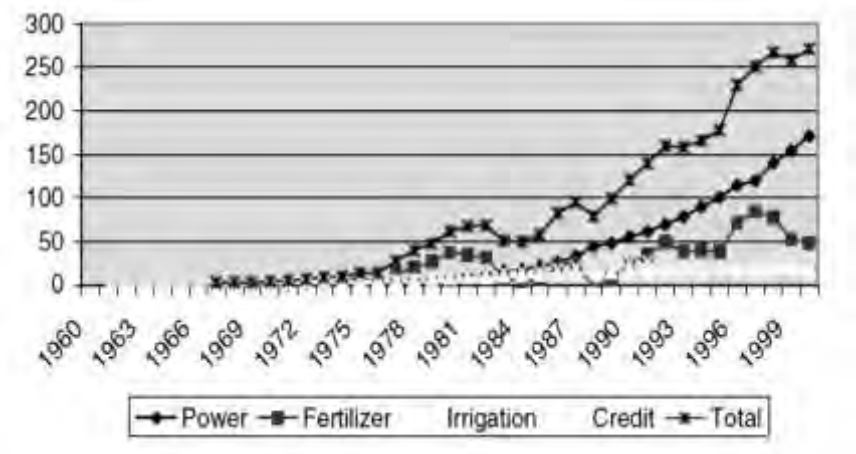

Figure 2:1 Government investment in agriculture in Billion Rupees (Fan *et. al.* 2004)

Figure 2.1 also shows the extent of investment by the Indian government, with investments in fertilizer use reaching 80 billion Rupees in 1993, from the 2.6 billion Rupees used in 1970 (Fan *et al*. 2008). This gives a difference in the subsidies implemented in India as compared to those of Africa, which unlike the Indian Revolution; do not include subsidies for irrigation as well as power as most African subsidies focus on inputs such as seed and fertilizer relying on rainfall

for water (Eicher 1995). Eicher (1995) goes further to acknowledge that indeed subsidies were a major component of the Asian green revolution and whilst referring to Gonzales *et al*. (1993) goes further to state that the 5% increase in cereal production recorded in Asia during the period 1970-88 can be accredited to the government subsidies.

2.2.1 Advantages of Subsidies in India

Increased yields of cereals, a result of increased use of chemical fertilizers, hybrid seeds together with other technologies, made the green revolution famous, and with evidence of the involvement of government through subsidies in India in Figure 2.1, the increased yields can thus be taken as a direct advantage of input subsidies. The green revolution is especially famous for preventing famine, which Malthus in 1798 gave as a probable future occurrence then, when he noted that the population was growing at a geometric rate whilst food production was growing at a linear rate. Therefore, input subsidies in India as one of the countries were the green revolution occurred, facilitated the prevention of this predicted famine and helped increase food security. This is more so given the fact that increases in the yields of cereals is often viewed as the assurance of food security and countries around the world take pride in being able to produce enough of their staple foods.

The International Food Policy and Research Institute (IFPRI) (2002), states that the green revolution increased returns to farming as well as farmers' incomes with the real per capita income doubling between the periods 1970 to 1995. With input subsidies facilitating the green revolution, this again can be viewed as an advantage of input subsidies in this era. Poverty was also curbed by the effects of the green revolution, with 825 million people reported poor in 1995 almost half of the 1.15billion recorded in 1970 despite a 60% increase in population (IFRPI 2002).

The explanation to this can be the increased demand for goods and services due the greater inputs needed on farms, which describes agricultural growth in addition to the reduced food prices which were characteristic of this period.

Increased income and reduced food prices also had an impact on the nutrition of the people with big increases of the per capita consumption of livestock products, vegetable oils, vegetables and fruits amongst others, a clear indication of diversified diets and better nutrition which gives an advantage of input subsidies (IFRPI 2002). Again, these occurring in an input subsidy facilitated revolution, can be viewed as advantages of input subsidies in India, during the green revolution.

2.2.2 Disadvantages of Subsidies in India

The Indian green revolution in which input subsidies were used as stated by Eicher (1995), had short falls which critics eagerly outline with some proving true whilst others may be an overstatement of what actually transpired (IFPRI 2002). The major disadvantage which not only affects the Indian subsidies in this revolution but also subsidies world over lies in the cost of input subsidies. It always comes down to whether or not the input subsidies do give a reasonable return to the public expenditures made to provide the subsidies. Ellis (1992) states that another disadvantage of input subsidies is that they can also result in extreme use of resources and diversion of inputs meant for certain crops.

Freebairn (1995), point out that the implementation of input subsidies in India during the revolution, was not as costly as it began to be as time progressed, initially giving a cost benefit ration larger than one, thus not making them as costly as they were as time progressed. Fan *et al.* (2008) whilst referring to investments in agriculture, points out that the investments that indeed input subsidies have dominated investments in agricultural development by the government, yet the rate of agricultural growth has not been satisfactory. They go further to explain that this shows a loophole as to what the government should do to increase returns to agriculture for the investments made by the government. This gives a disadvantage of input subsidies in this context.

2.3 INPUT SUBSIDIES IN AFRICA

Input subsidies have taken both a developmental role and a food security promoting role in many African countries, with seven African countries investing an average of 2 billion United States dollars in subsiding inputs a figure which represents a huge proportion of public expenditure for most African countries (Ricker-Gilbert *et al.* 2013). Sub Saharan Africa, having the lowest fertiliser use averaged at 8kg/ha, has indeed taken to subsidising their farmers to increase input use as well as ensuring food security. Input costs especially fertilisers and hybrid seed, are relatively high in Sub-Saharan Africa chiefly due to high transaction costs which are attributed to the poor transport systems that prevail in these countries making them unaffordable to the ordinary farmer (Dorward & Chirwa 2011). Governments of countries thus implement subsidies due to fear that food insecurity might become a problem with poor crop productivity due to low use of chiefly mineral fertilisers and seeds as stated by Dorward *et al*. (2008), and as Balter & Hansen (2012) states, fear over dependency on imports.

The use of subsidies in Sub Saharan Africa thus can also be viewed as an instrument for governments to help their farmers to produce more for less. However, literature reveals that some input subsidy programmes proved to be expensive, result in distortion of markets and would benefit the wrong people in the end (Dorward & Chirwa 2011). In trying to correct this, "smart" subsidies have been suggested, which were to harness the favourable effects at the lowest possible costs (Baltzer & Hansen 2012).

Smart subsidies, are a concept which many of the African countries subsiding inputs have tried to adopt to overcome the shortfalls of what were known as "universal" subsidies (Ricker-Gilbert *et al.* 2013). These were the norm in the 1970's before there were phased out following the structural adjustments programs of the International Monetary Fund (IMF) and the World Bank which discouraged universal subsidies based on what their high costs with reduced benefits (Ricker-Gilbert *et al.* 2013).

Subsidizing inputs using "Smart" subsidies is achieved by better administration, program planning and targeting amongst others, such that the intended beneficiaries benefit and make the most of what is given. Universal subsidies, which are typical of the Indian subsidies, as the name suggests, are universal, typically in a country everyone benefits and in the end, there is a vast room for mismanagement and thus lower returns than anticipated (Ricker-Gilbert *et al.* 2013).

Malawi, Zambia and Ghana are some countries that have tried to adopt smart subsidies, with Tanzania also joining the forum introducing a subsidy programme smaller than Zambian subsidy but larger than the Malawian subsidy (Baltzer & Hansen 2012). The scope of each input subsidy programme varies with the country in which it is being implemented as well as the outcome, targeting and the exit strategy (government's intention to have recipients graduate from the program) with similarities existing in some areas amongst countries as Baltzer and Hansen (2012) depicted in Table 2.1.

Table 2.1 Inputs Subsidies in Sub Saharan Africa (after Baltzer & Hansen 2012)

Criteria	**Malawi Agricultural Input Support Programme**	**Zambia Fertilizer Support Programme**	**Ghana Fertilizer Subsidy Programme**	**Tanzania National Agricultural Input Voucher Scheme**
Economic returns	Positive, but small	Largely negative	-	-
Programme costs	USD 114-285 mil	USD47mil	USD 14-26 mil	USD 100mil/yr
% GDP in 2008/9	7	0.9	0.05-0.1	0.4
% Subsidy	64-79	60		
% Subsidy in 2008/9	91	80	50	50
Targeting mechanism	Voucher	Farmer registry	Voucher	Voucher
Package size	50kg fert. + 2-4kg seed	400kg fert+ 20kg seed	No standard package	100 kg fert. + 10kg seed
Targeting criteria	Vulnerable households	Relatively less poor households	None	Ability to buy and use inputs
Input Supply	Contracted private firms	Contracted private firms	Large private importers	Private sector
Input retail	Mainly parastatal	Contracted private warehouses	Private sector	Private sector
Subsidy redemption	Retailers	Farmer cooperative	Fertilizer importers	National Microfinance Bank
Clear graduation strategy	None	2-year benefit, 3 year programme	Single year programme	3-year benefit, 3 year programme

"-" means missing information

2.3.1 Advantages of Inputs Subsidies in Africa

Agricultural input subsidies, together with other food related subsidies in Africa, are implemented, to ensure food security as the major goal. In Zambia, various input subsidies have been implemented, having the goal of improving household and national food security, incomes and access to agricultural inputs of smallholder farmers (Mason *et al*. 2013). These are the same goals under which input subsidies in Malawi, including the currently Farm Input Subsidy Programme run (Dorward & Chirwa 2011). Evidence of food production increases

due to the input subsidy programme, are reflected in Figure 2.2 using data from FAOSTATS (2014) reflecting the increases in food production in Malawi after 2004/2005 when the subsidy was implemented.

Prior to the 2005/2006 growing season, as depicted on Figure 2.2, there was a resurging drop of the quantities of maize production (Dorward *et al*. 2008). Malawi was a donor fiscus supplemented economy until 2005/2006 after the implementation of the programme which led to food self-sufficiency (Chirwa & Dorward 2011). The maize average increased to 2.04 ton per hectare in the 2006/2007 crop season from 1.59 ton per hectare in 2005/2006 (Dorward & Chirwa 2011). The programme has been hailed for its success thus far in raising maize yields from an average of 1.06 million tonnes in 2000-2005 to 2.7 million tonnes between 2009-2011; leading to increased food security (Holden & Lunduka 2010).

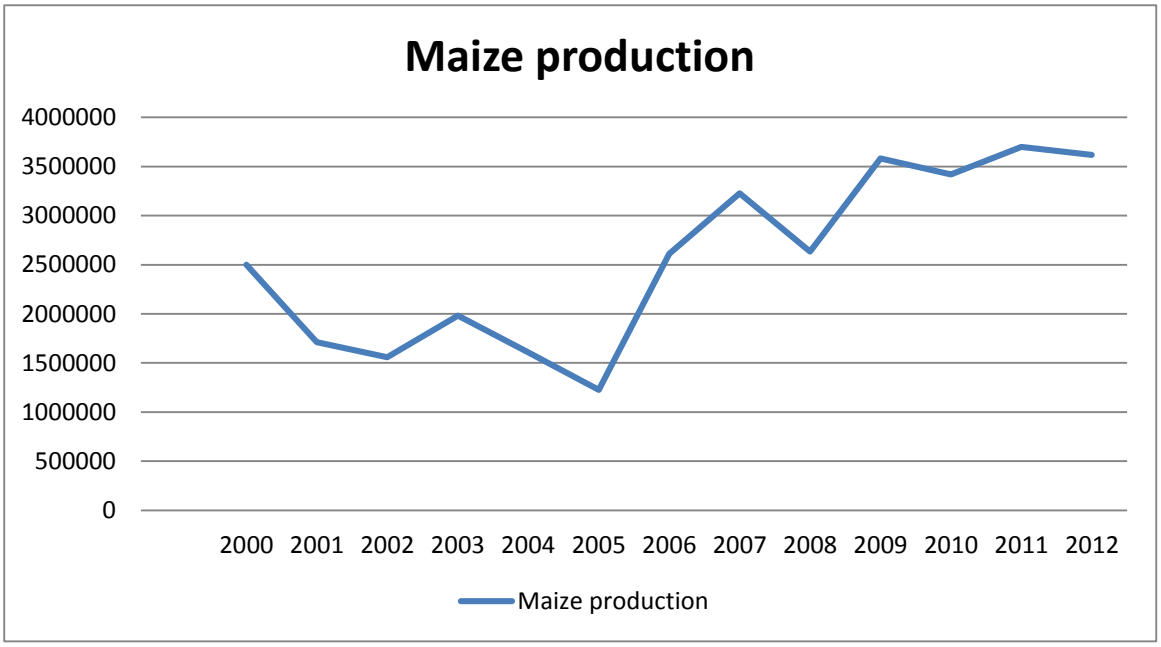

Figure 2:2 Maize Production Trends (mt) in Malawi (FAOSTATS 2014)

Zimbabwe also experienced a change in yields in the 1980's when a green revolution was also said to have occurred (Eicher 1995). This was due to the same practices as implemented by Malawi in the 2005. Eicher (1995) describes a two phase green revolution in this country, one prior to its independence consisting of mainly commercial farmers, and one post-independence dominated by the smallholder farmers, one in which yields increased from 738, 000 metric tonnes in 1980 to 1.2 metric tonnes in 1986 almost double the initial yields. The change in

Zimbabwe, as was in Malawi, was facilitated by subsidies from the Grain Marketing Board (GMB) a parastatal which runs mostly the marketing of grains within Zimbabwe (Eicher 1995).

In Zambia, a similar trend in increases in food production is realized as there are increases in maize quantities with various input subsidy programmes including the Food security subsidy programme which gives 100% subsidy to disadvantaged members of society (Mason *et al.* 2013). Figure 2.3 shows increases in food production after the year 2003 when large scale input subsidies were reintroduced in Zambia after they had earlier been eliminated (Mason *et al.* 2013).

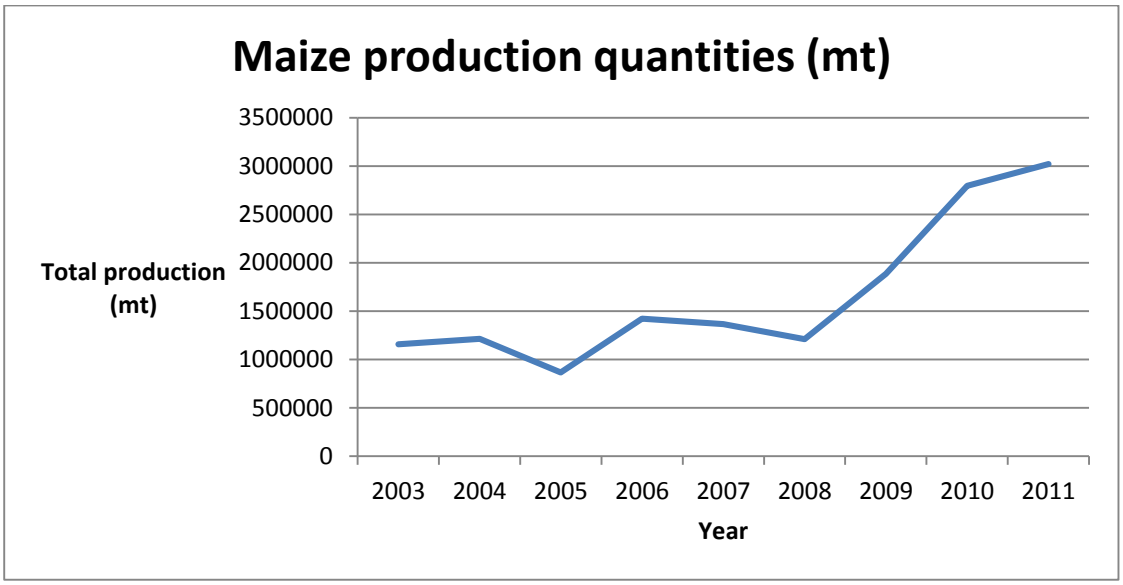

Figure 2:3 Maize production trends in Zambia (FAOSTATS 2014)

The evidence of increased food production above, gives the major advantage of input subsidies, that of increasing food security and since in the countries stated, maize reflects food security such as in Malawi, increased food security in terms of availability becomes a major advantage. Input subsidies are believed to reduce the prices of staples which would increase affordability for the net consumers of maize (Ricker-Gilbert *et al.* 2013). In a study to determine the effect of large scale input subsidies, Ricker-Gilbert *et al.* (2013) concluded that input subsidies do not cause significant change in the prices of maize in Malawi and Zambia were large scale subsidy programmes were implemented. In Zambia, doubling the scale of the subsidy caused a 2-2.8% reduction, with an average of 1.8% per capita whilst in Malawi; a 1.2-1.6% reduction was noted with the average per capita reduction in the price of maize being 2.5% reduction (Ricker-Gilbert *et al.* 2013).

Input subsidies, can also have a positive impact on a countries' economy, especially when it results in surplus produce which can be exported for a good price as was the case in Malawi (Mwase *et al*. 2013). Table 2.1 by Baltzer & Hansen (2012) shows changes in the Gross Domestic Product of the four countries selected in which Input subsidies were implemented and it is evident that the Malawi had the greatest GDP recorded of the four countries. In addition to the high GDP of Malawi, the input subsidy changed the inflation rate, which generally decreased after the implementation of the program in 2004/2005 as Dorward & Chirwa (2011) outlined in Table 2.2.

Table 2.2 Trends in Macroeconomics Indicators, 2005-2009

Indicator	**2005**	**2006**	**2007**	**2008**	**2009**
Real GDP Growth	3.3	6.7	8.6	9.7	6.9
Inflation	15.4	13.9	8	8.7	10.1

Source: Dorward & Chirwa (2011)

The input subsidy of Malawi targeted smallholder farmers which make up 80% of the Malawian community which boosted yields such that exports of the surplus maize were made to neighbouring countries such as Zimbabwe, Mozambique and Namibia as well as tobacco with increased yields shown in Figure 2.2 to the global market there by increasing the GDP (Denning *et al*. 2009). What is interesting to note in Table 2.2 is that there was a sharp increase in the real GDP recorded for Malawi, in the 2005-2006 season, a period when the FISP was implemented; showing the effects of the programme and at most the advantages that input subsidies can have on a countries economy.

Furthermore, Dorward and Chirwa (2011) in Table 2.2 again, also show a decrease in the inflation rate after the implementation of the program, something which is desirable in any country thus becoming an advantage of input subsidy programmes. Malawi also ranked amongst the top 20 performers on the Millennium Development goals indicators, during the 2004-2009, a time after the implementation of the programme, showing its contribution and an advantage for policy.

The Input Subsidy in Malawi, like in India also resulted in an increase in the incomes of the ordinary person, with Dorward & Chirwa (2011) concluding after a research that there was a 10-100% increase in the income of beneficiaries of the programme and 0-20% increase in the increase in non-beneficiary salaries. It also improved the number of meals consumed in a day,

reduced malnutrition and improved how long stocks would last which addresses the food security component of livelihoods (Dorward *et al*. 2008).

The increases in income result from the fact that increased access to agricultural inputs enables farmers who would not have afforded to plant in a season, to do so, such that there will not be able to provide much of their labor on other people's farms, increasing the labor demand, wages and income for the laborers who tend to be net consumers of maize (Ricker-Gilbert *et al*. 2013).

Karamba (2013) highlighted that the impact of agricultural interventions on nutrition can either be through direct consumption, termed specific or through increased income which is termed generic. Whilst discussing the effect of the FSIP of Malawi, Karamba (2013) concluded that the effects of the FSIP were more on the generic front. Furthermore, of particular interest is the fact that the research proved that there was improved short term nutritional status on preschool children following FSIP through increased weight of children located in rural areas. This shows that children nutrition was positively influenced by the FISP which again, gives another advantage of implementing input subsidies in the Sub-Saharan African context, where malnutrition of children is high. To illustrate changes in general nutrition as well as poverty for the people caused by the FISP of Malawi now and in the future, Pauw *et al*. (2011) gave Figure 2.4.

Pauw *et al.* (2011) noted that FISP had a positive impact on nutrition though it was not sufficient. As seen above, there was a decline in deficiencies from the 2004-2012 seasons, which was when the FISP running, maize led growth. The first phase of the FSIP, mainly focused on maize and tobacco, but lacked legumes, which were added in the second season so as to encourage crop diversification (Dorward *et al*. 2008). Dorward and Chirwa (2011) state that one of the reasons legumes were added to the programme was to encourage integrated soil fertility management (ISFM), as legumes are known to improve soil fertility. Legumes also are important for livelihood diversification (Chirwa & Dorward 2013). The later inclusion of legumes though not intensive, is a step towards improved fertility and diversification so as to harness the advantages of growing legumes. Figure 2.4 shows deficiencies and poverty levels as predicted occurrences; that is to say if Malawian agriculture takes on a crop diversification mandate, under the FISP to the year 2020.

It can be noted that like in the Indian Revolution, poverty levels declined due to subsiding inputs. Nutrition improves not only for those rural households linked to agriculture but urban

households also benefit from agricultural productivity growth and associated reduction in food prices (Lazarus *et al.* 2010). What is important to note is that at the end of the day, agriculture alone can neither eliminate poverty, hunger and malnutrition, but there is also need for non-agricultural, strategic investments and growth policies by governments, so that nutrition can be better addressed and growth-nutrition linkages are strengthened.

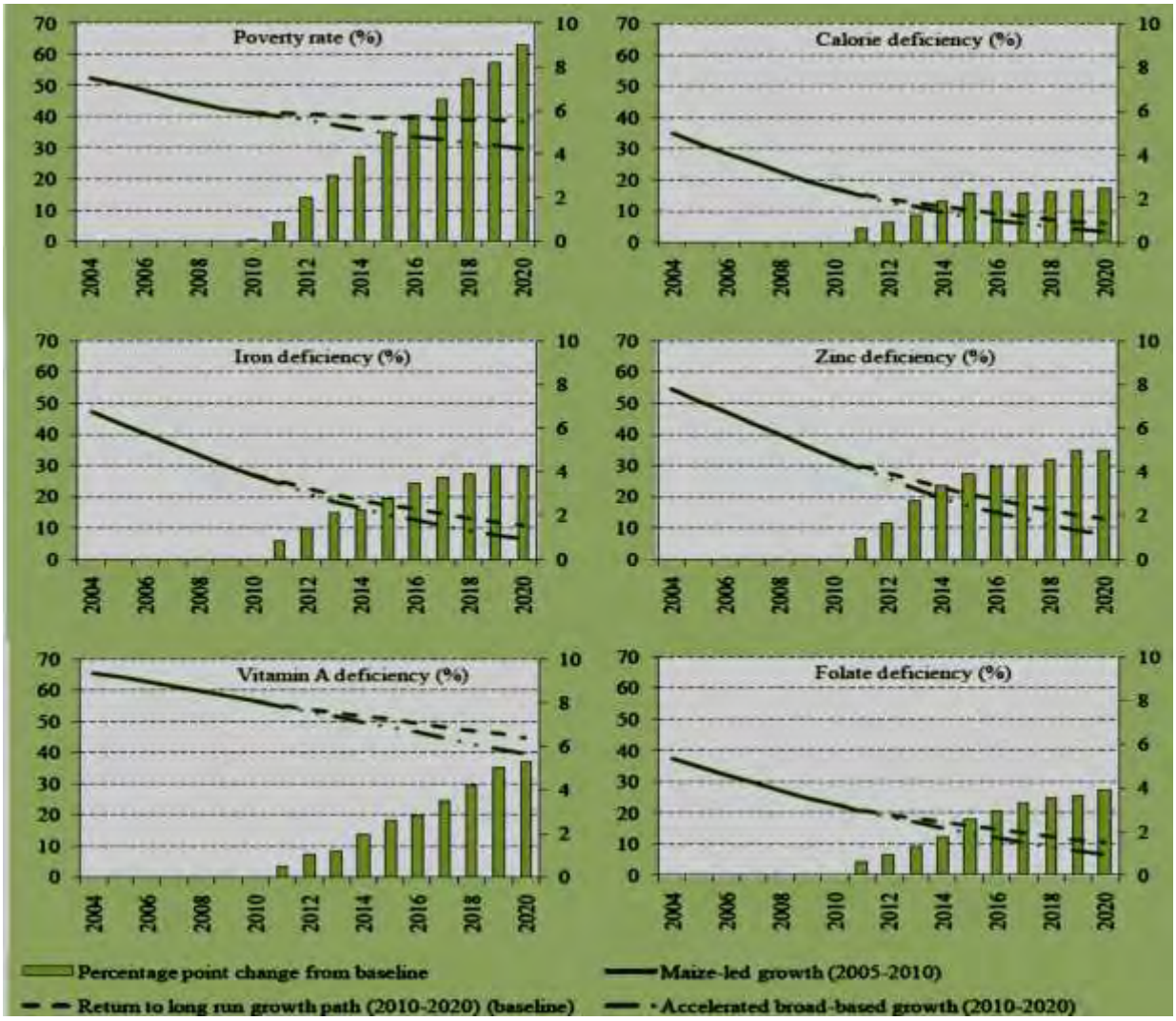

Figure 2:4 Poverty and nutrient deficiencies changes (2005-2020) (Adopted from Pauw *et al.* 2011)

Other than the direct impact on food production which topples down to nutrition amongst others, input subsidies especially those including fertilizers are known to affect the fertilizer system by sensitizing farmers on the advantages of using fertilisers such that farmers will buy

more fertilisers even beyond the subsidy a phenomenon known as crowding in, which can be viewed as an advantage (Takeshima *et al.* 2012).

2.3.2 Disadvantages of Input Subsidies in Africa

Input subsidies can also cause sales in the fertiliser private sector to go down, a reverse of crowding in known as crowding out of the private sector in the fertiliser industry (Takeshima *et al.* 2012). This has been the fear amongst the critics of input subsidies, who advocate that they should not be used as a policy instrument for development and improving food security as they result in crowding out of fertiliser markets (Xu *et al*. 2009; Shively & Ricker-Gibert 2013). Takeshima *et al.* (2009) note that for a collection of farmers using one metric tonne more of subsidised fertiliser, 0.19 and 0.35 sales losses are made in the commercial fertiliser market in selected input subsidy programmes in Nigeria.

Shively and Ricker-Gilbert (2013) estimates that the rate of crowding out for Malawi was at 22% meaning that each kilogram of subsidised fertiliser resulted in 0.22 kilogram crowding out of commercial fertiliser. Another concern that has been brought to the table by critics is the fact that input subsidies result in a deadweight loss to society (Takeshima and Lim lee 2012).

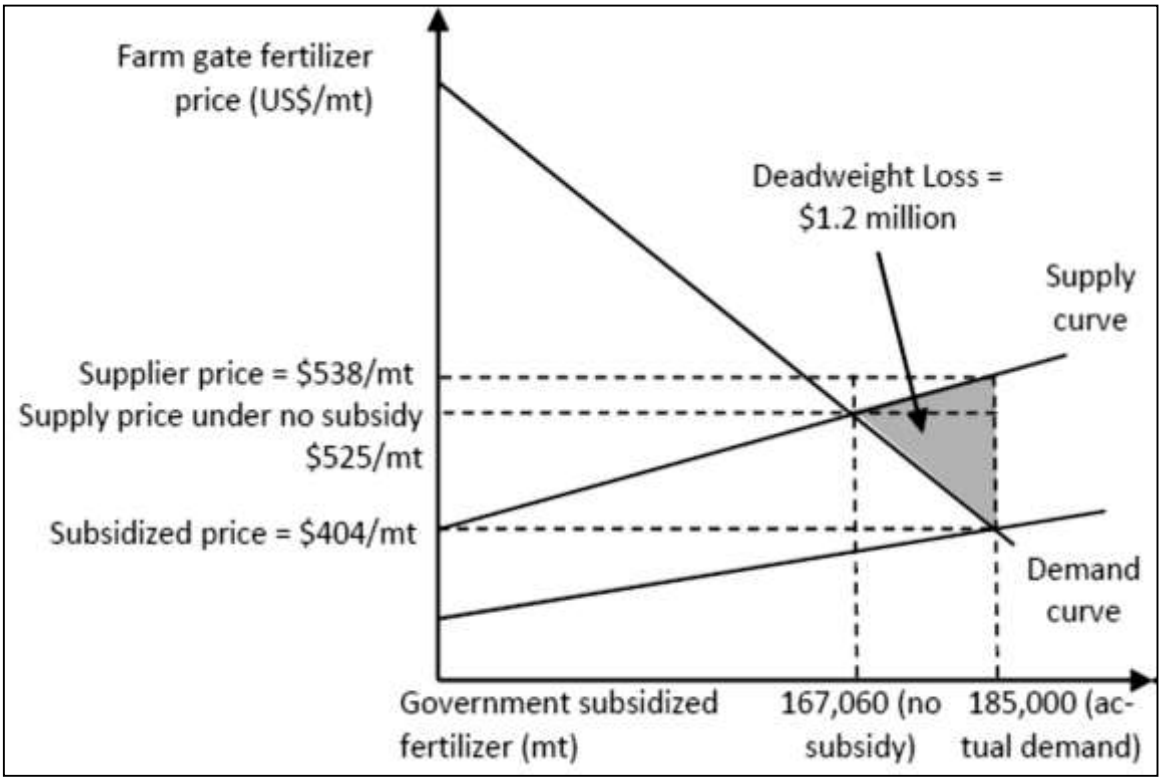

Figure 2:5 Deadweight loss to society in Malawi (Adopted from Takeshima and Lim lee 2012)

Input subsidies tend to be expensive and thus, those against their implementation point put that they encourage over expenditure, macroeconomic as well as fiscal problems (Chinsinga 2012). In Malawi, there have been concerns as to the fiscal and macro-economic sustainability of the FISP programme as stated by Chirwa *et al*. (2011) with the programme still running to date. With these concerns, it is possible that when funding the programme becomes a burden to the government bleeding fiscus purse, it would be terminated anytime and the beneficiaries would be left food and income insecure as before the 2005/2006 inception of the programme (Chirwa *et al.* 2011) Abrupt termination of an inputs subsidy programme has shown detrimental effects on food security and livelihoods (Dorward *et al*. 2013). Therefore, for an input subsidy programme to be effective there has got to be a proper exit strategy or proper graduation, a concept which lacks in the Malawian FISP (Chirwa *et al.* 2011). Furthermore, the lack of a proper graduation strategy leads to a strong dependency syndrome making the beneficiaries less resilient to various economic shocks.

2.3.3 Farm Input Subsidy programme and Food and Nutrition Security in Malawi

The FISP of Malawi aimed at overcoming food insecurity as most families had food deficits at some point during the course of the year. As seen in Figure 2.2, the subsidy resulted in increased yields of the staple maize, which equates to increased caloric intakes. Little is known, about the impact of the programme on the nutrition and food security. Dorward and Chirwa (2011) state that the first phase of the programme focused on maize, as it is a symbol of food security in Malawi, and only included legumes, in the second phase which even then, formed a small proportion of the overall subsidy programme.

Legumes help in increasing the fertility of soils as part of the Integrated Soil Fertility Management (ISFM) (Dorward and Chirwa, 2011), whilst giving the much needed nutritional balance. Verduzco-Gallo *et al*. (2014), whilst assessing changes in food and nutrition security concludes that, there has been an increase in caloric consumption whilst a decrease in Vitamin A, folate and Zinc consumptions in rural households of Malawi since the implementation of the programme. This is attributed to increased consumption of maize whilst reducing the consumption of milk, leafy vegetables, pulses and dairy products. Ecker and Verduzco-Gallo (2014) state that the FISP resulted in increased household income inequalities and food consumption whilst it did not have notable effects on poverty and food and nutrition security reduction as was expected of it.

2.4 INPUT SUBSIDIES: AN OVERVIEW

The move by the World Bank together with the IMF stated by Ricker-Gilbert *et al.* (2013) of banning input subsidies shows that there had been a general consensus that these are not an effective way to overcome food insecurity, or more so, achieve rural development in the developing world. However, food security has become a global challenge as Godfray *et al*. (2010) states such that governments have taken to bringing these back, as a solution to the food insecurity which in some countries, have become the norm every growing season.

In Malawi for instance, before the 2004/2005 growing season when a big subsidy was implemented, food insecurity was a problem, and in each season, the donor community needed to assist with food to avoid starvation of the population (Dorward & Chirwa 2011). However after the implementation of the programme, Malawi became a food secure nation, affording to even export to neighbouring countries (Mwase *et al.* 2013). In every country were input subsidies have been implemented, it can be seen that indeed the food security status of that country, improves and thus, without considering the costs, this effectively highlights that input subsidies, generally guarantee increased food security. Whilst referring to the cost of subsidizing, ARI (2007) states that the input subsidy program of Malawi, proved to be a cost effective way of feeding the nation and further went to highlight that the former minister of Agriculture, Aleke Banda, considered using subsidies to be five to six times cheaper than implementing food aid.

The nature of the subsidy, however, is worth noting, with the universal subsidies implemented in India, tending to be costly such that views on the effectiveness of the subsidy become relevant. Fan *et al.* (2008), argues that instead of input subsidies, the Indian government, should rather invest in agricultural research, education amongst others, as these would ensure development of the agricultural sector to a greater extent as compared to subsidizing inputs. Indeed, the green revolution in which India subsidized inputs sensitized the world on the importance of agricultural inputs, an occurrence which may also be linked to the subsidies implemented world over.

The difference in the input subsidies of India, the green revolution, and those of Sub-Saharan Africa, lies in the fact that in India, universal subsidies are implemented, whilst in most subsidies worth noting in Sub-Saharan Africa, subsidies have taken to becoming more of smart subsidies, than universal, which can be viewed as an evolutionary process over the years.

In Sub-Saharan Africa, the challenge to reducing the costs lies in proper targeting, as well as in properly implemented strategies with proper exit strategies to avoid excessive costs (Ricker-Gilbert *et al.* 2013). The major advantages and disadvantages however, are similar in India and in Sub-Saharan Africa.

2.5 CONCLUSION

It is clear from what has been raised that with no doubt, input subsidies increase the yields of cereals, a symbol of food security in many nations world over. The issue lies in whether or not input subsidies are a necessary evil, given their costs and benefits (Dorward & Chirwa 2011). Indeed, when it comes to improving the food security of any country, they have proven to be worthwhile. However, the cost issues still lie as a weapon in the hands of critics. It is astonishing however, how literature points out the need for countries to follow smart subsidies to harness the benefits of input subsidies, and how countries try but follow just part of what is required.

It leaves room for improvement of either the principles of smart subsidies themselves, or how the implementers of subsidies within countries implement their programs. In addition, Ricker-Gilbert *et al.* 2013 notes that there may be need for governments to consider if the benefit to subsidizing is worth the expense of scarce public resources which are invested in it which could have otherwise been allocated to other uses. The advantage of implementing subsidies with the world population increasing and requiring food as stated by Godfray *et al.* (2010) seems worthwhile, and thus eliminating disadvantages seems the best option. However, whether or not input subsidies should continue as policy instruments is a matter of opinion and lies on who is viewing the effectiveness of the subsidies.

2.6 SUMMARY

With the world population increasing, and expected to reach 9 billion by the year 2020, issues of food security have become pivotal more so in the developing world. Governments in the developing world, especially in Sub-Saharan Africa, have taken to subsidizing agricultural inputs, as a way to increase fertilizer and hybrid seed use in these countries and above all, increase food security. Input subsidies makes agricultural inputs affordable for the peasant farmer, who then manages to produce more, for his family and probably produce surplus for sale. In countries like Malawi, this surplus can have economic value at a national level,

increasing the Gross Domestic Product (GDP) and thus causing a positive economic impact in such countries.

The chief advantage of input subsidies is the increased food security. Increased incomes which increase accessibility to net consumers of maize, who are laborers on other people's farms are also worthy causes of input subsidies. However, the cost of input subsidies, compared to the returns made to public investments, are a major concern and the failure of proper targeting as well as proper exit strategies, makes these more costly, such that the cost to the benefits do not become feasible. Proper management and implementation, as well as the existence of a proper exit strategy are then a necessity, for the benefits of input subsidies to be harnessed at a reduced cost which makes subsidies, a worthy policy instrument for improved food security. Literature does not give however, the direct link between input subsidies and food security, especially at a household level. This remains a gap of knowledge, which needs to be filled.

CHAPTER 3:SOCIO-ECONOMIC CHARACTERISTICS OF FARMING HOUSEHOLDS IN MALAWI

ABSTRACT

The Farm Input Subsidy programme (FISP), a programme implemented in 2005 in Malawi, as a way to overcome food insecurity and to reduce reliance on the donor community, has been widely researched, due to the change it brought to the food security status of the country. Limited research has been conducted to determine the effect of the subsidy on food security at a household level. Analysis of data collected using the SPSS and STATA, revealed that close to three quarters of households under study were headed by male decision makers. Generally, the more experienced farmers received inputs through the FISP as compared to those who had minimal farming experience. The greatest proportion (58%) of the population had been to school up to the primary level whilst 21.2% had never been to school. Generally, FISP recipients had greater pieces of land whether arable, cultivated and total land area, household size and greater yields both in the 2013/14 growing season and in the years after implementation according to the estimates of the farmers themselves. However, it was clear that ten years after the implementation of the programme, corruption and late distribution are a problem and that though the FISP improved yields, there is still room for improvement on production and productivity and ultimately food security. The researcher recommends the government to invest in other policies such as education amongst others, to enhance the effects of programmes such as these as it is clear that this cannot be an individual solution.

Key words: Farm Input Subsidy programme (FISP), food security, productivity

3.1 INTRODUCTION

Malawi introduced the Farm Input Subsidy programme (FISP) in 2005 as a policy tool with goals of improving food security by increasing productivity (Denning *et. al*. 2009). The FISP provided coupons of fertilizer and hybrid seed for maize and other selected crops (Dorward & Chirwa 2011). Research has been done on this programme following its success, with researchers selecting various socio-economic variables which would be used in the analysis.

In their study to measure the impacts the FISP, Chibwana *et al.* (2010) selected characteristics such as household size, age, farm size, maize self-sufficiency and the educational level of household head. In rural Malawi, Fisher and Lewin (2013) sought to know the effect that education and the cultivated area available to a household on the household food security status and concluded that having a high school degree and large cultivated area per capita, significantly influenced the household food security.

Fisher and Kandiwa (2014) showed that 78.7% households were headed by males in the Northern region whilst in the central region this was 61.2%. The people's perceptions of the FISP programme were addressed in a research by Holden and Lunduka (2010) were problems such as corruption and late distribution were stated. The above mentioned give different characteristics of households from which conclusions will be drawn. This paper focuses on highlighting the household characteristics of the farming household in the Kasungu-Lilongwe plain of Malawi, about ten years after FISP implementation.

3.2 RESEARCH METHODOLOGY

Malawi is a South-Eastern African landlocked country covering 118000 square kilometers. It is bordered by Tanzania, Mozambique and Zambia. Figure 3.1 shows the map of Malawi. It is considered one of the least developed countries in the world (Babu and Sanyal 2007). The Malawi National statistics office (2012) statistical yearbook stated that the country was home to 13 million people as at the 2008 national census. The country has three main regions, which are the northern, central and southern regions. The central region, where the research was conducted, constitutes 42% of the total population falling second after the southern region which is the most densely populated making up 45% of the population (NSOMalawi 2012).

Agriculture forms a large part of the livelihood of the people of Malawi. Over 80% of the population relies on agriculture for their livelihood with most of the farmers being smallholder

farmers (Denning *et al*. 2009).Attainment of household food security in Malawi is dependent on the productivity of the maize, the staple food (Fisher & Lewin 2013).

Malawi Vulnerability Assessment Committee (MVAC) (2005) zoned the country into 18 livelihood zones depending on the livelihood activities conducted in the area. The two districts selected for this study were Lilongwe and Kasungu located in the central region of the country. The two districts fall into the same zone. According to MVAC (2005) the people in the Lilongwe-Kasungu plain grow maize as the main food crop. Groundnuts, soya beans and sweet potatoes are also grown in surplus quantities whilst tobacco is the main cash crop.

Figure 3:1 Map of Malawi (NSOMalawi 2012)

3.3 RESEARCH AND SAMPLING DESIGNS

The research used a mixed methods research design constituted of both qualitative and quantitative approaches. The mixed methods approach capitalizes on the strengths of both qualitative and quantitative whilst minimizing their weaknesses (Johnson & Onwuegbuzie 2004).

Quantitative data was collected by means of a structured questionnaire and qualitative data was by means of focus group discussions and observations. Non-probability, purposive sampling design was used for this research, which Daniel (2012) states is ideal when looking for certain attributes in the population. To select the sample, Daniel (2012) notes that the nature of research design, nature of the population amongst others determines sample size. One hundred representative smallholder farmers who were beneficiaries of the inputs subsidy programme were selected and interviewed. As a control measure, 100 farmers who, for one reason or the other, failed to be beneficiaries or were not regular beneficiaries of the programme were also be interviewed. In each of the two districts selected for the study, 50 former beneficiary and 50 non-beneficiary farmers will be selected.

To select respondents, in each village, the first household would be randomly selected after which every fifth household would be selected until the 100 households required in a district were acquired. In this respect, this research took a modified systematic random sampling approach. In each village, the traditional authority and village headman were consulted to give permission for the research to be conducted.

Four enumerators who were fluent in Chichewa, the local language in Malawi, were employed to conduct this research. Enumerators were trained to administer the questionnaire to reduce variations in the way the questions were asked. The questionnaire was pre-tested on five households and it was adjusted for better collection. Questions were rephrased for the better understanding of the respondents. The questionnaires were used to determine the extent of the use of both fertilizers and seed amongst others on their farms and their impact on yields after exposure to the FISP as well as the impact on household food security. Variables such as the age of the household head, their educational level, household structure, years of farming, source of income, and income, amongst others, were collected using the questionnaire. Two focus groups comprising of 12 people each were conducted for beneficiaries and non-beneficiaries in each district.

3.4 EMPIRICAL DATA ANALYSIS

The data collected was captured using the Statistical Package for Social Science (SPSS) and analyzed using STATA. Descriptive statistics was used for analysis so as to make deductions on the data. These include frequencies, percentages and cross tabulations. Where it was assumed that two categorical variables were associated, the Chi square test, which is a test for association, was applied.

3.5 RESULTS OF HOUSEHOLD DEMOGRAPHICS

3.5.1 Gender of household heads

In the context of this research, the household head was considered to be someone who made decisions on resource allocation, including farming decisions, at household level. Almost three quarters (74.5%) of respondents, were headed by males whilst 25.5% were headed by females. Females indicated they were the household heads only when they were widowed and seldom when they were single. Women were mostly interviewed, but in all cases men were the household heads as they were the decision makers with respect to allocation of resources. However, in most cases, the men would be absent from the household implying that though the man-made farming decisions, women actually did the farming.

3.5.2 Farming experience and age of household heads

Table 3.1 gives the farming experience of the respondents. Over half of the respondents had more than 12 years' experience (Table 3.1).

Table 3.1 Distribution of farming experience

Farming Experience in years	FISP Non-recipients (n=100)	FISP Recipients (n=100)
<2	6	3
2 to 6	27	20
6 to 12	18	17
>12	49	60
Total	100	100

Source: Survey data 2014

With respect to the age of the household head, the greatest proportion of heads was in the range 26 to 70 which covered above 80% of the respondents' population irrespective of FISP receipt status. Figure 3.2 below, shows the results when FISP provision is taken into consideration. It can be noted that the greatest proportion who received inputs were headed by heads in the 41 to 70 age group (48%) whilst that of those who were non recipients was highest in the 26 to 40 age group (44%) as reflected in Figure 3.2.

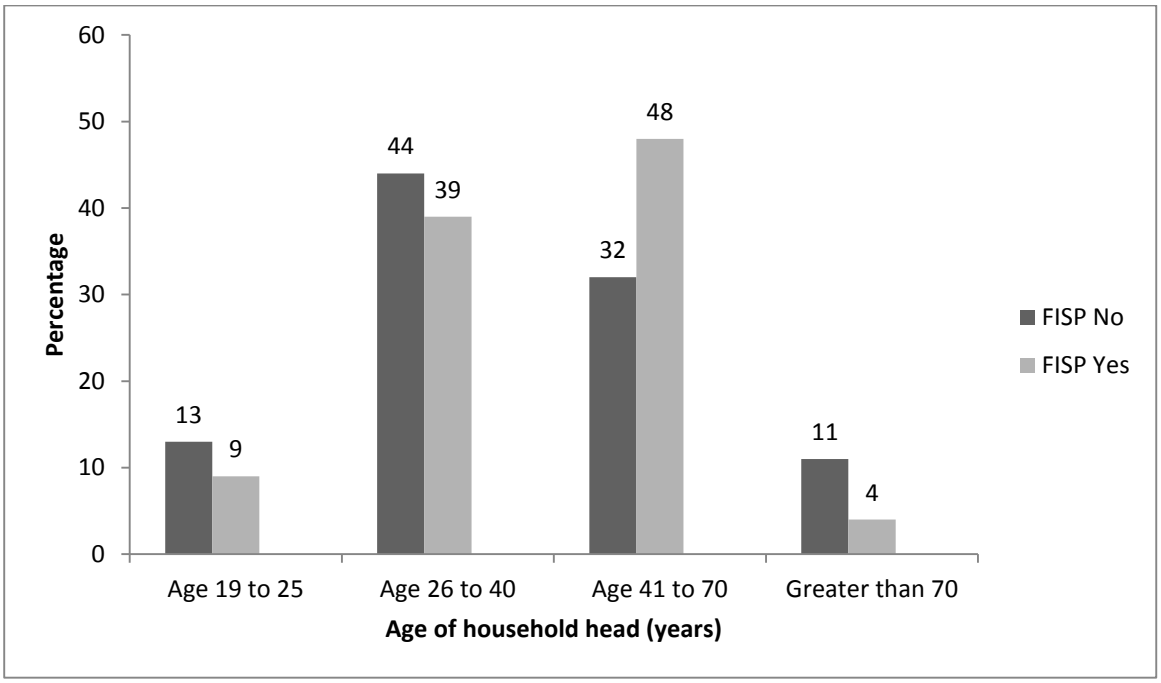

Figure 3:2 Proportions of the age of heads of households of the samples population

Source: Survey data 2014

To determine if there is any association between the age of the household head and FISP, the Chi square test was conducted. The results showed that there is some association between the age of the households head and the FISP at $p<0.1$. It can be noted that the greatest proportion of household that received inputs through the FISP were in the age range 41 to 70.

3.5.3 Education level of household head

Some 59.1% of the people had acquired education up to the primary level. A further 21.2 % had never been to school meaning high illiteracy rates. With respect to FISP, the difference in the proportions at each educational level is minimal as shown in Figure 3.3. This implies that the educational level did not have an effect on determining who receives inputs and who does not.

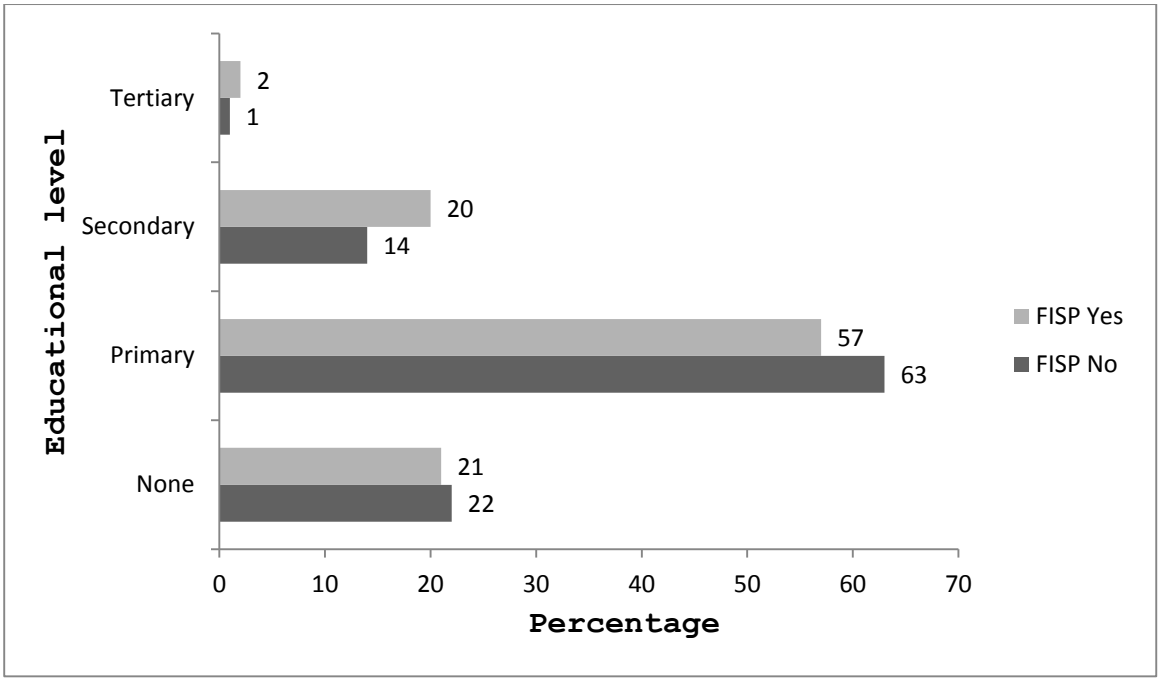

Figure 3:3 Percentage distribution of educational level of household heads

Source: Survey data 2014

To determine if some association exists between FISP and educational level, the chi square test was conducted and the result was not statistically significant. Therefore, the educational level of the household head is not associated to the receipt of inputs through FISP.

Table 3.2 compares the means and standard deviations of selected continuous variables of FISP recipients and non-recipients together with the overall statistics of the respondents. The Point Biserial Correlation was applied to determine the relationship between the dependant variable FISP with all selected variables (Table 3.2).

Table 3.2 shows that on average, households have 0.79 hectares of land at their disposal on which to farm. On average, households harvested 1.34mt of maize in the 2013/2014 agricultural growing season. Furthermore FISP recipients harvested relatively higher on average, 0.35mt/ha more than non-recipients. The harvest of non-recipients does not show much variance when comparing the yields farmers estimated they would have before the implementation of the programme, after the implementation as well as in the 2013/2014 agricultural season. However, when comparing the yield before programme implementation and after of FISP recipients, a 0.40mt/ha average yield increase can be noted, which is a 37% increase in yield. This is a little higher for the 2014 harvest, which is 0.45mt/ha and 42% higher respectively.

Table 3.2 Comparison of selected farming households characteristics in Kasungu and Lilongwe

Variable Description	No FISP		FISP		Total		t-test Sig. level
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	
Household size (numbers)	4.99	1.93	5.42	2.28	5.21	2.12	ns
Area available (ha)	0.74	0.64	0.84	0.60	0.79	0.62	ns
Area for cultivation (ha)	0.68	0.48	0.83	0.59	0.76	0.54	**
Regular area cultivated (ha)	0.68	0.48	0.79	0.50	0.73	0.49	ns
Area under maize (ha)	0.59	0.34	0.58	0.32	0.59	0.33	ns
Production levels 2014 (mt)	1.17	0.88	1.52	0.98	1.34	0.95	***
Production levels after FISP (mt)	1.16	0.88	1.47	0.93	1.32	0.92	**
Production levels before FISP (mt)	1.21	1.18	1.07	0.85	1.14	1.03	ns

n = 200

ns (not statistically significant), ** (significant) at 0.05, *** (siginificant at 0.01)

Source: Survey data 2014

With respect to the area available (arable and non-arable), area for cultivation (arable) and regular area cultivated (portion of the arable land), it can be noted that generally, households receiving inputs through the FISP had larger pieces of land compared to non-recipients. This implies that land size could be a determining factor to FISP receipt and non-receipt. T-test results were significant for cultivated area, production levels 2014 and the average production levels after the implementation of the programme as given by the farmers. Given that there was a significant difference between the cultivated land area of FISP recipients and non-recipients, it implies that a household had higher chances of receiving inputs through the FISP with an increase in the land area under cultivation. The land area under cultivation is therefore a factor that determines the FISP receipt in this instance. The area allocated to maize however, is almost the same for FISP recipients and non-recipients highlighting the importance of maize in the Malawian diet even for households with smaller pieces of land.

With respect to the production levels in 2014 as well as in the years after the implementation of the production, it can be noted that as households' moves from being a non-recipient to a recipient of FISP, there is a significant increase in the harvest that a household acquires as confirmed by the t-test results.

3.5.4 Categorical variables descriptive statistics

The distribution of categorical variables is given in Table 3.3. In Table 3.3, it can be noted that FISP recipient households chiefly relied on two or more sources of income (37%) whilst non-recipients were more inclined to other sources of income (24%) with two or more sources closely following at 23%. The results overall show that three sources of income are of importance in both groups, which are income from two or more sources of income, other sources and sales of surplus produce. Income from remittances was the least contributor to the income for both groups under comparison. When comparing the proportions of income from off own farm activities, it can be noted that FISP recipients, relied less on off-own farm activities as sources of income (5%) as compared to non-recipients (14%).

The results in Table 3.3 also reflect that majority of households used no pest management mechanisms. Whilst it is impressive that the greatest proportion of the sample practiced crop rotation (68% FISP yes, 58% FISP no), and just above half of the sample added manure to their soils to enhance soil fertility, this lack of attention to pest management by the farmers, could affect the yields recorded other than the FISP itself. However, comparing the two groups, it can be noted that the greatest proportions of households not using pest management practices

are non-recipients, and that the greater proportion of those that manage pests chemically or using an integrated approach are FISP recipients. This implies a comparative advantage to FISP recipients on overall yield.

Table 3.3 Characteristics of farming households in Kasungu and Lilongwe

Description of practice	FISP Yes	FISP No	Chi Square Sig. Level
Practice Crop rotation	68	58	ns
No crop rotation	32	42	
Add manure to field	54	49	ns
No manure addition	46	51	
No pest management	66	78	
Pest management Chemically	21	14	ns
Integrated pest management	3	0	
Biological pest management	10	8	
Change soil fertility management after FISP	33	32	ns
No change of soil fertility management	67	68	
Income (surplus produce)	22	25	
Income (off-own farm work)	5	14	
Income (remittances)	1	2	ns
Income (livestock/livestock products	2	4	
Income from other sources	21	24	
Income from cash crop sales	12	8	
Income from two or more sources	37	23	

n = 200

ns (not statistically significant)

Source: Survey data 2014

3.5.5 Relationship between the sources of income and educational level of household head

Table 3.4 gives the results of the level of association between the source of income and education level of the household head. The results are statistically significant ($p<0.01$). It is expected that the more educated a household head is, the more remunerative the sources and levels of income the household. Furthermore, it is expected that the more educated a household head is, the less diverse are the sources of income and vice versa.

Table 3.4 Source of income and educational level of household head

Source of income	Education level of household head			
	None (%)	Primary (%)	Secondary & Tertiary (%)	X^2 Sig level
Sales surplus produce	44	18	15	
Cash crop sales	5	15	0	
Remittances	5	1	0	
Livestock & livestock products	7	2	0	***
Ganyu labour	7	12	6	
Other (non-farm income)	7	23	44	
Two or more sources of income	26	30	35	
Total	100	100	100	
n	43	120	37	

*** (Statistically significant at 0.01)

Source: Survey data 2014

Table 3.4 shows that as the education level increase, the main sources of income become less diverse. With no education, households engage in various sources of income, with the greatest proportion (44%) relying on sales of surplus produce whilst 26% depends on two or more sources of income.

Thirty per cent of households headed by heads educated up to the primary level rely on two or more sources of income. At the secondary and tertiary level, 44 % have other sources of income which incorporate non-farm activities such as running small businesses. This is what was expected that the more educated the household head is, the less diverse are the sources of income and the better are the sources of income.

3.5.6 Relationship between income and educational level of household head

Table 3.5 shows the results of the association between educational level and the actual income. The association is statistically significant ($p<0.05$).

Table 3.5 Income and educational level of the household head

Income (Malawian Kwacha)	Education Level		
	None (%)	Primary (%)	Secondary & Tertiary (%)
<2000	40	18	8
2000-4000	23	17	14
4000-8000	16	15	14
8000-12000	5	14	14
>12000	16	37	51
n	43	120	37
Sig. Level		**	

Exchange rate: US$1=MKW430
** (Statistically significant at 0.05), **Source:** Survey data 2014

Of the three categories of educational levels given, households headed by heads with a secondary or tertiary education have the highest percentage which reflects an income of more than 12000 Kwacha. The greatest proportion (40%) of households headed by heads with no formal education acquires less than 2000 Kwacha a month as shown in Table 3.5.

Therefore, even if these households have diverse sources of income, they earn little out of them.

3.5.7 Relationship between source income and gender

Table 3.6 presents the relationship between the source of income and gender.

Table 3.6 Relationship between the source of income and gender of household head

Source of income	Gender	
	Female (%))	Male (%) (n=149)
Sales surplus produce	45	16
Cash crop sales	16	8
Remittances	0	2
Livestock and livestock products	2	3
Ganyu labour	8	10
Other	10	27
Two or more sources of income	20	34
n	51	149
Significance level	***	

*** = Statistically significant at 0.01

Source: Survey data 2014

There is a statistically significant association between gender and source of income ($p<0.01$). Table 3.6 shows that male headed households have more sources of income and rely on off-farm activities such as small businesses (other) more than female headed households.

The majority of female-headed households (45%) rely on sales of surplus produce to make a living whilst those of male-headed households had two or more sources of income (34%) which gives such a household a better chance of being food secure.

3.5.8 Physical assets and FISP

Table 3.7 gives the results of the proportions of physical assets as they relate to the FISP.

Table 3.7 Comparison of household ownership of physical assets by FISP

Assets	FISP			
	No	Yes	Total	Sig. Level
Hoes	42	32	74	
Chicken+	21	20	41	
Goats+	17	25	42	ns
Pigs+	12	8	20	
Cattle+	6	12	18	
Oxcart+	0	2	2	
Wheelbarrow+	2	1	3	
n	100	100	200	

ns= not significant

Source: Survey data 2014

As shown in Table 3.7, the greatest proportion of respondents has hoes as the most valuable assets in their household whilst the least proportion was for those who had an oxcart as the most valued asset in their household. The test for association between these two variables was not significant therefore owning physical assets, had no significant effect on the receipt of inputs through FISP.

3.5.9 Perceptions of the FISP

This sections aims to highlight the people's perceptions towards the FISP. Table 3.8 shows the proportions of the population's view of the FISP with respect to fairness.

Table 3.8 Frequencies of perceptions of fairness of distribution of inputs under the FISP

Perception	Percentage
Extremely bad	34.5
Quite bad	37.5
Slightly bad	5.5
Slightly good	5.5
Quite good	9.5
Extremely good	7.5
Total	100

n=200

Source: Survey data 2014

The majority of the sample considered the distribution of inputs under the program to be highly unfair. Some 72% of the sample described the distribution as either quite bad or extremely bad (34.5% extremely bad, 37.5% quite bad) (Table 3.8) whilst 5.5% expressed slight dissatisfaction. Some 22.5% considered the distribution of inputs to be good. Focus group discussions conducted revealed that most villagers blamed their traditional leaders. The villagers indicated that leaders are corrupt and tend to get more than is fair.

In some villages, villagers pointed out that they considered the programme to be unfair as the same people always receive inputs. Analysis also reflected that 81% of the population felt there was need for improvement in the FISP. Focus group discussions show that dissatisfaction emanates from lack of a fair distribution programme for the inputs under the subsidy. Results of opinions with regards timeliness were different as reflected in Table 3.9.

It can be noted that 58% considered timing to be bad whilst 42% considered it to be good (Table 3.9).

Table 3.9 Frequencies with respect to perceptions of timeliness of distribution of inputs under the FISP

Perception	Percentage
Extremely bad	25.5
Quite bad	28
Slightly bad	4.5
Slightly good	8
Quite good	22.5
Extremely good	11.5
n	200

Source: Survey data 2014

3.6 DISCUSSION

Malawi is considered to be amongst the poorest countries in Sub-Saharan countries (Ellis *et al.* 2003). Ellis *et al*. (2003), states that on average, the farms of the ordinary households are 0.5 hectares, a figure which is close to the 0.79 hectares obtained in this study. In addition, the mean results of the production levels before and after the implementation of the FISP, show an increase in the average yield of maize from 1.14mt/ha to 1.35mt/ha. In the Kasungu and Lilongwe districts, yields increased to 1.67 mt and 1.8 mt per hectare respectively (Holden & Lunduka 2010). According to Dorward and Chirwa (2011), yields of maize increased to 2.04mt/ha in the 2006/2007 from 1.59mt/ha in 2005/2006, which may not be same with what was observed in this study but which does confirm that indeed, the FISP resulted in increased maize yields. Since in Malawi, food security is highly associated with the availability of maize, the staple food (Fisher and Lewin, 2013), this shows a positive impact on the HFS. To further highlight how important maize production is to the Malawian smallholder farmers, it can be noted that an average of 0.59ha of land was allocated to maize of the average 0.79ha available to a household; this occupies 75% of the land area available to a family. However, this focus on maize with limited focus on other crops such as legumes hinders the attainment of nutrition security. As stated by Dorward *et al*. (2008), the first phase of the FSIP, mainly focused on maize but lacked legumes, which were added in the second season so as to encourage crop diversification. In this research, receipt of FISP, was mainly for maize, which further compromises nutrition security.

With respect to gender, the greatest proportion of households was headed by men, though most women interviewed in male headed households indicated that they did the actual farming. Though male headed households as stated by Fisher and Kondiwa (2014) have been said to cultivate more land and face less labour constraints, the question that can be raised is would women bring more crop diversification if they had a better command on other factors of production other than just providing labour? There is a high likelihood that women perform less because they have limited income. As results of this research show, male headed households had higher incomes. This income constraint could be the reason women are left to do the actual farming as they are not the major income earners. If women could do more than just provide labour and effect more crop diversification as they cook meals and understand the need for variety in making meals, then this could have a positive effect on nutrition security.

Results reflected that 21.2% of the people had never been to school whilst 59.1% only having been up to the primary level. The effect of this on the household and possibly on the farming practices and ultimately food security has been shown by the results which show that households led by more educated heads, earned more as compared to their counterparts. In focus group discussions, the more educated participants, or participants with household member/s who had a higher (secondary or tertiary) educational qualification, indicated that they could afford to buy inputs even if they did not receive through the FISP. Results further revealed that such households had less diverse sources of income as they would likely get a higher remuneration from whatever source they had as compared to their counterparts. Furthermore, sources such as remittances, did not contribute greatly to those households headed by heads with at least a secondary or tertiary education.

The people's perceptions of the FISP reflected two things, which are that it was highly unfair and that the timing was bad, though the former was a greater concern for most households. Results of focus group discussions reflected that most felt that the programme was unfair as the chiefs were the recipients year after year. The chiefs, in addition, would select the same people over and over again, something which greatly pained those with no control over the selection process. In some instances, the researcher observed that every chief interviewed, was a recipient whilst some villagers would be forced to share 1 bag for instance, over 6 families, such that in the end, the actual effect of the fertilizer will not be realized. Lack of knowledge and ignorance for the smallholder farmer, would see the farmer trying to apply that portion of fertilizer over the whole acre or two acres they had, further reducing the effect.

3.7 CONCLUSSION

The results of this research show that the more experienced farmers received inputs through the FISP as compared to those who had minimal farming experience. The greatest proportion (58%) of the population had been to school up to the primary level whilst 21.2% had never been to school, showing that acquiring an education, is not an easy task in this rural setup. Generally, FISP recipients had greater pieces of land whether arable, cultivated and total land area, household size and greater yields both in the 2013/14 growing season and in the years after implementation according to the estimates of the farmers themselves. The farmers' perceptions of this programme show that there is room for improvement that could be done in the running of the programme. Close to ten years after the implementation of the programme, it is clear that the issue of corruption and late distribution of inputs through this programme still poses a challenge.

3.8 RECOMMENDATIONS

This programme has a positive impact on the yields of farmers with increases noted as shown by the results, but it is clear from the farmer's perceptions of the programme, ten years after the implementation of the programme, that there is need to incorporate other policy tools to improve the yields, food security and productivity of crops. With the association between income and education noted, policies that encourage for the improvement of the education system could be worthwhile. The author therefore recommends that the government invests money in education to reinforce the effects of this programme.

CHAPTER 4: ACCESS TO AGRICULTURAL INPUTS THROUGH THE GOVERNMENT PROGRAMME IN MALAWI AND EFFECTS ON CROP PRODUCTION

ABSTRACT

The Farm Input Subsidy Programme (FISP), a policy solution implemented to overcome the food crisis in Malawi prior to the 2005/6 agricultural growing season, has received international recognition for its effects on food security. The programme has resulted in increased yields, which have seen Malawi realising national food self-sufficiency when it was first implemented. Chapter 4 presents the results of a survey conducted 10 years after implementation of the Farm FISP on household level crop production and productivity. The results showed that the FISP, together with bags of fertilizer used and received, bags of OPV used and received, and the gender, as the variables that affected crop productivity.

Key words: Productivity, Crop Production, FISP (Farm Input Subsidy Programme)

4.1 INTRODUCTION

Food insecurity is a problem that has attracted attention the world over. Thomas Malthus predicted the shortage of food in 1798, when he stated that food production would not be able to meet food demand as it will increases linearly whilst the population would grow at a geometric rate. With FAO (2013) stating that at least one in eight people is said to be suffering food insecurity, the theory has been proven. Malawi, introduced the Farm Input Subsidy Programme (FISP), as a policy tool to overcome food insecurity, as this problem is of major concern in the country (Dorward & Chirwa 2011). The FISP was implemented to overcome a food deficit within Malawi, by increasing crop productivity through increased application of fertilizers and improved seed (Denning *et al*. 2009). Makombe *et al.* (2010) in a research conducted in Malawi, recommended that increasing productivity per unit area, through the use of modern inputs is an approach governments may want to adopt, due to increasing land scarcity.

Edgerton *et al.* (2009) acknowledged the need to either increase the area allocated to agricultural grain production, or increase crop productivity as a way of ensuring grain food security for all. Evenson and Golin (2003) felt that, in Africa, increases in production of food crops relied more on increasing land area than increasing the yield per given area. Increasing productivity by 10% could result in a 4% decrease in the prevalence of poverty in the short term and 19% in the long term in Africa (Langyituo 2011, after FAO 2010).

Denning *et al.* (2009) state that low fertilizer use is among the reasons crop productivity is low in Sub-Saharan Africa including Malawi. Household food security in Malawi is dependent on the production of maize, the staple food (Fisher & Lewin 2013). It therefore follows that increased fertilizer and improved seed use which increases the maize crop productivity, is most appreciated in Malawi. It is in light of this that this research focused on the effects of the FISP on maize crop production and productivity.

4.2 RESEARCH METHODOLOGY

Malawi is a South-Eastern African landlocked country covering 118000 square kilometers. It is bordered by Tanzania, Mozambique and Zambia. Figure 4.1 shows the map of Malawi. It is considered one of the least developed countries in the world (Babu and Sanyal 2007). The

Malawi National statistics office (2012) statistical yearbook stated that the country was home to 13 million people as at the 2008 national census. The country has three main regions, which are the northern, central and southern regions. The central region, where the research was conducted, constitutes 42% of the total population falling second after the southern region which is the most densely populated making up 45% of the population (NSOMalawi 2012).

Agriculture forms a large part of the livelihood of the people of Malawi. Over 80% of the

Figure 4:1: Map of Malawi (NSOMalawi 2012)

population relies on agriculture for their livelihood with most of the farmers being smallholder farmers (Denning *et al*. 2009). Attainment of household food security in Malawi is dependent on the productivity of the maize, the staple food (Fisher & Lewin 2013).

The Malawi Vulnerability Assessment Committee (MVAC) (2005) divided the country into 18 livelihood zones, depending on the livelihood activities conducted in the area. The two districts selected for this study were Lilongwe and Kasungu located in the central region of the country. The two districts fall into the same zone. According to MVAC (2005) the people in the Lilongwe-Kasungu plain grow maize as the main food crop. Groundnuts, soya beans and sweet potatoes are also grown in surplus quantities and tobacco is the main cash crop.

4.3 RESEARCH AND SAMPLING DESIGNS

The research used a mixed methods research design constituted of both qualitative and quantitative approaches. The mixed methods approach capitalizes on the strengths of both qualitative and quantitative whilst minimizing their weaknesses (Johnson & Onwuegbuzie 2004).

Quantitative data was collected by means of a structured questionnaire and qualitative data was by means of focus group discussions and observations. Non-probability, purposive sampling design was used for this research, which Daniel (2012) states is ideal when looking for certain attributes in the population. To select the sample, Daniel (2012) notes that the nature of research design, nature of the population amongst others determines sample size. One hundred representative smallholder farmers who were beneficiaries of the inputs subsidy programme were selected and interviewed. As a control measure, 100 farmers who, for one reason or the other, failed to be beneficiaries or were not regular beneficiaries of the programme were also interviewed. In each of the two districts selected for the study, 50 former beneficiary and 50 non-beneficiary farmers were selected.

To select respondents, in each village, the first household would be randomly selected after which every fifth household would be selected until the 100 households required in a district were acquired. In this respect, this research took a modified systematic random sampling approach. In each village, the traditional authority and village headman were consulted to give permission for the research to be conducted.

Four enumerators who were fluent in Chichewa, the local language in Malawi, were employed to conduct this research. Enumerators were trained to administer the questionnaire to reduce variations in the way the questions were asked. The questionnaire was pre-tested on five households and it was adjusted for better collection. Questions were rephrased for the better understanding of the respondents. The questionnaires were used to determine the extent of the

use of both fertilizers and seed amongst others on their farms and their impact on yields after exposure to the FISP as well as the impact on household food security. Variables such as the age of the household head, their educational level, household structure, years of farming, source of income, and income, amongst others, were collected using the questionnaire. Two focus groups comprising 12 people each were conducted for beneficiaries and non-beneficiaries in each district.

4.4 DATA ANALYSIS METHODS

The data collected was captured using the Statistical Package for Social Science (SPSS) and analysed using STATA. The two dependent variables under study were the crop productivity and the harvest, particularly for the 2013/2014 agricultural season. Both of these variables were continuous in nature and the ordinary least squares regression was thus used. The relationship being modelled can be presented as follows:

$C_i = \beta_0 \beta_1 Z + \beta_2 P + \beta_3 T + \varepsilon$ ……(ii)

Where

C_i is the 2014 maize production

β is the intercept

Z is a vector of demographic variables (*gender, marital status, age of household head, education level of household head, household structure, physical assets location and household income)*

P is a vector of agronomic variables (*fertilizer bags used, fertilizer bags received, hybrid seed bags used, hybrid seed bags received, OPV bags received, OPV bags used and manure addition)*

T is a vector of the FISP variables (*FISP receipt of inputs, timeliness and fairness)*

ε is the error.

4.5 RESULTS

4.5.1 Effect of access to inputs on maize production levels

This section presents results which show the effect of access to input through FISP on the maize production levels of smallholder farmers.

4.5.2 Analysis of variance of 2014 Production and number of FISP fertilizer's bags applied by a household

The p value (0.026), a result of the ANOVA of the 2014 production between beneficiary and non beneficiary smallholder farmers and the quantity of fertilizers applied to the farmers' fields' shows that there is a statistically significant difference between the two under comparison.

The p value is <0.05, thus one can conclude that the number of bags or quantity of fertilizer applied to a field has a significant effect on the yield a household acquires. Table 4.1 below shows the difference in the bags of fertilizer received on the FISP recipients and non-recipients. As expected, the FISP non-recipients received no bags of fertilizer whilst there are a varied number of bags received per household for the recipients.

Table 4.1: Number of fertilizer bags received by recipient and non-recipients of FISP

Fertilizer bags used (50kg/bag)	FISP non-receipt	FISP receipt
0	100	3
0.1-0.5	0	6
0.5-1	0	31
2-3	0	46
3.1-4	0	8
5	0	6
Total	100	100
N	100	100
F Static (ANOVA)	**	

** (Statistically significant at 0.05)

Source: Survey data 2014

4.5.3 Analysis of variance of the 2014 Production and number of FISP hybrid maize bags applied by a household

The results reflect that the yield is significantly affected by the quantity of hybrid maize seed used by a household acquired through FISP. The p value, 0.01, is significant at the 1% level of

significance. This shows that, the access to hybrid maize inputs through the FISP has a significant effect on the production levels of farming households.

The ANOVA for the 2014 production and Open Pollinated Variety (OPV) seed used by farming households was not significant. This may largely be because most households interviewed who received inputs through FISP received (OPV) seed, as opposed to hybrid maize seed.

4.5.4 Average production before the implementation of the FISP

The P value obtained from the ANOVA is 0.359> 0.05, making this insignificant. It can be concluded that there was no significant difference between the production levels of respondents before the implementation of the FISP. At this stage it is assumed that all the households under study did not have access to inputs and their yields were thus within the same range.

In order to determine the effect of access to inputs on the production levels of the smallholder farmers, analysis of variance was performed on the harvest that farming households reported as their average harvest since the implementation of the FISP. Any significant difference between the harvest after the implementation of the programme between the two groups (receive or not), can be the first indication of the effect of access to inputs on the production levels of farmers. The results are presented in 4.3.1.4.

4.5.5 Average production after the implementation of the FISP

The results of the ANOVA (p=0.27< 0.05) show that there is a significant difference in the average production of FISP recipients and non-recipients after the implementation of the programme. The analysis of variance between the 2014 yields of households that are beneficiaries of the programme and non-beneficiaries gave a p value of 0.0077, which is significant at the 1% level of significance. This shows that the provision of inputs through the FISP had a significant effect on yields of the smallholder farmers.

4.5.6 Regression model selected variables

The OLS model was used to determine the relationship between the dependant variable 2014 Production and selected independent variables. The variables used in the model and in the OLS model run with 2014 harvest expected signs are shown in Table 4.2.

Table 4.2 Variables in regression model and expected signs

Dependant variables	**Measures**		Sign
2014 Production			
Independent Variable	**Measures**	**Rationale**	**+/-**
Gender	0 Female, 1 Male	Male-headed would be more productive compared to female-headed households	+
Marital status	Single 1/0 Married 1/0	Married headed would be more productive than single headed households	+
Age of household head	Years	The older the person, the more likely more likely productive they are	+
Education level head		The more educated a person is the more likely productive they are	+
Household structure	Numbers	The bigger the household, the more productive is the household	+
Household Income	Kwacha	The higher the income, the more productive is the household	+
Farming experience	Years	The more experienced a farmer is, the more productive he/she is likely to be	+
Crop rotation practices	No=0, Yes=1	Would increase chances of good yields and improved productivity	+
Manure added	No=0, Yes=1	Would increase chances of good yields and improved productivity	+
Pest management measures applied	No=0, Yes=1	Would increase chances of good yields and improved productivity	+
FISP	No=0, Yes=1	Receipt of inputs expected to increase yields and improved productivity	+
Physical assets	1-Chicken/s 2-Goat/s 3-Pig 4-Ox/en 5-Oxcart 6-Wheelbarrow	Certain assets expected to influence production whilst others will not	+/-
Fertiliser bags used	0 (0-0.5)up to 4 (3.1-4)	Greater quantities expected to equate to improved yields and productivity	+
Hybrid bags used	2kg (1), 5kg (1), 10kg (1)	Greater quantities expected to equate to improved yields and productivity	+
OPV bags used	0kg, 7.5kg	Greater quantities expected to equate to improved yields and productivity	+
Timeliness	Extremely bad=0 to extremely good=5	Correct timing of inputs receipt, expected to equate to improved productivity	+

4.5.7 Regression analysis of 2014 Harvest with selected factor variables

Table 4.3 shows the regression results of the 2014 production, with selected factor variables.

Table 4.3 Regression results showing effect of household characteristics on maize production 2014

Variable	Coef.	Standard Error	P>t
Bags of OPV used	-0.2359	0.1480	ns
Bags of hybrid used	0.1388	0.3584	ns
Bags of fertilizer used	0.2734	0.0961	***
House size in numbers	0.0524	0.0335	ns
Age in years	-0.0114	0.0056	**
Single household head	0.0721	0.3288	ns
Married household head	-0.1329	0.2612	ns
Income in MKW	0.2639	0.1434	*
Area under maize	-0.2996	0.2005	ns
Gender	-0.3124	0.1953	ns
Educational level	0.0540	0.1689	ns
Farming experience	0.1207	0.1826	ns
FISP	-0.4114	0.2967	ns
Crop rotation	0.0573	0.1424	ns
Manure addition	-0.0304	0.1388	ns
Pest management	0.1244	0.1562	ns
Timeliness	-0.0235	0.1317	ns
Physical assets			
1-Ownership of at most chicken/s	0.1608	0.1792	ns
2-Ownership of at most a goat/s	0.2551	0.1923	ns
3-Ownership of at most pig/s	0.6266	0.2379	***
4-Ownership of at most ox/en	0.3859	0.2404	ns
5-Ownership of at most oxcart	-0.2015	0.6496	ns
6-Ownership of a wheelbarrow	1.7558	0.5399	***
_cons	1.1655	0.3841	***
Number of obs			200
F(23, 176)			2.7
Prob > F			0.0001
R-squared			0.2609
Adj R-squared			0.1643
Root MSE			0.86556

ns (not statistically significant), * (significant at 0.1), ** (significant at 0.05), *** (significant at 0.01)

The regression results show that five variables have a significant effect on the production levels of the 2013/2014 agricultural season. The number of bags of fertilizer a farming household uses on their farming land is significant at $p<0.01$. A unit increase in the number of fertilizer bags used would result in a 27% increase in production. Age has a negative effect on production levels. As the age increases, there is a 1.1% decrease in the yields a household receives.

The income of the household has a positive effect on the production levels, with a 26% increase in production being realized with every unit increase in the income according to this model. The income is significant at $p<0.1$. This model reflects that physical assets also contribute to the production levels of a household. The researcher did not assign a monetary value to physical assets, but rather categorized them according to the perceptions of the villagers. According to this model, two physical assets seemed to contribute to the levels of production. These two are the fact that a household owned, at most, a pig and that it owned a wheelbarrow. Households that owned at most pigs would also expect to produce 63% more, being significant at $p<0.01$. Those that owned a wheelbarrow would expect to produce 175% more than their counterparts.

4.6 DISCUSSION

The tests for association between maize crop productivity and gender, FISP, bags of fertilizer used and the number of bags of fertilizer received were significant. In the regression model, all these variables had a significant effect on the maize crop productivity, thereby confirming that these variables have either a positive or negative effect on the dependent variable. The results of Fisher and Kondiwa (2014) in Malawi revealed 78.7% households being headed by males in the Northern region and 61.2% in the central region. Selected factor variables show that gender has a positive effect on the maize productivity. The findings confirm that a household headed by a male is likely to be more productive than one headed by a female. Fisher and Kondiwa (2014) also state than in Malawi, male headed households tend to cultivate and manage more land whilst facing less labour constrains compared to their female counterparts. This explains why the male headed households are more productive as these factors of production are in their favour.

Regression results showed that the increased productivity could be accredited to the FISP itself, the number of fertilizer bags received through FISP received and used by a farmer and the number of OPV bags received and used. This further highlight the positive impact the FISP

had on crop productivity. Most of the significant variables in the regression model for maize productivity and that of the 2014 harvest are directly linked to the FISP. This further shows the positive impact that the FISP had on the crop productivity and crop production levels at a household level, ten years after the implementation of the programme.

4.7 CONCLUSION

It is not debatable as to what the FISP did to the crop production levels and the maize crop productivity of the average rural Malawian farming household. At a household level, the number of bags received of fertilizers and improved maize varieties did result in increases in the maize yields and also increased crop productivity. However, it is also worth noting that the yields obtained in this particular study, were still not at the optimum. With previous researchers noting higher yields than the yields obtained in the previous growing season, it thus becomes questionable whether the yields are subsequent with the investments made, and whether providing a subsidy is sustainable in the long run given that yields are not only dependant on the agricultural inputs being provided.

4.8 RECOMMENDATIONS

Given that not every household was receiving the full input package and that most who did, were required to share with other families, the researcher recommends that it is essential to have the programme provide inputs in a complete package to families in such a way that once a family has received a subsidy, they can have a bumper harvest and be able to purchase agricultural inputs in subsequent seasons. Issues of corruption, which result in the distribution of fertilizer in such a way, should be dealt with, and even the chiefs themselves, should be educated as to what they will achieve, if one of households under their chieftainship manages to graduate from the programme. That way, with good rainfall, higher yields can be realized per household.

CHAPTER 5:SMALLHOLDER FARMER ACCESS TO AGRICULTURAL INPUTS THROUGH THE GOVERNMENT PROGRAMME IN MALAWI AND THE EFFECTS ON HOUSEHOLD FOOD SECURITY

ABSTRACT

The Malawi Farm Input Subsidy Programme (FISP) has resulted in higher yields of maize which have increased the country's national food security. The country once relied heavily on food aid. Studies have, however, focused on the national level impact and minimal research is available to reveal the impact of the programme on the household level food security status. The present study applied the Household Food Insecurity Access Scale (HFIAS) as the measure of household food security. The variable Household Food Security (HFS) was used as the dependent variable of the ordered probit regression model. The results showed that the marital status, household size, area available to a household, regular area cultivated by a household, area allocated to maize production, receipt or non-receipt of inputs through the FISP and the harvest of the 2013/2014 agricultural season had a significant effect on the HFS. Given that the receipt of inputs through FISP was significant, it can be concluded that the FISP had a positive impact on HFS. However, the severity of HFS is a cause for concern, as 61% of the population was severely food insecure. From this it can be concluded that the government of Malawi may want to consider other ways of improving HFS to support the fruits of the FISP.

Key words: Household food security, Farm Input Subsidy Program, MVAC (Malawi Vulnerability Assessment Committee)

5.1 INTRODUCTION AND CONTEXTUALISATION

Household food insecurity has risen over the past decade, and the global food crisis of 2008 heightened this. Countries have taken different measures to address this issue. Amongst the measures is the implementation of agricultural input subsidies. The use of input subsidies to improve food security lie in their ability to increase yields with Denning *et al*. (2009), citing an increment in maize production of 300 000 to 400 00mt in Malawi after its implementation in 2005. (Ricker-Gilbert *et al.* (2013) showed that if implemented properly, subsidies can significantly improve the food security status in poor countries. Malawi, a south eastern country, has drawn international attention as it achieved increased yields as a result of the Farm Input Subsidy Program (FSIP) implemented in 2005 (Dorward & Chirwa 2009). The FISP provided coupons for fertilizer, and hybrid seed for maize and other selected crops (Dorward & Chirwa 2011). The principle objectives of this programme were to increase the maize production, rural incomes and household food security by targeting the productive poor (Lunduka *et al.* 2013).

The impact of the programme on the national food security status is not arguable, as researchers agree that it had a positive impact on the yields of smallholder households and resulted in increased food self-sufficiency at a national level (Dorward & Chirwa 2011, Denning *et al*. 2009). However, at a household level, the assessment of this program on food security has been minimal (Lunduka *et al.* 2013). National food security cannot be equated to household food security. The Malawi Vulnerability Assessment committee (MVAC 2014), a government and donor funded assessment committee, state the same highlighting that 21 districts would be food insecure in 2014 despite the fact that food production had been satisfactory at the national level in 2013/14. This satisfactory production was attributed to the FISP. They further recommended that government should give precedence to interventions that build the resilience of the people, promote drought tolerant crops and encourage the setting up of irrigation systems to refrain from practicing rain-fed crop production.

However, MVAC tracks food security on a monthly basis and give an annual report on the state of food security, but though they accredit the FISP for increased national food production, they do not give a direct analysis between the programme and household food security. This motivated this research to focus on the impact of the program on food security at household level. The objective of this study is to assess the effect of provision of agricultural inputs through the FISP on household food security (HFS) in Malawi.

5.2 RESEARCH METHODOLOGY

Malawi is a South-Eastern African landlocked country covering 118000 square kilometers. It is bordered by Tanzania, Mozambique and Zambia. Figure 5.1 shows the map of Malawi. It is considered one of the least developed countries in the world (Babu and Sanyal 2007). The Malawi National statistics office (2012) statistical yearbook stated that the country was home to 13 million people as at the 2008 national census. The country has three main regions based on geographical location, which are the northern, central and southern regions (NSOMalawi 2012).

The central region, where the research was conducted, constitutes 42% of the total population falling second after the southern region which is the most densely populated making up 45% of the population (NSOMalawi 2012).

Agriculture forms a large part of the livelihood of the people of Malawi. Over 80% of the population relies on agriculture for their livelihood, with most of the farmers being smallholder farmers (Denning *et al*. 2009). Household food security in Malawi is dependent on the productivity of maize, the staple food (Fisher & Lewin 2013).

The Malawi Vulnerability Assessment Committee (MVAC) (2005) zoned the country into 18 livelihood zones, depending on the livelihood activities conducted in the area. The two districts selected for this study were Lilongwe and Kasungu, located in the central region of the country. The two districts fall into the same zone.

According to MVAC (2005) the people in the Lilongwe-Kasungu plain grow maize as the main food crop. Groundnuts, soya beans and sweet potatoes are also grown in surplus quantities whilst tobacco is the main cash crop.

Figure 5:1 Map of Malawi (NSOMalawi 2012)

5.3 RESEARCH METHODS

The research used a mixed methods research design constituted of both qualitative and quantitative approaches. The mixed methods approach capitalizes on the strengths of both qualitative and quantitative whilst minimizing their weaknesses (Johnson & Onwuegbuzie 2004).

Quantitative data was collected by means of a structured questionnaire and qualitative data was by means of focus group discussions and observations. Non-probability, purposive sampling design was used for this research, which Daniel (2012) states is ideal when looking for certain attributes in the population. To select the sample, Daniel (2012) notes that the nature of research design, nature of the population amongst others determines sample size. One hundred representative smallholder farmers who were beneficiaries of the inputs subsidy programme were selected and interviewed. As a control measure, 100 farmers who, for one reason or the other, failed to be beneficiaries or were not regular beneficiaries of the programme were also

to be interviewed. In each of the two districts selected for the study, 50 former beneficiary and 50 non-beneficiary farmers will be selected.

To select respondents, in each village, the first household would be randomly selected after which every fifth household would be selected until the 100 households required in a district were acquired. In this respect, this research took a modified systematic random sampling approach. In each village, the traditional authority and village headman were consulted to give permission for the research to be conducted.

Four enumerators who were fluent in Chichewa, the local language in Malawi, were employed to conduct this research. Enumerators were trained to administer the questionnaire to reduce variations in the way the questions were asked. The questionnaire was pre-tested on five households and it was adjusted for better collection. Questions were rephrased for the better understanding of the respondents. The questionnaires were used to determine the extent of the use of both fertilizers and seed amongst others on their farms and their impact on yields after exposure to the FISP as well as the impact on household food security. Variables such as the age of the household head, their educational level, the household structure, years of farming, source of income and amount of income were collected, using the questionnaire. Two focus groups, comprising 12 people each, were formed for beneficiaries and non-beneficiaries in each district.

5.4 DATA ANALYSIS METHODS

The data collected was captured using the Statistical Package for Social Science (SPSS) and analysed using STATA. Household food security is the dependent variable for the econometric analysis.

Carletto *et al.* (2013) acknowledges that in the complexity of measuring food security at a household level, which partly is a result of its multidimensionality, the HFIAS has proven to be a reliable tool when used across countries. Cooper (2009) whilst analysing food security in rural Malaysia, employed the HFIAS for it to give the experience based food security status of the people. AFSUN (2013) employed the same tool together with the household dietary diversity scale to assess the household food security status in Blantyre, Malawi. The advantage of using the HFIAS is that it is relatively easy to administer and analyse whilst giving a quick evaluation of food security (WFP 2009). Other tools such as the HEA require skills, time and experience which could also mean more resources to used (WFP 2009). The HFIAS was

therefore used to measure household food security in the present study. The dependent variable for household food security consists of four categories (Webb *et al*. 2006). Since the dependent variable (HFSS) is a categorical variable, this study used the ordered probit regression model.

The household food security status (HFSS) is a function of the independent variables, selected based on their effect on the HFS, as informed by theory. Therefore the relationship being modelled can be presented as follows:

$C_i = \beta_0 + \beta_1 Z + \beta_2 P + \beta_3 T + \beta_4 R + \varepsilon$ ……..(i)

Where

C_i is the household food security status

β_0 is the intercept

β_i is a vector of coefficients for the independent variables

Z is a vector of demographic variables (*gender, marital status, age of household head, education level of household head, household structure and household income)*

P is a vector of agronomic variables (*crop rotation practice, manure added and pest management applied)*

T is a vector of the FISP variables (*FISP receipt of inputs, timeliness and fairness)*

R is a vector of yield variables (*2014 harvest, average harvest after FISP)*

ε is the error.

5.5 RESULTS

5.5.1 Relationship between household food security and household characteristics

This section presents the results of the test for association between household food security and selected factor variables. All results presented in this section were statistically significant.

5.5.2 Area available for farming for each household and HFS

Table 5.1 presents the relationship between HFS and the arable land available to a household.

The chi-square test shows a statistically significant association between the two variables ($p<0.05$). The highest proportion (53%) of food insecure households had between 0 and 0.7 hectares of land, whilst 39% had 0.7 to 1.4 hectares of land.

Table 5.1 Relationship between HFS and arable area available to a household

Arable area (ha)	Household food security				χ^2
	Food secure (%)	Mildly food insecure (%)	Moderately food insure (%)	Severely food insecure (%)	Sig. level
0-<0.7	40	59	51	53	
0.7-<1.4	45	12	41	39	
1.4-<2.1	10	24	2	7	
2.1-<2.8	0	0	5	0	**
>2.8	5	6	0	1	
Total	100	100	100	100	
N	20	17	41	122	

** (Statistically significant at 0.05)

Source: Survey data 2014

A total of 92% of the households that were severely food insecure have a land area below 1.4 hectares. For the food secure households, 85% have land less than 1.4 hectares, which becomes 78% for the mildly food insecure households and 92% for moderately food insecure household.

These results generally reflect small farm sizes in Malawi. They also show that food insecurity can be influenced by the land area. Food secure households generally had more land. This is possibly because, with increased land, farmers can produce more food. In addition, the larger farming area can be an income source in times that the farmer cannot afford to farm it all, for one reason or the other. In focus group discussions, farmers indicated that those with large pieces of land, in excess of their household requirements tend to rent out the land. The sundry income acquired from this can assist in buying food for a more diversified diet.

5.5.3 Area allocated to maize and HFS

The results in Table 5.2 show that there is a strong association between area under maize and HFS, as the Chi square test was significant (P<0.1).

The greatest proportions of household who were severely food insecure (54%) had the least land area below 0.5 hectares (Table 5.2). Food secure and mildly food secure households on the other hand, owned the greater part of the larger land proportions being 17% and 18% respectively which when compared to moderately and severely food secure households' proportions of 9% and 7% respectively show a difference. This thus means that the land area allocated to maize is related to the food security status of a household.

Table 5.2 Relationship between HFS and area allocated to maize

Area maize (ha)	Household food security				χ^2
	Food secure (%)	Mildly food insecure (%)	Moderately food insure (%)	Severely food insecure (%)	Sig. Level
0-<0.5	45	59	37	54	
0.5-<1	40	24	54	39	*
1-<1.5	10	12	7	7	
1.5<2	0	0	2	0	
2-<2.5	5	6	0	0	
Total	100	100	100	100	
n	20	17	41	122	

* (Statistically significant at 0.1)

Source: Survey data 2014

5.5.4 Relationship between FISP and HFS

The core of this research lies in determining differences between the HFS of beneficiaries and non-beneficiaries of the FISP programme. It is therefore necessary to test whether or not there is an association between the HFS of a household and their receipt of FISP inputs. As can be noted in Table 5.3, the test is significant at 1%.

Some 61% of severely food insecure households did not receive inputs through FISP, while 39% did receive inputs through FISP (Table 5.3). It can be deduced that fewer of the severely food insecure households received inputs through the FISP and hence the high level of food insecurity. Sixty percent of food secure households received inputs through the FISP, whilst 40% did not. This generally shows that receiving inputs though FISP is associated with a household being food secure.

Table 5.3 Relationship between HFS and FISP

	FISP Receipt or no receipt			
Household food security	No (%)	Yes (%)	Total	n
Food secure	40	60	100	20
Mildly food insecure	24	76	100	17
Moderately food insure	32	68	100	41
Severely food insecure	61	39	100	122
X^2 Sig. level		***		

*** (Statistically significant at 0.01) **Source:** Survey data 2014

5.5.5 Relationship between HFS and dietary diversity

The two measures of HFS in the present research were the household food insecurity access scale and the dietary diversity scale. A test to determine the association between the two was conducted and the results are presented in Table 5.4.

Table 5.4 Relationship between HFS and dietary diversity

Dietary diversity score	Food security				X^2 Sig. level
	Food secure (%)	Mildly food insecure (%)	Moderately food insure (%)	Severely food insecure (%)	
0-4	15	18	5	19	
5-9	15	12	34	43	***
10-13	70	71	61	38	
Total	100	100	100	100	
n	20	17	41	122	

*** (statistically significant at 0.01)

Source: Survey data 2014

The result of the chi square test is significant (P<0.01) thus showing that the food security status of a household is highly associated with the dietary diversity. The results reflect that households with diverse diet are also more food secure. This line of thought can be confirmed with the greatest proportion (70%) of food secure households having a score of between 10 and 13 on the dietary diversity scale. This is replicated on the statistics for mildly food secure households which have their greatest proportion (71%), having a score of 10 to 13.

5.5.6 Relationship between HFS and the maize yield (was yield after implementation)

Table 5.5 shows the relationship between HFS and maize yield after the implementation of the FISP.

Table 5.5 Relationship between HFS and maize yield harvest after the implementation of the FISP

Maize yield (mt/ha)	Food security				X^2 Sig. level
	Food secure (%)	Mildly food insecure (%)	Moderately food insure (%)	Severely food insecure (%)	
0-<0.8	20	6	29	39	
0.8-<1.6	40	24	32	43	
1.6-<2.4	15	24	15	13	***
2.4-3.2	15	41	20	2	
>3.2	10	6	5	2	
Total	100	100	100	100	
n	20	17	41	122	

*** (Statistically significant at 0.01)

Source: Survey data 2014

Table 5.5 presents the results of the cross tabulation between HFS and the yield achieved after the implementation of the FISP programme. The results show that there is high degree of association between the two variables as the chi-square result is statistically significant (p<0.01).

Of the households who are severely food insecure, the greatest proportion (43%) are those households who obtained yields below 1.6mt/ha.This indicates that HFS is affected by the yield

in metric tonnes which a household produces gets. With higher yields, however, less severely food insecure households are recorded.

The distribution for the severely food insecure households is therefore highly skewed towards low yields. With food secure and mildly food secure households, the distribution is different. Whilst 40% of food secure households harvest 0.8 to 1.6mt/ha, a fairly great proportion harvest beyond 1.6mt/ha which makes 40% of the food secure households. This gives an indication that higher yields do affect the HFS.

5.5.7 The impact of the FISP on Household Food Security (HFS)

The comparison between the food security status of households of beneficiaries and non-beneficiaries was done by applying the t-test to the data collected. Results showed that there is a significant difference between the food security status of the households that received inputs and those that did not ($P<0.001$). This can be assumed as the impact of the FISP.

5.5.8 Regression model to show the determinants of HFS

The results presented in section 5.4.1 showed that there is some association between HFS and five variables. The variables are available area, area allocated to maize production, whether a household received inputs or did not, harvest achieved after the FISP for both beneficiaries and non-beneficiaries and dietary diversity.

The relationship of each of these and other variables was also modelled using the ordered probit model, with the dependant variable being HFS represented by a categorical variable. The four categories of the dependent variable are food secure, slightly food insecure, moderately food insecure and severely food insecure. The variables used in the model and the expected signs are shown in Table 5.6.

The results of the regression in Table 5.7 show that seven variables were statistically significant, namely marital status, area allocated to maize production, regular area cultivated by a household, household size, area available to a household, harvest of 2014 in mt/ha, as well as the fact that a family received fertilizer or did not receive fertilizer and seed through the FISP.

Table 5.6 Description of variables included in the ordered probit regression model

Independent Variable	Measures	Rationale	
Gender	0 Female, 1 Male	Female farmers are more likely to be highly involved with the farming in a household	+
Marital status	Single 1/0 Married 1/0	Household headed by a married couple is more likely to be food secure compared to one headed	+
Age of household head	Years	The older the person, the more likely it is that they will make better decisions	+
Education level head	Education standard reached	The more educated a person is the more likely it is that they will make better decisions and get a	+
Household structure	Numbers	The bigger the household, the higher the challenge of feeding the people.	-
Household Income	Kwacha	The higher the income, the higher the chances of a household being food secure	+
Crop rotation practices	No=0, Yes=1	Would increase chances of good yields, which, if combined with inputs, increase the chances of a household being food secure	+
Manure added	No=0, Yes=1	Would increase chances of good yields, which, if combined with inputs, increase the chances of a household being food secure	+
Pest management measures applied	No=0, Yes=1	Would increase chances of good yields, which, if combined with inputs, increase the chances of a household being food secure	+
Area available (Arable plus not arable)	Hectares	The bigger the area, the higher the chances of a household being food secure	+
Total Arable land	Hectares	The bigger the area, the higher the chances of a household being food secure	+
Regular area used for cultivation	Hectares	The bigger the area, the higher the chances of a household being food secure	+
Area allocated to maize	Hectares	The bigger the area, the higher the chances of a household being food secure	+
Receive inputs or not	No=0, Yes=1	Receipt of inputs will enhance chances of a household of being food secure	+
Timeliness	Extremely bad=0 to extremely good=5	Inputs supplied at the right time ensures right planting time, which enhances chances of a household being food secure	+
Fairness	Extremely bad=0 to extremely good=5	Fair distribution will result in an increased impact of FISP	+
Harvest2014	Metric tonnes/ha	The higher the harvest, the higher the chances of a household being food secure	+
Harvest after	Metric tonnes/ha	The higher the harvest, the higher the chances of a household being food secure	+

Table 5.7 Regression result of HFS as dependent variable and selected variables

Food security	Coeff	Robust Std. Err	Sig. level
Gender	0.3911	0.3012	ns
Marital status	-0.6967	0.3390	**
Age in years	0.009	0.0087	ns
Educational level	0.1963	0.2121	ns
Household size (numbers)	0.2233	0.0681	***
Farming experience in years	0.1141	0.3134	ns
Income in MKW	-0.1123	0.2213	ns
Area available (ha)	-0.7031	0.1620	***
Regular area (ha)	0.6637	0.2548	***
Area maize (ha)	-0.8591	0.3874	**
FISP Receipt	-0.7063	0.2022	***
Timeliness	-0.0315	0.2397	ns
Fairness	-0.0312	0.2528	ns
Crop rotation	-0.0852	0.2155	ns
Manure addition	0.221	0.1847	ns
Pest management	0.0019	0.2052	ns
2014 harvest (mt/ha)	-0.3175	0.1050	***
Average harvest before FISP (mt/ha)	-0.1407	0.0860	ns
Number of observations			200
Wald chi2(18)			58.76
Prob > chi2			0.0001
Log pseudolikelihood			-179.03876
Pseudo R2			0.1604

ns (not statistically significant), * (significant at 0.1), ** (significant at 0.05), *** (significant at 0.01)

The likelihood ratio (-179.04) with a p value of 0.0001 shows that the model as a whole is significant as compared to the null model with no predictors. The marginal effects are presented in Table 5.8.

Table 5.8 Result showing marginal effects

Food security	dy/dx	Std. Err.	Sig level
Gender	-0.0401	0.0335	ns
Marital status	0.0554	0.0249	**
Age in years	-0.0009	0.0009	ns
Educational level	-0.0183	0.0190	ns
Household size (numbers)	-0.0218	0.0083	***
Farming experience in years	-0.0113	0.0316	ns
Income in MKW	0.0109	0.0219	ns
Area available (ha)	0.0686	0.0217	***
Regular area (ha)	-0.0647	0.0299	**
Area maize (ha)	0.0838	0.0419	**
FISP Receipt	0.0674	0.0237	***
Timeliness	0.0031	0.0235	ns
Fairness	0.0031	0.0249	ns
Crop rotation	0.0082	0.0208	ns
Manure addition	-0.0216	0.0186	ns
Pest management	-0.0002	0.0200	ns
2014 Harvest (mt/ha)	0.0310	0.0122	**
Average harvest before FISP (mt/ha)	0.0137	0.0087	ns

ns (not statistically significant), * (significant at 0.1), ** (significant at 0.05), *** (significant at 0.01)

The marginal effects in Table 5.8 show that an increase in household size has a negative effect on the household food security. The variable FISP receipt or not, showing the impact of the FISP on HFS, shows that HFS status would increase by 6.7% if a household moves from being a non-recipient receiving FISP inputs. The results show that for every one unit increase in the household size, there is a 2.2% shift towards food insecurity.

A hectare increase in the area available to a household means a 6.9% increase in the chance of a household being food secure. Similarly, the area allocated to maize also has a positive effect on the HFS. A hectare increase in the area allocated to maize causes an 8.4% increase in the chance of a household being food secure.

The area usually cultivated by a household has a negative effect on the HFS. It causes a 6.5% reduction in the chances of being food secure, with every hectare increase. Marital status has a positive effect on the HFS. A household where the household head is married has a 5.5% chance of being food secure, compared to a single parent. The 2014 harvest had a positive

effect on HFS. An increase of the harvest by a metric tonne results in a 3.1% increase in the chance of a household being food secure.

5.6 DISCUSSION

Overall, the food security status is positively affected by the FISP receipt of inputs, marital status, the land area available to a household, the maize area for each household, and the yield of the 2013/14 agricultural season. The results reflect that when a family receives inputs through the FISP, there is an increase in the chances of that household becoming food secure and this shows the positive impact of the FISP. The fact that the marginal effects of the harvest of the 2013/14 agricultural season had a positive impact on the food security shows that this programme still has a positive impact on the FISP, close to a decade after implementation. More importantly, these results reflect that, at a household level, the programme had a positive impact on the HFS.

With respect to the household size, Kigutha *et al.* (1998), in a study conducted in Kenya, found that, with an increase in the household size, there is an increase in the likelihood of a household being food insecure. They add that households with less than four members were likely to have more than enough for consumption (181%), whilst households with greater than seven members were likely to meet only 68% of their dietary needs. The regression results showed that an increase in the size of the household has a negative effect on household food security. The average household size for the sample of 5.205 persons (Kigutha *et al.* 1998) falls between the two ranges, being more inclined to the latter than the former. The regression results show that an increase in the household size reduces the chances of being food secure. This is in accordance with Kigutha *et al*. (1998).

The results reflect that, even though this programme made a positive impact on food security, it has not managed to eradicate food insecurity. Close to a decade after the implementation of the programme, 61% of the respondents were food insecure at the household level. This shows that on its own, the FISP is not well equipped to eradicate food insecurity thus posing the need for either the termination of the programme or complementing it by introducing other interventions. The former however, may be difficult at it may result in extreme food shortages which are the case after the termination of an input subsidy.

5.7 CONCLUSSION

While at a national level, the FISP has been applauded for increasing the food security status of the country; this study though it showed a positive impact at a household level, also revealed that a great proportion was still classified as food insecure. In light of this, the government may want to consider other ways of improving food security which reinforce the results of the FISP. As it is, though a positive impact has been noted from this study, there is still a great proportion of the population that is still classified as food insecure. This implies that the FISP did improve the state of food security at a household level, but may not necessarily be a one way approach to eradicating food insecurity. Governments should thus consider employing other methods such as investing in research and development, creating employment even in marginalized rural setups, encouraging entrepreneurship by supporting different communal projects in addition to approaches such as the FISP.

CHAPTER 6:CONCLUSION AND RECOMMENDATIONS

6.1 RECAP OF STUDY OBJECTIVES AND METHODOLOGY

The main objective of this study was to determine the household level impact of the Farm Input Subsidy Programme of Malawi on the household food security status of smallholder households. The study had two specific objectives. Firstly, the study aimed determine the effect of access to agricultural inputs through FISP on crop production and productivity of smallholder farmers. The second objective was to compare the effect of access to agricultural inputs through FISP on household food security. Data acquired from a sample of 200 smallholder farmers from the central region of Malawi was analysed using econometric and descriptive techniques. The chi-square test was mainly used to test for association between variables, whilst the Probit regression model was used to identify the determinants household food security. The OLS was used to determine the effect of selected variables on the maize productivity and yields of 2014. Chapter 6 presents the major findings of the study and presents some policy recommendations.

6.2 CONCLUSIONS

The major findings of this study are that the FISP had a positive impact on household food security and maize productivity. However, 61% of the population was food insecure. Therefore, it appears that the programme has failed at this stage to completely eliminate food insecurity. The positive impact noted in this study reflects a reduction in the severity of food insecurity than elimination *per se*, 10 years after the implementation of the programme. With respect to maize productivity, 10 years after the implementation of the programme, there is still room for improvement. Nutrition security also remains to be improved results reflects that the food secure, had a highly diverse diet based on results of the household dietary diversity scale whilst the opposite is true for the food insecure. Given that legumes were excluded at the beginning of the FISP and later included to a lesser extent, it is essential that these are grown and that the subsidy makes available more legume seeds for production. Overall, given that this programme has been reported to be expensive, the decision to improve and continue with the programme lies in whether the positive impact is worth the input or whether it is better to invest in other developmental projects other than the FISP.

6.3 POLICY RECOMMENDATIONS

With the results obtained, the study recommends the following:

- Other policy instruments should be implemented to work together with the FISP, such as investing in research and development, creating employment even in marginalized rural areas, encouraging entrepreneurship by supporting different communal projects in addition to the FISP.
- It is essential to have the programme provide inputs in a complete package to families in such a way that once a family has received a subsidy, they can have a bumper harvest and be able to purchase agricultural inputs in subsequent seasons. Over the years, the constitution of the subsidy have varied. A complete package has included two coupons for fertilizer (formerly one maize and one tobacco and now all maize) and 2-10kg of seed with greater quantities being for OPV's. In this study, a small number of households indicated that they had received some legume seed through the programme.
- Issues of corruption should be dealt with, and even the traditional chiefs should be educated on their role in the programme.

6.4 AREAS OF FURTHER RESEARCH

The proportion of food insecure people in Malawi reflected in this research, highlights that food insecurity is still a problem which needs to be addressed from all different angles. Given the multidisciplinary nature of food security and the complexity that comes with it, there is need for further research to be conducted at a household level, so that more comprehensive conclusions can be made to accurately inform policy makers.

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APPENDICES

APPENDIX A: Survey data collection questionnaire

University of KwaZulu-Natal

African Centre for Food Security

Questionnaire

The information captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students of KwaZulu-Natal University only. The findings of this research will help inform policy for food security through facilitated improved crop productivity. Respondents can choose not to answer questions - answers are voluntary. The respondent should be the household head (directly involved in the farming practices of the household) residing in Kasungu/ Lilongwe District.

Date of survey……
Name of enumerator……..
Name of District……..Ward…….
Name of Respondent … …….....

Section A: Household Demographics and Socio economic assessment

1. Gender of household head Female (0) Male (1)

2. Marital status of household head Single (0) Married (1) Widow (2)

   Age of the household head……..

3. Household structure

Gender	Total	<12	12<18 (0)	19 to 25 (1)	26 to 40 (2)	41 to 70 (3)	>70 (4)
Male							
Females							
Total							

4. What is the educational level of head of household?

None (0) Primary (1) Secondary (2) Tertiary (3)

5. How many years of farming experience does the family have?

<2 (0) 2-6years (1) 6-12years (2) >12years (3)

6. What is your main source of income?

(0) Sales of surplus produce | Sales of cash crops (1) | Remittances (2) | Livestock and products sales (3) | Ganyu labour (4) | Other (5) (Specify)

7. How much do you earn in a typical month from the following?

(1) Sales of surplus produce | Sales of cash crops (1) | Remittances (2) | Livestock and products sales (3) | Ganyu labour (4) | Other (5) (Specify)

……..

8. What assets does household own?

No (0) Yes (1)

Physical assets

Cattle

Goats

Cultivator

Harrow

Wheelbarrow

Ripper

Ridger

Ox-drawn plough

Hoes

Section B: Farm Characteristics

1. What is the size of the land that you own? ……..
2. What is the size of the land area available for cultivation?
   …….
3. What is the size of land normally cultivated in regular growing seasons
   …….
4. What is the size of land used for maize cultivation in the 2013/14 growing season?
   ……...
5. What is the size of land used for tobacco cultivation in the 2013/14 growing season
6. What other cash crops did you grow?
   ……..

Section C1: Input subsidy (Beneficiaries only)

1. Since 2005, have you changed the cropping area that you use for maize?

   No (0) Yes (1)

If yes, indicate the changes over the years?

Year	2005	2006	2007	2008	2009	2010	2011	2012
Crop area planted (ha) Maize								

2. Since 2005, have you changed the cropping area that you use for tobacco?

   No (0) Yes (1)

If yes, indicate the changes over the years?

Year	2005	2006	2007	2008	2009	2010	2011	2012
Crop area planted (ha) tobacco								

3. Since 2005, have you changed the cropping area that you use for any other crop you usually produce?

   No (0) Yes (1)

If yes, which crop are these?

……..

Indicate the changes over the years?

Year	2005	2006	2007	2008	2009	2010	2011	2012
Crop area planted (ha) other crops								

4. Did you receive any fertilizer through the FISP?

No (0) Yes (1)

If answer is the affirmative, ask question 5 and 6, if not, proceed to question 7.

5. How many bags of fertilizer did you receive for your household in the 2013/14 growing season through the FISP?

   …….

6. How many bags of this fertilizer did you use for your household during the 2013/14 growing season?

   ……

7. Did you receive any hybrid maize seed?

   No (0) Yes (1)

If answer is the affirmative, ask question 8 and 9, if not, proceed to question 10.

8. If yes, how many 2kg bags of hybrid maize seed did you receive for your farm?

   ……..

9. How many 2kg bags of hybrid maize seed did you plant on your farm?

   ……..

10. Did you receive any Open pollinated variety (OPV) maize seed?

    No (0) Yes (1)

If answer is the affirmative, ask question 11 and 12, if not proceed to question 13.

11. If yes, how many 4kg bags of OPV maize seed did you receive for your farm?

……

12. How many 4 kg bags of OPV maize seed did you plant on your farm?

……

13. Other than hybrid and OPV seed, which other type of seed do you use?

……..

14. Other than applying the inputs on the farm, what else did you use the farming inputs for?

Sold inputs to other people (0)	
Shared inputs with neighbours and relatives (1)	
Traded inputs for other goods (2)	
Other (Specify) (3)	

15. Please indicate the years you received inputs and the quantities received from the year 2009.

Year	2009	2010	2011	2012	2013
Number of fertilizer bags received					
Number of bags of hybrid seed received					
Number of bags of OPV seed received					

Section C2- Input Subsidy (Non-beneficiaries only)

1. Are there any changes in the way you use fertilizer since the implementation of the programme?

   No (0) Yes (1)

2. If yes, indicate the changes you made?

   ……

   ……

   ……....

3. Are there any changes in the way you use maize hybrid since the implementation of the programme?

   No (0) Yes (1)

4. If yes, indicate the changes you made?

   ……

   ……

   ……....

5. Are you using fertilizer in your fields?

   No (0) Yes (1)

6. If yes, did you use fertilizers before the implementation of the programme?

   No (0) Yes (1)

7. Are you using maize hybrid seed in your field?

   No (0) Yes (1)

8. If yes, did you use maize hybrid seed before the implementation of the programme?

   No (0) Yes (1)

Section C-Input Subsidy (Universal questions)

1. How would you rate the distribution of inputs in terms of timeliness in this programme?

Bad ⟶ Good

extremely		quite		slightly		slightly		quite		extremely	

2. How would you rate the distribution of inputs in terms of fairness in this programme?

Bad ⟶ Good

extremely		quite		slightly		slightly		quite		extremely

3. Do you think there is anything that needs improvement?

No (0) Yes (1)

b) If yes , what?

……

……

……

……

……

……

Section D: Agronomic practices and yields

1. How often do you get in contact with your extension officers and/or other technical advisers?

……
……..

2. Do you practice crop rotation?

No (0) Yes (1)

a) If yes, briefly describe your rotation?

……
……
……
……
……..

3. Do you add manure to the soil?

No (0) Yes (1)

5b) and if so, how many wheelbarrows do you normally add?.....

4. Since the implementation of the programme, are there any changes you have made as to how you try to improve your soil fertility?

No (0) Yes (1)

b) If yes to 8, please indicate the change below:

Common practice before Practice after

……

……

……

5. How do control your pests and diseases
6. How many bags of maize in bags did you harvest in the last growing season?

b)

Biologically (0)		Chemically (1)		Integrated pest management (3)	

Size of bags used for harvesting

50kg ☐ 100kg ☐

7. What is the average yield in bags you get since the implementation of the programme on the same area of land you cultivated in the 2013/2014 growing season?

b) Size of bags used

50kg ☐ 100kg ☐

8. How many bags of maize would you usually get before the implementation of the programme?

b) Size of bags used

50kg ☐

100kg ☐

9. Did you have enough to eat till the next growing season?

No (0) Yes (1)

Section E: Assessment of Household Food Security (Applying the food insecurity access scale and dietary diversity scale)

	Answer to main question		Answer to 2nd part of question		
	No (0)	Yes (1)	Sometimes (0)	Often (1)	Always (3)
1. Did you worry that your household would not have enough food? (Y/N)					
1a) If yes to 1, how often?					
2. Were you or any household member not able to eat the kinds of foods you preferred?					
2a) If yes to 2, how often?					
3. Did you or any household member have to eat a limited variety of foods?					
3a) If yes to 3, how often?					
4. Did you or any household member have to eat some foods that you really did not want to eat?					
4a) If yes to 4, how often?					
5. Did you or any household member have to eat a smaller meal than you felt you needed?					
5a) If yes to 5, how often?					

6. Did you or any other household member have to eat fewer meals in a day?					
6a) If yes to 6, how often?					
7. Was there ever no food to eat of any kind in your household?					
7a) If yes to 7, how often?					
8. Did you or any household member go to sleep at night hungry?					
8a) If yes to 8, how often?					
9. Did you or any household member go a whole day and night without eating anything?					
9a) If yes to 9, how often?					

Household Dietary diversity Scale

Did anyone in the home drink or eat the following during the day or at night yesterday?

	Food Group	Examples	No(0)	Yes(1)
a	Cereals	Bread, nsima, or any food made from cereals		
b	Vitamin A Rich Vegetables And Tubers	Pumpkin, carrots, or sweet potatoes plus other locally available vitamin-A rich		
c	White Tubers And Roots	White potatoes or foods made from roots		
d	Dark Green Leafy Vegetables	Green/leafy vegetables (Rape, tomatoes and onions), including wild ones + locally available vitamin-A rich leaves		

e	Vitamin A Rich Fruits	Oranges, mangoes, paw-paws, other locally available vitamin A-rich fruits		
f	Meat	Beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds or other blood based meat.		
g	Eggs	chicken, duck, guinea hen or any other egg		
h	Fish	Fresh or dried fish or shell fish		
i	Legumes, Nuts And Seeds	beans, peas, lentils, nuts, seeds or foods made from these		
j	Milk And Milk Products	milk,or any local milk products or other milk products		
k	Oils And Fats	fats or butter added to food or used for cooking		
l	Sweets	sugar, honey, sweetened soda or sugary foods such as sweets		
m	Spices and Caffeine or Alcoholic Beverages spices	spices, kachasu, chikokeyani, coffee, tea, or any alcoholic beverages or local examples		

APPENDIX B: MAP OF MALAWI


Chitipa
Karonga
Rumphi
Mzuzu City
Nkhata Bay
Mzimba
Nkhotakota
Kasungu
Ntchisi
Dowa
Mchinji
Salima
Lilongwe City
Lilongwe
Dedza
Mangochi
Ntcheu
Zomba City
Balaka
Machinga
Blantyre
Mwanza
Zomba
Chiradzulu
Phalombe
Blantyre City
Mulanje
Thyolo
Chikwawa
Nsanje

APPENDIX C: OLS RESULT PRODUCTIVITY AND SELECTED VARIABLE

Source	SS	df	MS
Model	50.2223451	18	2.79013028
Residual	167.45051	181	.925140941
Total	217.672855	199	1.09383344

Number of obs	= 200
F(18, 181)	= 3.02
Prob > F	= 0.0001
R-squared	= 0.2307
Adj R-squared	= 0.1542
Root MSE	= .96184

Productivity	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Agecont	-.0040001	.0058763	-0.68	0.497	-.015595	.0075948
Households~e	-.0089621	.0365397	-0.25	0.807	-.0810606	.0631364
1.Gen	.5214178	.214441	2.43	0.016	.0982921	.9445435
1.MartS2	.0371331	.2606803	0.14	0.887	-.47723	.5514963
1.Edlevels~a	.3108634	.1868444	1.66	0.098	-.0578099	.6795367
1.Farminge~a	.1348976	.2007863	0.67	0.503	-.2612852	.5310804
1.Receiveo~t	.6810634	.3849448	1.77	0.079	-.0784931	1.44062
Bagsreceiv~t	-.3795397	.1520551	-2.50	0.013	-.6795684	-.079511
Bagsusedfert	.2093328	.1209086	1.73	0.085	-.0292389	.4479044
Bagsreceived	-.1173446	.1305383	-0.90	0.370	-.3749171	.1402279
Bagsused	.1135731	.1332866	0.85	0.395	-.1494223	.3765685
Bagsreceive	2.561877	.6195692	4.13	0.000	1.33937	3.784384
BagsusedOPV	-2.700239	.6153188	-4.39	0.000	-3.91436	-1.486119
1.Timeline~a	.0194919	.1833615	0.11	0.915	-.3423092	.381293
1.Fairness~a	.323379	.2154179	1.50	0.135	-.1016743	.7484323
1.Croprot	-.0602725	.1550972	-0.39	0.698	-.3663036	.2457586
1.Manuread~d	-.0968105	.1465093	-0.66	0.510	-.3858964	.1922754
1.Pestsstata	.1800809	.1724481	1.04	0.298	-.1601862	.5203481
_cons	-.3771038	.3291059	-1.15	0.253	-1.026481	.2722738

Source	SS	df	MS	Number of obs =	200
				F(23, 176) =	2.70
Model	46.5405309	23	2.02350135	Prob > F =	0.0001
Residual	131.857405	176	.749189799	R-squared =	0.2609
				Adj R-squared =	0.1643
Total	178.397936	199	.896472038	Root MSE =	.86556

Product~2014	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
BagsusedOPV	-.2359012	.1479157	-1.59	0.113	-.527818	.0560156
Bagsused	.1387919	.3584215	0.39	0.699	-.5685652	.8461491
Bagsusedfert	.2733782	.0961258	2.84	0.005	.0836706	.4630857
Households~e	.0523527	.0334713	1.56	0.120	-.013704	.1184095
Agecont	-.0113934	.0055866	-2.04	0.043	-.0224189	-.000368
Marst2Single	.0720827	.3288089	0.22	0.827	-.5768329	.7209983
MartS2	-.1329073	.2612392	-0.51	0.612	-.6484718	.3826572
Incomestata	.2639427	.1433512	1.84	0.067	-.0189659	.5468512
Areamaize	-.2996417	.2004959	-1.49	0.137	-.6953273	.0960439
1.Gen	-.3123899	.1952972	-1.60	0.111	-.6978156	.0730358
1.Edlevels~a	.0539886	.1688703	0.32	0.750	-.2792826	.3872599
1.Farminge~a	.1207475	.1826243	0.66	0.509	-.2396678	.4811628
1.Receiveo~t	-.4114384	.296698	-1.39	0.167	-.996982	.1741053
1.Croprot	.0572589	.142359	0.40	0.688	-.2236914	.3382092
1.Manuread~d	-.0304062	.1387554	-0.22	0.827	-.3042448	.2434324
1.Pestsstata	.1244066	.1561749	0.80	0.427	-.1838099	.4326232
1.Timeline~a	-.02345	.1317124	-0.18	0.859	-.2833889	.2364889
Physicalas~s						
1	.1607601	.1792362	0.90	0.371	-.1929687	.5144888
2	.255088	.1922505	1.33	0.186	-.124325	.6345009
3	.6265634	.2378704	2.63	0.009	.157118	1.096009
4	.385878	.240397	1.61	0.110	-.0885537	.8603098
5	-.2015318	.6496108	-0.31	0.757	-1.483561	1.080497
6	1.755811	.5398742	3.25	0.001	.690351	2.821272
_cons	1.165523	.384102	3.03	0.003	.4074847	1.923562

APPENDIX D: PROBIT REGRESSION RESULTS OF HOUSEHOLD FOOD SECURITY AND SELECTED VARIABLES

Ordered probit regression — Number of obs = 200; Wald chi2(18) = 58.76; Prob > chi2 = 0.0000; Log pseudolikelihood = -179.03876; Pseudo R2 = 0.1604

Foodsec	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Gen	.3910652	.3012145	1.30	0.194	-.1993043	.9814348
MartS2	-.6967459	.3389781	-2.06	0.040	-1.361131	-.032361
Agecont	.0090181	.0086639	1.04	0.298	-.0079629	.0259991
Edlevelstata	.1963038	.2120946	0.93	0.355	-.219394	.6120016
Households~e	.223379	.0680835	3.28	0.001	.0899379	.3568202
Farmingexp~a	.1141145	.3133924	0.36	0.716	-.5001232	.7283523
Incomestata	-.1122606	.2212966	-0.51	0.612	-.545994	.3214728
Areaavaila~e	-.7031371	.1619938	-4.34	0.000	-1.020639	-.385635
Regarea	.6637207	.2548102	2.60	0.009	.1643018	1.16314
Areamaize	-.85905	.3873823	-2.22	0.027	-1.618305	-.0997947
Receiveornot	-.7062623	.20218	-3.49	0.000	-1.102528	-.3099969
Timeliness~a	-.0315083	.2396512	-0.13	0.895	-.5012161	.4381995
Fairnessst~a	-.031184	.2527922	-0.12	0.902	-.5266476	.4642797
Croprot	-.0851923	.2154793	-0.40	0.693	-.507524	.3371394
Manureadded	.2209683	.1847004	1.20	0.232	-.1410379	.5829744
Pestsstata	.0019002	.2051608	0.01	0.993	-.4002076	.404008
Harvest2014	-.3175146	.1050318	-3.02	0.003	-.5233731	-.1116561
Harvestbef~e	-.1406508	.0860319	-1.63	0.102	-.3092703	.0279686
/cut1	-1.910922	.6622478			-3.208904	-.6129407
/cut2	-1.43724	.6337419			-2.679351	-.1951285
/cut3	-.6052455	.6060726			-1.793126	.582635

```
. mfx compute, predict (outcome (1))

Marginal effects after oprobit
      y  = Pr(Foodsec==1) (predict, outcome (1))
         =  .07036074
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
Gen*	-.0400908	.03351	-1.20	0.232	-.105765	.025584	.745
MartS2*	.0553792	.0249	2.22	0.026	.006579	.104179	.835
Agecont	-.0008795	.00086	-1.02	0.307	-.002569	.00081	42.47
Edleve~a*	-.018283	.01903	-0.96	0.337	-.055578	.019012	.185
Househ~e	-.021786	.00827	-2.63	0.008	-.037994	-.005578	5.205
Farmin~a*	-.0113085	.03156	-0.36	0.720	-.073163	.050545	.72
Income~a	.0109487	.02192	0.50	0.617	-.032007	.053904	1.47
Areaav~e	.0685766	.02173	3.16	0.002	.025986	.111167	.7878
Regarea	-.0647323	.02989	-2.17	0.030	-.123324	-.006141	.73325
Areama~e	.0837827	.04194	2.00	0.046	.001581	.165985	.5863
Receiv~t*	.0674101	.02368	2.85	0.004	.021005	.113816	.5
Timeli~a*	.0030781	.02352	0.13	0.896	-.043019	.049175	.42
Fairne~a*	.0030588	.02493	0.12	0.902	-.045808	.051926	.225
Croprot*	.0082434	.02083	0.40	0.692	-.032578	.049065	.63
Manure~d*	-.0215538	.01862	-1.16	0.247	-.058058	.01495	.515
Pestss~a*	-.0001853	.02	-0.01	0.993	-.039383	.039013	.28
Har~2014	.030967	.01222	2.53	0.011	.007024	.05491	1.34385
Harves~e	.0137176	.00868	1.58	0.114	-.00329	.030726	1.1397

(*) dy/dx is for discrete change of dummy variable from 0 to 1