UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

CENTRE FOR SOCIAL POLICY STUDIES

AN ASSESSMENT OF THE IMPACT OF THE PLANTING FOR FOOD AND JOBS POLICY ON SMALLHOLDER FARMERS FOOD SECURITY IN THE WA WEST DISTRICT

BY

FAWZAN NURIDEEN

(ID. NO. 10348879)

A DISERTATION SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILMENT OF THE AWARD OF DEGREE OF MASTER OF RESEARCH AND PUBLIC POLICY

JULY, 2019

DECLARATION

I do proclaim this thesis as the outcome of my freethinking investigation towards the award of a Master of Research and Public Policy. I have duly acknowledged any source used in the work.

Name of Candidate:	**Fawzan Nurideen**
Student Number:	10348879
……	…….
Signature	Date
Supervisor:	**Dr. Fred Mawunyo Dzanku**
……	…….
Signature	Date

ABSTRACT

An important goal of government agricultural sector policies is to improve food security through high agricultural production and job creation. Implementation of the flagship policy of the government of Ghana dubbed the "Planting for Food and Jobs" started in 2017. After three years of implementation, the study sought to examine whether the policy has impacted on food security among smallholder farmers in the Wa West District of the Upper West Region. The study also examined the kind of on-farm jobs created, youth involvement as well as the experiences of farmers with the programme. The study employed a quasi-experimental cross-sectional survey design involving semi structured questionnaire administered to 200 farmers of whom 62 represented the participant group and 138 the non-participant group. Logit regression was employed to identify the factors that determine household participation in the programme. Age, education, capital access, monthly income, infrastructure, community group association and assets were found to have statistically significance in association with the probability to participate in the Planting for Food and Jobs Programme. A propensity score matching technique was applied to assess the impact of the programme on food security. At the end of the survey, participation in the PFJ has a significantly higher average food security than the non-participants.

ACKNOWLEDGMENTS

My heartfelt appreciation goes to Dr. Fred Mawunyo Dzanku for his unparalleled and exceptional supervision. His consistent and dedicated guidance has been key to finishing this thesis.

I thank my parents for their constant support and prayers. Those friends and colleagues who honoured my conversations with useful ideas are all truly appreciated. I have to mention Dinko Hanan Dinko who did not only help with academic contributions, but counselled me as a friend.

I am grateful to Mr. Nashiru International who helped me with farmer's data in the various communities. To all the farmers who co-orporated in the study, I am eternally grateful. I owe CSPS entire faculty my gratitude for their comments and constructive criticisms, which undoubtedly have improved my thesis. I cannot forget the immense support of Mr. John Tetteh Kofi of CSPS library and his abled assistants Kelly Okine, George Owusu Gyami, and Shadrack Nyarko.

Finally and most importantly, I thank God Almighty for the gift of life and good health. I would not have made it without His blessing.

DEDICATION

To all smallholder farmers in the developing world, this work is dedicated.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

LIST OF EQUATIONS

ABBREVIATIONS

SDGs	Sustainable Development Goals
FAO	Food and Agricultural Organization
MoFA	Ministry Of Food and Agriculture
AfDB	African Development Bank
CFSVA	Comprehensive Food Security Vulnerability Assessment
NLC	National Liberation Council
GSGDA	Ghana Shared Growth Development Agenda
FASDEP	Food and Agricultural Sector Development Policy
METASIP	Medium Term Agricultural Sector Implementation Plan
CAADP	Comprehensive African Agricultural Development Programme
PFJ	Planting For Food and Jobs
GDP	Gross Domestic Product
WFP	World Food Programme
CAP	Common Agricultural Policy
GR	Green Revolution
NEPAD	New Partnership for African Development
ECOWAP	Economic Community of West African Policy
EU	European Union
IFPRI	International Food Policy
APRM	African Peer Review Mechanism
AU	African Union

GSS	Ghana Statistical Service
NLC	National Liberation Council
AFRC	Armed Forces Revolutionary Council
ISSER	Institute of Statistical Social and Economic Research
WFC	World Food Conference
IFAD	International Fund for Agricultural Development
GSF	Global Strategic Framework
ASP	Agricultural Subsidy Programme
YIAP	Youth in Agricultural Programme
DDS	Dietary Diversity Score
ATE	Average Treatment Effects
ATU	Average Treatment on the Untreated
ATT	Average Treatment on the Treated

CHAPTER ONE

Introduction

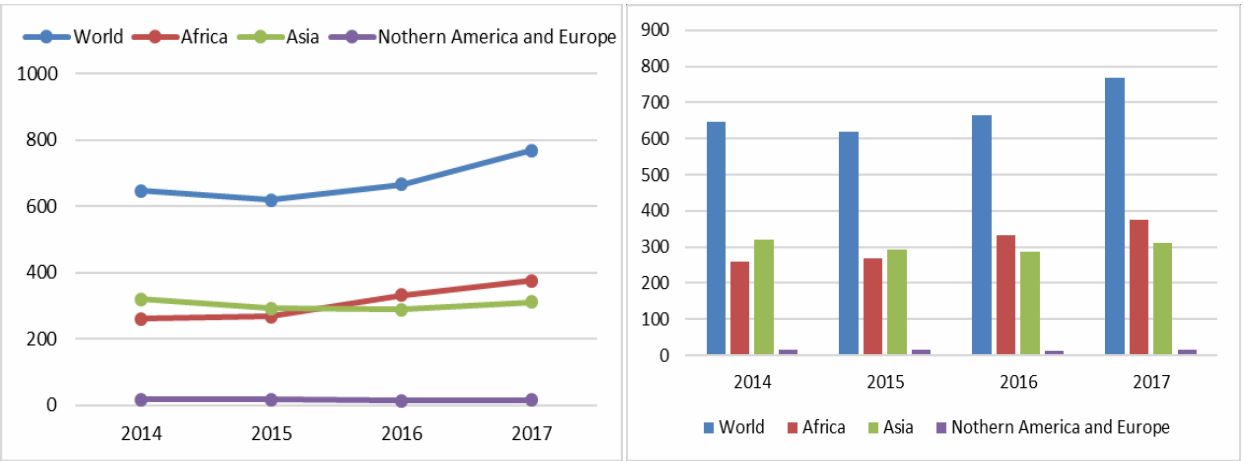
1.1: Background to the Study

As reflected in the Sustainable Development Goals (SDGs), one of the global challenges is to end poverty and hunger in the world and achieve food security (SDG I&II). Available data show that the number of people who suffer undernourishment in the world has been growing since 2015 (FAO, 2018).Increasing from783.5 million in 2014to 820.8 million people in 2017 (FAO, 2018). The situation is worsening in most regions of Africa. Almost 21 percent of the population (more than 256 million people) are undernourished. Under-nutrition in Africa has continuously increased since 2005, rising from196 million people to 256.5millionin 2017 (FAO, 2018).

Under-nutrition and food insecurity are often used interchangeably. In Africa, the number of people facing severe food insecurity rose from 260.1 million people in 2014 to 374.9 million people in 2017, accounting for 51.3 percent of the 769.4 million people facing severe food insecurity globally (FAO, 2018). Sub-Saharan Africa is the hardest hit in the world, in terms of food insecurity (Darfour et al, 2016).

There continue to be major threats to food security in Ghana notwithstanding the overall increase in its wealth measured by GDP (MoFA, 2015). World Food Programme (2009) estimated that food insecurity affects about 5% of Ghana's population. And about 2 million people are likely to become food insecure (MoFA,2016). Poor agricultural performance and poverty are the major cause of this crisis in Africa (AfDB, 2016). The three regions in the north have continued to record higher incidences of poverty, food insecurity and malnutrition (Ghana Statistical Service, 2015).

Figure1.1: Situation of food insecurity in various regions of the world



(Source: FAO, 2018)

The Wa West District of the Upper West Region has the highest proportion of households who are either severely or moderately food insecure (CFSVA, 2012). However, in the era of the PFJ programme, how is the food security situation changing in rural Ghana and the Wa West District in particular?

Ghana has adopted policies and programmes to achieve food self-sufficiency, reduce poverty and create jobs. During the first republic, agriculture policy focused on the formation of state farms along corporative lines (Ward, 1966).There was the establishment of seed processing centres, disease and pets control, improvement of livestock and subsidies and tractor services among others (Buah, 1998). Attention was equally paid to livestock and deliberate efforts made to reduce the importation of meat products (Jotie, 2017).The National Liberation Council (NLC) that overthrew the Nkrumah regime in 1966 sought to support farmers by way of providing ready market, infrastructural development and offering credit to farmers. The regime described these policies as necessary for the rapid increase in the production of food and other crops (Boahen, 1996).The "Operation feed yourself policy" in 1972 under the National Redemption Council was a continuation of earlier

efforts at achieving food self-sufficiency.

The next military regime in 1981 under the Armed Force Revolutionary Council continued to place emphasis on the need to increase agricultural productivity. Achieving a green revolution was important to the regime. Chiefs became a focal point in rallying the nation for higher agricultural production (Boahen, 1996).

Since returning to constitutional democracy in 1992, a number of short to medium term plans has been put in place to transform the economy through Agricultural modernization and higher productivity (GSGSA, 2014). These include Ghana Shared Growth Development Agenda (GSGDA I&II), the Coordinated Programme of Economic and Social Development Policies. Specific policies included Medium Term Agricultural Sector Investment Plan (METASIP I&II) and the Food and Agricultural Sector Development Policy (FASDEP II, 2007-2015). The METASIP provides the road map for the implementation of the Comprehensive Africa Agriculture Development Programme (CAADP) (METASIP, 2014). The most recent policy in the agricultural sector, which is a flagship programme under the METASIP III is called the Planting for Food and Jobs Policy (PFJ).

The main goal of the PFJ programme is to achieve food security, employment creation and poverty reduction through modern agricultural practices. This will transform the national economy.

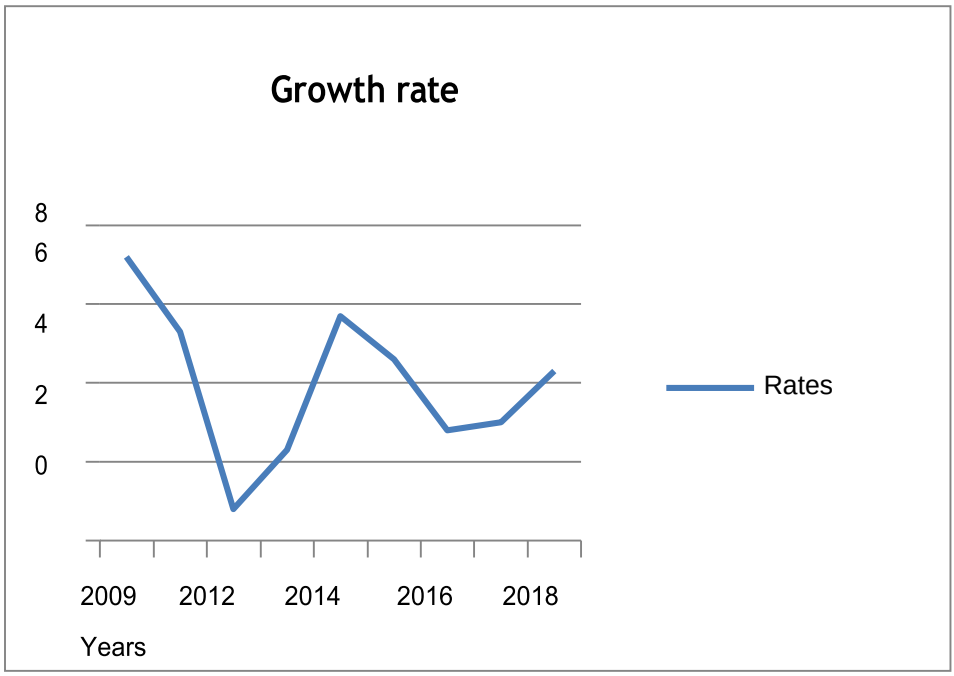
The objectives of the PFJ programme are to make sure that food crops are readily available in Ghana, and also creating opportunities for the private sector operators, and helping address youth joblessness in the country. (Plan, Implementation, & Food 2019)

1.2: Problem Statement

Farming provides livelihood for millions in Ghana by offering work and food. Even though smallholder farmers operate less than 2 acres of land, they contribute to 75% of the total agricultural output of the country (Plan, Implementation, & Food, 2017).

Despite past policy interventions, the role of the Agricultural sector in reducing food insecurity is inadequate. The contribution of agriculture to GDP in the recent years has been uneven (Kwarase, 2017). Cereal food crops (rice, sorghum and maize) continue to present a wide yield gap which is the difference between the actual production and the potential production (ISSER, 2016). Poor agronomic practices, low quality of inputs used and lack of extension services are the factors accounting for the poor performance of on-farm productivity. (Plan, Implementation, Food, 2017).

Figure 1.2: Agriculture growth rate in Ghana from 2009 to 2018



According to the WFP (2012), smallholder farmers in the savannah north are the worst affected by food insecurity. Food insecurity in Ghana is a reflection of the poverty situation whereby poorer regions, especially in the drier ecological zone, have more food insecure peasants than the rainforest south (Hesselberg & Yaro, 2006).

There continue to be doubts about the role and impact of the Agricultural sector policies, including the Planting for Food and Jobs programme in highly vulnerable communities like the Wa West Communities (Quaye, 2008). Wa West is the poorest district in Ghana with poverty incidence of 82% (GLSS, 2016). According to CFVA (2012), Wa West has the highest proportion of food insecure household. The inhabitants depend mostly on their own local production, compared with other districts (CFSVA, 2012).This is a distinct contrast to other food insecure districts, which are typically more reliant on market purchases (CFSVA, 2012). Further analysis reveals that households in Wa West typically have reasonable harvests and remaining stocks of staple grains, but the consumption of food items outside this category is limited. As a result, there are few households falling into the more extreme 'poor' food consumption group, but very large numbers classified as 'borderline' (GLSS 6). The lower wealth index also indicates that communities in the district would not be able to meet their dietary needs. Also worth noting here is that the entire population of Wa West District is living in rural areas (MoFA, 2016).

The Planting for Food and Jobs Programme if well implemented should help reduce food insecurity, create a vibrant labour market and intensify farming in the district. Exploring the impact of the PFJ programme in areas with such unique conditions will show how poorer areas are faring in the national intervention which is meant to improve food security and

promote jobs. This study seeks to explore the impact of the planting for food and jobs programme on the smallholder farmer food security. The questions guiding the study are:

1. What is the impact of the Planting for Food and Jobs programme on the smallholder farmer food security?
2. What kind of on-farm jobs have the programme created?
3. How involved are the youth in the programme?
4. What are the experiences of farmers with the programme?

1.3: Research Objectives

The overall aim of the study is to explore the impact of the planting for food and job's programme on the smallholder farmer food security. The specific objectives are:

1. Examine the smallholder farmer food security situation under the programme.
2. Describe the nature of jobs created among smallholder farmers.
3. Explore the level of youth participation in the Programme.
4. Explore the experiences of farmers with the programme.

1.4: Justification of the Study

The study is important for several reasons. First, it provides insight into how the flagship programme of government is doing at the level of the smallholder farmer in the district. This could provide some basis for government to know what needs to change for the programme to achieve its objectives. In line with Paul J. Gertler et al (2011), explanation of the general importance of impact evaluation studies, this study would create public awareness of the impact of government flagship policy. Citizens would have reason to continue or not their support of

similar policies in future. In this sense, information and evidence become means to facilitate public awareness and promote government's accountability.

At a conceptual level, this study throws more light on the need for policy makers to consider context-specific conditions when conceptualizing national interventions. This is crucial because a policy intervention gets defeated when applied equally among people with very different living circumstances and objective conditions. The ability of some to adopt the programme and benefit is compromised by the very fact of their objective conditions. Providing a context specific evaluation is therefore important.

1.5: Organization of the Study

The study is made up of five chapters. Chapter one is the introduction. It provides the background for the study, its significance, justification, limitations and organization of the study. Chapter two reviews literature on food security and the role of agricultural subsidy policies in promoting food security. Chapter three is presented in two parts. The first part highlights the location and characteristics of the study area. The second part discusses the research methods and research design.Chapter four is a presentation of the evidence of the impact of the Planting for Food Jobs programme on food security. This chapter presents the main findings of the study and key conclusions drawn from the research. It also provides policy recommendations that could improve the Planting for Food and Jobs Programme in the Wa-West District and Ghana at large.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction

Relevant literature on food security and the role of agricultural subsidy policies in promoting food security are reviewed in this chapter.

2.2: Defining and Conceptualizing Food Security

Food security encompasses the whole process where an individual does not lack food or the means to acquire food in the right quality and quantity. According to the life sciences research (2006) of the United States, Food Security mean being able to afford enough food for adecent living. At the very least, an individual should not struggle to acquire food, or going through risk where his personal safety and dignity is compromised or undermined.

The definition of food security has undergone series of evolutions in the aftermath of the world summit on food security in the year 1974. The genealogy of the term can be traced to the mid-1970s, when the World Food Conference (1974) defined food security in terms of food supply.

"Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices". This definition assured the availability and price stability of basic foodstuffs at the international and national level.

In 1983, FAO defined food security as; "Ensuring that all people at all times have both physical and economic access to the basic food that they need". This definition evidently focused on food access. This definition appreciated that beyond the supply factors, there are demand side considerations in the food security equation.

The regional and national level analysis became part of the definition together with the individual and household, in food security analysis. The report on hunger and poverty commissioned by the World Bank brought a very important the distinction between severe food insecurity which is linked to historical and generational deprivation and temporary food insecurity, which is a product of unexpected shocks or bad economic periods (Clay, 2002).

In connection with this distinction, Amartya Sen (1981) showed the effect of personal entitlements on food access (i.e., production, labour, trade and transfer based resources). This was his popular theory of famine. In 1996, The World Food Summit out-doored food security in a in a form that captured access, availability, utilization and stability. These became the four dimensions in food security measures. Food security further adopted a human right and ethical angle in its discourse. After the UN declaration of the right to food in 1948, it was not until 1996 that it was formally adopted and recognized by delegates at the world food conference. The conference showed the importance and belief in the human right focus to food security. It is therefore worthy to mention that 30 countries have the right to food enshrined in their constitution (FAO, 2018).

The definitions of food security has set forth a number of dimensions widely accepted, and used as prisms through which food security can be understood and perhaps measured. These dimensions are; food availability, food access, food utilization and food stability.

Food availability: The availability of enough food of the right quality, provided through domestic food production or imported from external sources (FAO, 2013).

Food access: The access people have to food or the means to acquiring foods for a balanced diet (FAO, IFAD, WFP, 2011).

Food Utilization: Being able to satisfy your food needs through adequate diet, water, and environment safe, hygienic and proper health care to feel trulysatisfied.This highlights the importance of non-food inputs in food security (FAO, 2013).

Food Stability: Food stability implies that individuals and households must have the continued food access and the continued ability to acquire food. Individuals must be cushioned against the unexpected and expected shocks which can easily make a food secure person insecure. (GSF 2011, FAO 2013).

2.3Agricultural Subsidy Policies

Increasing agricultural sector production, reducing food insecurity and growing the incomes of farmers remain high on the agenda of governments of the world. The European Union Comprehensive Agriculture Policy (CAP) has achieved for Europe self-sufficiency in Food and Agricultural Production (Valentin, 2011). The Policy was designed after the Second World War to restore efficiency in the Agricultural and related sectors (EU Commission report). The plan was to achieve higher agricultural productivity through farmer support systems. This would also make rural economies sustainable through agro-industrial development (Czerwca, 2018).

Other successful and thoughtful strategies included agricultural subsidy policies under the American policy for new deal under Eleanor Roosevelt in the 1930. These policies responded to the circumstances of the great depression (Effland, 2016). United States price and income support, known as agricultural subsidy, emerged in the wake declining farm incomes and a crises in the financial system, which led to wild convictions that the market system did not adequately reward farm people for their contributions to agricultural commodities (Gardner, 2002). Overall agricultural subsidies in 2010 was about $172 billion (Glauber & Effland, 2016). Fisher and

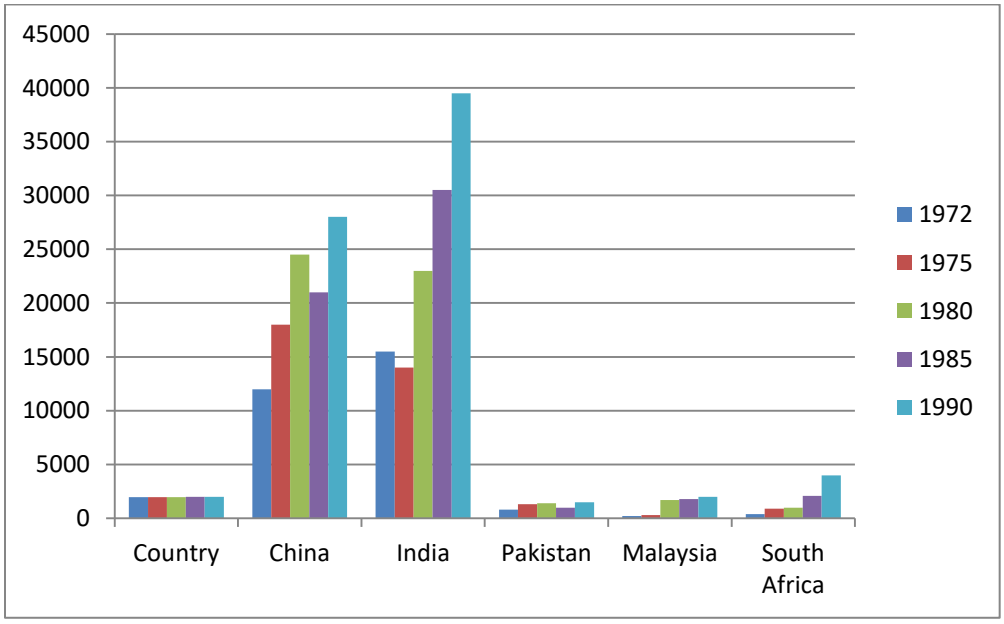
Gorter (1993) in their work titled the dynamic effects of agricultural subsidies in the United States. Selected crops were used for the study. The study concluded that the subsidy programme resulted in higher output of each of the crops. There are those who criticize agricultural subsidies in the United States. They refer subsidies as a form of regressive tax that helps high-income businesses, not poor rural farmers.

The Asian green revolution was also notable for the incredible leap forward in Asian agriculture productivity and food security (FAO, 2010). This massive turnaround in farming also reduced poverty to levels never seen before. Scholars have argued that Asia was on the brink of famine if not for the Green Revolution (GR) in the 1960s and 1970s. How true this is remains a question. The lesson here is the role of policy is achieving sustained agricultural growth and food security in most countries of Asia. Before, the 1950s prior to the green revolution, there was no agricultural growth; no off-farm employment growth and no income growth in China (Sebby, 2010). International Food Policy Research Institute (2009) reported that the rapid manner that the food security was achieved was truly historic, and it brought poverty to substantially low levels and spiralled economic growth in many Asian countries (Hazel, 2009). But it also taught scientists and policy-makers some important lessons for the future. The Green revolution was anchored on institutional reforms, market liberalization and investment in Agriculture (IFPRI, 2009).

The levels of public investment needed to launch and sustain the Green Revolution were impressive. Asian countries not only invested heavily to launch their Green Revolution, but continued to invest in agriculture to sustain the gains that were achieved. On average, Asian

countries were spending 15.4 percent of their total government spending on agriculture by 1972 and they doubled the real value of their agricultural expenditures by 1985.

Figure 2.1: Investments in Agriculture from 1972 to 1990.



(Source: FAO, 1996)

In Africa, Some of the development policies within the continental context include NEPAD and its related programmes such as CAADP and APRM. On the regional context, members of heads of state in West Africa (ECOWAS) adopted a regional agricultural policy (ECOWAP) on 19th January 2005 to steer agrarian activities within the sub-region. At the national level, the first food and agricultural policy developed in recent times is (FASDEP I & II). One of the critical strategies that had been implemented over the years to ensure food security by increasing domestic production of food and cash crops is the implementation of fertilizer subsidy programmes (MoFA, 2015). Moreover, the comprehensive programme dubbed Planting for Food and Jobs launched in 2017 is also one of the critical strategies to modernize agriculture in Ghana.

2.4: Some Agricultural Policies in Ghana

This section examines some critical policies and programmes that have been implemented, as well as those being implemented, to boost the agricultural economy in Ghana. These include the Food and Agricultural Sector Development Policy (FASDEP), the Medium-term Agricultural Sector Investment Plan (METASIP), input subsidy programmes, and programmes in the agricultural extension sub-sector.

2.4.1: Food and Agricultural Sector Development Policy (FASDEP)

FASDEP I was developed in 2002, under the Ministry of Food and Agriculture (MoFA) to provide a framework for modernizing the agricultural sector and using it transform the rural conditions. It was the first comprehensive policy of the government of Ghana aimed at strengthening the private sector as an engine of growth. The primary focus of FASDEP I was the modernization agricultural, to serve as a spur for rural economic transformation. However, Poverty and Social Impact Analysis concluded that FASDEP I could not achieve the desired results due to some significant limitations. Some of the challenges of FASDEP I included; improper definition of "poor smallholder farmer" within an environment where there is limited access to credit and technology, poor infrastructure, and limited access to input and output markets. Another key reason that could be ascribed to the failure of FASDEP I was that the process by which MoFA was to stimulate a response from other Metropolitan, Municipal and District Assemblies (MMDAs) for interventions, that fell outside the domain of MoFA, was not well specified (MoFA, 2007). These, among other reasons, incited a review of FASDEP I in 2007 to FASDEP II, that spanned from 2007 to 2015. The review of FASDEP I had seven pillars. These included human resource development, technology development and

dissemination, infrastructure development, promotion of specific commodities for markets, improved to financial services, crosscutting issues (e.g. gender, land, etc.) and implementation framework. Thus, FASDEP II was developed as a long-term policy objective of the government regarding the development of the agricultural sector to ensure that the stakeholders in the industry are well positioned to take advantage of the evolving opportunities within the sector.

2.4.2: Medium Term Agricultural Sector Implementation Plan (METASIP)

The METASIP was a medium-term investment plan which sought to make the country food secured by 2015 (MoFA, 2010). METASIP was to increase investment in agriculture to at least ten percent of the national budgetary allocation in line with the Maputo declaration in 2003. The ten percent investment in agriculture was aimed at inducing growth in GDP by 6%. Thus, METASIP provided an integrated investment framework to support growth in the agricultural sector, rural development and food security (MoFA, 2007). The METASIP was intended to implement the six programmes outlined in FASDEP II. These were; Food security and the readiness for emergency occurrences, increasing farm incomes, achieving market competitiveness through regional, continental and international integration, sustainable land management and environmental conservation, fostering better institutional coordination and leveraging on science and technology in food and agriculture development (MoFA, 2007). The METASIP was expected to make a significant contribution to achieving the targets of the MDGs of the United Nations.

2.4.3: Fertilizer Subsidy Policy

Agricultural transformation largely depends on productivity. However, African soils have been documented as one of the poorest in the world due to long years of unsustainable mining

(African Union [AU], 2006). Every year, an equivalent of $4 billion worth of soil nutrients is lost in Africa, thereby weakening its ability to sustain plant life (Fearon et al., 2015). Given the depleted nature of African soils coupled with poor farm management practices, there is no doubt that significant increase in the application of fertilizers is a necessary condition to replenish and maintain the fertility level to boost productivity. These losses, which are invariably estimated to range from 30% to 80% of achievable crop yields, does not only pose a threat to especially household and national food security needs of the country, but also reduces the income levels of food crop farmers (MoFA, 2013). However, farmers in Africa, and for that matter, Ghana, are not able to afford to buy and apply fertilizer on their farm lands because of cost implications or unavailability of the input. For instance, Mokwunye (2012) reported that the cost of fertilizer in Sub-Saharan Africa is the most expensive in the world. Aside from the cost and physical unavailability of the input, farmers may not use it because of their inability to perceive the benefits of fertilizer utilization (Druilhe and Barreiro Hurlé, 2012). Thus, while African soil nutrients are depleting, fertilizer utilization is low, making it one of the poorest in the world with an application rate of about 7kg/ha compared with more than 150kg/ha in Asia (Druilhe and Barreiro-Hurlé, 2012). Under such circumstances, one of the ways to address such market failures and provide incentives for farmers to increase fertilizer application rate and boost crop productivity is through subsidy programmes. Many countries (e.g., Kenya, Tanzania, Malawi, and Zambia) in Sub-Saharan Africa embarked on large-scale subsidy programmes from the 1960s through the late 1980s in an attempt to boost crop productivity, particularly food crops (Dorward, 2009). Under these programmes, smallholder farmers were supplied with farm inputs at controlled prices, as well as heavily subsidized credits. Though these programmes succeeded in increasing farm inputs utilization and boosting agricultural productivity in many cases, they

were prone to high inefficiencies arising from high administrative costs and political manipulations (Banful, 2010). Hence, these subsidy programmes were discontinued, and inputs market liberalized as part of the structural adjustment process (Crawford et al. 2006). The Structural Adjustment Programme (SAP) and market liberalization in the 1980s and 1990s led to the suspension of fertilizer subsidy programmes in Africa, including Ghana. However, with the subsequent effect of low production, declining soil fertility, and rising food insecurity, the fertilizer subsidy programmes were revived as a significant tool to reverse the increasing gap between biological and actual agricultural productivity on the African continent. Hence, the organization of the Africa Fertilizer Summit in Abuja in 2006 to address the situation. The Summit led to the "Abuja Declaration on Fertilizer for Green Revolution". The declaration was for member states to resolve to increase fertilizer application to 50 kg/ha by 2015 (AU, 2006). To achieve this, a smart subsidy was proposed where 10% of the country's national budget allocated to agriculture was to be invested in fertilizer subsidy to increase productivity by 6% or more. With the subsequent effect of low production, declining soil fertility, and rising food insecurity, fertilizer subsidy programmes were revived as a significant tool to reverse the increasing gap between biological and actual agricultural productivity on the African continent. For African countries where fertilizer subsidy has been implemented, the impacts on yield vary from one country to another. For instance, Druilhe and Barreiro-Hurlé (2012) analysed differences in average yields of selected crops between pre-subsidy period (1995-2007) and post-subsidy period (2008-2010) and observed that Ghana, Mali, Senegal, Zambia, Rwanda and Malawi had significant increase in targeted crops. According Druilhe and Barreiro-Hurlé (2012), fertilizer subsidy in Ghana resorted in an increased in the yields of maize, sorghum and millet and that of Mali recorded an increase in rice, maize and cotton produce. A research by Wiredu et al. (2015)

showed that fertilizer subsidy policies have positive relation with agricultural land productivity, but a reduction in labour productivity because more family labour was used in weeding and harvesting. The above observations are in line with the success story of some countries that have implemented similar programmes and achieved more significant results (Morris et al., 2007) and Kato and Greeley (2016). Though Dorward et al. (2010) indicated that farm input support programme introduced in Malawi resorted in an increase of maize yield by about 54% in 2008/09, Messina et al. (2017) findings failed to support this claim. The differences in the findings resulted from the different sources of data". Also, before and after analyses showed that while maize, millet and sorghum yields increased in Nigeria, rice yield decreased. Burkina recorded a decrease in maize yield. As a result, the government of Ghana brought back a fertilizer subsidy programme in a form a vouchers scheme, in July 2008. This programme was intended to aim was to make seedlings fertilizer affordable and accessible to smallholders, who mostly suffer external price shocks. This will boost production and productivity, reduce food insecurity and improve standards in the rural communities. The subsidy programme was expected to boost the fertilizer application rate to at least 50kg/ha by the end of 2015 as recommended by the Abuja summit. The programme started with 600,000 bags of 50kg fertilizer at a subsidized cost of $15 million, where farmers obtained subsidy through an acquisition of fertilizer-specific and/or region-specific voucher (Banful, 2009). Table 1 report a summary of the investment made in the fertilizer subsidy for the period 2008–2012.

Table 2.1: Annual quantity and cost of fertilizer subsidy programme in Ghana (2008–2012)

Year of Distribution	2008	2009	2010	2011	2012	Total
Total Quantity ('000'tons)	43.2	72.8	91.2	176.3	173.8	557.3
Cost of Subsidy (GH¢)	20, 654	34, 400	30,002	78,746	117, 437	202, 493

Source: SRID, MoFA 2013

Available records indicate that there was no fertilizer subsidy programme in 2014. However, at the beginning of the year 2015, another fertilizer subsidy was launched, involving all types of compound fertilizer and urea as the two main types of fertilizer in the subsidy programme. This was again within the national development agenda to promote the agricultural sector to positively change the structure of the economy. For the compound fertilizer valued at GH¢115 per 50kg, the government subsidy absorbed GH¢26.00, pegging the selling price to farmers at GH¢89, representing 22.6%% in price reduction. For urea, there was a price reduction of GH¢21 bringing the price per 50kg from GH¢105 to GH¢86, representing 20% in price reduction. 13 There are reports that this was a massive investment in a fertilizer subsidy programme, and that it was one of the most liberal fertilizer subsidy programmes in South Sahara Africa, with local private enterprises engaged in the input supply, distribution and retailing (Baltzer and Hansen 2012). However, there were some challenges with the implementation. There were reports of hoarding even by farmers and some politicians at the district level who had no intention or capacity to use the fertilizer (Baltzer and Hansen 2012). Since the programme was announced in advance, farmers postponed the purchase of their input in anticipation of the subsidy. However, the fertilizer arrived at community levels very late to benefit the major season in the southern

part of the country and plantings in the northern regions, which significantly reduced its effectiveness. A study conducted by Yawson et al., (2010) reported many other implementation challenges that adversely affected the smooth running of Ghana's fertilizer subsidy programme. These included the availability of inputs at the right time, lack of technical support and extension advice on Good Agronomic Practices during the implementation stage. There have also been the issues regarding the sustainability of the subsidy programmes over the years. Table 1 indicates that the annual cost of subsidy increased from GH¢ 20.6 million in 2008 to GH¢ 117.4 million in 2012, representing about 468%.1 This situation has been experienced in many other African countries, such as Malawi, putting enormous fiscal pressure on the national budget, thereby, leading to an array of implementation challenges such as diversions, displacements and market distortions (Chinsinga 2008; Druilhe& Barreiro-Hurle 2012). Moreover, some researchers have argued that, in a perfectly competitive market, subsidies are less efficient in transferring incomes to farm households leading to welfare loses (Crawford et al., 2006; Filipski and Taylor 2011). This is because, apart from the programme being so expensive, it distorts input markets leading to abuse of the usage, and also ends up benefiting the wrong people. Thus, how much of the subsidized amounts get to the intended farmers as against how much ends up in private pockets is yet to be addressed.

2.4.4: Youth in Agriculture Programme (YIAP)

There is compelling evidence of an ageing farmer population in Ghana which must be addressed to create sustainable agricultural production (MoFA, 2011). Young people play a critical role in sustaining agricultural sector productivity. However, there is growing disinterest in the agricultural sector from the young people globally (Phyo, 2018).

The YIAP programme was designed by the Ghana government to motivate the youth to take up farming, generate income and help in improving food security. More specifically, the YIAP is expected to contribute to the six components of food security and emergency preparedness namely; Nutrition, Diversification, food storage/distribution, early warning system, irrigation, water management and mechanization services (MoFA, 2016). The YIAP supports interested and selected youth by providing them with the necessary inputs which they could otherwise not afford.

The need for youth involvement in farming and related agriculture sector activities is a logical requirement for increasing and sustaining productivity gains in most areas of the world. The irony is that the proportion of youth engaged in farming is smaller than the older/aged population in Ghana and the rest of Africa. ISSER (2015) reports that the proportion of the active population (15 years and older) working in the sector has reduced from 55 percent in 2005/2006 to 45 percent in 2012/2013. This situation is arguably bad for the future of agriculture in Ghana unless deliberate measures are put in place to correct it. This problem appears widespread in Africa. The average age of a farmer in Nigeria is 47 years and life expectancy at 47-50 years (NBS 2008, Oboh et al., 2009). In Ghana, the average of a farmer is 55 years, and life expectancy is 55-60 years (MoFA, 2010).

2.4.5: Agriculture Extension Policies

Agricultural extension services have been one of the critical routes for increasing productivity and production. Agricultural extension has long been used to enable farmers to obtain the necessary information and know how that can improve their lives and food security situation through increased farm productivity and efficiency. Thus, agricultural extension programmes have served as one of the many avenues to addressing poverty and food insecurity in the rural

areas. This is because of the support systems that guarantee technology transfer and adult knowledge and information acquisition. Farmers get woven into this agricultural knowledge and information system (Christoplos & Kidd, 2000: 11). The Food and Agricultural Organization (FAO, 2010) defines extension as a system where farmers are helped with the knowledge, technology and the information for the better functioning in their farming and agricultural occupation. This definition suggests that extension service delivery is to make agriculture and its related activities more efficient and effective to meet the needs of the rural poor. Agricultural extension programmes can also be regarded as a tool to safeguard the quality of agricultural products. Bonye et al., (2012) argued that extension provides a source of information on new technologies for farming communities which, when adopted, can 1 Inflation rate for Ghana was 7.1% in 2012, decreasing from 16.5% in 2008. 14 improve production, incomes, and standards of living, and has been promoted in Ghana's agriculture since the nineteenth century.

2.4.5.1: Agriculture Extension Service delivery system in Ghana

In Ghana, MoFA is the primary provider of agricultural extension services, though not the sole provider. Even though MoFA extension agents are found in all the districts, their number is inadequate. MoFA extension programmes are supervised by National Extension Directorate. The Agricultural Extension Service delivery in Ghana has undergone a paradigm shift, from the approach of export commodity development before independence in 1957, to the stimulation of local food crop production and productivity to ensure food security and improve rural livelihood (Hill 1970). The primary goal of this shift in focus was to modernize the Ghanaian farming practices, transfer technology and resources, and train agents that will address the extension needs of smallholder farmers (Donkoh, 1989). In 1978, a ministry-based general extension

approach was adopted by the government of Ghana. However, this approach was view as a top-down and pro-urban and believed to pay more attention to progressive farmers, while neglecting poor and peasant farmers, and hence was intensively criticised. This was due to some challenges such as lack of coordination amongst various departments within MoFA, poor management of the extension approach, lack of well-trained workers and poor infrastructure, etc. In response to these criticisms, a review was made to the general extension system, and a new approach called Unified Extension System (UES) was adopted in 1992 with funding support from World Bank. Aside from the UES, Ghana's extension service delivery has been subjected to other reforms such as; decentralization of extension management and delivery adopted in 1997; merger of cocoa extension with the general extension of the MoFA in 2000, and the increased function of the private sector in financing and providing extension services. The following subheadings discuss some of the reforms about food production.

2.4.6: Ghana Seed Policy

Agricultural production depends heavily on inputs. Seed is a critical input in agricultural modernisation and productivity improvement. The importance of seed to any crop-based production system cannot be overemphasized, as it is the fundamental source of life for any crop production system (Etwire et al., 2013). There are two types of seed systems in Ghana, namely, the formal system and the traditional or informal system. Unlike the traditional or informal seed system, the formal seed system is regulated, and the seeds are improved. According to Maredia et al. (1999) and Louwaars & De Boef (2012), over 80% of smallholder 16 farmers in Africa obtain seeds from the informal sector by using their own seeds, do seed exchange or purchase of seeds from the local market. The Ghana seed sector has evolved. The Plants and Fertilizer Act enacted in 2010 spells out how the seed sector should be organised. The Act covers processes

related to seed in the establishment of the National Seed Council and not introduced production and certification policy. The law aimed at sanitising the activities of producers of improved crop seed ultimately has the objective to improve agricultural production in the country through the introduction and adoption of modern technologies. Through the implementation of the law, it was expected that the seed industry will be stimulated to produce reliable seeds for farmers to increase agricultural production. Alongside the Plants and Fertilizer Act (2010), MoFA developed the National Seed Policy which aims at supporting the private sector to champion the production and supply of improved seeds to farmers. The National Seed Policy clearly states the regulatory framework for variety release, licensing of varieties, accreditation of seed quality control functions, and simplification of seed import and export processes (GoG, 2013). This framework is to help streamline seed production in Ghana. However, as shown in Table 2, certified seed production for maize, rice, soybean, cowpea, sorghum and groundnut has been fluctuating over the years. This can be explained by the fact that seed production is usually supported by projects, and the donor funding for most of these projects are not continuous.

Despite the efforts of government in developing a formal seed distribution system and create a conducive environment of seed commercialization, one cannot deny the fact that these efforts have not yielded impact. It is a well-known fact that while some of the producers of improved certified seeds are registered and regulated, many others who are unregistered produce seeds with low germination rates when farmers have planted them on their fields.

Table 2.2: Quantity (MT) of certified seed produced in Ghana from 2001 to 2011

Year	Maize	Rice	Soybean	Cowpea	Sorghum	Groundnut
2001	996	732	87	34	7	–
2002	1,498	457	190	28	15	–
2003	1,341	407	179	27	36	9
2004	1,356	495	–	47	36	9
2005	2,035	233	356	30	14	63
2006	1,672	516	218	35	5	23
2007	1,677	344	92	57	1	3
2008	2,474	550	154	38	5	7
2009	3,789	2,378	295	16	6	9
2010	4,424	3,906	354	27	5	18
2011	2,670	2,367	189	14	1	_

Source: Plant Protection and Regulatory Services Department

Despite the efforts and arrangements of government to have sufficient improved and certified seeds produced, improved seed availability and affordability for farmers is still very low. This has resulted in a situation of excess demand over supply leading to higher prices beyond the reach of the farmers. These issues are not the seed issues facing farmers. Farmers have difficulties in obtaining good quality improved and certified seeds due to inadequate selling centres.

2.5: Theoretical Considerations

This study conceives of food security in terms of Amartya Sen's entitlements approach. The Planting for Food and Jobs programme is expected to increase the entitlement endowments of smallholder farmers, and therefore guarantee their food security. The Entitlements theory was a master piece in providing a framework for famine analysis. Before this work, the prevailing understanding was that famine was a result of the shortage of food. Sen (1981) explained

"Starvation is the characteristic of some people not having enough food to eat. It is not the characteristic of there being not enough food to eat".

This publication was a major revolution in the philosophy and analytic framework of food security. Sen described food insecurity as; a person will starve if the resources possessed are not adequate to engender food stability. Also, a person is reduced to starvation if some change occurs either in his endowments (alienation of land, loss of labour power, ill health) or in his exchange entitlement (for example, fall in wages, rise in food prices, loss of employment, drop in price of foods he produces). (Sen1995,56)

This theory is relevant to the study because the theory identifies entitlement failures as the cause of starvation, famine and by extension food insecurity. The logic model of the planting for food and jobs is to make inputs such as quality seeds, fertilizer, extension services and ready markets (endowments) available to the smallholder farmer. The supply of these inputs will augment the endowment set for higher crop yields, to guarantee food security.

Some challenges with the use of this theory acknowledged by Sen himself include: starvation by choice, disease-driven rather than starvation-driven mortality, ambiguities in entitlement specification and extra-legal entitlement transfers. Some scholars have sought to weaken the theory conceptually and empirically by pointing to its methodological individualism and by its fixation of economic aspects of famine above sociopolitical determinants (Devereux, 2001).

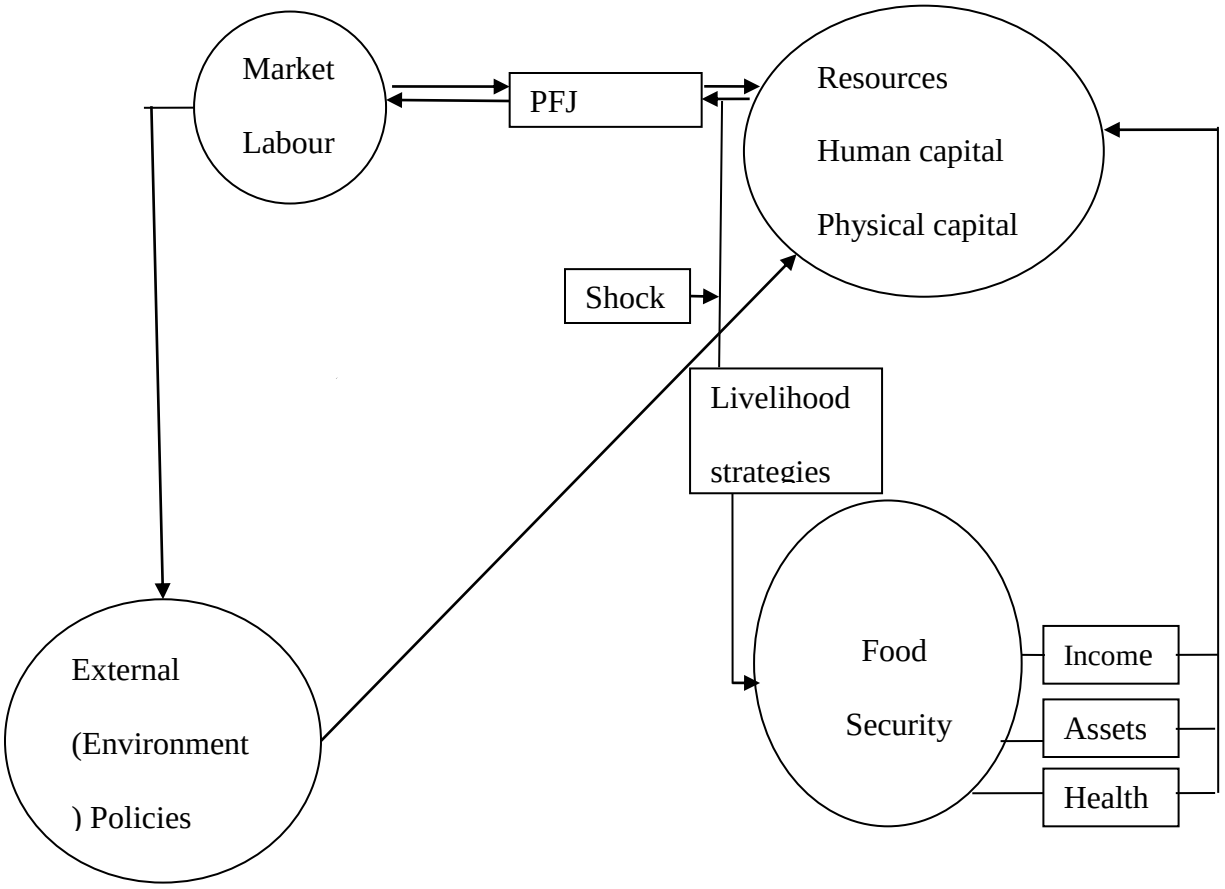
Conceptual Framework

2.6: The Household Economic Portfolio Model (HEPM)

This model was used in Habte (2016), where micro finance impact in rural Eritrea was studied. It was originally developed by chen (2001). It describes the nature of interactivity among resources, economic activities and the exchanges between them. Resources which

include human, physical and financial resources are deployed in the production process. These resources are enhanced by the institutional and policy environment (PFJ incentives). There are shocks out there as well as adaptation strategies by households. The powerful interaction between all, these sets of factors will lead to Food security. The model presents a continuum of links where economic activities are affected by resources and each effect becomes a cause generating further effects in a circumference of flows (Al-Al-Mamun, Adaikalam, Mazumder, and Wahab, 2011:12983; Dunn, 1996). The model considers the household, its economic activities and the larger society in order to understand the nature of exchanges. Therefore, in this study, it is assumed that PFJ affects household resources and household food security. The links between household activities and resources are illustrated in Figure below.

Figure 3.1: Household Economic Portfolio Model



Source (Based on Chen and Dunn, 2001 original model)

CHAPTER THREE

METHODS AND STUDY AREA

3.1: Introduction

This chapter is in two parts. The first part highlights the location and characteristics of the study area. The second part discusses the research methods and research design.

3.2: Wa West District

The Wa West District is found in the Upper West Region. The Upper West Region has nine districts. In 2004, the Wa West district was created through a parliamentary instrument (GSS, 2014). The district is located in the south western part of the region. On the equator, it is within Longitudes 40 Degrees North and 45 Degree North and Latitude 9 degree West and 32 Degree West. The district capital is Wechau (GSS, 2014). There are other major towns which constitute the area council namely: Vieri, Ga, Gurungu, and Dorimon (GSS, 2014). The district is sandwiched between Sawla-Tuna Kalba to the south, Wa Municipal to the east, Burkina Faso to the west and Nadowli to the north western angle (GSS, 2014).

Climate

The district like other in the guinea savannah zone has two seasons. They are; the rainy and the dry season. The rainy season spans from September to May, and the dry season starts in October and ends in April (GSS, 2014). The district has a single rainy, which is a characteristic feature of districts in that ecological zone (GSS, 2014). According to the Ghana Metrological Agency, average rainfall figures are within 840mm and 1400mm (GSS, 2014). Rainfall pattern in the district is erratic and this raises concerns about sustainable livelihoods. One other feature of the

district is the exposure to drought, and this condition has severe implications for agricultural productivity (GSS, 2014).

Soils fertility is generally not bad in the district. Crops like millet, maize, Guinea Corn, Yam, Cowpea, groundnuts, Soya beans etc. do well in that soil (GSS, 2014). Like other districts in Ghana, declining soil fertility is a growing concern. The atmospheric temperature in the district is normally between 20.5 degree Celsius and 45 degree Celsius (GSS, 2014).

Economy

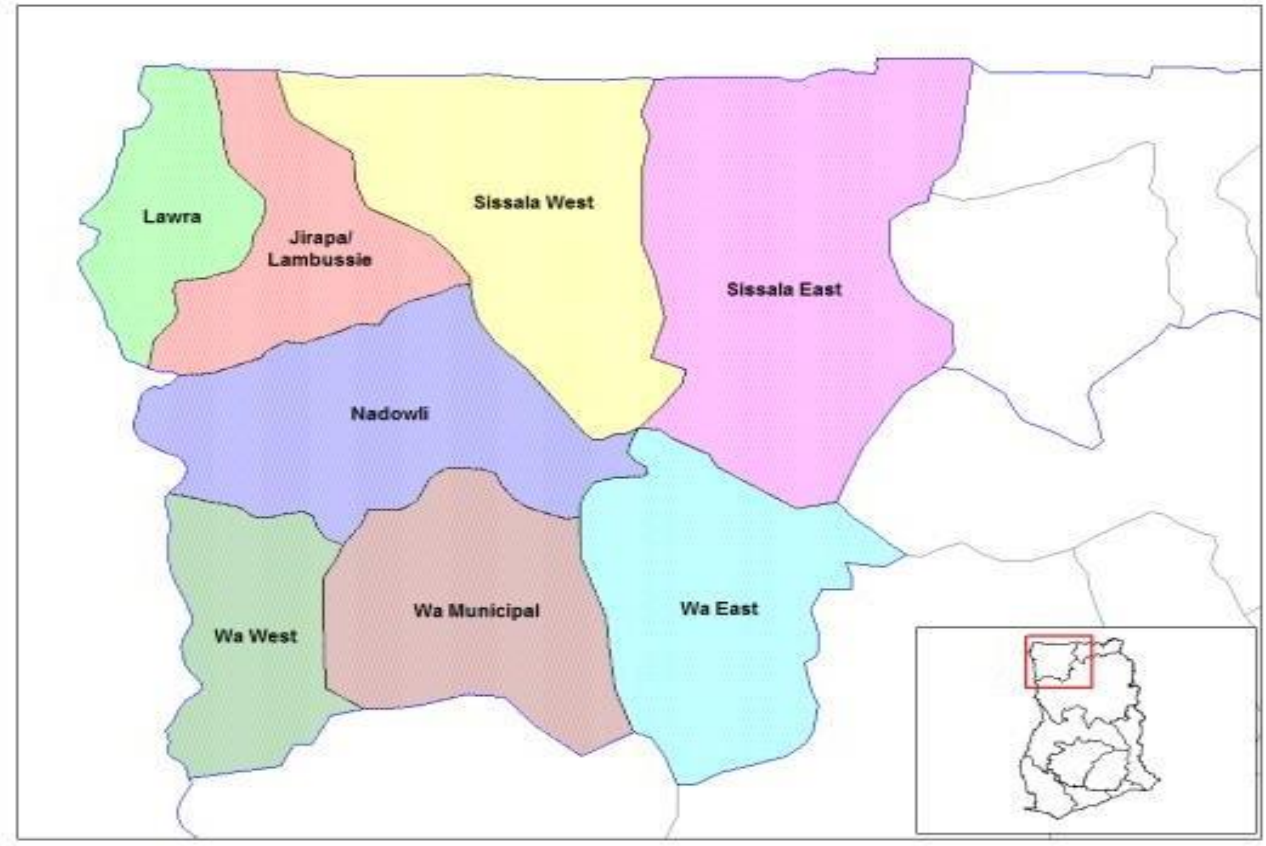
The district is 100% rural. The economy of the district is agricultural with over 90% of the population being subsistent farmers. A few of the inhabitants engage in fishing in the nearby river 'Black Volta' and other water bodies. Other forms of trade like pito brewing, Shea butter making are mainly done by the womenfolk in these communities (GSS, 2014). Farming in the district is influenced by the climate and other ecological factors; the single rainy season is one of the main issues. There are two notable farm types; the distant or bush farms and the surrounding or compound farms (GSS, 2014). Farming in the district is a pure manual activity. Land is cleared with mainly hoe and cutlasses. Farmers rely on the less costly, easier and traditional ways in the management of soil fertility. This is through the use of use of household refuse, crop residue and animal dung. Beside the traditional cereals and legumes, Tobacco is planted by some farmers but on a very small scale (GSS, 2014).

Population

The district has a population of about 81,348, with 49.5% males and 50.6% females (GSS, 2014). There is high pressure on resources like land for its agricultural and other economic potentials. The rate at which the population increases is said to be 1.7% per anum (GSS,

2014). Waala and Dagaabas are some of the ethnic groups in the district but the major ethnic group is the Brefor with dialectical variations, there are other minor tribes such as the Hausa, Asante's (GSS, 2014).

Figure 1.1: District Map Of Wa West District



(**Source: http:www.ghanadistricts.com)**

3.3: Research Design

The study adopts a mixed methods research. This research technique is the approach where the quantitative and qualitative techniques are employed in one study. (Onwuegbuzie, 2004).To quote Esterby-Smith, Thorpe and Jackson (2012, p.63) "using the approach of mixed methods in research has the advantage of providing deeper insights that explain issues,

increase reliability and demonstrates generalizability". The mixed method made it possible for the qualitative and quantitative methods to complement each other. Its logic to discovery includes the use of inductive methods (or discovery of patterns), deduction (testing of theories and hypotheses), and abduction (Waal, 2001). The quantitative design used a quasi-experimental design called Propensity Score Matching. This technique was used to estimate the impact of the Planting for Food and Jobs Policy on the smallholder farmer's food security. Quasi-experimental methods can be used retrospectively, i.e., after the intervention has taken place. This is the reason why it is most suitable for this study.

While the survey is ideal for quantification and generalization, the use of interviews complements the inherent weakness of quantification. Qualitative interview and focus group discussion is well suited when the goal is to gain an in-depth understanding of a phenomenon (Creswell, 2009). This goal corresponds with the objective of this study. Again, a qualitative investigation allows perceptions, meaning, and conceptualizations which are often downplayed or least valued when quantitative approaches are used. Qualitative research methods focus on discovering and understanding the experiences, perspectives, and thoughts of participants by exploring meaning, purpose, or reality towards understanding the lived worlds of people (Baxter & Jack, 2008; Patton & Cochran, 2002; Whitehead, 2002) through case studies, ethnographic work, and interviews. The method has an interpretive epistemological underpinning and is rooted in a constructivist ontology emphasizing the presence of multiple "truths" that are socially constructed and can be uncovered through an inductive approach. Qualitative methods emphasis the meanings people give to phenomena around them, and thus reveal the thoughts and individual perceptions about structure and processes and how they influence life options and outcomes. Qualitative compliments the

weakness of quantification by addressing why and how society and institutions act and react in a particular form and shape than another. Rather than living in a world 48 in which the causes and outcomes are clear and the definitions of success are unproblematic, we live in a world in which causality is unclear and the evaluation of outcomes are ambiguous. In short, a qualitative approach enables us to understand the participant's construction of everyday reality through their experiences, knowledge, interpretation, and agency and how power relations are socially defined.

3.4: Data Description and Sampling

Table 3.1: A Distribution of the Sample Communities

Distribution of Sample Communities

Communities	Participants	Non Participants	Total
Nyuoli	5	18	23
Ga	5	20	25
Taanvaare	5	15	20
Wechau	7	17	15
Vieri	5	15	20
Dorimon	5	15	20
Varempare	5	15	20
Yeliyire	5	12	17
Diesi	5	10	15
Tanina	5	15	20
Dole	5	15	20
Gonbile	5	10	15
Tanpieni	5	13	18
Lassie	5	15	20
Total	62	138	200

(Source: Field Survey, 2019)

Data used in the study came from 200 households in 14 sampled communities. A sampling frame of 55 villages was acquired and the systematic sampling technique was used. A survey questionnaire was completed by the sampled households. Ten (10) key informant interviews and two (2) focus group discussions were conducted. While the survey is ideal for quantification and generalization, the use of interviews complements the inherent weakness of quantification.

3.5: Empirical Procedure and Measurement of Variables

Planting for Food and Jobs (PFJ) Policy provides inputs (certified seeds and fertilizers), good agronomic training (extension), and a platform for marketing of outputs. This could lead to increase in production, higher incomes and guarantee food security. Two indicators of household food security were used; which captured food availability and food access. These are Calorie Intake and dietary diversity.

Dependent Variable

3.6: Food Security Index

In assessing the impact of the Planting for Food and Jobs policy on smallholder farmer food security, a food security index (FSI) is created. An FSI is used to determine the food security status of each household based on the Recommended Daily Calorie Required (RDCR) approach (R. O Bababtunde et al, 2007).

The Food Security Index is given by:

$$L_i = \frac{F_i}{R_i}$$

Where L_i stands for Food Security Index for the x^{th} household; F_i is the Daily Calorie Intake

of the household; R_i is the Recommended Daily Calorie Required (RDCR).

Households with daily calorie intake >1 are deemed food secure whiles those with daily calorie intake < 1 are food insecure.

Table 3.2: Daily Recommended Energy intake

Age Group (Years)	Energy Requirement	Conversion Scale
Children (<6years)	1150	0.4
Children (6-18 years	2250	0.7
Adult	2900	1.0

Table 3.3: Energy content in Foods (Calorie/kg)

Food Crops	Calorie Levels
Maize	3590
Millet	3410
Rice	3640
Beans	3380
Groundnut	3320
Yam	297.5

3.7: Dietary Diversity Score

The dietary diversity of households refers to the food groups consumed over a period of time (FAO, 2018). It is one of the best measures of food access widely used in food security analysis (FAO, 2018).Dietary diversity is used in this study to complement the calorie intake measure of food security. This is important because DDS reflects the different foods a household is exposed to (FAO, 2010). In computing the DDS, FAO (2018) has a standard list of 12 foods which cut across the various nutritional layers: Roots and tubers, Sugar/honey Vegetables, Fish and seafood, Fruits, Meat/poultry/ offal Pulses, /legumes/nuts, Cereals, Eggs Milk and milk products, Oil/fats, Miscellaneous.

Each food group is assigned a score of 1 (if consumed) or 0 (if not consumed). The household score will range from 0 to 12 and is equal to the total number of food groups consumed by the household (FAO, 2018).

Explanatory Variables

Table 3.4: Definition and measurement of variables

Variables	Definition and Measurements
Sex	(1 = Male; 0 = Female)
Age	Age in years
Ever attended school	(1= Yes, 0= No)
Married	(1= Married, Single=0)
HHSize	Continuous
Village Group	(1=Yes, 0= No)
Credit	(1= Yes, 0= No)
Farm Size	Continuous
Road	(1=Good, 2= Bad)
Cattle	(1= Yes, 0= No)
Sheep	(1= Yes, 0= No)
Goat	(1= Yes, 0= No)
Poultry	(1= Yes, 0= No)
Gfowl	(1= Yes, 0= No)
Bicycle	(1= Yes, 0= No)
Motorbicycle	(1= Yes, 0= No)

Age: The age of the smallholder farmer in years is expected to have an impact on his labour supply and food production. Young people are expected to cultivate large farm size from the old people. Babatundeet, al. (2007) found that age of the household head had a correlation with labour supply.

Education: Education is an investment in intellect as well as social capital. This can impact positively on household ability to take informed production and proper nutritional decisions. The education of the smallholder farmer is expected to influence their food security status.

Highly educated farmers therefore are likely to be food secure than uneducated farmers.

Household Size: Household size is the number of individuals a household contains. House hold refers to people sharing a common living arrangements (Apwah, 2014).This is measured by the number of adult individual members of the household. Since food requirements increase with the number of persons in the household, food insecurity is likely to be higher for larger household than household with a smaller number (Tsegey, 2009).

Monthly Income: The total earnings of household in a month from all available sources combined constitute the monthly income. The income is expected to boost household productive potential. Smallholder farmers earning a higher monthly income is expected to be food secure.

Farm Size: Farm size is the farming land cultivated by the household, commonly measured in acres. Higher production levels are associated with larger farms and the vice versa. It is thus expected that household with larger farm size are more likely to cultivate more than those that cultivate a small farm size.

Village Group Membership (VGM): Corporations are vehicles of development in the rural areas. Belonging to such groups increases various farmers support avenues. Access to corporative loans for instance depends on membership of such groups.

Road Network: the road network ensures easy mobility to and from the production and marketing site**.**

Access to loan: access to loan will increase the resources a farmer needs for production.

Assets stock: the assets pool of farming equipments and livestock determines the wealth

status of the farmer and are important for production.

3.8: Method of Analysis

3.8.1. Treatment Effects and Propensity Scores

Propensity score is the contingent likelihood of being part of the PFJ programme given characteristics before participation:

$$P(R_i) = Pr[M_i = [R_i] = E|M_i|R_i]; p\ (Z_i) = F\{h|Z_i\} \ldots\ldots 2$$

Where *M= (0, 1)* is the indicator of PFJ participation and *R* is a vector of characteristics before participation, and *F* can be a normal or logistic cumulative distribution. The propensity score can be predicted with logistic or probit models.

Below is the formula with logit regression, where treatment is regressed on the variables.

$$\frac{P_{(t_1=1)}}{1-P_{(t1=1)}} = \beta_\theta + \beta_1 X_{1i} + \beta_n XX_{ni} + ei \ldots\ldots 3$$

This equation creates a logarithm of the odds; the probability of being in one group is separated by the probability of being in the alternative group. Rosenbaum and Rubin (1985a) suggest using the logit of the predicted probability of the propensity score because the distribution approximates to normal (Rosenbaum & Rubin, 1985).

The predicted propensity score can then be used to estimate treatment effects. The most common treatment effect in the evaluation literature include the Average Treatment Effects (ATE) which captures the treatment effects for the whole sample, Average Treatment Effects on the Treated (ATT) or the participation effects, and the Average Treatment Effects on the untreated (ATU). Becker and Ichino indicate that the parameter of interest in the estimation of the propensity score is the Average Treatment Effect on the Treated (ATT). However

under the assumption of unconfoundness, Titus (2007) and Millimet and Tchernis (2008) point out that an appropriate approach of evaluating policy relevant outcomes in a counterfactual framework is to examine not only the ATT but also the ATU which captures effect of treatment on individuals who do not participate.

Given the propensity score $p(Z_i)$, the three effects are evaluated as:

$ATE = E[E(Y_i^1 L_i = 1, p(Z_i) - E\{Y_i^0 | L_i = 0, P(Z_i)\}]$……..……..4

ATT= $E[E(Y_i^1 L_i = 1, p(Z_i) - E\{Y_i^0 | L_i = 0, P(Z_i)\}][(L_i = 1]$…….5

ATU= $E[E(Y_i^1 L_i = 1, p(Z_i) - E\{Y_i^0 | L_i = 0, P(Z_i)\}]\ [(L_i = 0]$…….6

Where Y_i^1 and Y_i^0 are conditional outcomes.

3.8.2: Matching Algorithm

A number of matching algorithms have been suggested in the literature to match participants and non-participants of similar propensity scores (Owusu, Awudu & Abdul Rahman, 2011). In this study, the nearest neighbour matching was used. It is a widely used method. The units are placed in a random order and the samples matched according to the closeness of their propensity scores.

For robust estimation of the propensity score, a balancing property which is a function of the potentially relevant covariates must be satisfied.

Another relevant assumption for robust estimation of the p score is to satisfy the common support condition (Heckman et al, 1999). This requires that individuals with the same covariates Z should have positive probabilities of being both participants and non-participants in the PFJ, implying that individuals in the common support region can actually participate in all states.

3.8.3: Modelling the Planting for Food and Jobs Participation

A smallholder farmer's decision to either participate in the PFJ programme is assumed to be the result of a number of factors related to the farmer's endowments and vulnerabilities. What can be observed is whether farmer participated or not. This study postulates that a smallholder farmer will only engage in the programme when more output is gained. The study collected data on participating and non-participating smallholder farmers and examined their difference on the various household characteristics, farm characteristics and assets. Thus, Logistic regression model is employed to estimate the probability to participate and generate estimates of propensity scores. The PFJ Model is illustrated below.

$$PFJ_i = \beta_0 + \beta_1 Sex + \beta_2 Age + \beta_3 Educ + \beta_4 Mstatus + \beta_5 HHsize + \beta_6 Group + \beta_7 Credit + \beta_8 Asset + \beta_9 Road + \beta_{10} Income + \beta_{11} Fmsize + \varepsilon$$

Where *Sex* takes on the value 1 if farmer is male, zero if female; *Age* is age of farmer; *Educ* is farmer's educational attainment; *Mstatus* is marital status of the farmer, which takes the value 1 if married and zero if single; *HHSize* is the household size of the farmer; *Group* takes the value 1 if farmer belongs to any association and zero if otherwise; *Credit* takes the value 1 if farmer have access to credit, zero if no access; *Assets* takes the value of 1 if farmer owns assets, zero if no assets; *Road* takes the value of 1 if road condition is good, zero if bad; *Income* is the income a farmer makes in a month; *Farm Size* is the total acres of land a farmer cultivates. The dependent variable *PFJ* and takes the value 1, and zero otherwise.

The propensity score matching design must be able to determine that the intervention and comparison groups are equivalent on observable characteristics. Identifying and selecting potentially-relevant covariates becomes critical. Many studies have shown that the covariates

selected can have a substantial impact on the performance of the propensity score (Heckman, Ichimura, Smith, &Todd, 1998; Lechner, 1999; Smith & Todd, 2005).

I have also taken note of the relationship between the number of covariates selected and the sample size. (Howarter, 2015) has indicated that with limitations in sample size, comes a limitation in the number of possible covariates to include in the matching design. In small samples, it may not be possible to include a very large set of variables in the procedure. With limited covariates, Brookhart and colleagues (2006) suggest further, that the priority should be given to variables that are believed to be related to the outcome, as choosing variables with low relation to the outcome and high relation to the treatment will result in increased variance. Though Specific strategies of covariate selection are yet to be determined when working with limited sample sizes, the strategy adopted in this study was the selection of the following covariates: gender, education level, age, number of children and access to credit. etc.

3.8.4: Qualitative Data Analysis

Interviews constitute an effective data collection tool that reveals deep structures which survey methods may gloss over. A total of 10 key informant interviews were conducted. These interviews sought to understand the nature of on farm jobs that have been created, and also the level of youth involvement with the programme. Two (2) focus group discussions were conducted to understand the experiences of farmers with the programme. Data from interviews and focus group discussions were transcribed and analysed using Invivo software. Various themes such as reasons for the low level of youth participation in the programme, nature of jobs created by the PFJ programme, experiences of farmers with the programme

etc. were outlined. Quotations were used to make emphasis on certain comments and also validate the results of the survey (Kemp-Benedict et al., 2009).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1: Introduction

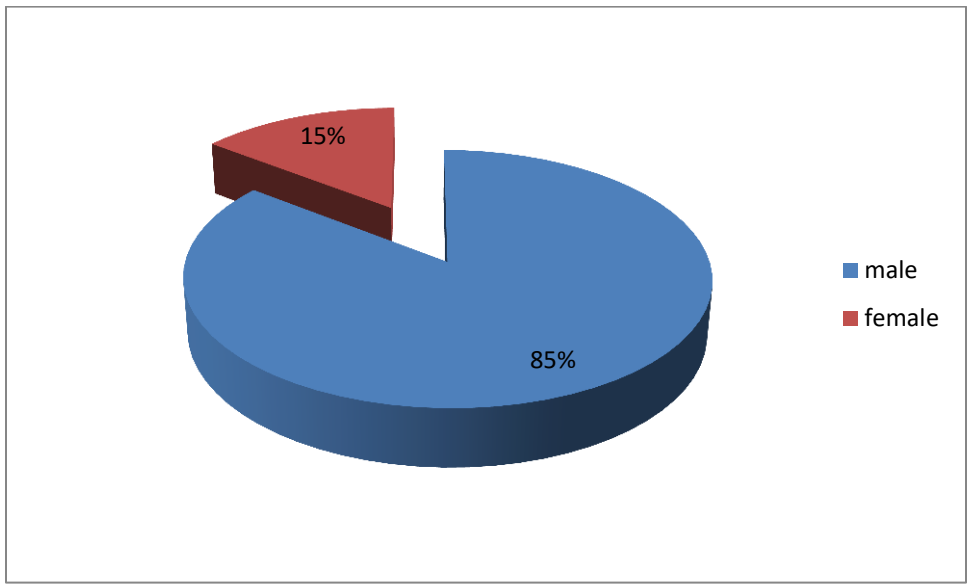
A presentation of the evidence of the impact of the Planting for Food Jobs programme on food security in the Wa-West District is contained in this section. It also presents the food security status of sampled households with the use of recommended daily calorie intake of 2900 Kcal, and the dietary diversity score (DDS) using 12 food groups.

4.2: Demographic Characteristics

The demographic characteristics on sex, age, education attained have been discussed in the subsequent pages.

The sex distribution according to the data obtained and presented in Table 4.1 revealed that majority of the smallholder farmers interviewed in the study area were males, with a percentage of 85 percent. These respondents were also the heads of their households. it is evident that the Wa West District has majority of its smallholder farmers being males. This can be due to the traditions and beliefs in northern Ghana which regards men as breadwinners of families.

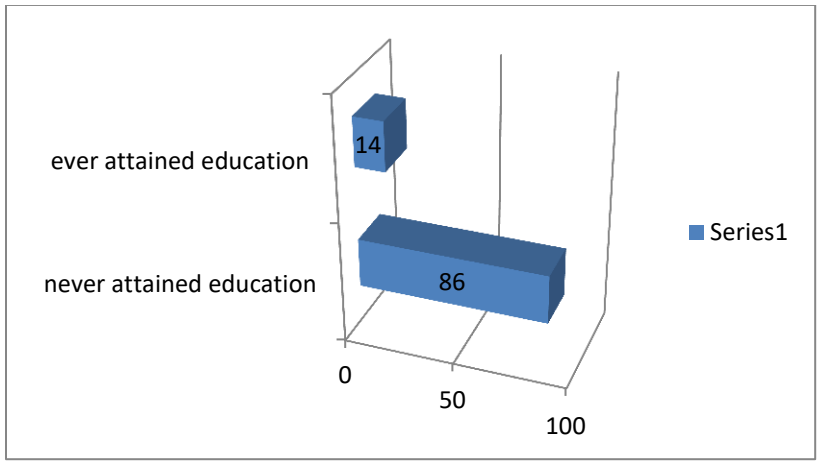
Figure 4.1: Sex of Respondents



Field survey, (2019)

Table 4.1 reveals that 86 percent had no formal education. This implies a high illiteracy rate among the smallholder farmers in the study area. This is in harmony with a report by GSS, (2012) that indicated that there is high illiteracy rate among majority of the population in the Northern region of Ghana.

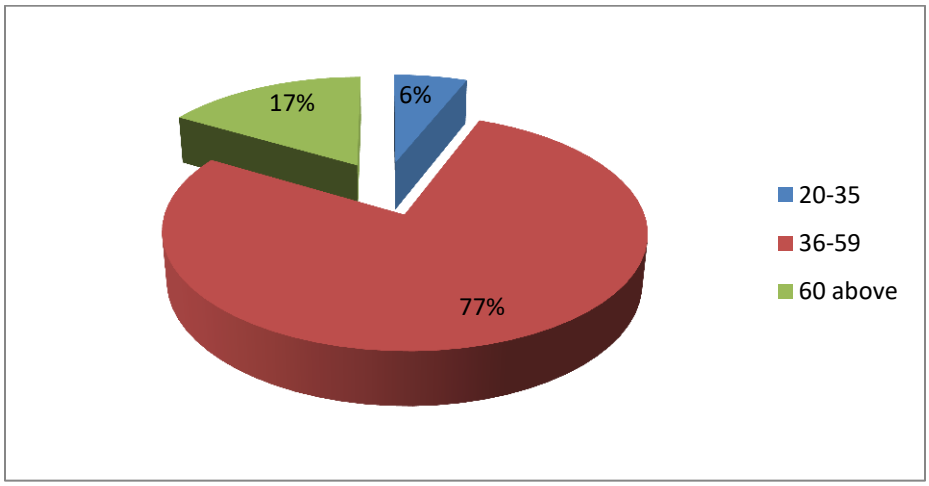
Figure 4.2: Distribution of the Smallholder Farmers' Educational Levels



(Source: Field survey, 2019)

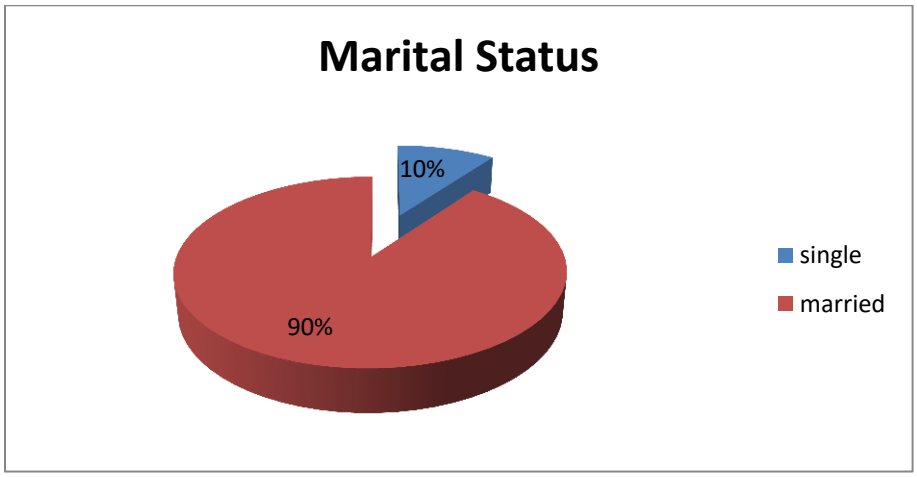
The mean age of smallholder farmers in the study area is 50.29. This is related to (MoFA, 2010) report, which puts the average age of farmers in Ghana as 55 years. The situation denotes an ageing smallholder farmer population in the study area.

Figure: 4.3 Age Distribution of Smallholder Farmers



(Source: Field survey, 2019)

From the data, the majority of respondents are married, about 90% of smallholder farmers in the study area are married whereas 10% are not married**.**



(Source: Field survey, 2019).

Table 4.1: Variables of participation in Planting for Food and Jobs (PFJ)

	Participants		Non-participants		Difference
	Mean	SD	Mean	SD	in mean
Calorie intake (kcal)	3.19	0.79	1.93	0.57	1.26***
Food insecurity	0.24	0.43	0.83	0.37	–0.59***
Dietary Diversity Score	7.45	1.07	6.01	1.14	1.44***
Sex	0.95	0.22	0.81	0.39	0.14***
Age	43.3	12.4	54.3	10.7	–11.0***
Education	0.02	0.13	0.20	0.40	–0.18***
Marital status	0.92	0.27	0.83	0.38	0.09*
Household size	13.7	4.8	12.0	3.9	1.69***
Community Association	0.79	0.41	0.36	0.48	0.43***
Loan access	0.11	0.32	0.03	0.17	0.08***
Road network	0.35	0.48	0.37	0.48	–0.01
Farm size	3.60	1.00	3.28	1.45	0.31
Income monthly	57.9	24.2	26.9	12.3	30.9***
Cattle	0.19	0.40	0.00	0.00	0.19***
Sheep	0.29	0.46	0.17	0.37	0.12**
Goat	0.39	0.49	0.32	0.47	0.07
Poultry	0.44	0.50	0.25	0.43	0.19***
GFowl	0.42	0.50	0.24	0.43	0.18***
Asset	0.61	0.13	0.57	0.13	0.04**

(Source: Stata Output, 2019)

From table 4.1, the calorie intake and dietary diversity reports a higher mean for the participants in the programme. Food insecurity has a lower mean for the participants. This indicates that participants are more food secured. This finding will only make sense when the treatment effect of the three outcome indicators are ascertained and compared. Attribution to the intervention cannot be gotten here yet. However, what it does suggest for all other variables is that, they have means which are statistically significant except for marital status, road network, farm size and goats.

4.3: Determinants of Participation

A logit regression model was used to calculate the probability of participation in the

programme. A number of eleven covariates were regressed on the dependent variable to get the effects and level of significance.

The model was statistically significant at 0.000. Variables such as; Age, education, capital access, monthly income, infrastructure, community group association and assets were significant. These factors therefore influenced participation in the programme.

Table 4.2: Factors influencing Participation in the Programme

Coef.	Std. Err.		z	P>z	95% Conf. Interval	
Age	-.0635012	.0179957	-3.53	0.000	-.0987721	-.0282303
sex	1.596015	2.282998	0.70	0.484	-2.878578	6.070609
Education	-1.459564	.6355902	-2.30	0.022	-2.705298	-.2138299
household_size	.0027544	.0423213	0.07	0.948	-.0801939	0857026
farm_size	.1120089	.1500595	0.75	0.455	-.1821023	.4061202
capital_access	2.356146	.7307078	3.22	0.001	.9239848	3.788307
Income_monthly	.0940761	.0192724	4.88	0.000	.0563029	.1318494
infrastructure	-1.164993	.459801	-2.53	0.011	-2.066187	-.2637997
marital_status	.5742719	2.138907	0.27	0.788	-3.617909	4.766452
Community_Group	1.834876	.4394022	4.18	0.000	.9736635	2.696089
Asset	3.119248	1.459875	2.14	0.033	.2579451	5.980551

Number of obs = 199
LR chi2(15) = 175.69
Prob> chi2 = 0.0000
Pseudo R2 = 0.7163

4.4: Treatment Effects

The treatment effects were computed to determine the effect of the PFJ programme on the outcome indicators of calorie intake and dietary diversity. An additional category called food

insecurity has been added to shed more light on the analysis.

Table 4.3: Treatment effects and sensitivity estimates.

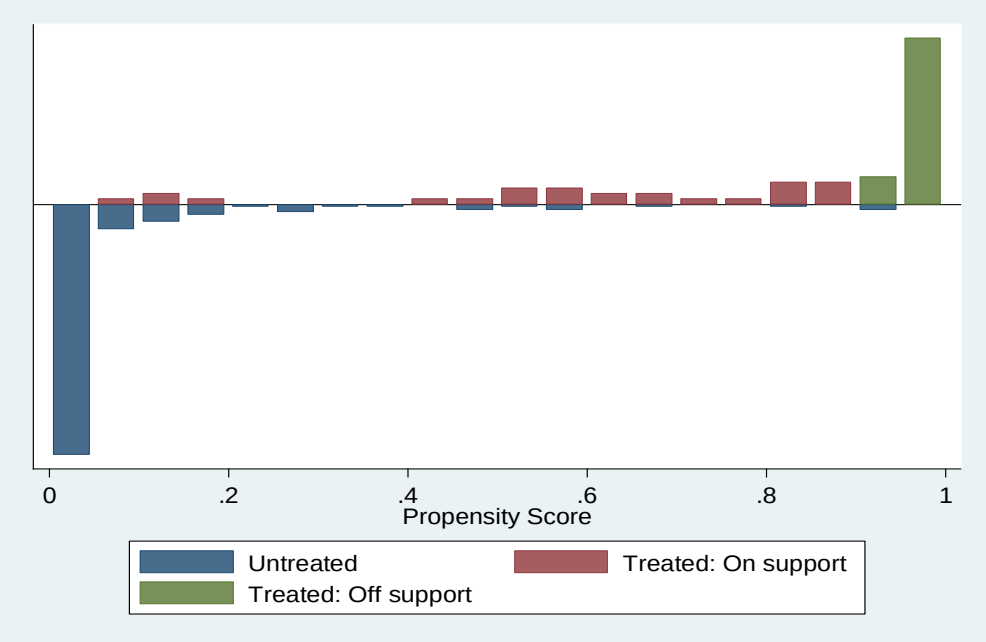
			Treated		Control	
Outcome Indicators	ATT	Critical value	On support	Off support	on support	off support
Calorie (thousand)	1.674 (–0.35)	12.19	50	—	138	—
Food insecurity	–0.66 (–0.31)	–2.15	62	—	138	—
Dietary diversity score	1.21 (–0.82)	1.48	62	—	138	—

The Average treatment effects for calorie intake is 1.67, indicating that a farmer who participates in the programme will have an additional calorie intake of 1.67. ATT on food insecurity is -0.66, implying that participating in the programme reduces your food insecurity. In other words, participation improves your food security situation. The next outcome indicator from the Table 4.7 is the dietary diversity score. The ATT dietary diversity score is 1.21, suggesting that dietary diversity increases with participation.

4.5: Common Support Region

The condition of common support and the balancing property has been satisfied in the regression model**.** The importance of the region of common support in propensity score analysis is the strength it provides to the matching results.

Figure 4.1: Overlap Structure for Unmatched and Matched samples..



Source: Authors' computation using STATA

The red and blue portions in the graph above are the areas where there existed overlap in the two samples after matching was done. The red portion belongs to the treated sample whiles the blue portion belonged to the untreated sample. The green portion was eliminated because no match was found for it.

4.6: Level of Youth Involvement in the Programme

The data shows a strong evidence of low involvement of youth in farming generally and the Planting for Food and Jobs Programme (PFJ) in particular.

Table 4.4: Participants and Non Participants Age Structure

Age Group	Participants		Non Participants	
	N=62	%	N=138	%
20-35	7	11	5	4
36-59	46	74	97	70
60 Above	9	15	36	26

(Author field survey, 2019)

Table 4.4 shows that 11% of farmers in the participant group were young people. Though this figure is higher than the non-participant group, it represented the lowest in the participant group. This situation is parallel to the interventions goal of encouraging the youth to take farming as a business and make a living out of it.

4.7: Why the Low Level of Youth Participation

Some reasons have been found as the causes for the low participation of young people in farming and the planting for food and jobs Programme in particular.

From the interviews, negative perceptions and the fact that farming is unprofitable were identified as some reasons why farming is unattractive to the youth in the study area.

4.7.1: Negative perceptions

It is a popular belief that many young people in Ghana have certain perceptions about farming. Perceptions which push them away from farming related activities. Back in my early school days, people who studied agriculture were seen as local and un-progressive.

A young man from Dorimon narrates:

> "*My father is a farmer and he wants me to go school and not also be a farmer. I don't like to farm because have you seen a farmer becoming a president before? My father is doing a good thing because people who come from school are respected more than those who are just farmers. I will like to be a high person and people will like me everywhere I go"*

This narration is supported by a study where lack of respect giving to farmers had a strong relation with their interest in modern jobs (Sumberg, Yeboah, Flynn, & Anyidoho, 2017). The issue of respect and social status demonstrated by the above narration is a common belief that pushes young people away from farming. It is therefore critical that policy makers develop a strategy to deal with the many negative perceptions about farming.

4.7.2: Farming is Unprofitable

The issue of profitability; which is tied to productivity is a real concern in many farming communities in the study area. Many farmers worry about poor disease control and post-harvest storage issues. The fact that rains are irregular, and no alternative irrigation systems to fall on. These problems according to them make farming very risky and unprofitable.

A farmer from Vieri narrates:

> *"My father and mother are both farming very hard and we don't have enough money to buy things we need. I am also married now and my father has asked me to go to Kumasi and find some work there to support them and my new family. Here in our village you can farm three acres of*

groundnuts and get only half an acre to cultivate you know this way we are losing the little money we used"

4.8: The Nature of Jobs Created by the PFJ Programme

The planting for Food and Jobs programme has created a vibrant labour market for farmers. Many smallholder farmers interviewed indicated that they have not only increased the acres of land they farm but has also made farming a full time activity.

A farmer recounts:

"*I use to farm one acre of beans in previous years. Now that Agriculture officers bring fertilizers and seeds to my village at cheap prices, I have added two acres of maize. This is a good thing for my family because I get more money from farming and we also have more food to eat"*

The PFJ is reported to have distributed 4,400 metric tonnes of certified improved seeds and 296,000 metric tonnes of fertilizers to 202,000 selected farmers in 2017. Maize, Rice, Sorghum, Soya were produced in the following respective quantities; 485,000, 179,000 33,400 9, and 750 metric tonnes. These products at the farm-gate generated income for the beneficiary farmers worth some GH¢ 1.2 billion (DGN, 2018).

In 2018, the PFJ recorded further progress with the investments and subsequent outputs. A total of 660,000 farmers benefitted from the Programme (MoFA, 2018). Ghana exported excess foodstuffs such as maize, sorghum, cowpea, plantain and yam to Burkina Faso and Cote d'Ivoire. It is expected that at the end of 2019, the program performance will build on the earlier successes chalked.

Interviews conducted have revealed that the Planting for Food and Jobs has created intensive farm activities, which has resulted in the use of more hands/extra farm labour by the small holder farmers. Farmers in the Wa West District rely on manual labour because of their economic circumstances. They are unable to afford the cost of mechanized farming.

A farmer tells me in an interview

> *"I need people to clear the land and help me plant. Also during harvesting, I need people to help me in harvesting and transport them to my storage facility. In between planting and harvesting he added, I contract people to help clear competing weeds from time to time*".

Another farmer tells me this in answering my question of whether there has been any change in the persons hired to help in the farm previously and after joining the PFJ?

> "*I use to hire five people to help me during harvest for my two acre maize and cowpea farm. When I joined the programme last year, I cultivated six bags of maize which was an increase from my normal 2 to 3 bags of maize in previous years. It was required that i increase the people to help me harvest, so I added four more persons. I would have loved to add many more people if I had the money to pay them. So the program has helped me get more bags of maize than I previously had*"

It is evident from the in-depth interviews that there has been an increase in on-farm employment due to the planting for food and jobs Programme. These jobs have been listed to include: expansion of farm lands, labour to clear farm lands for planting, sowing of seeds on the field, clearing of weeds, harvesting of crops, transporting of farm outputs among others.

These interviews do not establish the veracity of the job creations figures published by the Ministry of Food and Agriculture of the government of Ghana. It only seeks to determine the nature of on-farm jobs created district.

4.9: Experiences of Farmers with the Programme

4.9.1: Who gets to participate

According to the policy document, participation in the programme is voluntary. There are existing conditions that a farmer must satisfy before he/she can be part of the programme. A farmer must register by supplying his bio-data to the officer in charge. The farmer then pays half of the cost for the subsidized inputs (fertilizer and feed). This process then qualifies the farmer to extension/agronomic support and marketing opportunities.

This process to participate in the programme is a source of discrimination to start with. These communities have significant differences among the inhabitants. Many inhabitants are poor and food insecure. They resort to sale of family lands to cope with livelihood stress. It is important that policy recognizes these complex factors in how interventions are designed to benefit the majority.

Discussions with farmers suggest that all farmers are interested in the programme because of the benefits. There are however more farmers outside the programme than there are in. This again raises the question of entry barriers. NPK and UREA which cost GHC75 and GHC70 respectively is a big deal for farmers in the study area. Additionally, a farmer may be able to afford just one which is insufficient for a three acres farm. The role of public policy in meeting the needs of the poor and needy farmers becomes critical.

4.9.2: Increasing productivity

Many farmers hold the view that the PFJ policy is a timely intervention and is a good one. The impact on their produce is enormous. It has doubled, tripled and in some cases quadrupled their crop yields. Many farmers assert that prior to the Planting for Food and Jobs Programme, they used to harvest on a small scale. The low yields recorded were as a result of a myriad of factors and challenges. These ranged from poor soil fertility, quality of seedlings, disease and pest attacks, little or no capital to farm, irrigation challenges among others.

Farmers express joy about the Planting for Food and Jobs Programme, because the inputs (fertilizer, seedlings) supplied deals with the porosity of the soil, and at the same time relieves them of the capital needed to procure inputs for farming. The quality of seeds supplied tend to be better at resisting drought and other unfavourable farming conditions, and helps to produce more in terms of quantity. The PFJ has created the situation where more labour is used in the farm, making farming truly intensive for them.

Apart from the positive role of the PFJ in improving food security, a focus group with farmers revealed certain practices which can undermine the policy and its future impacts. Issues ranging from the late supply of inputs, repayment mode, PFJ becoming costly to adopt were raised.

4.9.3: Late Supply of Inputs

Farmers receiving inputs a month or two after the start of rains was cited by farmers as one of the major experiences which negatively affects their production.

A discussant said:

> "*If you want your crops to do well you must plant with the rains or just before the rains start. In our community, the agric officer brought the inputs late and i also sat down and was waiting…. and this affected my harvest*"

This concern must be situated within the context of the study area where rainfall pattern is uni-modal (once a year). This complete reliance on rain fed agriculture by farmers makes them gauge the rains and begin planting. In the case were input are received late into the farming season, there is less quantity of rainfall received to make for a good harvest.

Yaro and Teye (2017) corroborates this finding when they reported that inputs for the Planting for Food and Jobs were not supplied at the right time, which led them to conclude that the policy was practically weak.

4.9.4: Mode of Repayment

The mode of repayment is considered a way of dealing with the issues of equity in public policy implementation. In these communities, farmers welcomed the policy when they understood that repayment for inputs supplied was to come after they had harvested and sold their produce.

Many farmers raised concerns about the mode of repayment. They have indicated that the absence of a ready market and the ever-present reality of post-harvest losses make it difficult to easily convert produce into cash. The demand for cash repayments puts pressure on farmers who end up selling produce at giveaway prices. The call of farmers is for government to agree to repayment in kind. This call is also in line with what government planned on paper prior to the start of the PFJ programme.

4.9.5: Programme Becoming Costly to Adopt

The focus group discussions revealed that most farmers are unhappy about the changing eligibility criteria, which to them is insensitive to their conditions. The programme is becoming costly to adopt, and most farmers complain about low incomes and how benefiting from the PFJ is on the decline.

In 2017, farmers were required to pay 50% of the subsidized cost of inputs and pay the remaining 50% after they had harvested. In 2018, farmers who participated in the programme had to pay 75% upfront for the cost of inputs before receiving inputs, whiles the remaining 25% was paid after harvest. In 2019, the farmers are to pay the full amount for the cost of inputs before they can be supplied. This situation is not sensitive to poor farmers in these communities.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1: Introduction

This chapter presents the main findings of the study and key conclusions drawn from the research. It also provides policy recommendations that could improve implementation of the Planting for Food and Jobs Policy in the Wa West District.

5.2: Summary

The study sought to empirically asses and analyse the impact of the PFJ policy on smallholder farmer food security in the Wa West District. In particular, the study addressed the following objectives; (1) Examined the smallholder farmer food security situation under the PFJ (2) Described the nature of jobs created among smallholder farmers (3) Explored the level of youth participation in the programme; (4) Explored the experiences of farmers with the programme.

The literature reviewed highlighted the increasing trend of food insecurity globally. It emphasizes how acute this situation is in Africa. The literature further suggested the important role input subsidy policies in Africa and other parts of the world have played in addressing low productivity of farmers and food insecurity in general. It draws the direct and indirect linkages with economic growth and poverty reduction.

The study relied on Amartya Sen's entitlements theory to explain food insecurity among smallholder farmers. This theory identifies entitlement failures as the cause of starvation and famine. The study further adopted the Household Economic Portfolio Model (HEPM) as an analytical tool to show how human, capital and institutional resources flows and interacts

within farmers households. These resources are seen as endowments that ensure sustainable livelihoods.

The study used a cross sectional survey data collected through surveys, interviews and focus group discussions. A total of 200 households comprising of 62 in a participant group and 138 in a non-participant group were selected through a systematic random sampling procedure.
A propensity score matching technique was employed to empirically estimate the impact of participating in the programme on food security. The propensity scores were estimated using a logit regression based on observable explanatory variables which included socio-demographic characteristics, programme and village variablesthat determined household participation in the PFJ. The nearest neighbour algorithm was used to match units in the two groups. The balancing property was satisfied with some overlap or common support region.

5.3: Conclusion

The study concludes that the PFJ programme has a significant impact on food security in the Wa West District. The average treatment on the treated (ATT) on Calorie intake, Food Insecurity and the dietary diversity is 1.67, -0.66 and 1.21 respectively. All the outcome indicators show that food security increases when a farmer participates in the programme**.**

The kinds of on-farm jobs created were in the form of extra labour for clearing farm lands, planting, weeding, harvesting and transporting produce to storage sites. These were the additional forms of labour, and also the source of employment in these communities.

The level of youth participation in the programme was visibly low. The negative perceptions about farming and its unprofitable nature were some of the reasons cited by young people in

the study area.

Farmers generally commend the role of the intervention in boosting their crop productivity and guaranteeing their food security. Other concerns related to the delays in input supply, the fact that the Planting for Food Jobs is becoming costly to adopt and the changing mode of repayments. An important concern also related to the barriers to joining the programme that many poor farmers face.

Despite enhancing food security, a large number of farmers continued to be food insecure because their conditions seem incompatible with the requirements for participation. This raises the question of equity in public policy implementation.

Additionally, the development of food security interventions does not take into account the conditions specific in some communities. This is important if the poor are to benefit from these policy interventions. Evidence from this study suggests that all the communities in the district were treated as one and equal. This ignored the identity, power and associational differences that exist.

5.4: Recommendations

In the long term, a broader conversation and the generation of ideas on how to tackle food security across the different ecological zones is needed. An interrogation of the specific policy tools for specific context must require a collaboration of the various fields and disciplines.

In the short term however, government through its agencies must engage in means testing and proper targeting of poor farmers because the less powerful and less connected appear to be

cut off from benefiting from the programme.

Furthermore, farming in the rural communities must be made profitable through investment in irrigation, post-harvest management, road networks, and market linkages among others. This will attract many young people to aspire to farming.

Government should not discontinue the intervention after four (4) years, because it will threaten the food security of the farmers. Until proper storage and marketing of farm produce is achieved in these communities, government should continue to offer farmers input subsidies.

The mode of repayment by farmers should include the option of repayment in kind. This will relieve farmers from the difficulties they go through in marketing their produce.

Prospective research should be directed at: ways to open the policy and political space to ensure equity and justice in policy implementation.

1.5: Limitations of Study

After discussing the data and presenting the findings, the following limitations must be acknowledged:

- The study cannot be generalized across the whole country because it was conducted in the Wa West District.
- The model used could only account for the observed factors. It is therefore a source of bias in the estimation of the treatment effects.
- Persons who were not currently part of the PFJ programme were treated as non-participants. In other words, if you joined the programme but dropped in subsequent years, you are treated as a control unit. This could overestimate the impact of the

programme.

REFERENCES

Darfour, B., & Rosentrater, K. A. (2016).Agriculture and Food Security in Ghana Agriculture and Food Security in Ghana. https://doi.org/10.13031/aim.20162460507,FAO. (2017). Regional overview of food security in Africa, 2015–2016.

Kwarase, P. K. (2017). Analysing Trends in Agricultural Output in Ghana 1995-2015: Underlying causes and options for sustainable growth, (May).

Quaye, W. (2008) Food Security Situation in Northern Ghana, Coping Strategies and Related Constraints. African Journal of Agriculture Research, 3, 334-342.

Mango, N., Zamasiya, B., Makate, C., Nyikahadzoi, K., &Siziba, S. (2014). Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. Development Southern Africa, 31(4), 625–640. https: //doi.org /10.1080 /0376 835 X. 2014.911694.

OECD/FAO. (2016). Agriculture in Sub-Saharan Africa : Prospects and challenges. OECD-FAO Agricultural Outlook 2016-2025, 181(November 1947), 39. https: //doi .org/ 10.1787 /888933381341.

Economist Intelligence Unit (2015) Global Food Security Index Report. Accessed 30 September 2015.http://foodsecurityindex.eiu.com/Home/DownloadResource?fileName=EIU%20Global %20Food%20Security%20Inde x%20 %202015%20 Findings %20%26%20 Methodology. pdf

Plan, A. (2017). “Planting for food and Job”Activity Plan, 1–13.

Plan, S., Implementation, F. O. R., & Food, M. O. F. (2017). PLANTING FOR FOOD AND JOBS.

Smith, L. C., El, A. E., & Jensen, H. H. (2000).The geography and causes of food insecurity in developing countries, 22. Banful, A. B. (2010) Market-Smart? Lessons from the 2008 and 2009 Fertilizer Subsidy Programs in

Ghana. GSSP Notes, the newsletter of the Ghana Strategy Support Program, IFPRI

Banful, A. B. (2009) Operational Details of the 2008 Fertilizer Subsidy in Ghana – Preliminary Report. GSSP Background Paper 18, Washington D.C., IFPRI.

State, T. (2015). The State of Food and Agriculture 2015 (SOFA): Social Protection and Agriculture: Breaking the Cycle of Rural Poverty.

Food and Agricultural Organization (2013) The State of Food Insecurity in the World. The Multiple Dimensions of Food Security. Food and Agriculture Organization of the United Nations, Rome

State, T., & Insecurity, F. (2014). The State of Food Insecurity in the World.

Randolph, J. J., Falbe, K., Manuel, A. K., & Balloun, J. L. (2014). A step-by-step guide to propensity score matching in R. Practical Assessment, Research & Evaluation, 18, 1-6.

Rosenbaum, P. R., & Rubin, D. B. (1984).Reducing bias in observational studies using sub-classification on the propensity score. Journal of the American Statistical Association, 79, 516-524

World Food Programme, & Ministry of Food and Agriculture, G. (2012).Comprehensive Food Security & Vulnerability Analysis. Focus on Northern Ghana, (May). Retrieved from http://documents.wfp.org/stellent/groups/public/documents/ena/wfp257009.pdf

Harris, H., & Horst, S. J. (2016).A Brief Guide to Decisions at Each Step of the Propensity Score Matching Process - Practical Assessment, Research & Evaluation, 21(4). Retrieved from https://pareonline.net/getvn.asp?v=21&n=4

FAO. (2014). Food and agricultural organization of United nations; Contribution to the 2014 United Nations Economic and Social Council (ECOSOC) Integration Segment, 1–7. Retrieved from www.fao.org

International Food Policy Research Institute, IFPRI (1999) Choosing Outcome Indicators of Household Food Security. Technical Guide 7, Washington DC.

Danso-abbeam, G. (2018). Assessment of Implementation of Planting for Food and Jobs (Pfj) Agriculture Policy Support, (September). https://doi.org/10.13140/RG.2.2.34030.46402.

Ghana Statistical Service (2008) Ghana Living Standards Survey, Report of the Fifth Round (GLSS 5). Accra

Brooks, J., Croppenstedt, A., Aggrey-fynn, E., Brooks, J., Croppenstedt, A., &Aggrey-fynn, E. (2007).Distortions to Agricultural Incentives in Ghana Distortions to Agricultural Incentives in Ghana.

Burchi, F., & De Muro, P. (2016). From food availability to nutritional capabilities: Advancing food security analysis. Food Policy, 60, 10–19. https://doi.org/10.1016/j.foodpol.2015.03.008

Osarfo, D., Senadza, B. and Nketiah-Amponsah, E. (2016) The Impact of Nonfarm Activities on Rural Farm Household Income and Food Security in the Upper East and Upper West Regions of Ghana. Theoretical Economics Letters, 6, 388-400. http://dx.doi.org/10.4236/tel.2016.63043

Quaye, W. (2008). Food security situation in northern Ghana, coping strategies and related constraints. African Journal of Agricultural Research, 3(5), 334–342. Retrieved from http://www.academicjournals.org/AJAR

Solh, M., &Saxena, M. C. (Eds.).(2011). Food secuirty and climate chnage in dry areas.In International Conference, 1-4 February 2010. Aleppo

Alberto Zezza, L. T. (2010). Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. ElSevier , 265–273 .

Sebastian Levine, M. L.-R. (2016). Toward a food secure future: Ensuring food security for sustainable human development in Sub-Saharan Africa. Elsevier , 1-9

Ministry of Food and Agriculture. (2007). Agriculturall Extension Policy. Directorate of Agricultural Extension Services

USAID. (2017). Strenghening Land Reforms to Stimulate Private Sector Investment In Agriculture. Agriculture Policy Support Project

Yaro, J.A. 2004. Theorizing food insecurity: building a livelihood vulnerability framework for researching food insecurity. NorskGeografiskTidsskrift–Norwegian Journal ofGeography Vol. 58, 23–37. Oslo. ISSN 0029-1951.

Jan Hesselberg, J. A. (2006). An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. GeoJournal (2006) , 67:41–55.

Abdel Raouf Suleiman Bello, H. A. (2015). Attitudes of rural youth towards agriculture as an occupation: A case study from Sudan. International Journal of Development and Sustainability ISSN: 2186-8662 – www.isdsnet.com/ijds , Pages 415-424 ISDS Article ID: IJDS15022301.

James Sumberg, T. Y. (2017). Young people's perspectives on farming in Ghana: a Q study . Food Sec. , 9:151-161 DOI.

Gardner, Bruce L. (2002). American Agriculture in the Twentieth Century: How It Flourished and What It Cost. Harvard University Press. ISBN 0-674-00748-4.

Spitze, Robert G. F.; Harold G. Halcrow; Joyce E. Allen-Smith (1994). Food and Agricultural Policy.Mcgraw-Hill College.ISBN 0-07-025800-7.https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en

Effland, J. W. (2016). United States Agricultural Policy: Impacts and Evolution. IFPRI Discussion Paper , 01543.

Sebby, K. (2010). The Green Revolution of the 1960's and Its Impact on smallholder farmers in India. University of Nebraska - Lincoln@DigitalCommons@University of Nebraska - Lincoln .

Hazell, P. (2009). The Asian Green Revolution. IFPRI Discussion Paper 00199 , (www.ifpri.org/millionsfed).

Baltzer, K. and Hansen, H. (2012) Agriculture Input Subsidies in Sub-Saharan Africa. An Evaluation Study. Ministry of Foreign Affairs of Denmark, International Development Corporation.

Banful, A. B. (2009) Operational Details of the 2008 Fertilizer Subsidy in Ghana – Preliminary Report. GSSP Background Paper 18, Washington D.C., IFPRI.

Banful, A. B. (2010) Market-Smart? Lessons from the 2008 and 2009 Fertilizer Subsidy Programs in Ghana. GSSP Notes, the newsletter of the Ghana Strategy Support Program, IFPRI.

Chinsinga, B. (2011), Seeds and subsidies: The political economy of input programmes in Malawi, IDS Bulletin 42(4), Institute of Development Studies.

Christoplos, I., Kidd, A. (2000). Guide for Monitoring, Evaluation and Joint Analyses of Pluralistic Extension Support. Lindau: Neuchaˆtel Group; 2000.

Crawford, E. W., Jayne, T. S. and Valerie A. K. (2006) Alternative Approaches for Promoting Fertilizer Use in Africa. Agriculture and Rural Development Discussion Paper 22, Washington D.C., The World Bank.

Donkoh, F. (1989), The History of Agricultural Extension in Ghana, Internal Mimeo, MOFA, Accra.

Dorward, A. (2009) Rethinking Agricultural Input Subsidy Programmes in a Changing World.London,School of Oriental and African Studies.

Dorward, A., Chirwa, E. and Jayne, T. S. (2010) The Malawi Agricultural Input Subsidy Programme2005/6 to 2008/9 [Prepared for the World Bank African Success Stories]. Project Report.Washington D.C.: World Bank.

Etwire, P. M., Atokple, I. D. K., Buah, S. S. J. Abdulai, L. A., Karikari, A. S. and Asungre, P. (2013).Analysis of the seed system in Ghana.International Journal of Advance Agricultural Research.1(3013): 1-13.

Hill, P. (1970). The northern Ghanaian cattle trade.In P. Hill Studies in rural capitalism in West Africa. 80-140. Cambridge: Cambridge University Press.

Kato, K. and Greely, M. (2016). Agricultural input subsidy in Sub-Saharan Africa. Institute of Develoment Studies, Vol. 47, # 2.

Likert, R. (1932). A Technique for the Measurement of Attitudes. Archives of Psychology. Vol. 140: 1-55.

Louwaars N.P., & De Boef W.S. (2012). Integrated seed sector development in Africa: A conceptual framework for creating coherence between practices, programs, and policies. J. Crop Imp.26:39–59.

Maredia M., Howard J., Boughton D., Naseen A., Wanzala M. & Kajisa K. (1999). Increasing Seed System Efficiency in Africa: Concepts, Strategies and Issues. Michigan State University International Development Working Paper No. 77. Department of Agricultural Economics MSU East Lansing Michigan. Retrieved December 13, 2012. Available online at:http://www.aec.msu.edu/fs2/papers/idwp77.pdf. (Accessed on 16/12/2017)

Messina, J. P., Peter, B. G. and Snapp, S. S. (2016). Re-evaluating the Malawian Farm Input Subsidy Programme. Nature Plants, vol. 3, No. 17013 (2017)

MoFA (2016). Statistics, Research and Information Directorate (SRID), Ministry of Food and Agriculture, Accra, Ghana

Morris, M., Kelly, V. A., Kopicki, R., and Byerlee, D. **(**2007).Promoting Increased Fertilizer Use in Africa:

Wiredu, A.N.; Zeller, M. and Diagne, A. (2015) Impact of Fertilizer Subsidy on Land and Labor Productivity of Rice-Producing Households in Northern Ghana, Oxford: Centre for the Study of African Economies

Yawson, D. O., Armah, F. A., Afrifa, E. K. A. and Dadzie, S. K. N. (2010) Ghana's Fertilizer Subsidy Policy: Early Field Lessons from Farmers in the Central Region. Journal of Sustainable Development in Africa 12(3), pp.191-203.

Habte, Z (2016) Spatial market integration and price transmission for papaya markets in Ethiopia: Journal of Development and Agricultural Economics,Vol. 9(5), pp. 129-136, May 2017 DOI: 10.5897/JDAE2016.0777 http://www.academicjournals.org/JDAE

Appendix 1.

University of Ghana

Center for Social Policy Studies (CSPS)

QUESTIONNAIRE ON "AN ASSESSMENT OF THE IMPACT OF THE PLANTING FOR FOOD AND JOBS PROGRAMME ON THE FOOD SECURITY STATUS OF SMALLHOLDER FARMER IN THE WA WEST DISTRICT".

Good morning/afternoon Sir/Madam. Please my name is……I'm an interviewer from……in partner with a masters' student at the university of Ghana, Legon. We are conducting interviews in several local areas in your district.

You have been randomly/purposively selected to participate in a research study on the impact of the Planting for Food and Jobs programme on the food security status of the smallholder farmer in the Upper West Region.

The objective of this study is 1. Examine the small holder farmer food availability and accessibility situation under the programme 2. Describe the nature of jobs created 3.The level of youth involvement in the programme 4.The experiences of farmers with the intervention.

It is purely for academic purpose and if you agree to participate, you would be asked a number of questions within forty-five (45) minutes. Your views would be confidential, and will neither be linked to you in the analysis nor the findings.

0.1 Respondent ID..... 0.2 Date of interview (dd/mm/yy).....

0.3 Enumerator Name..... 0.4 Community.....

0.5 District..... 0.6**Control [ ] Experimental [ ]**

Contact:.....

SECTION A.

Background Information on Smallholder Farmer

1.Name of smallholder farmer…….....

2. Gender of smallholder farmer? 1. Male [ ] 2. Female [ ]

3. Age of respondent (smallholder farmer) ? .....Years

4. What is the highest level of schooling you have attained?

None [ ] P1 [ ] P2 [ ] P3 [ ] P4 [ ] P5 [ ] P6 [ ]

JHS 1 [ ] JHS 2 [ ] JHS 3 [ ] SHS 1 [ ] SHS 2 [ ] SHS 3 [ ]

NVTI [ ] O Level [ ] A Level [ ] Tertiary [ ] other [ ]

1 How much income do you earn/ spend in a month?.....

2 Do you belong to any village group? 1. Yes [ ] 2. No [ ]

3 Do you have access to any loan facility? 1. Yes [ ] 2. No [ ]

4 How will you rate the condition of roads in your community? 1. Yes [ ] 2. No [ ]

Information on household size, age of children and their educational status.

	Ages below 6	Ages 6-18	Ages18 above	Total
9. Size				
10. Schooling status				

PART THREE: Agricultural/Other Assets
Do you currently own any of the following assets? If Yes, please tick
Animal asset

		11.
Code	**Asset**	**Yes/No**
1	Cattle	
2	Sheep	
3	Goat	
4	Fowls	
5	Guinea fowls	

Farming Assets

		12.
Code	**Asset**	**Yes /No**
1	Hoe	
2	Cutlass	
3	Safety boots (wallentin boots)	
4	Knapsack sprayer	
5	Bicycle	
6	Motor bike	
7	Bullock plough	

8	Donkey cart	
9	Tricycle (motor king)	
10	Tractor	
11	Ceiling/standing fan	

Non- Farming Assets

		13.
Code	**Asset**	**Yes**
21	Radio	
22	Television	
23	Satellite dish	
24	Computer	
25	Commercial vehicle	
26	Private car	
27	Frigde	
28	Iron	
29	fan	
30	Cooking stove	
31	Wall clock	

DIETERY DIVERSITY

14. Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning,

Codes	Food group	Examples	YES=1 NO=0
1.	CEREALS	bread, noodles, biscuits, cookies or any other foods made from millet, sorghum, maize, rice, wheat local foods e.g. porridge or pastes or other locally available grains	

2	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + other locally available vitamin-A rich vegetables	
3	WHITE TUBERS AND ROOTS	white potatoes, white yams, cassava, or foods made from roots.	
4	DARK GREEN LEAFY VEGETABLES	sweet pepper, dark green/leafy vegetables, including wild ones + locally available vitamin-A rich leaves such as cassava leaves etc.	
5	OTHER VEGETABLES	other vegetables, including wild vegetables	
6	VITAMIN A RICH FRUITS	ripe mangoes, papayas + other locally available vitamin A rich fruits	
7	OTHER FRUITS	other fruits, including wild fruits	
8	ORGAN MEAT (IRON-RICH)	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
10	EGGS		
11	FISH	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	beans, peas, lentils, nuts, seeds or foods	

		made from these	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	oil, fats or butter added to food or used for cooking	
16	COFFEE/TEA	tea (black, green, herbal) or coffee	

CALORIE INTAKE

15. What is was your quantity of food intake in the last seven days for the following crops?

Crop	**Food Intake (Kg)**
Maize	
Rice	
Cowpea	
Sorghum	
Yam	
Bean	
Groundnuts	

Appendix 2.

INTERVIEW GUIDE

(GENERAL INFORMATION ON THE NATURE OF ON-FARM JOBS CREATED)

1. Do you normally hire labor for your farming?
2. What kind of labor do you normally hire? And why?
3. Can you mention the various activities that the hired labor undertakes?
4. Did you hire extra labor this year?
5. What kind of extra labor do you use in the farm this year?
6. For each activity, how many days do they work?
7. What do you think about the quality of work of the hired labor?
8. What are the alternatives for this kind of hired labor?
9. Do you think your labor needs has changed with the PFJ? Regarding the number of persons required to help in the farm? How so?
10. How much extra labour do you use in the entire farming season under the PFJ?
11. How many were you using before the PFJ if you can recall?

YOUTH INVOLVEMENT

1. Why do you think many young people in the community do not farm?
2. Why is the PFJ not able to address this low involvement

Appendix 3.

FOCUS GROUP DISCUSSION

(EXPERIENCES OF FARMERS WITH THE PROGRAMME)

1. Can someone give me a brief history about this community?
2. What is the Planting for Food and Jobs programme all about?
3. Can someone tell me how you heard about the programme?
4. What do you do to be part of the programme?
5. Are there some of you who did not join the programme the year it started? Why?
6. Are there some who joined the programme the year it started and subsequently dropped out? Why?
7. What are your experiences with the programme so far?
8. Do you have any advice on making the programme much better?
9. Have you been part of any similar program before? What was your experience?
10. What do you think is the best way of undertaking similar programs in the future?

Appendix 4.

Output of Logistic regression, treatment effects and matching algorithm.

Probit regression — Number of obs = 199
LR chi2(11) = 175.69
Prob > chi2 = 0.0000
Log likelihood = -34.800001 — Pseudo R2 = 0.7163

treat	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
age	-.0635012	.0179957	-3.53	0.000	-.0987721	-.0282303
sex	1.596015	2.282998	0.70	0.484	-2.878578	6.070609
education	-1.459564	.6355902	-2.30	0.022	-2.705298	-.2138299
household_size	.0027544	.0423213	0.07	0.948	-.0801939	.0857026
farm_size	.1120089	.1500595	0.75	0.455	-.1821023	.4061202
capital_access	2.356146	.7307078	3.22	0.001	.9239848	3.788307
Income_monthly	.0940761	.0192724	4.88	0.000	.0563029	.1318494
infrastructure	-1.164993	.459801	-2.53	0.011	-2.066187	-.2637997
marital_status	.5742719	2.138907	0.27	0.788	-3.617909	4.766452
CommunityAssociation	1.834876	.4394022	4.18	0.000	.9736635	2.696089
asset	3.119248	1.459875	2.14	0.033	.2579451	5.980551
_cons	-6.023282	1.844574	-3.27	0.001	-9.63858	-2.407983

.

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Calorie_intake	Unmatched	3182.65574	1928.37681	1254.27893	99.6945356	12.58
	ATT	3182.65574	1411.47541	1771.18033	263.957275	6.71
	ATU	1928.37681	1884.7971	-43.5797101	.	.
	ATE			512.703518	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support On suppor	Total
Untreated	138	138
Treated	61	61
Total	199	199

Description of the estimated propensity score
in region of common support

Estimated propensity score

	Percentiles	Smallest		
1%	.1331661	.1331661		
5%	.1486404	.1350032		
10%	.1783358	.1426818	Obs	85
25%	.391373	.1440959	Sum of Wgt.	85
50%	.833168		Mean	.702292
		Largest	Std. Dev.	.321236
75%	.9990073	1		
90%	1	1	Variance	.1031926
95%	1	1	Skewness	-.5949575
99%	1	1	Kurtosis	1.73732

****
Step 1: Identification of the optimal number of blocks
Use option detail if you want more detailed output
****

The final number of blocks is 5

This number of blocks ensures that the mean propensity score
is not different for treated and controls in each blocks

****
Step 2: Test of balancing property of the propensity score
Use option detail if you want more detailed output
****

The balancing property is satisfied

This table shows the inferior bound, the number of treated
and the number of controls for each block

Inferior of block of pscore	treatment=1, control=0		
	0	1	Total
.1331661	8	2	10
.2	8	5	13
.4	1	7	8
.6	3	4	7
.8	3	44	47
Total	23	62	85

Note: the common support option has been selected

****
End of the algorithm to estimate the pscore
****