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COLLEGE OF AGRICULTURE AND RENEWABLE NATURAL RESOURCES

FACULTY OF AGRICULTURE

DEPARTMENT OF AGRICULTURAL ECONOMICS, AGRIBUSINESS AND EXTENSION

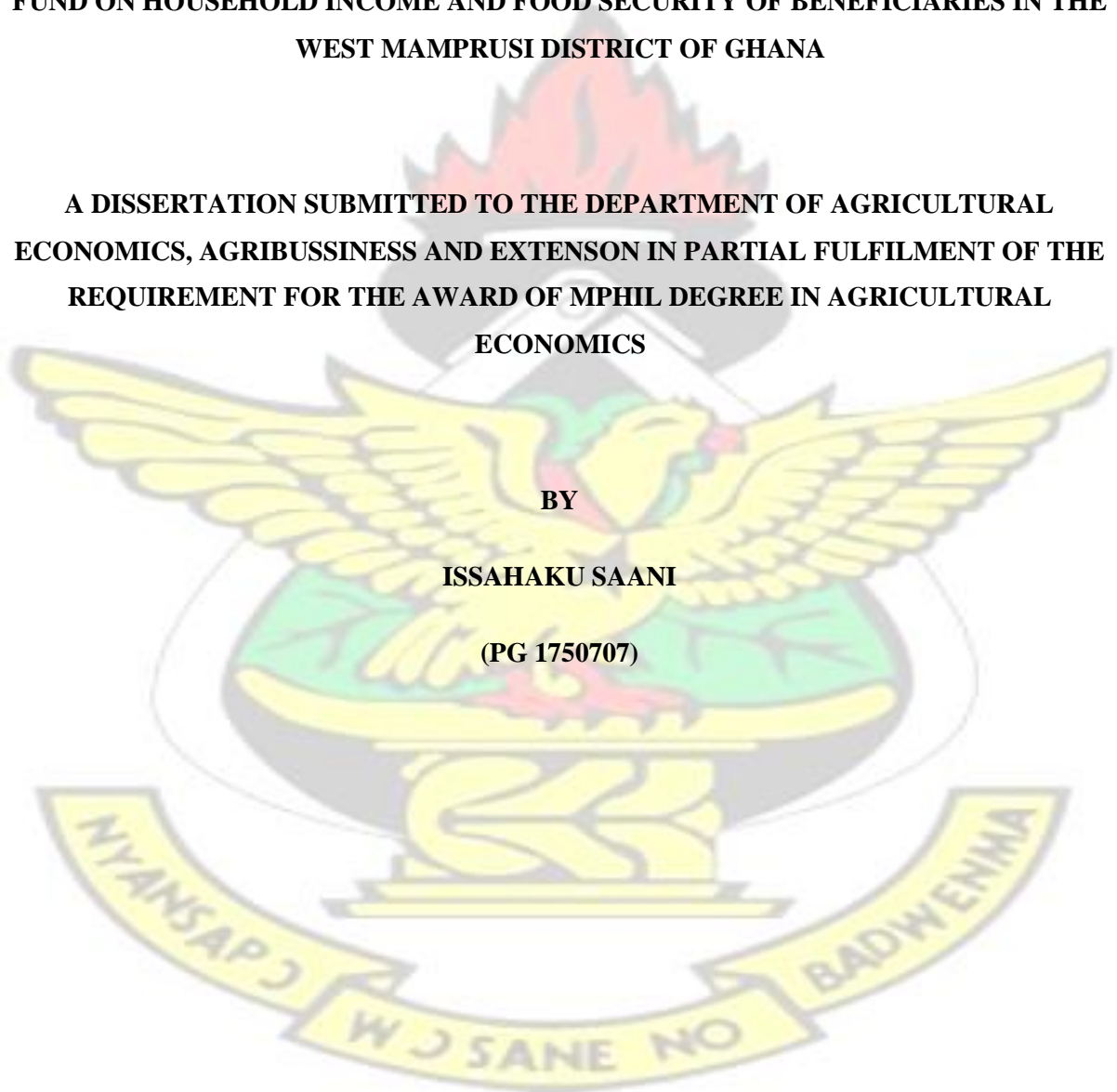
**IMPACT OF PRODUCTIVITY IMPROVEMENT AND EMPLOYMENT GENERATION
FUND ON HOUSEHOLD INCOME AND FOOD SECURITY OF BENEFICIARIES IN THE
WEST MAMPRUSI DISTRICT OF GHANA**

**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL
ECONOMICS, AGRIBUSSINESS AND EXTENSON IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF MPHIL DEGREE IN AGRICULTURAL
ECONOMICS**

BY

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JANUARY, 2016.

DECLARATION

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ABSTRACT

The study employed the Propensity Score Matching (PSM) technique to examine the impact of the Productivity Improvement and Employment Generation Fund (PIEGF) on household income and food security in five farming communities in the West Mamprusi District of the Northern region of Ghana. The study communities were: Walewale, Wulugu, Wungu, Nasia and Tinguri. A sample size of 300 respondents was used in the study. The descriptive results indicated that the fund had contributed positively to improving the food security and income levels of about ninety percent (90%) of the respondents. The results revealed that more of the females (74.09%) than the male (67.50%) headed households were aware of the existence of the fund. It was observed that ninety eight percent (98%) of beneficiaries and thirty one percent (31%) of non - beneficiaries had access to credit from other sources respectively. The empirical results generally show that the Productivity Improvement and Employment Generation Fund had positive and robust impact on food security status and income levels of the beneficiary households. With regards to food security, there was an observed mean difference of 346 kg of food with participants recording higher food stock of 1.154 tonnes comparable to non-participants who recorded 0.808 tonnes of food stock. This was observed at a statistical significant level of 1% indicating the presence of heterogeneous effects. The results also showed an observed mean difference of GH¢ 370.00 of household income with participants recording mean household income of GH¢ 1200.00 and GH¢ 830.00 for the non-participants which was also statistically significant at 1% indicating that there is presence of heterogeneous effects.

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May Allah be with you all.

DEDICATION

I, Issahaku Saani, hereby dedicate this work to my parents-Mr.Mahama Issahaku and Mrs Memunatu Tia(of blessed memory) for their care, affection and support right from the cradle to date. It is also dedicated to my dear wife, Tahiru Nafisah and my lovely children, Maridiya and Aarif.



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LIST OF ACRONYMS



DAC	District Assembly Common Fund
FAO	Food and Agriculture Organisation
FANTA	Food and Nutrition Technical Assistance
FASDEP	Food and Agriculture Sector Development Policy
PIEGF	Productivity Improvement and Employment Generation Fund
OECD	Organization of Economic Cooperation and Development
GSS	Ghana Statistical Survey
NDPC	National Development and Planning Commission
NGO	Non-Governmental Organization
NPED	National Planning and Economic Development
PHC	Population and Housing Census
UNDP	United Nation Development Programme
GPRS	Ghana Poverty Reduction Strategy
SAP	Structural Adjustment Programme
PSM	Propensity Score Matching
GLSS	Ghana Living Standards Survey
REP	Rural Electrification Project
UNDP	United Nations Development Programme
USDA	United States Department of Agriculture
WFP	World Food Programme
IFAD	International Fund for Agriculture and Development

CHAPTER ONE

INTRODUCTION

1.0 Background

WFP (2009) adopted a definition of Food Security, which states that. “Food security exists when all people, at all times, have both physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” Food security therefore requires an available and reliable food supply at all times. Thus, household food security refers to the ability of the household to produce or buy sufficient, safe and good quality food to meet the dietary needs of all its members.

WFP (2009) also emphasized that; increasing food production in the developing countries would be the basis on which food security can be built. In Ghana, the Ministry of Food and Agriculture’s operational definition of food security states that food security only exists only when there’s good quality nutritious food, which is hygienically packaged, attractively presented and available in sufficient quantities all year round and located at the right places at affordable prices” (MoFA,2003). It is worthy of mention that, poverty has a direct and close relation to food insecurity and hunger. This explains that poverty encompasses different dimensions of deprivation that relate to human capabilities including consumption and food security, health, education, rights, voice, security, dignity and decent work. Thus, the debilitating nature of poverty can be said to have serious implications for food security, nutrition and human welfare (IFAD, 2007).

It has also been observed that one of the greatest unsung global achievements in the second half of the 20th Century has been the world’s extraordinary success in raising global food production. While the global population has doubled to over 6 billion people in less than 50 years, average per capita food consumption has risen from about 2350 to 2800 kcal per day,

with the fastest increases in both food output and consumption occurring in developing countries (FAO, 2004).

FAO (2004) observed that, even though there has been a purported phenomenal increase in both total food output and consumption in Africa, the number of people without enough to eat on a regular basis remains stubbornly high, at over 800 million, and this has not witnessed a significant decline over the years. More so, it is estimated that, over 60% of the world's undernourished people live in Asia, and a quarter in Africa. The proportion of people who are hungry, however, is greater in Africa (33%) than in Asia (16%). The latest FAO figures indicate that, there are 22 countries, 16 of which are in Africa, in which the undernourishment prevalence rate is over 35% (FAO, 2004). Interestingly, much of the global growth in food production has come from small-scale farmers, who especially, reside in Asia and Africa. In spite of the fact that many people in China and India have been successful in raising smallholder output and reducing poverty, many millions of people, both rural and urban, continue to be chronically undernourished. In these countries, the gap between the poor and the rich continues to widen and hunger symbolizing one's economic exclusion. However, it has been observed that, economically active people in developing countries have very low formal education. It has been further argued that inadequate formal education causes low productivity with its consequential effects of poor resource base, which is reflected in low income, poor nutrition and health (Pat,1995).

It is estimated that every day, 1.2 billion people – one fifth of the world's inhabitants, cannot fulfil their most basic needs, let alone attain their dreams or desires. More disturbing is the fact that the largest segments of the world's poor are the 800 million poor women, children and men who live in rural environments. These are the subsistence farmers and herders, the fishers and migrant workers, artisans and indigenous peoples whose daily struggles seldom capture the

world's attention (IFAD, 2007). Studies of poverty situations in developing countries have revealed a positive correlation between household income and poverty levels.

Available statistics indicate that more than one billion people in the world live on less than US\$1 a day while 2.7 billion struggle to survive on less than US\$2 per day (IFAD, 2007).

Furthermore, subsistence which has been the bedrock of agriculture in Africa and other developing countries is saddled with a myriad of problems one of which has been inadequate capital to permit increased productivity. It has therefore been suggested that, making credit accessible to the rural poor could enhance their livelihood through increased productivity and improved incomes. It is against this backdrop that empowering rural people is an essential first step in eradicating poverty. This will culminate in building the capability of the marginalized rural folk and thus help them to take charge of their own lives and to seek out opportunities to make them better (IFAD, 2007).

In spite of the disappointing slow pace of progress in hunger reduction, it is highly expected that the goal of halving the number of chronically undernourished people by 2015 as set at the World Food Summit in 1996, is still attainable. This desired dream will however require a combination of adjustments in tactics and a deliberate sequencing of required actions which give initial priority to low-cost interventions which benefit very large numbers of people. It also demands that stronger commitment be made by both developing countries and the international community to apply known solutions on a scale which reflects the size of the hunger problem (FAO, 2008).

Stamoulis & Zezza (2003) contended that, the issue of low income which is manifested in high poverty levels as well as food insecurity has been sources of concern for researchers and policymakers worldwide. In other words, one of the major challenges facing developing countries in particular and the international community in general, in the 21st century, has been

how to alleviate extreme poverty and promote global food security for millions of people wallowing in abject poverty.

Extreme poverty refers to people, whose standard of living is insufficient to meet the basic requirements of life even if they devoted their entire consumption budget to food, is still common in Ghana. This form of poverty is said to be a rural phenomenon since as many as 1.8 million persons in these areas in Ghana live in extreme poverty. This accounted for about 27.3 per cent in the rural savannah of the northern region of Ghana (GSS, 2010). It is therefore not surprising that, the first goal of the Millennium Development Goals (MDGs) which sought to eradicate extreme poverty and hunger by the year, 2015 could not be actualised.

In order to reverse the trend, it has been realised that, agricultural growth which being essential ingredient for fostering economic development and feeding growing populations in most less developed countries such as Ghana, has not received the needed attention. In the light of this, proper policies should be formulated to ensure that rural farmers are given inputs in the form of credit and others to enhance their productivity (Datt & Ravallion, 1996). Following the foregoing discussion, Ghana was one of the first countries in Africa to embark on the structural adjustment reforms. This programme was intended to create job opportunities for people most particularly, the youth in both urban and rural areas. However, twenty five years down the lane, Ghana's continuing commitment to reform her youth who would be the catalyst for national economic development, has yielded no impressive results. This is evident in the continued non-existence of well-functioning markets as well as avenues for people to pull themselves out of poverty into a state of wellbeing. The situation in the north is further aggravated by the fact that, majority of the people in this part of the country, poor access to markets and well-functioning financial institutions. This disparity in resource endowments compared to the south has led to high levels of poverty and food insecurity among

subsistent rural farm households in Northern Ghana (Whitehead, 2006). This clearly shows that though economic growth is said to be taking place in Ghana, the pattern is not fairly distributed as poverty in the three northern regions – Northern, Upper East and Upper West – remains stubbornly high. In 2005 the three northern regions alone, accounted for 22% of the national population, but 45% of the head count is poor (GSS, 2010).

The UNDP (2007) report also indicated that, the three northern regions of Ghana harbour what was described as “the poorest of the poor”. This is to buttress the point that, Ghana unlike many other countries in sub-Saharan Africa, has made some notable progress on some of the Millennium Development Goals (MDGs), the process has not been even within the country as segments of the population have been left behind in other parts of Ghana, especially in the large urban centres in the south. Yet the worst indicators are concentrated in the north (UNDP, 2007).

It is to reverse this worrying trend that succeeding governments have come up with various policy interventions for the three regions of the north so as to bridge the developmental gap between the northern and southern Ghana. This was the basis for the introduction of the Productivity Improvement and Employment Generation Fund (PIEGF) popularly known as the Poverty Reduction Fund (GSS, 2010)

1.1 Background of Productivity Improvement and Employment Generation Fund (PIEGF)

The PIEGF also known as the Poverty Alleviation Fund (PAF) was introduced in the West Mamprusi District in 1998. The PIEGF constituted 5% of the District Assembly Common Fund (DAF) usually given to each District to facilitate the smooth administration following the decentralisation policy which was implemented in Ghana during President Kuffour's regime. The total amount of Common Fund which was disbursed to the study District in the year 2010 was One Billion three Hundred and Seventy Six Thousand Three Hundred and Ninety Eight Ghana Cedis Forty Pesewas (GH¢1,376,398.40). Of this amount, 5% was

allocated to the PIEGF program .Thus in the year under review; a total amount of Sixty Eight Thousand Eight Hundred and Nineteen Cedis Ninety Pesewa (GHC68,819.90) was allocated to the PIEGF to assist farmers and micro and medium scale entrepreneurs to boost their activities. This fund was channelled through the various community Banks in the targeted districts and subsequently disbursed to the approved applicants.

The fund was disbursed on group basis with each group consisting of five members. The amount given per group was based on the type of activity of which prospective beneficiaries were engaged in. In the case of beneficiary farmers, each group was given a maximum amount of Five thousand Ghana Cedis (GHC5,000.00).This meant that, each beneficiary farmer received an amount of Five Hundred Ghana Cedis (GHC 500.00) to help improve their farm operations. People who proposed to use the fund for business activities were given same amount as that of the farmer but with varied rate of interest charged. Beneficiaryfarmers paid 25% interest on the loan they had received, that of beneficiaries who used the loan for business activities were charged an interest rate of 35% per annum. Whereas farmers were expected to pay back their loans soon after they had harvested their produce, petty traders and other micro business enterprises had a tight repayment schedule- they were expected to pay the loan back within a period of two to three months. The rate of interest charged by the disbursing authorities on the loan also varied based on the type of occupation of beneficiaries.

1.1.1 Objectives of Productivity Improvement and Employment Generation Fund

The main goal for the establishment of the Productivity Improvement and Employment Generation Fund (PIEGF) was to improve the socio-economic wellbeing of the people in the most deprived areas of Ghana. In pursuit of this goal, the Central Government devoted five percent of the District Assembly Common Fund (DACF) to provide credit assistance to the target group to help build their capacities. This micro-credit facility was channelled through the various Community Banks and accessed by the groups.

Among other things, the PIEGF was introduced in the West Mamprusi District to attain the following objectives:

To remove the bottlenecks associated with credit access in the formal sector by selfemployed micro and medium scale entrepreneurs.

To promote the growth of micro and medium scale entrepreneurs who had the potential of expanding their businesses but were cash-constrained due to the lack of access to credit from formal financial institutions.

To create employment and improve incomes of the people thereby contributing to checking rural-urban drift with its attendant repercussions.

1.1.2 Procedure for the disbursement of the PIEGF

Like all other formal credit facility, the District Administration which is the disbursement authority, had laid down procedures which all potential beneficiaries must go through before accessing the PIEGF.

At the District Assembly level, a sub-committee headed by the Presiding Member, as Chairman, would usually collect and collate information from applicants. Eligible applicants are then required to form groups of not more than ten members each; thereafter, applicants are required to submit formal application with the names of at least, three guarantors to the specified bank. After screening to determine eligibility of beneficiaries, the bank would require qualified applicants to open an account with them. These customers are then taken through the process of loan disbursement procedures. This includes information on loan interest rates, period within which loan has to be paid back, benefits associated with compliance of repayment schedule as well as sanctions for default. Disbursements of loans are then channelled through the account.

Some measures were put in place to ensure repayment of the PIEGF. .Loan default has been one of the factors which affect the sustainability and success of most credit facilities. To avert this unfortunate and unpleasant occurrence, the bank which is the disbursing institution of the PIEGF, has closely monitored the utilization of the credit facility over the years. The bank explained that, the District was divided into five zones each of which was served by a project staff that monitored the activities of loan beneficiaries with the aid of community volunteers. Beneficiaries who paid back their loans promptly had their volume of credit increased while those who defaulted in repayment were denied their share of the next time consignment. Cases of default were referred to the Project Officer who made sure that such defaulting participants do not benefit from the credit in the next consignment.

1.1.3 Some Achievements of Productivity Improvement and Employment generation

Fund

Since its inception in 2004, the PIEGF has made tremendous impact in the life of its beneficiaries some of which are outlined below:

An increase in output levels of beneficiary farmers: Hitherto, farmers recorded low output level because they lacked the needed credit to engage the services of tractors and had to rely on bullocks services. For this reason, they could not expand their farm sizes and hence recorded lower out. However, following the introduction of the PIEGF, beneficiary farmers have been able to cultivate large acres of farms and many have shifted from the practice of subsistence farming to that of commercial. A case in point is their ability to now grow sesame, which is a cash crop and whose output since the PIEGF was introduced in the study area and has recorded an impressive performance in output. This is presented in Table1.1 below.

Table 1.1 Comparison of sesame crop yield for 2013 and 2014 cropping season in WMD

Number of acres cultivated	2012 cropping season	Number of acres cultivated	2014 cropping season
	Yield /Kg		Yield/Kg

3	450	3	900
4	450	3	1,280
5	750	5	1,250
4	600	4	1000
7	1050	7	2100
9	1350	9	2,700
10	1,500	10	2,000
13	1,950	13	3,250
23	3,450	13	7,360

Source: SNV-Ghana

A rise in enrolment and retention of wards of beneficiary farmers in School: Before the introduction of the PIEGF, many children dropped out of school because of their parents' inability to pay their school fees. It is heart-warming to know that, the enrolment rates and retention of wards of the parents of the beneficiary communities has increased in all levels of education. This has been made possible because profits accruing from the businesses of participants have enabled them to send their wards to school and to cater for them to ensure their retention. See Table 1.2 below

Table 1.2 Comparison of school enrolment rates before and after PIEGF introduction

Level of education	Before PIEGF introduction		After PIEGF introduction	
	Number	percentage	Number	percentage
Primary	4775	55.3	22871	67.16
JHS	1823	21.11	7766	22.8
SHS	1763	20.42	2987	8.77
Tertiary	264	3.06	433	1.27
Total	8625	100	34057	100

Source: DAPU of west Mamprusi, 2014

A drastic reduction in rural-urban drift: Before the PIEGF was introduced in the study area, it was a common practice to youth travelling to the big towns in the southern part of Ghana either for exploration or fend for them. This was happening because they had no work to do during the lean season. However, following the implementation of the PIEGF, the youth have been

empowered economically and are now engaged in off-farm income generating activities such as dry season gardening, basket weaving, carpentry, „zana“ mat weaving among others.

The improvement in welfare of beneficiaries is also reflection in the types of housing they occupy. Through the profits realised from their income generating activities, some beneficiaries have been able to re-roof houses with aluminium sheets as compared to their counterparts who still rely heavily on thatch. Some of them have been able to buy new bicycles, donkey carts and tricycles and could provide three square meals for their families all year round.

Finally, the PIEGF has assisted women engaged in Shea butter and ground nut extraction business to increase their capacity and realize an increase in their profit margins (WMDA, 2014). Evidence from the study clearly indicates that the volume and value of Shea butter production has seen tremendous improvement since the introduction of the PIEGF program (See Table 1.3 below). As compared to the other shea butter producing Districts, West Mamprusi District is lagging behind. However, the value of Shea butter sold in 2013 has risen to GHc 8633.00 from GHc 4,380.00. This is a clear indication that the PIEGF has contributed immensely in the empowerment of women as far as shea butter extraction industry is concerned.

Table 1.3 Volume and value of Shea butter sold for selected districts in the Northern Region

District	2012		2013	
	Volume of Butter Sold (tons)	Value of Butter Sold (GHc)	Volume of Butter Sold (tons)	Value of Butter Sold (GHc)
Central Gonja	102.08	47,170	112	53760
Yendi municipal	200	92417.7	190.7	91536
Tamale Metro	19.8	9,697	21	10185
West Mamprusi	12.6	4,380	17.8	8633
Chereponi	109.68	44,780	111.3	46,580

West Gonja	50	26,114.42	52	28,134
Total	494.16	224,559.12	504.8	238,828.00

Source: SNV – Ghana, 2014

1.1.4 Challenges facing the Productivity Improvement and Employment Generation

Fund

Despite its contribution to the socio-economic well-being of its beneficiaries, the PIEGF is saddled with a number of challenges some of which were identified as:

Cumbersome Bureaucratic procedures; the procedures used in accessing the credit was so tedious that it sometimes serves as a disincentive to clients who would have wished to participate in the programme.

Lack of proper monitoring: It is saddening to know that project officials of the PIEGF scarcely make follow ups to assess how beneficiaries utilize the fund. Consequently, most clients misapplied the fund resulting in wilful default.

Inadequate volume of credit given coupled with late disbursement did not augur well in turning the fortunes of beneficiaries around.

Others contended that, the interest rate charged by the disbursing authorities was too high culminating in their high default rates.

1.2 Problem Statement

West Mamprusi District is predominantly a farming community with about 80% of its populace engaged in farming activities. The area is characterised by poor quality soils, short unimodal rainfall season coupled with dry periodic dry spells (Dickson & Benneh, 1998). This is further exacerbated by poor access to markets as well as well-functioning financial institutions among farming households who operate on subsistence basis (Whitehead, 2006).

Though poverty level is said to have declined in the country over the years, this has not reflected among subsistent food crop farmers in the West Mamprusi District as most of them lack access to credit facility. The poor District is also bedevilled with the issue of unpredictable rain fall patterns culminating in poor crop output. (Devereux ,2008 & Adams *et al.*,2004).

A number of pro-poor interventions have been implemented by successive governments in order to reverse the trend. Among these policies was the Structural Adjustment Programme (SAP), which aimed at job creation in both rural and urban areas. This initiative also called for employment promotion, creation of jobs and the prevention of job losses on the medium term. The SAP was succeeded by yet another intervention called the Rural Electrification Project (REP) whose main focus was to create jobs in rural areas in order to curb rural-urban drift among the youth (NDPC, 1998).

With the government decentralisation policy, the focus was to reach out to the citizenry through the decentralised structures-the District Assemblies. Consequently, the Productivity Improvement and Employment Generation Fund (PIEGF), was instituted as a sub-component of the District Assembly Common Fund (DACF) to bridge the gap between the so-called affluent and poor societies in Ghana (NDPC, 1998). Since its inception however, little studies has been done to ascertain the impact of the PIEGF program on beneficiaries. It is to bridge this knowledge gap that this study is being conducted.

1.3 Research Questions

This study seeks to address the following questions:

- What is the level of awareness of the existence of the Productivity Improvement and Employment Generation Fund in the study area?
 - What are the factors which influence beneficiaries to participate in Productivity Improvement and Employment Generation Fund?
- What is the impact of the Productivity Improvement and Employment Generation

Fund on food security status of the beneficiary households?

- What is the impact of the Productivity Improvement and Employment Generation

Fund on income levels of the beneficiary households?

1.4 Objectives of the Study

The main objective of the study was to assess the financial impact of the Productivity Improvement and Employment Generation fund (PIGEF) on household income and food security status of male and female beneficiaries in the study area.

The specific objectives of the study are:

1. To determine the level of awareness of the existence of the Productivity Improvement and Employment Generation Fund in the study area
2. To examine the factors which influence beneficiaries to participate in the Productivity Improvement and Employment Generation fund (PIGEF).
3. To examine the impact of the Productivity Improvement and Employment Generation Fund on household income of beneficiaries.
4. To examine the impact of Productivity Improvement and Employment Generation Fund (PIEGF) on household food security of beneficiaries.

1.5 Justification of the Study

The Productivity Improvement and Employment Generation Fund were introduced in the West Mamprusi District to assist credit-constrained subsistence farmers to increase their productivity and hence escape poverty (NDPC, 1998). This study is therefore justified on the following grounds:

It shall make information available and accessible to the government on the extent to which this poverty reduction policy has impacted on its target group. Consequently, it would help Central government to properly assess the success chalked by the intervention in the study area

or otherwise and hence improve on the policy. All in all, information from the study would therefore contribute greatly in improving this pro-poor policy

Findings from the study will also assist development partners such as community based NonGovernmental Organizations (NGOs), as information provided can be harnessed for better policy formulation and development interventions.

Information from the study will assist the District Assembly in the proper disbursement of the District Assembly Common Fund (DACF) and put to refute the widely held perception that, the fund was given to only party functionaries. Consequently, it will guide local governing bodies in ensuring that, resources provided by the central government for the people are equitably distributed to promote development for all people.

It will also provide relevant information to the Ministry of Food and Agriculture (MoFA) in the District, to know their weaknesses and to consolidate their gains to enhance food production and productivity in the study area.

It will also be useful to researchers as information provided by this study will assist them in conducting future research to help address some of the limitations of this study.

1.6 Organization of the Study

The study is organized into five chapters. Chapter one presents an overview of poverty and food insecurity at the global and national level. A brief background of the Productivity Improvement and Employment Generation Fund, objectives, procedure of disbursement achievements and challenges of the PIEGF has also been dealt with in this Chapter. Chapter One also tackles the Problem Statement, Research Questions, Objectives of the Study as well as the Justification for the study.

Chapter Two reviews literature on poverty from Global, National and regional perspectives. It delves more into types of poverty, measurement of poverty. Definition of food security causes of household food insecurity and coping strategies are all treated in this Chapter. It also examines the concept of micro credit, challenges to loan recovery by disbursing authorities, factors influencing loan repayment and solutions have been duly treated under this chapter. The theory of impact assessment and related works on impact evaluation coins the concluding part of this Chapter.

Chapter Three examines the Conceptual frame work, Over view of food Security, the empirical/theoretical frame work, Hypothesis, Methods of data collection, The study area, Sampling techniques ,Measurement of outcomes variables and methods of data analysis

Chapter Four presents and discusses the demographic characteristics of respondents such as age, gender, educational level among others. The empirical results with regards to the impact of the PIEGF on household income and food security are also treated under this Chapter.

Chapter Five, which is the concluding one looks at conclusions and some policy recommendations based on the results of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter examines some Empirical works done on poverty with regards to its global and national character. Also covered under this topic are the Qualitative and Quantitative Determinants of poverty among others.

2.1 Definition of Poverty

Different agencies and Institutions have defined poverty in various ways. Agbenyega(1998) defines poverty as inability to supply adequately the basic needs for biological structure of human species some of which include: food, health, shelter and security. World Bank (2001) referred to poverty as the percentage of people living on less than \$1 a day.

UNDP (1997) however, regards poverty as the denial of opportunities for a tolerable life. One can also see poverty as the lack of all that is deemed necessary for material well-being or as the denial of choices and opportunities most basic to human development, which has to do with long, healthy and creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others. Hungers, lack of shelter, inability to access health care among others, are seen as the key manifestations of poverty.

UNDP (1997) also defined Poverty as a state of being jobless, being apprehensive of the future, living one day at a time; the inaccessibility to portable water and hence being killed by curable diseases all indicate that one is poor.

UNHCR (2004) viewed poverty as powerlessness and lack of representation and freedom. From the foregoing, it goes without saying that, poverty stares almost everyone in the face especially in the developing countries. It is therefore about time something concrete was done to transform

the world so that, many more can have enough to eat, adequately sheltered, access to education, health care, absence of violence, and for the poor to have their voices heard in their communities.

For purposes of this study, poverty is seen as the inability of one to attain essential elements that will help in the sustenance of life and human health (UNDP,1997).

So many forms of poverty can be found within a single society. Each of these has to be well spelt out in order to find action plans that will effectively prevent poverty or reduce it to the barest minimum. Marie (1986) described inherited poverty as a phenomenon which poor parents could pass on to their children, who would grow up to remain poor. Poverty caused by natural disasters such as earthquakes, drought is termed as Instant Poverty (ibd). Also, high unemployment and inflation rates which erode income of workers and pensioners or high input cost and low prices of agricultural products leading to poverty is referred to as new poverty (ibd). Poverty that is caused by the denial of opportunities and material assets or loss of self-respect is termed as relative poverty. The inability to meet the basic necessities of life which encompass adequate food, shelter, employment, safe drinking water and personal security is termed as absolute poverty (Chen & Ravallion, 2007).

Report by UNDP (1997) also argues that people may sometimes meet all their basic necessities afore-mentioned but deficient in other basic needs such as sufficient heat in cold weather or access to health care especially those in remote areas but do not report these cases; this is called Hidden Poverty. Marie (1986) contends that when low productivity and poor resource base which is reflected in low incomes, poor nutrition and health normally affects small- holder farmers on rain fed farmlands or it can affect small-scale fishermen and herders. Poverty resulting from any of the afore-mentioned is termed Endemic Poverty commonly found in Ghana. When people are overcrowded due to high population density in a given area, it results

in a type of poverty called Over-Crowding Poverty. This type of poverty is common in Bangladesh. In some cases, people can be born poor and still end up their entire lives in poverty; this type of poverty is referred to as Terminal.

2.1.1 Poverty Disparities among Regions in Ghana

It is worth remembering that Ghana was one of the first countries in Africa to embark on structural adjustment reforms. The adoption of this program was meant to bring economic recovery and hence stamp out poverty, especially in the rural areas of the country.

It is observed that the relationship between poverty and subsistence-oriented agriculture in Ghana is strong, with poverty being concentrated among food crop farmers, who live disproportionately in the three northern regions. Poverty has fallen rapidly among export crop farmers (mainly cocoa) but remains high among farmers whose livelihoods are dominated by the production of low value food crops (GSS, 2010)

MOFA (2007) defined the type of farmers being referred to as „vulnerable“ group as farmers who usually start farming with few inherited assets and/or have to cope with disability, then may be hit by further shocks, such as drought, bush fire, malaria, accident, widowing or loss of animals through theft. Many of these farmers no longer engage in agriculture at all. They struggle to obtain enough food during the annual „hungry season“ (March-July) and depend on family or community assistance, which is weaker for those who have migrated to town.

The „poor“ groups are more dependent on agriculture than the „vulnerable“, but are constrained by lack of labour (sometimes land) and hence are unable to accumulate capital.

MOFA (2007) describes them as pursuing a „survival strategy“ rather than a „development strategy“. Interestingly, households of this group of farmers depend on agriculture for their livelihoods and to accentuate their plight, they are vulnerable to climatic shocks (bushfires,

droughts, floods) and also to market volatility (food price seasonality, rising input prices), and health risks which include disease and malnutrition (NDPC, 2004).

GSS, (2008), observed that nine out of every ten people in the Upper East Region, eight out of ten in the Upper West, seven out of ten in the Northern Region and five out of ten in Central and Eastern Region were classified as being poor in 1999. It further observed that that, of the ten regions, the three Northern regions had their poverty as well as extreme poverty levels accentuated in the 1990s. Urban areas in the northern savannah also experienced significant increases in poverty during the period. The high incidence of poverty in Northern Ghana has been attributed to exclusion of farmers from trade (Aryeetey & McKay, 2004) and the slowdown of growth in the staple crop sub-sector. GSS (2010) report of the sixth round indicated that, the following targets were achieved as far as poverty reduction efforts in the three regions of the north are concerned. Poverty in northern region had been reduced from 69% in 2004 to 36.1% by 2006. In the upper east region also, poverty reduction had witnessed a major breakthrough as it was reduced from 88% in 2004 to 56.9% by the year 2006 and it is still being reduced. In the upper West region, poverty had also been reduced from 84% in 2004 to 76% in 2006. The national poverty level had also seen yet a drastic reduction as it decreased from 88% in 2004 to 75.4% in 2006. Though a lot has been achieved as far as poverty reduction efforts are concerned, more still needs to be done to achieve poverty reduction across all parts of the country.

2.1.2 Poverty disparities among individuals

Ellis (1991) observed that gender is an integral and inseparable part of rural livelihoods. Thus, men and women have different assets, access to resources, and opportunities. Women rarely own land, may have lower education due to discriminatory access as children, and their access to productive resources as well as decision-making tend to occur through the mediation of men.

In labour market situation, men have wider range of choices than their female counterparts. Again, in terms of wages, men receive higher wages than women for the same work done.

The major role women play in promoting agriculture has been highlighted by various authors. One of such writers contends that, sustainable agriculture and equitable and effective rural development could not be pursued without explicit recognition of the substantial contribution of women. It further states that in an atmosphere of increasing poverty, food insecurity, rural-out migration and environmental degradation, women continue to provide food for families despite limited access to land, credit, capital and technology lack of education, training and information as well as unfavourable legal and policy environment. In spite of that in terms of economic activity, poverty is by far highest among farmers who grow food crops of which women predominate (NPED, 2002).

Poverty in Ghana has important gender dimensions and therefore requires focused attention. Earlier studies by UNDP have shown that women experienced greater poverty, have heavier time burdens, lower rates of utilization of productive resources and lower literacy rates. Gender disparities also abound with respect to access to and control of a range of assets including direct productive assets such as land and credit. Human capital assets which were outlined as education and health: social assets such as participation at various levels, legal rights and protection. In the Human Development Report, it is observed that women were poorer than men because more households which were headed by women fell below the income poverty line than those headed by men (UNDP, 1997).

Latifee (2003) also reported that, the majority of the 1.5 billion people living on 1 dollar a day or less are women. In addition, the gap between women and men caught in the cycle of poverty has continued to widen in the past decade, a phenomenon commonly referred to as "the feminization of poverty". It is worth noting that, women living in poverty are often denied

access to critical resources such as credit, land and inheritance. Their labour goes unrewarded and unrecognized. Their health care and nutritional needs are not given priority, they lack sufficient access to education and support services, and their participation in decision-making at home and in the community are minimal. Caught in the cycle of poverty, women lack access to resources and services to change their situation.

Latiffee (2003 also clearly pointed out that, Poverty has a woman's face. This implies that, there are more women than men who suffer from abject poverty. They are found to be living in severe deprivation and despair. In fact, hunger and poverty are more female-related issues than male issues. It is estimated that of the 1.2 billion people worldwide who are said to experience absolute poverty, the majority are women. Traditionally they have to manage the family with virtually nothing to manage. If anyone has to go hungry in the family; it is usually the mother (Latiffee, 2003).

Despite the unfortunate circumstances that women find themselves it is argued that they have made progress in some areas like life expectancy, education ,fertility rates, Maternal mortality rates among others in different countries, women still face many barriers to economic ,social and political opportunities. It is also realized that women are the recipients of over 75% of the credit provided by Non-Governmental Organizations (NGOs) and have maintained a high loan repayment capacity (85%) as compared to their male counterparts (Armendariz, 2005) . It is also observed that in many countries, women continue to face legal discrimination. They are not treated as equal to men whether in property rights, rights of inheritance, laws related to marriage and divorce, or the rights to acquire nationality, manage property or seek employment. For many women, life is shadowed by a threat of violence" both physical and psychological. For all these reasons, credit is much more significant for women than me. With credit, poor women turn out to be better fighters. They have immense potential to move up. They are hard working. They are concerned about their human dignity, and about the future of their children.

They are ready to make personal sacrifices to increase benefits to their family and for building a brighter future for their children. They do not like to see their children suffer from poverty as they have suffered throughout their own lives. Once they have access to credit they are better equipped to manoeuvre the forces around them to their best advantage. Women are also credited as being better at credit repayment than men (Ghate, 1997).

2.2 Methods of Measuring Poverty

This section discusses the various measures of poverty identified in the literature. These measures include poverty indicators such as Absolute and Relative poverty, Perspectives of Poverty and Quantitative and Qualitative indicators of poverty

2.2.1 Absolute and relative poverty

Poverty is determined in both absolute and relative terms. An individual is said to be in absolute poverty if he or she is unable to attain the minimum standard of living conditions deemed socially acceptable in a given locality. Absolute poverty is usually ascertained based on nutritional requirements and other basic commodities. Relative poverty, on the other hand, is established by comparing the lowest segments of a population with upper segments, usually measured by differences in income. Absolute and relative poverty trends do not always move in the same direction. For instance, if there is a decline in the well-being of high income earners at the same time more people or households fall below the poverty line, relative poverty may decline while absolute poverty increases (Dessalien, 2000).

2.2.2 Perspectives of Poverty

Poverty can be viewed from both objective and subjective perspectives. The objective perspective involves deciding on certain factors (Normative judgements) which are believed to be the constituents of poverty and what is required to move people out of their impoverished situations. With the subjective approach, the emphasis is based on individual utility. This

approach uses people's subjective views to evaluate their preferences of the goods and services available. However, because of the obstacles encountered when trying to aggregate multiple individual utilities across a population, economists have traditionally based their work on the objective approach (Dessalien, 2000). Advocates of this approach argue that individuals do not in all cases present the best judgment of what is best for them. The argument placed by the advocates is that, even though all individual value food consumption; some may place a higher value on certain types of commodities that are not the best for their well-being. For this reasons, they conclude that when the subjective approach is used, it may undervalue or overvalue food consumption, leading to conflicting assessments as to who are the poor. However, the international community has recently started to build a serious interest in measuring subjective poverty. This is because of certain limitations associated with objective indicators and the value of understanding the perspectives of the poor in shaping policies and programmes. As a result, participatory poverty assessments methodologies have been gaining grounds (Dessalien, 2000).

2.2.3 Quantitative and qualitative indicators of poverty

Both quantitative and qualitative indicators are used to measure objective and subjective poverty. Makoka & Kaplan (2005) demonstrated this with an example thus: an objective approach to poverty measurement may determine that perceptions of 46 deteriorating academic standards (a qualitative indication) are the principal cause of declining school enrolment. Likewise, a subjective approach to poverty measurement may reveal that household composition (which can be quantified) is a central characteristic of poverty. However, confusion may arise when both quantitative and qualitative indicators are used to measure objective and subjective poverty. This happens because the main methodologies for obtaining objective poverty indicators are survey questionnaires which collect mainly quantitative data whereas the main instruments used to ascertain subjective perspective of poverty mainly rely on qualitative information (Dessalien, 2000).

2.3 Definition of food security

The two bodies whose definition of food security has gained universal recognition and acceptance is that from the United Nations Food and Agriculture Organization (FAO) and the United States Department of Agriculture (USDA). To these bodies, food security only exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Household food security has three main components: availability, access and usage. Food security for a household means access by all members at all times to enough food for an active, healthy life.

Ghana Ministry of Food and Agriculture conceptualizes Food Security as: “Good quality nutritious food, hygienically packaged and attractively presented, available in sufficient quantities all year round and located at appropriate places at affordable prices,” (MoFA, 2003).

Food security is viewed as a three-dimensional concept; food availability, food access and food adequacy (Letham, 1997). For households and individuals within them to be food secure, food at their access must be adequate, not only in quantity, but also in quality. Randolph & Hertel (2012), also defines food security to be three-dimensional in nature: adequate food supply, stability in availability, and access to food by those who need it. Food insecurity can therefore result from destabilizing any of these three components.

The Brandt Commission also contends that food security does not guarantee only its availability but that the people who need it must have the ability to purchase it. The reduction of poverty itself is equally essential to abolishing hunger. Basically, there are two forms of food insecurity, namely chronic undernourishment and transitory food insecurity. Eradicating hunger and poverty requires an understanding of the ways in which these two injustices interconnect (Korem, 1981).

In support of the foregoing,(Maxwell,1995)also agrees that a country and its people are said to be food secure when their food system operates in a manner so as to remove any traces of fear that there will not be enough to eat.

WFP (2009) outlined the following conditions of food insecurity:

- When people experience a large reduction in their source of food and are unable to make up for the difference through new strategies.
- When the prevalence of malnutrition is abnormally high for most time of the year which is not caused by health care factors.
- A large proportion of the population is using marginal or better still unsuitable food security strategies for survival.

2.4 The Cause of Household Food Insecurity

The U.S. Department of Agriculture identified factors that depress Africa's food production as low level of output, poor mechanization and weak research base, lack of incentives to producers, poor infrastructure and poor access to markets (USDA,1987).

The short and erratic rainfall patterns marked by dry spills and peak season floods among others, have accentuated the already precarious crop failure and food shortages situation in the Northern region (Jarawurah, 2015).

Ninety five percent (95%) of the food in Sub-Saharan Africa is grown under rain fed agriculture, but there is still a major challenge to food security in the region because there is an overall decline in external farm input-investment including fertilizers, seeds and technology adoption. Other causes include rapid population growth, limited access to agriculture-related technology assistance and lack of knowledge about profitable soil fertility management practices (Mwaniki, 2006). Mwaniki (2006) proposed seven strategies whose implementation would contribute substantially to alleviating food security in Africa. Thus, Nutritional

interventions, Facilitating market access, Capacity building, Gender sensitive development, Building on coping strategies, Creating off-farm opportunities, and Good governance.

Drawing conclusions at the forty-seventh Executive Session on Food Security in Africa, it was noted that the food crisis of 2008 should be considered a wake-up call and it demonstrates clearly the vulnerability of African countries' food security (UNCTAD,2008). It again stressed that for African countries to improve their food security, the state should take proactive role than has been the case in recent years by improving farmer access to agricultural inputs such as seeds, fertilizer and pesticides, provision of credit to farmers in need of capital, improving research, improving agricultural extension and tackling international market imbalances.

Bartfeld &Wang, (2006) found that food insecurity is linked to an array of household characteristics that are consistent with findings from existing research. It is realized that a broad array of local attributes, related to housing costs, transportation, retail food outlets among others have significant and in some cases large impacts on food security. Overall, results lend strong support to the view that food insecurity results from a complex interplay among personal resources, public resources, and the economic and social contexts in which a household resides.

There are factors that influence the proper food production, and their presence at relatively low levels or in excesses hamper normal levels of achievements, resulting in food insecurity problems that bedevils mankind. Rainfall which largely determines the seasonal deficit or surplus of soil moisture is the major element of climate which exerts a limiting influence on plant growth in the tropics, the other climatic factors such as light, temperature and humidity are adequate at most times and change little from season to season. Rainfall has its greatest value when it falls as expected during the growing season, ordinarily between April-October in the Guinea and Sudan Savannah zones of Northern Ghana (Tweneboah, 2000).

Smith *et al.* (2007) observed that, understanding the causes of food insecurity is of primary importance in choosing appropriate interventions for addressing them. Some of these were identified as unfavourable climatic conditions, economic shocks, political instability, and HIV/AIDs through poverty and unequal distribution of food within the household. Hence, to ensure food security, these factors must be tackled jointly.

Food security in Ghana is truncated by such factors as externalities in terms of deterioration of environmental, social and other factors that pose threat to or increase the cost of food production and distribution. These include irregular climatic conditions (rainfall and drought), soil degradation, outbreak of diseases and pests, bushfires, poor farm-to market roads and storage facilities, increases in non-food prices, rural-urban migration, internal ethnic conflict and a host of others (Wilhelmina, 2008).

2.5 Household Coping Strategies on Food Insecurity

One strategy for coping with food insecurity according to Wilna *et al.* (2006) is to procure and cook limited varieties of food and to ensure maternal buffering by limiting intake to make food available to the children. Frankenberger *et al.* (1992) looked at the relationship between coping strategies, food security and their environmental effect. They pointed out that short-term coping strategies are used by small farmers in times of food insecurity but have consequences on the environment and long term sustainability. Short-term strategies include dispersed grazing, changes in cropping and planting practices, migration in search of employment, increased petty commodity production, collection of wild foods, use of interhousehold intergenerational transfers and loans, use of credit from merchants, rationing of food consumption, sale of firewood and charcoal, consumption of relief program food, sale of productive assets among others.

Other existing literature have also established the fact that, many livelihood systems are maintained by a wide range of both on-farm as well as off-farm activities which work in tandem to provide a variety of procurement strategies for food as well as cash security (Swift,1989). It has been realized that though some of the coping strategies being employed by farmers to contain food crises situations have been of tremendous help in reducing hunger, specially, off-farm employment when it is available, can help in mobilizing savings and meeting other family commitments. Others such as severe reduction in food consumption, selling productive assets, reducing expenditures on basic services such as health and education and rural-urban drift have negative effects for those involved (Taal,1989).It has also been established that households that are engaged in off-farm activities are not badly affected by seasonality (Devereux, 2009; Longhurst,1986)

2.6 The Concept of Micro-credit

The concept of microfinance is not new, savings and credit schemes that have operated for centuries include Susu of Ghana, Chit funds of India, Arisen in Indonesia, Cheetu in Sri Lanka, Tontines in West Africa as well as numerous credit and saving institutions for the poor have been around for decades, providing customers who were traditionally neglected by commercial banks as way of obtaining financial services through co-operations and development finance institutions (Murdoch,1999).

Microcredit is the provision of small loans to individuals or people in poverty, designed to spur entrepreneurship (Berhanu, 2005). These individuals lack collateral, have a steady employment and a verifiable credit history, and therefore cannot meet even the most minimal qualifications to gain access to traditional credit (Berhanu,2005).The terms microcredit and microfinance are often used interchangeably, but it is important to highlight the difference between them because both terms are often confused. Addae-Korankye(2012)sees

“microcredit” to mean small loans, whereas microfinance is appropriate where NGOs and Microfinance institutions supplement the loans with other financial services such as savings, insurance, among others. Therefore, microcredit is a component of microfinance in that, it involves providing credit to the poor, but microfinance also involves additional non-credit financial services such as savings, insurance, pensions and payment services (Okiocredit, 2005).

Microcredit is a financial innovation that is generally considered to have originated with the Grameen bank in Bangladesh, where it has successfully enabled extremely poor people to engage in self-employment projects that allow them to generate an income and in most cases begin to build wealth and exit poverty in the long run (Latiffee, 2000).

2.6.1 Challenges to Loan recovery

The biggest challenge which bedevils the sustenance of microcredit schemes is the high default rates by clients. Since most of the borrowers are predominantly poor or fall within the lower income bracket and are often self-employed, they therefore lack collateral and hence have slim chances of accessing credit (Roslan, 2000). Some of the key reasons which contribute to high default rates in financial institutions are as follow:

- Most clients lack assets for collateral which has made lending to them not only costly but also very risky since it involves high screening, monitoring and enforcement cost. This explains why it is almost impossible for them to obtain credit from formal financial institutions. The existence of microfinance institutions nevertheless has made it possible for the poor and the lower income group to have access to the much needed credit (Roslan, 2000).
- Whiles the poor have been generally perceived to have low credit worthiness, their repayment rates of the loans has generally been very impressive. The low default rates

of microcredit programmes have led observers to believe that, lending to the poor and low income group might not be as risky as it has been conventionally presumed (Murdoch,1999).

- Indeed, one of the main reasons argued for the low default rates among the poor is that, lending to them is based on group lending model, as practiced by most NGOs. In this case, the borrowers are jointly responsible for their loan. The group lending approach therefore reduces not only the problem of moral hazard, but also provides the incentive for peer pressure or peer monitoring among group members which leads to good repayment rates of microcredit loans. Group pressure and monitoring thus seem to be a substitute for collateral and reduces the probability of loan default (Murdoch,1999).
- If there is high repayment rate, the relationship between the Microfinance Institutions and their client will be good. Bond & Rai (2009), argued that, high repayment rate paves the way for clients to obtain the next higher amount of loan and other financial services, whereas low repayment rates affects both the financial institutions and the borrowers adversely.

2.6.2 Factors Influencing Loan Repayment

(Murdoch, 1999) identified socio-economic and institutional factors which influence loan repayment rates in Micro financial Institutions. These include: factors from the lenders side are high-frequency of collections, tight controls, and good management of information system, loan officer incentives and frequent follow ups. In addition, the size and maturity of loan, interest rate charged by the lender and timing of loan disbursement have also an impact on the repayment rates. The main factors emanating from the borrower's side include socioeconomic characteristics such as, gender, educational level, marital status, household income level and peer pressure, in the case of group based schemes (Oke, *et al.*, 2007).

The writer further contended that, one fundamental factor that limits individual access to credit is informational gap which comes in two-fold. Thus, there is lack of information regarding the use to which a loan will be put and secondly, there is lack of information regarding the repayment decision of borrowers as well as limited knowledge of the defaulter's subsequent needs and activities (Murdoch, 1999). Kono & Takahashi (2010) also stated that, the lack of information significantly increases default rates often precipitated by adverse selection of potential clients, among others.

Armendariz & Murdoch, (2010), contend that the two key factors identified earlier are further aggravated by the difficulty of enforcing contracts in regions with weak judicial systems.

The adverse selection occurs when the lender cannot easily determine which customers are likely to be more risky than others. Therefore, the lenders would like to charge riskier customers more than safer customers in order to compensate for the added probability of default. But the problems, the lender does not know who is who, and raising average interest rates for everyone often drives safer customers out of the credit market (Armendariz & Murdoch, 2010).

Other factors contributing to high default rates in many financial institutions are moral hazards. This usually arises when banks are unable to ensure that customers are making the full effort required for their investment projects to be successful. Moral hazard also arises when customers try to abscond with the bank's money (Armendariz & Murdoch, 2010). In the absence of collateral, the lender and borrower do not have the same objectives because the borrower does not fully internalize the cost of project failure. Moreover the lender cannot stipulate perfectly how the borrower should run the project (Berhanu, 2005).

Karlan & Zinman (2006), contend that, better understandings of information asymmetries are critical for both lenders and policymakers. For instance, the problems with regards to selection of clients by banking institution should motivate policymakers and lenders to consider

subsidies, loan guarantees, information coordination, and strengthen their screening procedures.

Armendariz & Morduch (2010) however, argued that, problems related to information asymmetry could potentially be eliminated if lenders have cheap ways of gathering and evaluating information on their clients. However, they observed that lenders working in poor communities face high transactions costs since they handle many small transactions which is far more expensive than servicing one large transaction for a richer borrower.

2.6.3 Solutions to High Default Rates

The high default rates among clients could adversely affect the growth of micro credit institutions. This trend can however, be reversed if the following measures are put in place.

Giving training to the clients prior to the transaction of each loan and financial incentives for the credit officers can be used to lower the default rates. Statham (2008) stated that training from Microfinance Institutions to the clients can be broadly classified into two areas; Group formation and Business development.

In addition, providing regular in-service training to loan officers enhances their skills and competences. This motivates the loan officers, knowing that the Microfinance Institution is concerned about their welfare and on-going training requirements. With their capacity built through regular training, the loan officers will be more committed in monitoring their clients and this will lead to high loan recovery rates among clients (Statham, 2008).

Making regular follow –ups on clients will contribute to a reduction in default rates.

Zeller (1996) also agrees with the importance of saving to influence the repayment rate. It is expected that, saving services offered by the program improves the repayment rate of the group.

Saving may increase the financial discipline of group members and they can also serve as loan collateral.

2.7 Theory of Impact Evaluation

Impact Evaluation or assessment according to Wikipedia Foundation, Inc., (2009) is defined as the changes that can be attributed to a particular intervention, such as a project, programme or a policy in which both the intended ones as well as ideally the unintended. It is also defined as the benefits that are inured to the participants of a policy, programme or project or indirectly the non-participants.

Assessment or evaluation is defined as the process of appraising, or determining the benefit or quality of a policy, in terms of its relevance, effectiveness, efficiency, and outcome (FAO, 2000).

Impact on the other hand, refers to the extensive, long-term economic, social and environmental outcomes resulting from an introduction of a policy or a concept. Such outcomes may be anticipated or unanticipated, positive or negative, at the level of the individual or the organization (FAO, 2000). Generally, these outcomes involve changes in cognitive and behavioural pattern of the beneficiaries. FAO (2000), defined assessment as a process employed to determine in broad terms, whether a programme or an intervention has had the desired outcome on beneficiaries; and whether those outcomes are due to the programme or intervention. It went further to say that, impact assessment can also explore unintended externalities, whether positive or negative, on beneficiaries (FAO, 2000).

2.7.1 Impact Assessment measurement

In actual sense, there are only three major approaches to impact assessment, each having its own merits and weaknesses. These are the quantitative or scientific statistical method, qualitative method and participatory learning and action method (Wikipedia, 2009).

Quantitative or scientific statistical method of Impact Assessment

This approach to perform impact evaluation employs an experiment to establish causation between the outcome and the treatment. Normally, a survey is used as a tool by econometricians and statisticians to effect such evaluation. The method borders on putting across a fundamental question: What would have been the situation if the intervention had not been implemented? Such a condition cannot be directly observed but it is possible to approximate it by constructing an appropriate counterfactual. This is stimulated by comparing programme beneficiaries (treatment group) with the non – beneficiaries (control or untreated group). This method has many limitations;

A qualitative method of Impact Assessment

This approach uses key informants to assess impacts. It is an inductive technique in which the data analyst is usually directly involved in the data gathering. It adapts interviews, beneficiary observations, case studies and focus group discussions as the main tools of assessing the impacts. It uses techniques which rely heavily on beneficiaries’ knowledge of the conditions surrounding the project being evaluated (Baker, 2000). This technique does not use any statistical means to evaluate impact as in the quantitative methods; it rather seeks to provide an interpretation of the processes involved in an intervention and of the impacts that have a high level of plausibility. The validity of such evaluation is highly dependent on the arguments and materials presented; the strength and quality of evidence provided; the degree of triangulation used to crosscheck evidence; and the quality of methodology (Hulme, 2000).

2.7.2 A Brief Overview of related works on Impact Assessment

Over the years, various authors have employed impact assessment in their research works. Abdulai & Owusu (2009) examined the impact of Non-Farm work on household income and food security among farm households in the Northern region of Ghana. These authors used a Propensity Matching Approach (PSM) in analysing their data so as to account for selfselection

bias. The results of the study showed that, participating in Non-Farm work exerts a positive and statistically significant effect on household income and food security status; thus, supporting the widely held view that income from Non-Farm work is very crucial to food security and poverty alleviation in rural areas of developing countries.

Impact assessment approach was also employed by Ali & Abdulai (2009), to examine the Adoption of Genetically modified Cotton and Poverty Reduction in Pakistan. These researchers also employed the Propensity Matching Approach, using a cross sectional data from a survey of farmers in the Punjab Province of Pakistan. Interestingly their study revealed that adoption of the new technology exerts a positive and significant impact on cotton yields, household income and poverty reduction but a negative effect on the use of chemicals. The positive and significant impact of the technology on yields and household income is consistent with the potential role of agricultural technology in directly reducing rural poverty through increased farm household income.

Eva (2009) also employed impact evaluation to investigate the impact of micro-finance in poverty reduction among rural folk in Tanzania. Results of her study showed that administering micro-finance to rural farmers had a positive and significant effect on their yields and poverty reduction. In sum, farmers who participated in micro-finance programmes experienced an improvement in their welfare and standard of living.

Latiffee (2003) investigated the impact of micro-credit on women in rural Bangladesh. His results indicated that women who had access to micro-credit had their income levels increased and their poverty levels reduced. The writer also discovered that, women exhibited high loan repayment capacity than their male counterparts.

This thesis contributes to the foregoing debate by assessing the impact of the Productivity Improvement and Employment Generation Fund (PIEGF) on household income and food

security status of West Mamprusi District of Northern Ghana. Propensity matching approach was employed to account for self-selection bias. The results also showed that, PIEGF contributed positively to household income and food security status of participants. However, the impact of Productivity Improvement and Employment Generation Fund in this study was found to greater in female beneficiaries than their male counterparts.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter examines the empirical/theoretical framework, Hypothesis, Methods of data collection, the study area, Sampling techniques, Measurement of outcomes variables and methods of data analysis

3.2 Conceptual framework and empirical model specification

To analyze the relationship between farm households“ benefitting from the PIEGF program and household welfare (income) or food security status, we assumed a linear function:

$$Y_i = \alpha + \beta_i X_i + \gamma T + \epsilon_i \quad (1)$$

Where Y_i is household welfare or food security status; T is the treatment variable (Dummy) =1, if households benefits from the PIEGF program, 0 otherwise, X_i is a vector of personal, household characteristics and location characteristics; β_i is a vector of unknown parameters; γ is the treatment effect and ϵ_i is the random error term.

Following the utility maximizing decisions of rural households, the decision of a farmer is either to benefit or not benefit from the PIEGF program, which is a discrete choice scenario. The farmer i then compares the expected utility or profit from benefiting [$U^1(\pi)$] to the

expected utility or profit from not benefitting $E[U^0(\pi)]$. As the utility of the farmer is not measurable, observable measures could be obtained by examining the factors which influence the distribution of the expected utility of profit. Representing the factors by a vector

Z and the random disturbances by ε , the expected utility of profit of the farmer for benefitting

from the PIEGF programme may be written as $U^1 = \beta_0 + \beta_1 Z_{1i} + \varepsilon_{1i}$ and a farmer not

benefitting by $U^0 = \beta_0 + \beta_0 Z_{0i} + \varepsilon_{0i}$. The difference in the expected utilities may be written as;

$$U^1 - U^0 = \beta_1 Z_{1i} - \beta_0 Z_{0i} + \varepsilon_{1i} - \varepsilon_{0i} \quad (2)$$

The difference in the expected utilities of profit would determine whether or not the farmer would access the PIEGF program. Specifically, the farmer would benefit from the PIEGF program if $E[U^1(\pi)] - E[U^0(\pi)] > 0$ whereas $E[U^1(\pi)] - E[U^0(\pi)] < 0$ represents not benefitting from the PIEGF program. The equation depicting farmers who benefit from the PIEGF could be related to a set of independent variables as:

$$\Pr(T_i = 1) = \Phi(Z_i \beta) \quad (3)$$

Where Z_i is the independent variables affecting farmers who benefit from the PIEGF program, which may include household, plot-level, institutional characteristics and other policy-wide

related variables. α denotes a vector of parameters to be estimated and ϵ_i denotes the random unmeasured factors that affect the farmers who benefit from the PIEGF program.

Estimating the outcome equation (1) and treatment equation (3) with Ordinary Least Square (OLS) could result in biased estimates as the error terms may be correlated (Mendola, 2007; Ali & Abdulai, 2009). To correct the possible selection bias due to the non-random assignment of treatment, we resort to statistical matching techniques (Dehejia & Wahba, 2002). The propensity score $p(X)$ is the conditional probability of receiving treatment given pre-treatment characteristics $P(X) = \Pr(T|X) = E(T|X)$, where $T \in \{0,1\}$ is the indicator of being a beneficiary or a non-beneficiary of the PIEGF program and X is a vector of pretreatment characteristics. The probit model was used in this study to estimate the p -score (Hujer et al, 2004; Sianesi, 2004). Other authors have also used the logit model (Caliendo & Kopeinig, 2008). Given the propensity score, $P(X)$, the Average Treatment Effect on the Treated (ATT) was

computed as;

$$ATT = E(Y_i^1 - Y_i^0 | T_i = 1, p(X_i) = p(X_i)) - E(Y_i^0 | T_i = 0, p(X_i) = p(X_i)) \quad (4)$$

Where Y_i^1 and Y_i^0 are the potential outcomes in the two counterfactual situations of benefitting and not benefitting from the PIEGF program.

The relevant assumptions that must be satisfied to ensure that the matching is done properly are the balancing property, the conditional independence assumption (CIA) and the common support condition (Heckman et al., 1999). The matching estimator used in the estimation of the ATT was the nearest neighbour matching (NNB). Other estimators from the literature include,

radius matching, and the kernel-based matching. The mean standardized bias proposed by Rosenbaum and Rubin (1985) was used to ascertain whether the matching procedure was able to balance the relevant covariates. The pseudo- R^2 before and after matching was also compared to test if there were still some systematic differences in the distribution of the covariates between treatment and controls (Sianesi, 2004). Finally, using the bounding approach, sensitivity analysis was undertaken to check if the influence of an unmeasured variable on the selection process is so strong to undermine the matching procedure (Rosenbaum, 2002).

3.2.1 Specification of empirical model

The first step in the Propensity Score Matching (PSM) approach is the estimation of the access of model or farmers participation in the PIEGF model using a binary choice model. In this study the probit model was employed to estimate the factors which influence farmers' decision to access formal financial services. In this case, to estimate factors that influenced farmers' decision to benefit or participate in the PIEGF.

The empirical model is specified a

$$PAR = \beta_0 + \beta_1 GEN + \beta_2 EDU + \beta_3 FSIZE + \beta_4 OFFINC + \beta_5 HHS + \beta_6 FBOMEM + e_i \quad (5)$$

Where:

PAR = Participation in PIEGF, GEN= Gender of Participants, EDU= Educational of participants, FSIZE= Farm Size, OFFINC= Off-farm income, HHS= Household Size and FBOMEM= Farmer Membership to an Farmer Based Organisation

3.3 Description of Variables used in probit Model

Participation in the PIEGF (PAR): A dummy is used as the dependent variable to mean participation in the PIEGF. It is specified as 1 if a respondent participate in the PIEGF, 0 otherwise.

Gender: This represents the gender of the respondents. It was taken as a dummy denoted by 1 if a male benefitted from the PIEGF and 0 if a female did

Average years of schooling (EDU): This represents the number of years respondents spent in attaining formal education.

Farm size of household (FARMSIZE): Farm size is measured in hectares and used as a proxy for the scale of operation.

Participation in off-farm income generating activities (OFFINC): Farmers may engage in off-farm income generating activities. This variable was taken as a dummy and denoted by 1 if a farmer engages in off-farm income generating activity and 0, otherwise.

Household size of respondents (HHS): This variable is measured as the number of people taken care of by the respondent.

Membership of respondents to an FBO: This variable was analyzed as a dummy and denoted by 1, if a farmer/respondent belongs to an FBO, 0 otherwise.

3.3.1 Description of Outcome Variables

Farmers who participated in PIEGF were assumed to realize an increase in their household income and food security levels. The two main outcomes considered for this study are explained below.

Household Income

Household income was measured using two (2) main variable group indicators. The first variable group which is farm income indicator or variable included income from the sale of cereal crops (Maize, Rice, Sorghum and Millet) and leguminous crops (Groundnuts and Beans).

Income from the sale of animals such as goats, sheep, among others also fell within this category.

Another variable which contributed to Household income was off-farm income. This included income obtained from engagement in other non – farm income earning activities such as Teaching, Paid labour jobs, security jobs (watchman). Others included sources such as remittances from household members outside the study communities were also included in the off – farm income variable group. The unit of measurement for the household income was in thousands (000s) of Ghana Cedis.

Household Food Security

This was defined as the net quantity of food crops in kilograms left to sustain the household from the end of the harvest through to the lean season till the next cropping season (Hussein & Sen, 1992).

More so, the variables examined in the regression models were selected based on economic theory and sound knowledge of previous research and information about the institutional settings of smallholders' access to rural micro credit facilities (Reardon, 1997; Elbers et al., 2003). The variables were those that influence both treatment and outcomes but are not affected by treatment (Caliendo & Kopeinig, 2008). The variables include household characteristics such as age, education, number of dependents, household size; farm level characteristics such as farm size, household assets such as livestock, radio, television, motor bike and bicycle; institutional factors that affect access to credit such as member of farmers' organization (FBOs), and locational dummies to capture location-specific effects.

3.4. Hypotheses of the study

The study sought to test the following hypotheses;

H₀: The Productivity Improvement and Employment Generation Fund impacts negatively on household income.

H₁: The Productivity Improvement and Employment Generation Fund impacts positively on household income.

H₀: The Productivity Improvement and Employment Generation Fund impacts negatively on household food security.

H₂: The Productivity Improvement and Employment Generation Fund impacts positively on household food security

3.5 The Study Area

The study area was the West Mamprusi District. Geographically, the District lies within latitude 9°55'N and 10°35'N and longitudes 0°35' and 1°45'W. It has a total of 5,013 sq km land area and shares boundaries with ten districts and two regions. West Mamprusi District is one of the Twenty (20) Administrative Districts in the Northern Region of Ghana. Walewale is the District capital which harbours 12% of the District's population. It shares boundaries with East Mamprusi, Gushegu District to the East, West Gonja, Tolon/Kumbungu Savelugu/Nanton, and Karaga District to the south, Builsa, Kassena-Nankana and Talensi/Nabdam Districts (Upper East Region) to the north and Sissala and Wa East District (Upper West Region) to the West. Administratively, the district lies within the Northern Region, although it has strong economic and functional linkages with some major settlements in the Upper East Region like Bolgatanga and Fumbisi (DPU, West Mamprusi District Assembly).

West Mamprusi District happens to be one of the luckiest Districts that benefited from the PIEGF. The study however, sampled five beneficiary communities for the research. Sampling in any research is generally conducted to permit an in-depth study of a part of a thing rather than a whole of the population. The information obtained however, is used to develop useful generalization about the population. Sampling was employed in this study in order to reduce

the high cost which would have been incurred if a whole population was to be investigated. Besides, since population is dynamic and the individuals of whom it comprises, also change with time, a small data set will guarantee a better homogeneity than a larger one; consequently, improving the accuracy and quality of the data.

The samples for this study were chosen purposively based on their geographical location and number of people who benefited from the fund since its inception. Below is the map of the study area with the selected communities shown in red

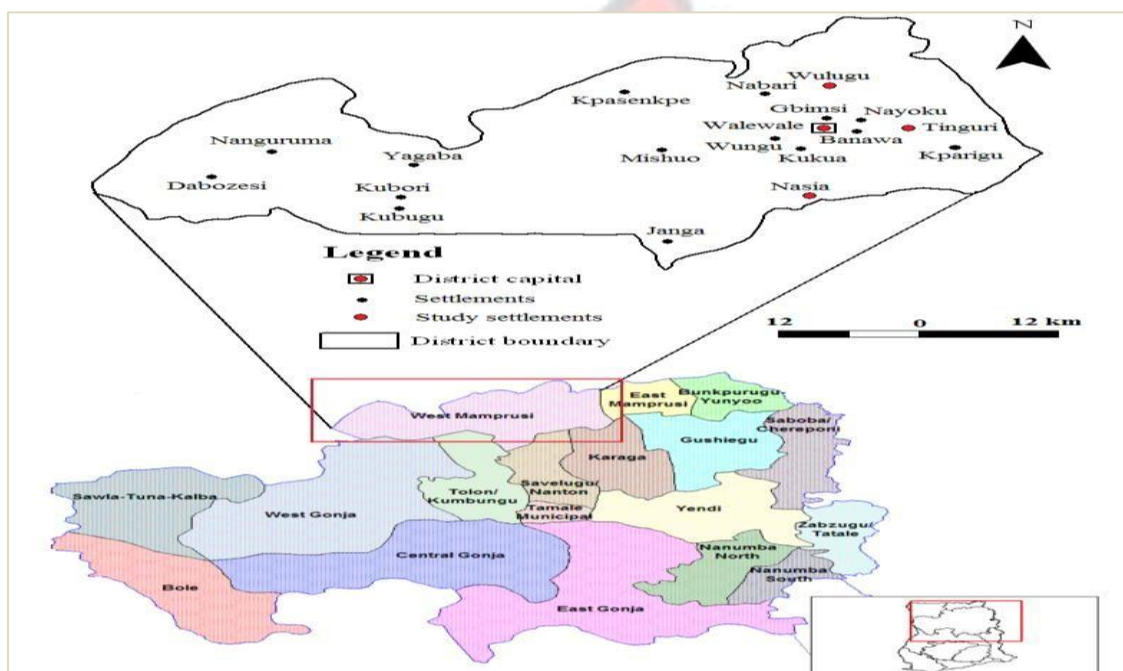


Figure 3.1 Map of study area

3.5.1 Demographic Characteristics

Statistics from the 2010 population and Housing Census indicated that, West Mamprusi District had a total population of 168,011. Out of this 49.4% were males while 50.59% were females. The urban population in the District was 18% (GSS, 2010). The District has an annual population growth rate of 2.4% with an average household size of eight (8). The District thus, has a population density of about 24 person/kilometre. The population is concentrated in and around Walewale the District capital of within 10 to 15km radius. There are other pockets of relative concentration in and around Janga in the Southern part of the

District, in and around Yagaba-Kubori and Yizesi areas to the Western Half of the District. The last area of relative concentration is Kpasenkpe-Duu area. The rest are either very sparsely concentrated or unsettled at all. There is therefore a very vast and unoccupied land mass in the District which could be put to crop cultivation and animal rearing.

The District is predominantly a rural one, with majority of the population living in rural areas. It is interesting to note that only five (5) settlements have a population of about 5,000 and above. Sixteen (16) settlements were found to be in the range of 2,000 to 5,000 in 1997 but this number increased to twenty three (23) in 1999. The District capital, Walewale alone accounts for 12% of the district's population.

3.5.2 Soil Types

Soils of alluvial origin (savannah glycols) can be found in the major river valleys and drainage courses; these soil types are predominantly found in the west of the District along the basins of the White Volta and its tributaries. These soils are deep, fine -textured and well suited for the cultivation of a wide range of crops. The depth of these soils also allows for the use of bullocks and other forms of mechanised farming. In spite of their potentials, soils in this category remain under-utilized due to drainage and flood control problems. On the flat to gentle upland slopes of the eastern parts of the District are found the moderately well drained upland soils which are developed mainly from Voltaian sandstones. These soils are characterized by deep loamy soils of sand with good water retention capabilities described as moderately well drained. Their development potential is in the fact that they are well suited for a wide range of crops; although good farming practices especially soil conservation is imperative. These soils however, are prone to sheet and gully erosion especially, under cultivation. To curb the unfortunate occurrence, organic materials are applied to the soil to curtail heavy nutrients from leaching.

3.5.3 Climate and Rainfall Pattern

The District is characterized by a single rainy season, which starts in late April with little rainfall, rising to its peak in July-August and declining sharply and coming to a complete cessation in October-November. The area experiences occasional storms, which have implications for base soil erosion depending on its frequency and intensity especially when they occur at the end of the dry season. Mean annual rainfall ranges between 950 mm - 1,200 mm.

The dry season is characterized by Harmattan winds which blow across the Sahara desert. These winds are usually warm and dry resulting in a significant rise in daily temperatures as well as the rapid loss of soil moisture. Maximum day temperatures are recorded between March-April of about 45°C while minimum night temperatures of about 12°C have been recorded in December-January. The humidity levels between April and October can be as high as 95% in the night dropping to 70% in the day. Night humidity for the rest of the years ranges between 80% and 25%.

3.5.4 Vegetation

The natural vegetation of the District is classified as Guinea Savannah Woodland, composed of short trees of varying sizes and density, growing over a dispersed cover of perennial grasses and shrubs. The climatic conditions, relief features and soil texture which foster water logged conditions (especially in the area west of the White Volta) in the rainy season and draughty soils. The vegetation is typically characterised by trees that are hardy enough to withstand the prolonged dry spells. The existence of dense woodlands and forests along river valley (especially areas along the basin of the White Volta and its tributaries) is gradually beginning to change due to the influx of people into these areas as a result of the successful control of river borne diseases such as Onchocerciasis. The vegetation is also annually affected by bush fires, which sweep across the savannah woodland each year.

3.5.5 Agricultural Activities

The economic base of the West Mamprusi District is agriculture with an average 80% of the economically active population engaged in one form of it or another. A number of Agricultural activities such as crop production, livestock and fisheries are not uncommon in the District. However, only about 54.7% of economically active populace are engaged in farming as a major activity.

Agriculture is basically on a subsistence level with smallholder farmers representing the main users of agricultural land. The average farm sizes vary from 0.5 ha to 2.4 ha. The predominant type of farm labour is from the immediate family (man, wife or wives and children) a factor that may account for the love of large families as was explained under the population profile of the District. There are however, periods where farm labour is hired to supplement family labour. Because children in the family, especially those above 15 years are intensively used, there is an unacceptably low enrolment of children in primary and junior secondary school as captured under the current status of education in the District. The major crops farmed in the District are sorghum, groundnut, millet, beans, maize and rice. Cash crops that are also cultivated include: rice, cotton, tobacco, vegetables and cashew. These crops are grown during the rainy season. The total acreages cultivated and average yields for these crops are indicated in the table 3.1. Dry season farming is done along the banks of the White Volta. Crops cultivated include leafy vegetables, tomatoes, onions, soybeans, pepper and tobacco. The potential of dry season farming is limited by inadequate water-retaining structures including dams and dugouts.

Major cash crops grown in the district are groundnuts, rice, millet, ground nuts, sorghum, yam, and cotton. As far as the cultivation of these crops is concerned, the District is not faring badly at all. For instance the average yields of maize, rice and sorghum which are shown in Table 3.1 below far exceeds the regional average yield of maize, rice and sorghum which are 1.8, 2.95

and 1.83 respectively. The performance of millet, ground nuts, cow pea and soybean does not fall far below the regional average yields as indicated in Table 3.1 below.

This gives ample evidence that the study district plays a major in efforts to ensure regional and even national food security.

Vegetables grown include pepper, tomatoes and onions and this is done along the banks of the White Volta.

Table 3.1 Average Yields of Major Crop in Study Area

Name	Yield(metric tons/hectare)
Maize	1.90
Millet	1.75
Rice	3.50
Sorghum	1.83
Groundnut	1.63
Beans	1.49
Yam	7.17

Source: From MOFA 2011

There are large tracks of fertile land in the Yizesi, Kunkua, Katigri and Soo valleys, which could be utilized for large-scale, rice production. The soil conditions in this area are rich and loamy and have a very high water holding capacity. These conditions are very conducive for commercial rice production.

The main tree crops indicated in field discussions are Sheanut and Dawadawa (both harvested from the wild) and small plantings of cashew. To promote the production of cashew, the District Assembly has established a 10-hectare cashew plantation on the outskirts of Walewale.

Dry season farming is done along the banks of the White Volta. This off-farm activity is practiced in the following areas; namely-Kpasenpke, Nasia, Banawa, Gbimsi, Tampulungu,

Nayoku among others. Crops cultivated include leafy vegetables, tomatoes, onions, soybeans, pepper and tobacco. It is of interest to know that, this activity makes the farmers maximise their free time and also fetches them some money to enable them pay their wards' school fees as well as meet their daily social/economic commitments such as naming ceremonies, funerals and a host of others. The potential of dry season farming is however, limited by inadequate water-retaining structures including dams and dugouts.

3.6 Data Collection

3.6.1 Types of Data Collected

Primary Data

To be able to gather enough data on respondents, both primary and secondary data were collected. The significance of primary data is that, it provides the researcher with the exact information and hence ensures the reliability of results of the research. Primary data collection technique revolves around interviews and questionnaire, among others. To obtain the primary data from the sample population, questionnaires were used as well as interviews in order to clarify questions which were not well understood by the respondents. In all, two set of questionnaire were administered to both respondents as well as the District Assembly. For the benefit of respondents who could not read or write, they were interviewed with the language of their understanding in order to solicit the right information needed and questionnaires were given to those who could read to provide the information needed. The interview conducted was through face to face interaction between the researcher and the respondents.

Secondary Data

In order to source for more information, printed materials such as magazines, brochures and leaflets were obtained from both the West Mamprusi District Assembly as well as the

Bangmarigu Community Banks. Relevant information pertaining to the PIEGF program was also sought from books in libraries as well as the internet's. The use of secondary as well as primary data makes the results of this study valid and authentic.

3.6.2 Sampling Techniques

Due to factors such as budget constraints, time constraints and quickness of data collection, a sample size of 300 respondents were randomly selected from the five (5) beneficiary communities which were zoned as : Central (Walewale), Western (Wungu), Eastern (Tinguri), Northern (Wulugu) and Southern (Nasia) zones. A village each was randomly selected from the zones to capture the impact of the credit on beneficiaries in all geographical locations within the study area. The 300 respondents selected for the study comprised 106 beneficiaries and 194 Non-beneficiaries. This was to present a counterfactual situation (comparing the social and economic conditions of beneficiaries with that of their nonbeneficiary counterparts). The ease and convenience in obtaining data was the most decisive factor in the selection of the sample and sampling procedure for data collection. The households were first numbered and all the numbers were written on pieces of paper. The pieces of paper were then put in a box and mixed up vigorously. The numbered households were then picked at random from the box. The households that were lucky to be picked were considered for the study. This was done to avoid bias in selecting the clients since the researchers could not get the entire clients due to limited resources.

To ensure proportional distribution of the sample across the District, stratified random sampling technique was employed and the District was divided into five zones of which one community was randomly selected. Each community selected was then considered a stratum.

The distribution of the 104 respondents among the study communities was based on proportional representation of the number of people who benefited or participated in the

PEGF program.

The number of household heads which was the unit of analysis for this study was then sampled using simple random method. This was done to remove any possibility of selfselection bias. Apart from eliminating any possibility of selection bias, the distribution of participants in the five study communities as shown in Table 3.1 below was based on direct proportionality. Thus, communities with greater number of participants in the PIEGF program had greater number of respondents selected more than those with smaller number of participants. The detail of the samples drawn from each community is shown in the Table below

Table 3.2 Distribution of beneficiaries in each study community

Community	Number Sampled
Walewale	31
Tinguri	19
Wulugu	25
Nasia	15
Wungu	14
Total	104

Source: Author's own computation from field data (2010)

In order to get the number of non - participants in each of the study communities, an inverse proportionality method was also employed. Thus, greater number of respondents was selected from communities that participated less in the PIEGF program. The reason for choosing this method was to ensure a fair distribution of respondents between the beneficiary and the nonbeneficiary communities. The results of the distribution of non-participants in each of the study communities are shown in Table 3.2 below.

Table 3.3 Distribution of non-beneficiaries in each study community

Community	Number Sampled
Walewale	26
Tinguri	37
Wulugu	34
Nasia	44
Wungu	55
Total	196

Source: Author's own computation from field data (2010);

3.7 Data Analysis

Presented below is a table which summarizes the objectives of the study, method used in analyzing data as well as the software.

Table 3.4 Objectives of study and method of data analysis

Objective	Method of Data Analysis	Software employed
1. Level of awareness of respondents about the PIEGF	Descriptive statistics such as means, pie charts, and frequencies were employed.	SPSS
2. Factors which influenced respondents access to the PIEGF	Logit Regression Model	STATA
3. The impact of the PIEGF on Household Income	Propensity Score Matching (PSM)	STATA
4. The impact of the PIEGF on household food security	Propensity Score Matching (PSM)	STATA

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter discusses the Descriptive results, such as gender of respondents, household size, awareness level of beneficiaries, and educational level among others. It concludes with detailed discussion of the Empirical Results with respect to the impact of the productivity Improvement and Employment Generation Fund (PIEGF) on house hold food security and Income.

4.1 Characteristics of Respondents

This section discusses the age, marital status, and gender of respondents. It also looks at how each of these demographic factors impacts on respondents as far as their access to and use of the PIEGF is concerned.

4.1.1 Age Distribution of Respondents

Results from the study showed that, majority of respondents fell within the economically active group (30-49 years). Specifically, 65 of the participants (62.50%) were within this age bracket whereas 85 of the non-participants (43.37%) also fell within same age bracket. This simply implies that, since most of the respondents were engaged in farming or any form of economic venture that requires a lot of energy. Only a few numbers of the aged and the juveniles were involved in participated in the fund (See Table 4.1 below)

Table 4.1 Age distribution of respondents

Age	Beneficiaries		Non-beneficiary		total
	Frequency	Percentage	Frequency	percentage	
18-29	15	14.42	35	17.86	50.00
30-49	65	62.50	85	43.37	150.00
50-59	12	11.54	52	26.53	64.00
≥ 60	12	11.54	24	12.24	36.00
total	104	100.00	196	100.00	300.00

Source: Author's own computation from field data

4.1.2 Marital Status

It was also observed that majority of the respondents are married (See Table 4.2 below). This obviously reflects the cultural values of the people in the communities involved in this study where a high premium is placed on one's marital status.

Table 4.2 Marital Status of Respondents

marital status	Beneficiaries		Non-beneficiary		Total
	Frequency	Percentage	Frequency	percentage	
Married	92	88.46	169.00	86.22	261.00
Divorced	4	3.85	5.00	2.55	9.00
Widowed	8	7.69	22.00	11.22	30.00
total	104	100.00	196.00	100.00	300.00

Source: Author's own computation from 2010 field data

The result reported in Table 4.2 above clearly indicates that most of the respondents in both Participants and non-participants were married (88.46 % and 86.22% respectively). The small percentage of divorcees and the widowed recorded from the study clearly leans credence to the claim that this group of people are often marginalised when it comes to resource distribution and utilisation.

Besides, in study area men are predominantly heads of households. Women only become household heads only if their husbands die and there is nobody in the family who is allowed to remarry her. More so it is generally believed that people who are married shoulder more responsibilities than the unmarried. It was therefore a matter of course that majority of those who benefitted from the program were married men or women. In the opinion of the elders in the communities, it was considered that, married people shoulder more responsibilities than their unmarried counterparts and hence needed to supplement their household incomes through participation in PIEGF program.

4.1.3 Gender of Respondents

With regards to gender, the results showed that, majority (55.77%) of the participants and 77.55% of non-participants were males while a few (44.23%) of females participated in the PIEGF program (See Table 4.3 above). This is because, according to the family system which is operated in the study area, males are predominantly heads of households and take charge of all issues pertaining to the family including all assets such as cattle, land among others.

These findings are not surprising because apart from farming being the predominant occupation in the area, the study also established that most (72.11%) of the participants of the PIEGF program used their credit on farming.

Table 4.3 Gender of Respondents

Gender	Beneficiaries		Non-beneficiary		Total
	Frequency	Percentage	Frequency	percentage	

Male	58	55.77	152	77.55	210.00
Female	46	44.23	44	22.45	90.00
Total	104	100.00	196	100.00	300.00

Source: Author's own computation from 2010 field data

4.1.4 Educational level of respondents.

This sub-theme considers the number of respondents involved in the study that had attained formal education. It is evident from the Table 4.4 below that; majority of both participants (69.23%) and 58.16% of non-participants involved in the study had very low level of formal education. Thus, whereas only a small number of participants (10.58%) had attended school up to of the primary level only slightly a few of non-participants had primary education (18.37%). Sadly enough less than 10% of the sample population (300) had attained tertiary education.

Table 4.4 Educational Level of Respondents

Level of education	Beneficiaries		Non-beneficiary		total
	Frequency	Percentage	Frequency	percentage	
None	72	69.23	114	58.16	186
Primary	11	10.58	36	18.37	47
JHS/Middle	11	10.58	23	11.73	34
SHS/Technical	5	4.81	13	6.63	18
Tertiary	5	4.81	10	5.10	15
Total	104	100	196	100	300

Source: Author's computation from field data (2010)

4.1.5 Household size of Respondents

From the study it came to light that both participants and non-participants had large household sizes. Specifically, the mean household size of 8.15 people/household for participants of the PIEGF program was slightly higher than the District average household size of 8 people /household (GSS, 2010). This finding of 8.15 persons per household is about 1.89% higher than eight recorded by the Ghana Population and Housing Census in the study area; indicating that

the population has risen marginally. This could be a major factor influencing demand for food and the difficulty in meeting its demand.

4.2 Farm Level Characteristics of Respondents

The Table below shows farm level characteristics of 75 respondents who used their credit on farming. These include farm size, farm distance, membership of farmer to Farmer Based Organisation (FBO) and number of extension contacts.

Table 4.5 Farm Level Characteristics of Respondents

	Male Household Characteristics		Female Household Characteristics	
	Beneficiary Mean	Non-Beneficiary Mean	Beneficiary Mean	Non-Beneficiary Mean
FarmSize (acre)	1.74	2.00	1.74	1.24
Farm Distance from home (Km)	4.50	4.50	3.50	3.50
Extension Contact (days/ Season)	3.00	2.00	3.00	2.00

Source: Own computation from Survey Data

It is observed that both beneficiaries and non- beneficiaries had average farm sizes of less than 3 acres. It is against this backdrop that farmers in the study area are said to be operating on subsistent levels. However, farm size expansion and farm commercialization would have motivated a farmer's participation in the PIEGF. Operating on subsistence basis, it was observed that both participants and non-participants farmed very close to their homes.

It is argued that, the number of contacts a farmer has with agricultural extension workers has a positive and significant impact on the adoption of a new technology or a farmer's decision to participate in a financial market. Through verbal interaction with participating farmers it was revealed that they belonged to farmer groups and therefore attracted the attention of the extension officers and hence had greater frequency of extension visits than their nonparticipating colleagues.

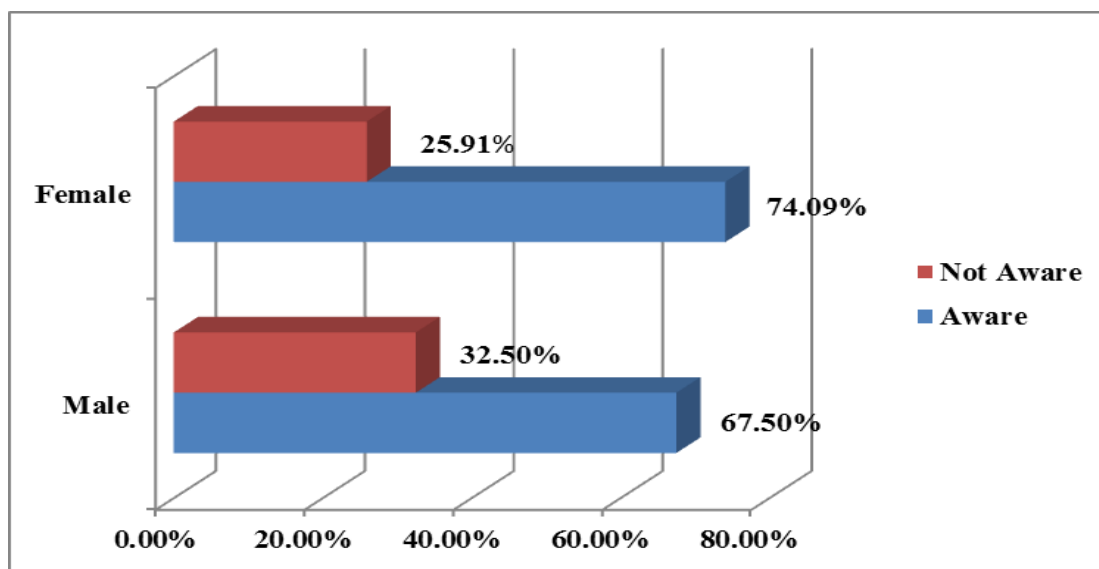
4.3 Services provided by the PIEGF program

The PIEGF program offered cash credit to beneficiaries to assist them procure seed and fertilizer. Besides, the cash received by participants also made it possible for them to pay for tractor services as well as the services of people who were hired to perform some farm level operations for the beneficiaries. Beneficiaries, who needed improved seed but did not know where to get them, were provided with the seed. In the same vein farmers who did not want to be given physical money or cash but needed to be provided with fertilizer, herbicides and pesticides were equally satisfied.

4.4 Respondents level of awareness of the PIEGF Program

Results from the study showed that, majority of males (67.50%) and females (74.09%) were knew about the existence of the PIEGF Program the year it was introduced into the District as indicated in Figure 4.1 below. This means that, enough publicity was done prior to the implementation of the PIEGF.

Moreover, the results are consistent with the normal adoption curve, which indicates that when a new innovation is introduced, the level of adoption increases steadily over time. Obviously, this describes as a normal adoption curve where the first people who adopt a technology are described as innovators. The second and third groups of people who are the majority are referred to as early and late adopters respectively whereas the last adopters are the laggards.



Source: Author's Computation from field Survey

Figure 4.1 Level of awareness of respondents about the PIEGF

Regarding source of information, the study revealed that respondents had information about the PIEGF from different sources. It was revealed that few of the respondents (7.5%) heard of the fund from the mass media which include the radio, television programmes and newspaper advertisements. Interestingly, majority of the respondents (84%) indicated that, they heard it from friends and relatives

4.4.1 Disbursement Criteria of the PIEGF

Before the fund was disbursed, prospective beneficiaries had to form five-member groups. Each group was made to submit their application to the project officer, proposing what they were going to use the credit for. Applicants were then required to go to the District Assembly for screening. This was done in order to establish the eligibility and credit worthiness of prospective clients.

Three weeks later, approved applicants clients were then made to go to the project officer of the disbursing bank where they were taken through loan disbursement procedures, expected rate of interest and penalty for default among others. They were made to open accounts with the Bank after they had come with two guarantors each per group.

Finally, the approved credit was then channelled through the groups' account. This process took exactly three weeks for beneficiaries to access the credit.

4.5 Perceptions of beneficiaries about the Disbursement Criteria of the PIEGF

On the implementation of the PIEGF, there were speculations that, it was targeted at assisting only supporters of the government of the day. Some respondents therefore showed a lukewarm attitude towards participation in the PIEGF program for the reason that the procedure involved in accessing the fund was fraught with delays and frustrating. This perception about the difficulty involved in accessing the PIEGF was confirmed when 65% of respondents admitted that they were not comfortable with the procedure involved; describing it as not only cumbersome but also time consuming (See Table 4.6 below). This gives strong backing to the bureaucratic tendencies which are often associated with formal financial institutions such as the PIEGF which serves as a disincentive for potential clients.

That the PIEGF was introduced to provide financial support to party supporters could not be established or substantiated from the results.

Table 4.6 Respondents perception about procedure of disbursing the PIEGF

Type of perception	Frequency	Percentage
Found procedure to be cumbersome and time consuming	68	65.38
Found procedure to be easy and comfortable	36	34.62
Total	104	100

Source: Researcher's own computation from survey data

4.6 Uses put to PIEGF by Beneficiaries

Results of the study revealed that, beneficiaries (participants) of the PIEGF used the money they had received to engage in four main income generating activities which included: farming, trading, industry and others. It was revealed that majority of the beneficiaries (72.11%) used the money received in farming whilst a minority (5%) used it on off-farm income generating

activities (See Table 4.7 below). These results were not strange because majority (80%) of the people in the study area are predominantly farmers (Adam *et al*, 2004).

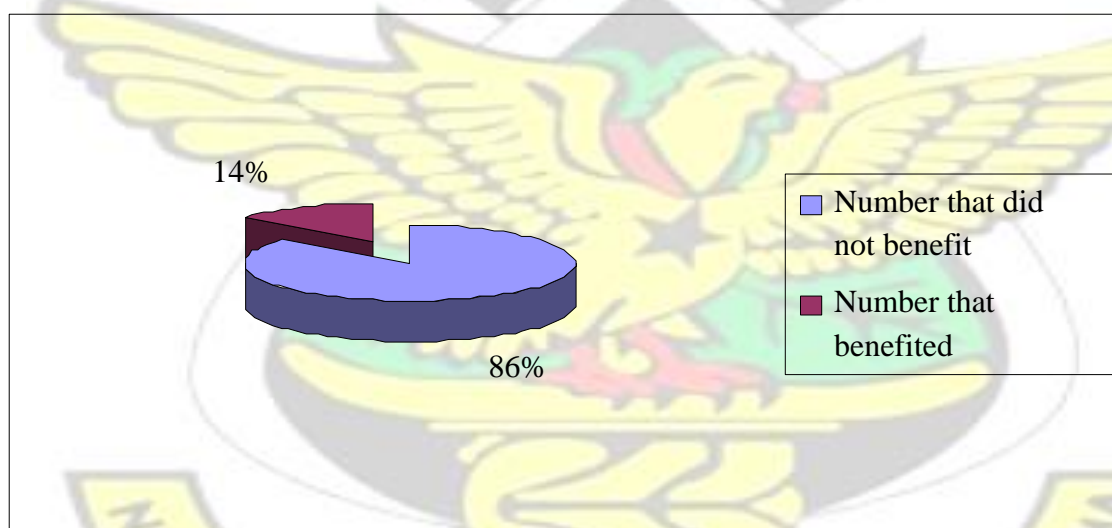
Table 4.7 Uses put to PIEGF by beneficiaries

Activity	Frequency	Percentage (%)
Farming	75	72.11
Trading	12	11.53
Industry	11	10.57
Off-farm	6	5.76
Total	104	100

Source: Researcher's own computation from survey data

4.6.1 Scope of disbursement of the PIEGF

Evidence from the study showed that, in the year 2009/2010, a total of 4,000 individuals applied for the credit. Out of this number, only 571 individuals representing (14.2%) benefited from the facility. (See figure 4.2below).



Source: Bangmarigu Community Bank

Figure 4.2 Proportion of respondents who benefited from the credit (2008/2009)

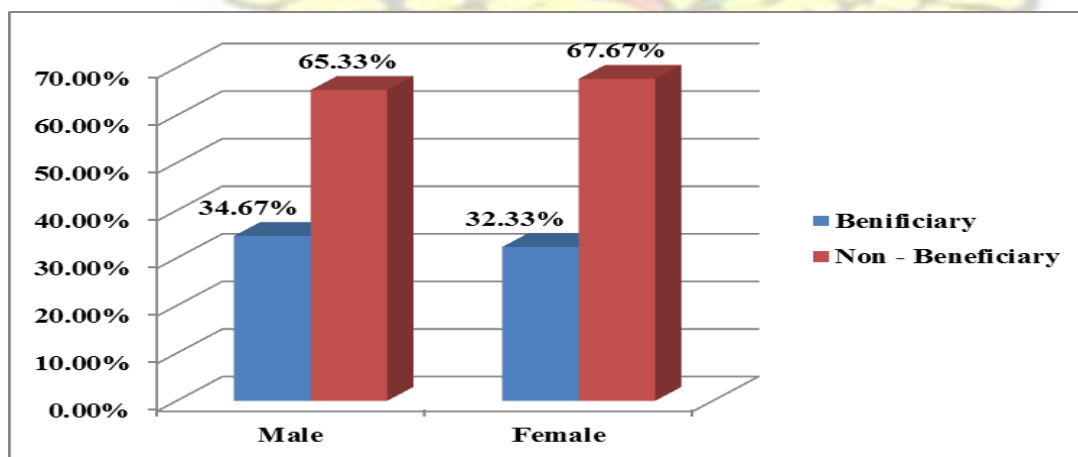
GSS (2010) results indicate that the proportion of male to female population in the West Mamprusi District is 83005 males against 85006 females. This indicates that, a proportion of 50.6% of the population are females. The study revealed that, minority of the beneficiaries was female (32.33%) whilst a slightly bigger number of beneficiaries (34.67%) were males. The

results of this study gives course for concern considering the key role women have played in the socio-economic development of many nations. Studies have also pointed out clearly that women have a good track record as far as loan repayment history was concerned Latiffee (2000).

Furthermore UNDP (1997) which was compiled in India maintained that, between 1993 and 1994, 86% of the population of women was in agriculture, compared with men (74%) who are engaged in the activity. The report argued that, since the poor engage more in agriculture, women constitute a large proportion of the marginalized groups.

The pattern of disbursement of the PIEGF in West Mamprusi District should serve as a wake - up call to policy makers and implementers to give due consideration to women when it comes to issues regarding formal financial services.

Based on information from the study and that of the Disbursing authorities of the PIEGF, a greater chunk of the population in the District have not yet participated in the program able to reach out to (see figure4.3 below).



Source: Author's own computation from field Survey

Figure 4.3 Proportion of respondents who benefited from the credit (2008/2009)

4.7 Empirical Results

The section presents the empirical results from the analysed data. Prior to presenting the model results, descriptive statistics on variables used in estimating the model are presented in Table

4.18 below. Although not statistically significant, beneficiaries of the PIEGF appeared to be relatively old compared to non-beneficiaries. Similar results were observed on the level of formal education. However, as much as eight out of ten of beneficiaries were members of local farmer-based organization.

Table 4.8 Descriptive statistics of variables which influence respondents' participation in PIEGF

<i>Variable Name</i>	<i>Variable Definition</i>	Beneficiary (N) =(104)34.67%		Non-Beneficiary (N) =(196)65.33%		<i>Diff In mean</i>
		Mean	S.d	Mean	S.d	
<i>INDEPENDENT VARIABLES</i>						
<i>Household characteristics</i>						
<i>AGE</i>	Age in years	43.83	12.59	40.44	15.78	3.39
<i>EDU</i>	Number of yrs of schooling	3.35	2.01	2.51	1.50	0.84
<i>FBOMEMB</i>	1=Member 0=Otherwise	0.83	0.39	0.30	0.16	0.53***
<i>HHS</i>	Household size	8.15	4.00	7.93	5.3	0.22**
<i>CHLD<18</i>	Children less than 18 years	4.47	2.45	2.12	2.38	0.35
<i>CHLD>18</i>	Children above 18	2.87	1.84	2.31	1.74	0.56
<i>NODEP</i>	Number of dependents	6.91	4.06	4.36	3.39	1.59**
<i>MRRD</i>	1=Married 0=Otherwise	0.74	0.45	0.61	0.49	0.13
<i>CREDACC</i>	1=Access 0=No Access	0.81	0.21	0.31	0.11	0.58**
<i>OFFINC</i>	1=Off farm income 0=otherwise	0.13	0.03	0.33	0.07	0.20**
<i>FRMSIZE</i>	Farm size in Hectares	1.74	0.82	1.24	0.61	0.50***

Source: Researcher's own computation from survey data

Beneficiaries of the PIEGF appeared to have high number of dependents. While on the average a beneficiary has about seven dependents, non-beneficiaries only have on average of three depending on them. Also, as much as eight of the beneficiaries had accessed credit while about

three had for non-beneficiaries. Beneficiaries cultivated larger farm sizes and also had accessed credit compared to non-beneficiaries.

4.7.1 Probit Results on Factors influencing participation in PIEGF

Using probit regression model, factors which determine respondents' decision to access the PIEGF were estimated. It can be observed from Table 4.9 below that, respondent's membership to a farmer-based organisation exerts a positive and highly significant impact on participation in the PIEGF. This is so because since the fund was disbursed on group basis, it becomes much easier for a respondent belonging to such organisation to mobilise and access the fund as compared to respondents who did not belong to any organised association.

Table 4.9 Probit results on factors which influence participation in PIEGF

Variable	Coefficient	Std. Error	Z – Value	P-Value
Household Characteristics				
AGE	0.1244***	0.0466	2.67	0.008
AGE ² /100	-0.1074**	0.0457	-2.35	0.019
EDU	0.0377*	0.0225	1.67	0.094
FBOMEMB	1.3264***	0.2279	5.82	0.000
NODEP	0.0548*	0.0309	1.77	0.076
CHLD<18	0.0187	0.0501	0.37	0.710
CHLD>18	-0.0345	0.0409	-0.84	0.400
MRRD	0.3411	0.3778	0.90	0.367
CREDACC	-0.0591	0.1160	-0.51	0.610
OFFINC	-0.1679	0.2586	-0.65	0.516
FRMSIZE	0.4044***	0.1464	2.67	0.006

Pseudo - R^2 0.3616 LR Chi2 (20) 107.39 Prob> Chi2 Observation 300 Log likelihood -94.8084 * Significant at 10%; ** Significant at 5% and *** Significant at 1% Source: Authors' computation.

Source: From Researcher's own computation from field data

More so, it was revealed that farmers with greater number of dependents or large household sizes have a higher propensity to participate in the PIEGF than those with smaller household size. It is in view of this that this factor was also significant at 1%.

Again, it is a known fact that farmers who engage in off-farm income generating activities tend to have a greater urge of participating in formal credit markets than those who are not. It is in the light of this that this factor was found to be highly positive and significant at 5%.

One other factor which greatly influences a respondent's decision to participate in the PIEGF program was farm size. It is obvious from empirical studies that, the size of a farm varies directly with the quantity of fertilizer, weedicides, number of labour required of the farmer in question. This therefore means farmers with large farm sizes require more credit to be able to execute all the needed farming operation in order to maximise output. It is against this backdrop that this factor was observed to impact positively and significantly (1%) on a farmer's decision to participate in the PIEGF program.

Impact of PIEGF on participants

The average household income for participants was GH¢1,200.00, while the corresponding figure for non-participants was GH¢830.00. The mean difference of 0.37 which is highly significant at 1% implies that participation in the PIEGF program impacts positively on one's household income level as compared to non-participation in the program. The average household food stock for farmers who participated in the PIEGF program was 1.154 tonnes and that of non-participants was 0.808 tonnes with a mean difference of 3.46*** which is also highly significant at 1%. This simply implies that one's participation in the PIEGF program has led to an increase in household food stock status than non-participation. In sum, the PIEGF has impacted greatly on participants' household income and food security status than non-participation. These results are seen in Table 4.10 below .

Table 4.10 Comparing outcome variables of beneficiaries and non-beneficiaries of PIEGF

Variable Name	Variable Definition	Beneficiary (N) =(104)34.67%		Non-Beneficiary (N) =(196)65.33%		Diff In mean
		Mean	S.d	Mean	S.d	
Treatment variable/PIEGF	1=Beneficiary 0=Otherwise					
Outcome variable						
HHFS	Food Qty/100Kg left	11.54	4.43	8.08	4.05	3.46***
HHINC	Household Income (C/000)	1.20	0.47	0.83	0.41	0.37***

Note: t-values in parentheses

* Significant at 10%, ** Significant at 5% and *** Significant at 1%

Source: Researcher's own computation from survey data

4.7.2 Empirical Results on impact of the PIEGF on income and food security

The probit model was employed in the prediction of the propensity scores for the participants in the PIEGF program. The common support condition was imposed and the balancing property was set and satisfied in all the estimated regression models at 1% level of significance. The distributions clearly indicate that estimating the *p*-score helps in making the treated and control groups similar than without the *p*-score analysis.

The empirical results on the Average Treatment Effect on the Treated (ATT) for both maleheaded and female-headed households, all estimated with the nearest neighbour matching (NNM) algorithm are presented in Table 4.11 below. Generally, the matching results indicate robust positive and significant effects of the PIEGF program on household welfare and food security status. Specifically, the causal effects of male participation in the poverty alleviation program for beneficiaries is 1.97, suggesting that participating in the PIEGF program assisted in raising the household income of males by GhC 1970. The reduction in mean absolute standardized bias from 24.98 to 9.5 indicates a substantial reduction in bias as a result of the matching technique. Also male participation in the PIEGF program helped increased the

household food stock by 0.182 tonnes. The absolute bias reduction in this case, is 63.98% which is quite substantial. Similarly, the magnitude of the coefficient of the ATT suggests that participating in the PIEGF program increased the household income of females by GhC 3180. The causal effect of females' participation in the PIEGF program is 0.262 tonnes of food stock which was in stock for the household during the hunger or lean season. A reduction in mean absolute bias of 22.2 to 7.9 is an indication that, by choosing the matching algorithm and propensity score estimation, the covariates were balanced. The logic here is that, the income and food security gained from participating in the PIEGF fund were slightly higher for households with a higher probability of benefiting than households that did not benefit from the PIEGF. This therefore suggests that, the PIEGF has impacted positively on participants' food security status as well as their income levels as compared to their counterparts who did not participate in the PIEGF program.

Table 4.11 Treatment Effects and Sensitivity Estimates

Gender	Outcome variable	ATT	Critical value	Treated		Control	
				On-support	Offsupport	On-support	Offsupport
Male	HHFS	1.82* (1.91)	1.73	59	-	241	-
	HHINC	1.97** (1.93)	1.40	52	8	148	92
Female	HHFS	2.62* (1.87)	1.54	48	12	223	17
	HHINC	3.18** (1.91)	1.68	33	26	124	117

Source: Authors Computations (Note: t-Values in parentheses; * Significant at 10%, ** Significant at 5% and *** Significant at 1%)

As noted by Hujer et al. (2004), the Rosenbaum bounds are computed only for treatment effects that are significantly different from zero. Results from the sensitivity analysis on hidden bias, which show the critical levels of gamma (γ) at which the causal inference of significant beneficiary impact may be questioned are also Presented in Table 4.12 below. For example, the

value of 1.40 for male beneficiaries implies that if households that have the same Z –vector differ in their odds of benefiting by a factor of 40%, the significance of the participation on income may be questionable. The lowest critical value of $C = 1.40$ and the highest critical value $C = 1.73$ clearly indicate that even large amounts of unobserved heterogeneity would not alter the inference about the estimated treatment effects, indicating that the results are generally insensitive to hidden bias.

The figures presented in Table 4.12 below demonstrate the bias in the distribution of the propensity scores between the groups of beneficiaries and non-beneficiaries of the PIEGF.

They clearly reveal the significance of the propensity score matching and the imposition of the common support condition to avoid bad matches. It is quite clear from the matching that benefitting from the PIEGF exerts a positive and significant effect on the productivity and household income of beneficiaries. Specifically, the causal effects of participating in the program in terms of food stock left /household was 0.262 tonnes while that of nonparticipants was 0.186 tonnes. This clearly suggests that, yields from participants were much higher than those of the non-participants. The results are consistent with the findings by Qaim & Zilberman (2003) for different states of India, where trials showed that BT cotton increased yields and also contributed significantly to poverty reduction among participants.

The results generally reveal that even within different farm size groups benefitting from the PIEGF, tend to impact positively and significantly affect productivity with the impact declining with increasing land ownership. The same goes for the income effect on beneficiaries which is consistent with earlier observations of positive relationship between size of land and household income. These results are consistent with (Mendola, 2007) who conducted a research in Bangladesh and observed that introducing an innovation increased farmers yield hence reducing poverty among participants.

It is also worth mentioning that, benefitting from the PIEGF exerts a negative and statistically significant impact on poverty among farmers despite the income effect of being greater for larger farmers.

4.7.3 Indicators of Matching Quality

In using the PSM, a Sensitivity analysis is usually performed to estimate the magnitude of the selection bias with non-experimental data. The study employed the bounding approach suggested by Rosenbaum (2002). The presence of hidden bias implies that two individuals with the same observed covariance would have different chances of receiving treatment.

More so, the Matching algorithm employed in this study is the Nearest Neighbours Matching (NNM). This method was chosen because; it matches only the participants with their closest neighbours. Consequently, hidden bias due to efficiency loss is minimized. The results of the matching quality employed in this study are reported in Table 4.12 below.

Table 4.12 Indicators of matching quality before and after matching

Gender	Outcome variable	Pseudo-R ² (Unmatched)	Pseudo-R ² (Matched)	_ Bias (Unmatched)	_ Bias (Matched)	Bias Reduction
Male	HHFS	0.363 (0.000)	0.025 (0.716)	24.71	8.90	63.98
	HHINC	0.369 (0.005)	0.013 (0.104)	24.98	9.50	61.97
Female	HHFS	0.257 (0.005)	0.051 (0.987)	22.20	7.19	67.61
	HHINC	0.261 (0.005)	0.043 (0.233)	19.62	11.57	41.30

Source: Author's own computation from field survey

The indices of matching quality presented in Table 4.12 above shows substantial reduction in absolute bias for the entire outcome variables for both male and female beneficiaries. As indicated in the last column of the Table 4. 12, the mean bias in the covariates Z after matching lies below 20% level of bias reduction as suggested by Rosenbaum and Rubin (1985). This indicates that the covariates were significantly balanced as a result of the propensity score

matching procedure. Besides, the pseudo- R^2 s after matching are averagely low with none of the diagnostic statistics being significantly different from zero, suggesting that the overall results from the matching procedure are satisfactory in balancing the covariates among the beneficiaries and non-beneficiaries (Sianesi, 2004; Becerril and Abdulai, 2010).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter gives a summary of the major findings of the study and proffers policy recommendations on the way forward.

5.1 Summary and Conclusion

The study examined the impact of the Productivity Improvement and Employment Generation Fund (PIEGF) program which was initiated by the Government of Ghana on household income and food security status. A cross-sectional data was collected on 300 farm households in five rural communities of West Mamprusi Districts. To eliminate any possibility of Self-selection bias due to non-random assignment of participants into the poverty reduction program the Propensity Score Matching (PSM) approach was employed.

The estimated average treatment effects (ATT) of household welfare and food security status for females were found to be statistically higher than that of males, indicating gender heterogeneous effects regarding pro-poor intervention programs toward poverty alleviation. The results from the PSM analysis also showed that, farmers who participated in the PIEGF tended to spend more on variable inputs than the non-participants and hence were better off in terms of food and income security. A mean difference of 1.54 tonnes of food quantity left (household food security) per household in the effects of treatment beneficiaries in the hunger

season 0.808 tonnes of food stock left per household in the case of and nonbeneficiaries which was statistically significant at 1% level indicating the presence of heterogeneous effects. The results also showed that, the observed difference of GHC 370.00 of household income in the effects of treatment male beneficiaries (GHC 1,200.00) and nonbeneficiaries (GHC 830.00) is statistically significant at 1% indicating that there were heterogeneous effects. This suggests that the PIEGF had a positive impact on participants' house hold income and food security.

The propensity score results also indicated that, factors such as age, family size, farm size, education, FBO membership and off-farm income played a major role in respondents' decision to participate in the PIEGF program.

The study also revealed that, majority of the respondents had no formal education and could not appreciate information published in the print or mass media. This unfortunate development is exacerbated by the infrequent extension visits and the hence the lack of regular training. An issue which is translated into poor yield recorded by farmers in the catchment area and thus, posed a serious hunger threat to the people.

The study indicated that enough publicity was prior to the implementation of the PIEGF program in the area. This was evident in the number of respondents who knew about the existence of the program in the West Mamprusi District. A good number of respondents also acknowledged that, the PIEGF has made tremendous contribution to their household welfare and food security status of the people in the study District.

Despite the great impact the PIEGF has made on participants in the beneficiary communities in the West Mamprusi District, its scope of coverage is nothing to write home about. Evidence from this study clearly pointed out that, about eighty six (86%) of the people had not accessed the credit yet although they were much interested in it. This poses a serious threat to the sustainability of the program.

More disturbing also is the fact that, the program is said to have been fraught with unnecessary bureaucratic procedures and hence time consuming. Thus, majority of respondents (65%) were displeased with the procedure followed in accessing the credit whilst 35% of respondents thought otherwise.

In the light of the above challenges which threatened the sustainability of the PIEGF program the following recommendation have been proposed.

5.2 Policy Recommendations

Agriculture, being the engine of growth for most developing nations including Ghana, it is imperative that, successive governments pay a great deal of attention to it if its quest to becoming a middle income country is to be achieved. In the light of this, the following recommendations are proposed.

It was evident from the study that, farmers who were engaged in off-farm income generating activities, did not only realise an increase in their household incomes but also an improvement in their food security status. In the light of this, farmers should be encouraged through seminars and farm visit by extension officers to take part in off-farm income generating activities since it contributes positively to their welfare. This will give them the leverage to increase their participation in formal financial markets such as the PIEGF. To whip their interest in off-farm income generating activities, Government and Non-Governmental Organisations (NGOs) that work to empower farmers' livelihoods should provide regular training to farmers on off-farm income generating activities.

The desired effect of the PIEGF will only be realized if the PIEGF could be disbursed timely and its volume increased for small holder farmers. This should be followed by constant monitoring and education by extension workers.

The low level of formal education of respondents as the study revealed has a telling effect as far as the growth of the Agricultural sector as well as poverty reduction efforts are concerned.

This is because a farmer's readiness to adopt a new agricultural technology correlates positively with his/her level of academic attainment and vice versa. To address this hydraheaded concern, it is recommended that government trains more extension officers and deploy them to the deprived district nationwide. These trained extension officers will not only help in building the capacity of farmers but also assist them through regular farm visits, monitoring and evaluating their activities to improve farmers' efficiency.

The study revealed that most beneficiary who used the loan for farming activities were either very old or in their middle ages. With the exception of only few members of households who were above 18 years and were not enrolled in school that assisted their parents on their farms. This is a rather unfortunate development considering the fact that, farming is a backbreaking exercise. This paints a gloomy picture about the future of agriculture and hence poses a serious security challenge considering the pivotal role played by the sector as major export earner. To reverse the trend it is recommended that farming be made attractive to the youth even at the school level. Teachers who use weeding as punishment to erring students should discontinue the practice. Rather, Government and other stakeholders should introduce an incentive package for youth who embrace farming. More so, scholarship schemes should be given to students who pursue agriculture to the higher levels to pursue courses abroad. This will go a long way to entice the youth into this all important area and make them debunk the erroneous notion that agriculture is meant for only the illiterate folk and the elderly.

Also, farm size expansion and commercialization policy will improve farmers' participation in formal financial services. To ensure this, government should take it upon itself to provide inputs

at subsidised prices to farmers to be able to expand their areas of farm lands put under cultivation.

Furthermore, available financial institutions should increase their coverage and relax their disbursement criteria to make the formal financial sector more attractive to farmers.

Finally, Ministry of Food and Agriculture (MoFA) should be up and doing by ensuring that their extension workers embark on regular farm visits to help monitor and supervise the activities of farmers. This will equip farmers with the requisite knowledge and skills to embrace modern and better methods of farming.

5.3 Limitations of the study and suggestions for future research

This research, like any other, was not without its fair share of challenges. Thus, in an attempt to gather the data for this study, one was bedevilled with myriads of daunting challenges. Some institutions were unable to trace some relevant documents concerning the Fund under review.

Additionally, some of the respondents had divergent views about the exercise. Whilst some thought it was meant to find out about their economic wellbeing and hence provide a panacea to their economic woes, others saw it as a witch hunting exercise. Clouded by this thought therefore, some of them were suspicious and sometimes gave conflicting information, thereby making it difficult for the researcher to be certain which information was authentic.

In some of the study communities visited, respondents demanded to be paid some allowance before they could volunteer any information to the researcher. It therefore took a great deal of patience and persuasion to get this calibre of people change their stance. This attitude exhibited by some of these respondents made the whole data collection exercise not only stressful but also frustrating.

Securing financial support to travel to all the communities covered was a problem.

Consequently, samples were drawn from within the same neighbourhood in each of the five communities under study. Notwithstanding these daunting challenges, the data collected were reliable enough to make the results dependable.

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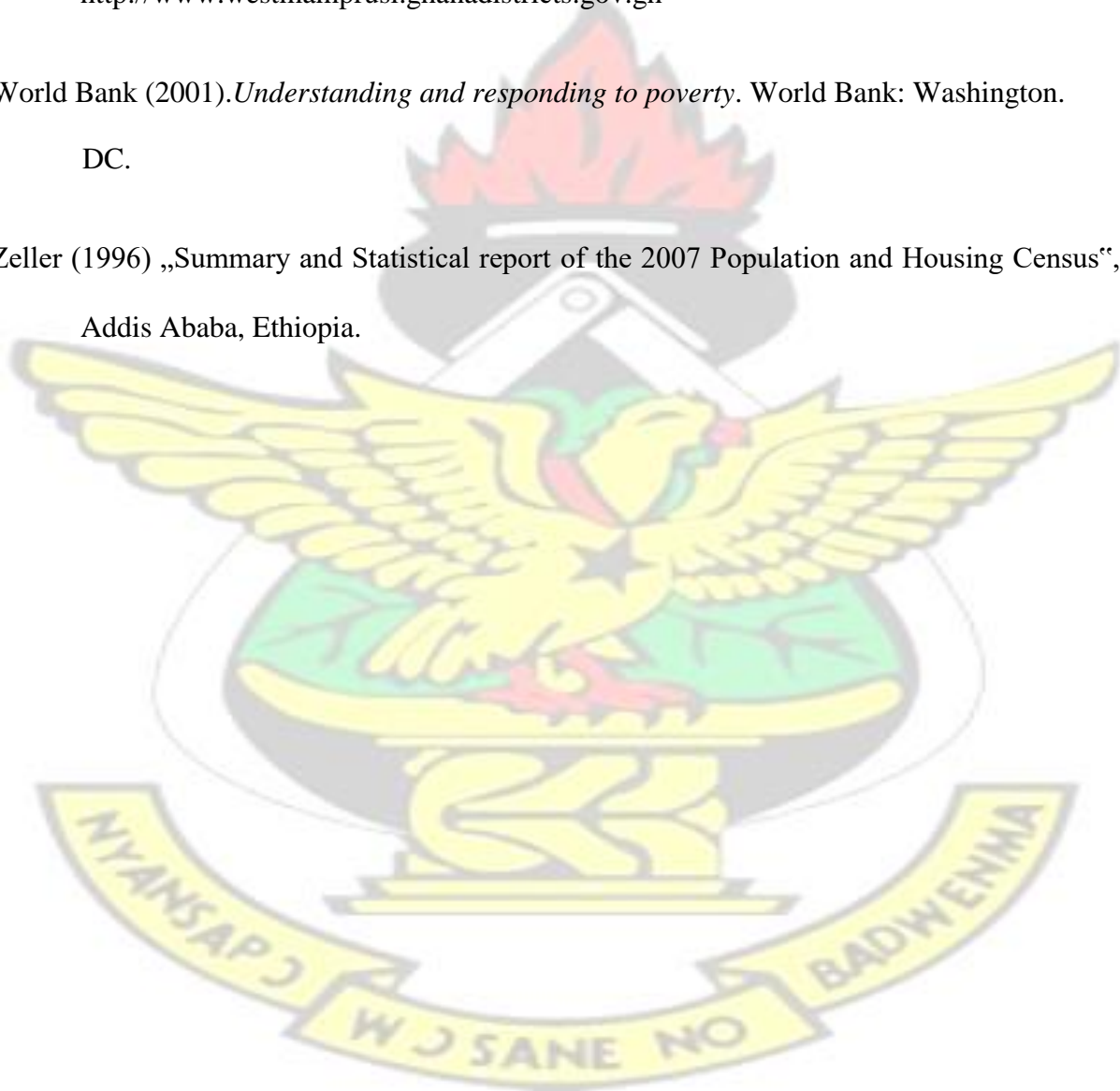
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APPENDICES

APPENDIX 1

Table A. Probit estimates of propensity score for males' participation in PIEGF

Variable	Coefficient	Std. Error	Z – Value	P-Value
Household Characteristics				
MAGE	0.1244***	0.0466	2.67	0.008
MAGE ² /100	-0.1074**	0.0457	-2.35	0.019
MEDU	0.0377*	0.0225	1.67	0.094
FBOMEMB	1.3264***	0.2279	5.82	0.000
NODEP	0.0548*	0.0309	1.77	0.076
CHLD<18	0.0187	0.0501	0.37	0.710
CHLD>18	-0.0345	0.0409	-0.84	0.400
MRRD	0.3411	0.3778	0.90	0.367
CREDACC	-0.0591	0.1160	-0.51	0.610
OFFINC	-0.1679	0.2586	-0.65	0.516
FRMSIZE	0.4044***	0.1464	2.67	0.006
Household Assets				
IFTV	0.3928	0.3723	1.06	0.291
IFRAD	0.1661	0.3642	0.46	0.648
IFBIKE	0.4345*	0.2588	1.68	0.093
IFMOTOR	0.9245***	0.3363	2.75	0.006
IFGOAT	0.0573	0.3663	0.16	0.876
Location Characteristics				
TINGURI	0.3183	0.5802	0.55	0.583
NASIA	-0.0328	0.6017	-0.05	0.957
WULUGU	0.2953	0.5593	0.53	0.597
WALEWALE	-0.3441	0.6193	-0.56	0.579
CONSTANT	-6.8138	1.4420	-4.73	0.000
Pseudo - R ²	0.3630	LR Chi2 (20)	107.82	Prob> Chi2
Observation	300	Log likelihood	-94.595	0.0000

* Significant at 10%; ** Significant at 5% and *** Significant at 1% Source: Authors' computation

Table B: Probit estimates of propensity score for females' participation in PIEGF program

Variable	Coefficient	Std. Error	Z – Value	P-Value
Household Characteristics				
FAGE	0.1264***	0.0464	2.73	0.006
FAGE ² /100	-0.1094**	0.0453	-2.41	0.016
FEDU	0.0365	0.0224	1.63	0.103
FBOMEMB	1.3257***	0.2274	5.83	0.000
NODEP	0.0535*	0.0307	1.75	0.081
CHLD<18	0.0164	0.0496	0.33	0.741

CHLD>18	-0.0289	0.0399	-0.72	0.469
MRRD	0.3324	0.3761	0.88	0.377
CREDACC	-0.0632	0.1160	-0.54	0.586
OFFINC	-1.0756***	0.3052	-3.52	0.000
FARMSIZE	0.4107***	0.1455	2.82	0.005
Household Assets				
IFTV	-0.4108	0.3729	-1.10	0.271
IFRAD	0.1695	0.3632	0.47	0.641
IFMOTOR	-0.9242***	0.3328	-2.78	0.005
IFGOAT	0.0166	0.3598	0.05	0.963
Location Dummies				
TINGURI	0.3121	0.5791	0.54	0.590
NASIA	0.0129	0.6003	-0.02	0.983
WULUGU	0.2816	0.5589	0.50	0.614
WALEWALE	-0.3425	0.6194	-0.55	0.580
CONSTANT	-5.8210	1.3343	-4.36	0.000

Pseudo - R^2 0.3616 LR Chi2 (20) 107.39 Prob> Chi2 Observation 300 Log likelihood -94.8084

* Significant at 10%; ** Significant at 5% and *** Significant at 1% Source: Authors' computation.

APPENDIX 2

PRODUCTIVITY IMPROVEMENT AND EMPLOYMENT GENERATION FUND AND FOOD SECURITY IN WEST MAMPRUSI DISTRICT OF NORTHERN GHANA

HOUSEHOLD QUESTIONNAIRE

Identity of respondent.....

District.....

Village/Community.....

Date of interview.....

Personal Characteristics

Age of respondent:

Gender; male () female ()

Educational Level; Primary () JHS/Middle () SHS/Vocational () Tertiary () None ()

Other; specify.....

Marital status: married () Single () Divorced () Widowed ()

Religion: Islam () Christianity () Traditional () Other; Specify.....

Ethnicity: Mamprusi ()Dagomba()Mossi()Kasena () other; specify.....

Household Characteristics

a. Do you belong to any farmer based organization? Yes ()No ()

b. If yes to 7, do you get any financial assistance from the group? YesNo

a) How many people are in your household?

b)State the number of children you have.....

c. How many of the children are above 18 years?

d. How many of your children are less than 18 years?

e. How many people in your household are dependants or not working?.....Household

Assets/Wealth

A. livestock wealth

Assets	2003			2004		
	Quantity	Quantity	unit price	Quantity	Quantity	unit price
	Sold (kg)	consumed	(Gh ¢)	sold (kg)	consumed	(Gh ¢)
Sheep						
Goats						
Pigs						
Rabbits						
Chicken						
Guinea fowls						

B. household physical assets

Physical Assets	2003	2004

	Quantity	unit price(Gh ¢)	Quantity	unit price(Gh ¢)
Television				
Radio set				
Bicycle				
Motor bike				
Hoe				
Cutlass				

Plot Level Characteristics

9. How many acres of land do you cultivate?
10. How far is your farm from your home? (Km)
11. What is the nature of your plot? flat () Hilly () Other; specify.....
12. What is the soil type in your farm? Loam () sandy () sandy loam () Clay loam ()
13. What is the fertility level of your plot? Very fertile () Fertile () Poor () Very poor ()
14. How do you acquire your Land for farming? Family (matrilineal / matrilineal. ()
Community () Inherited () Hired ()
15. How do you prepare your plot for crop cultivation? Slash and burn () zero tillage ()
Plough with bullocks () Plough with tractor () other; specify.....
16. Please, fill the spaces provided in the table below on resources available to the farmer

Type of input	Quantity	unit price (Ghcedis)
Fertilizer(Kg)		
Seed(Kg)		
Pesticides (Litres)		
Weedicides (Litres)		
Other, specify.....		

17. Fill in the table below on labor inputs based on gender

a) Family labor input

Farm Operation	Males			Females		
	No.	of Days	man-	No.	of Days	man-days
	persons		days	persons	worked	
Weeding						
Ploughing						
ridging/mounds						
planting/sowing						
Harvesting						

(b) Hired labor input

Farm Operation	Males	Females
----------------	-------	---------

	Persons	Days	man- days	Unit Cost of labour (GH¢)	Persons	Days worked	man- days	Unit Cost of labour (GH¢)
Weeding								
Ploughing								
ridging/mounds								
planting/sowing								
Harvesting								

Output from the farm

18. Fill in the spaces provided in the table below

	2003			2004		
	Land (acres)	Output	Unit price (GH¢)	Land (acres)	Output	Unit price (GH¢)
Groundnuts						
Beans						
Bambara beans						
Maize (bags)						
Millet						
Rice						
Sorghum						
Yam						
Potato						

D. Off-farm activities

19.a) Apart from farming, did you engage in any income generating activity during the offseason? Yes () No ()

b) If yes, indicate the non-farm activity you engaged in 2003 and 2004

<i>Type of activity</i>	<i>2003</i>		<i>2004</i>	
<i>wage employment</i>	<i>Monthly/daily wage(GH¢)</i>	<i>number of days worked</i>	<i>Monthly/daily wage(GH¢)</i>	<i>number of days worked</i>
1.				
2.				
3.				
4.				



APPENDIX3

PRODUCTIVITY IMPROVEMENT AND EMPLOYMENT GENERATION FUND AND FOOD SECURITY IN WEST MAMPRUSI DISTRICT OF NORTHERN GHANA

QUESTIONNAIRE FOR THE DISTRICT ASSEMBLY

1. (a) When was the Productivity Improvement and Employment Generation Fund (PIEGF) established?.....
2. How many years did it run in the district?
3. Who were the multilateral donors of the fund? Was it government/the district assembly itself/world bank/IMF or WHO?
.....
.....
.....
2. What were the goals of the Productivity improvement and Employment Generation Fund?
.....
.....
.....
.....
.....
.....
.....
3. What were the objectives of the Productivity Improvement and Employment Generation Fund?
 - i).....
.....
 - ii).....

.....
iv).....

.....
v).....

.....
4. Who were the target beneficiaries of the PIEGF Programme?

i).....

ii).....

iii).....

IV.....

5 What criteria did your District use in selecting the beneficiaries?

i).....

ii).....

iii).....

iv).....

6. What were the problems encountered in selecting the beneficiaries?

i).....

ii).....

iii).....

.....
iv).....

.....
7. What were the achievements of the Productivity Improvement and Employment Generation Fund?

i).....

ii).....

iii).....

iv).....L.....

8. What were the challenges of the PIEGF?

i).....

ii).....

iii).....

iv).....

9. Please, fill in the spaces provided in the table below

Disbursement of Productivity Improvement and Employment Generation Fund in 2009 2010

Year	No applicants	of No. approved applicants	of Volume loan disbursed (GH Cedis)	of Interest Rate Recovery Charged	Rate
2009					
2010					

APPENDIX 4

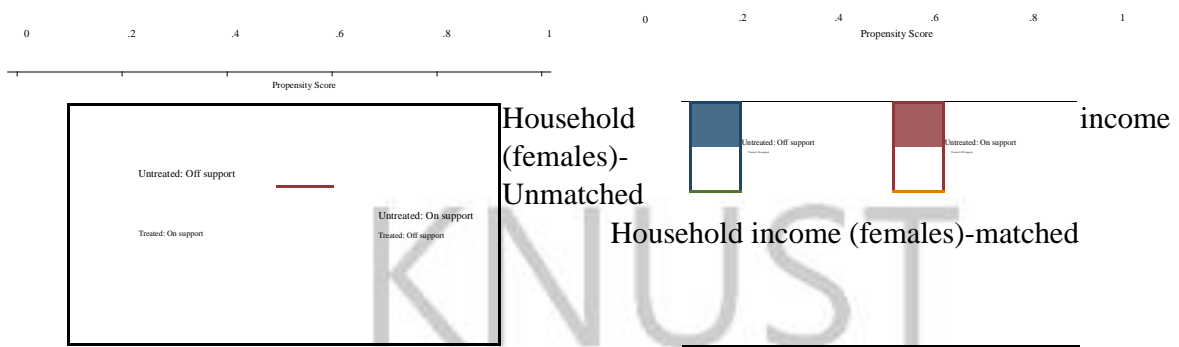


Figure Indicates indices of matching quality of participants

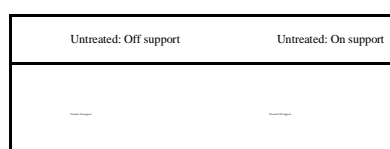
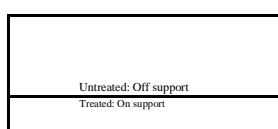
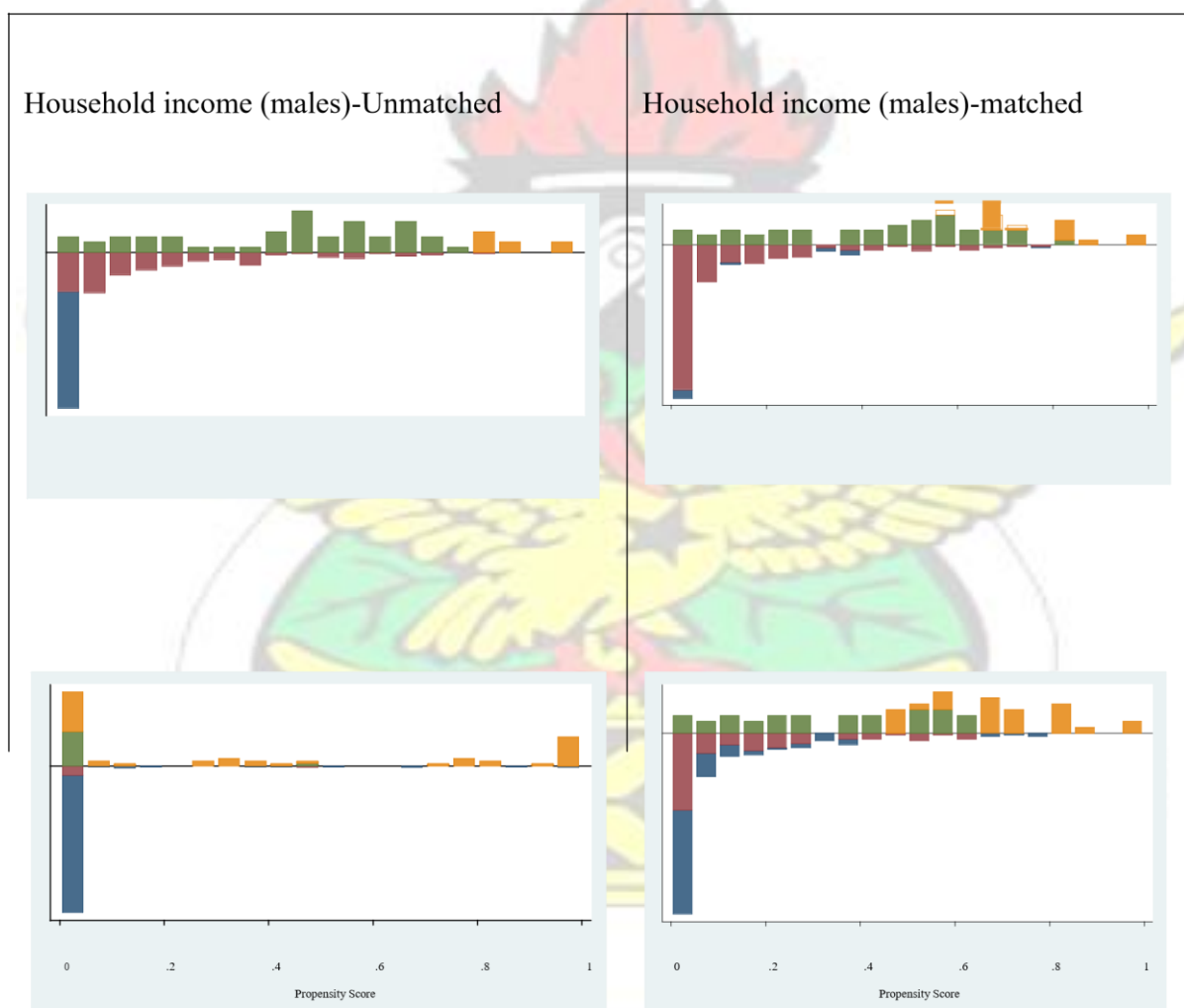




Figure A1. Impact on household income

