UNIVERSITY OF CAPE COAST

FARMERS' PERCEPTION OF THE EFFECTIVENESS OF MILLENNIUM CHALLENGE ACCOUNT TRAINING AND CREDIT ON MAIZE FARMERS' PERFORMANCES IN THE KWAHU NORTH DISTRICT OF EASTERN REGION, GHANA

BY

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been submitted for any degree in this University or elsewhere.

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SUPERVISORS' DECLARATION

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidance of supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature ---------- Date ----------

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ABSTRACT

Ghana's agriculture continues to suffer rudimentary practices by majority of smallholder farmers who also lack credit. It was for this reason that part of the US Millennium Challenge Account was committed to smallholders' training as well as credit for agriculture modernization and poverty reduction; hence this study to explore farmers' perception of the effectiveness of the MCA training and credit on maize farmers' performances in the Kwahu North district of Eastern region of Ghana.

This study employed a descriptive –correlation survey research design and structured interview schedule to work with a sample size of 120 comprising of maize farmers from the study area. Data analysis was done using statistical procedures to generate frequencies, percentages, means, standard deviation, paired sample t-test and independent sample t-test, to describe the outputs of data.

Farmers' identified constraints to better performance included poor access to credit, marketing and mechanized services, erratic rainfall, and labour unavailability. Farmers generally perceived the training sub-component of the MCA compact to be more effective in helping increase their maize output more than the credit by its users. Farmers also well adopted improved farming practices after MCA compact implementation but farmers without credit tend to outperform those with credit. Results also revealed that more middle aged men than women with low educational levels but well experienced enjoyed the MCA credit whiles the female farmers had higher perception of the overall effectiveness of the MCA components than the male farmers.

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DEDICATION

To my dear husband Reverend Emmanuel Darku and loving children John Elorm Darku, Abigail Dede and Hannah Gyemfi.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

CDFO	Commercial Development of Farmer Based Organizations
CF	Chemical Fertilizer
CIDA	Ghana-Canadian International Development Agency
CIMMYT	International Maize and Wheat Improvement Center
CMC	Central Management Consultant
FAO	Food and Agriculture Organization
FASDED	Food and Agriculture Sector Development Policy
FBO	Farmer Based Organization
GDP	Gross Domestic Product
GGDP	Ghana Grains Development Programme
GPRS	Ghana Poverty Reduction Strategy
IBRD	International Bank for Reconstruction and Development
IFAD	International Funds for Agriculture Development
IFPRI	International Food Programme Research Institute
ILEIA	Centre for Learning on Sustainable Agriculture
MCA	Millennium Challenge Account
MCC	Millennium Challenge Cooperation
MDG	Millennium Development Goals
METASIP	Medium Term Agriculture Sector Investment Plan
MIDA	Millennium Development Authority
MOFA	Ministry of Food and Agriculture
MV	Modern Variety

OSUE	Ohio State University Extension
PAF	Poverty Alleviation Fund
PASW	Predictive Analytics Software
RCP	Rural Credit Promotion
SIF	Social Investment Fund
SRID	Statistical Research and Information Directorate
SPSS	Statistical Product and Service Solution
US	United States
VLTC	Volta Lake Transport Company

CHAPTER ONE

INTRODUCTION

Background to the Study

Improving the productivity, profitability, and sustainability of smallholder farming is the main pathway out of poverty in using agriculture for development (World Bank, 2007). People engaged in smallholder agriculture are an important focus for development assistance, because they comprise a large percentage of those involved in agriculture. In most African and Asian countries, over 75 percent of farms are smallholdings, and smallholder activities provide employment for over 1.3 billion people world-wide (Wiggins, 2008).

In Ghana, agriculture plays important roles among which include the provision of food security and raw materials for industries, creation of employment and the generation of foreign exchange. The agricultural sector contributes as high as 39 percent of GDP (METASIP, 2010). About 50 percent of the country's total agriculture output is predominantly on smallholder family-operated using rudimentary technology with the majority of them being among the poorest households in Ghana (MOFA-SRID, 2008).

The importance of agriculture in the economy of Ghana cannot be over emphasized. The numerous contributions of agriculture as mentioned above show clearly that it has the potential to be the driver of economic growth for the country. The main staple crops produced in Ghana are maize, rice, cassava, yam, and plantains which are consumed across the country.

Of an estimated five million small scale farmers in Ghana, more than one million (20%) gain their main income from the production of maize. However, production is inefficient and rudimentary. Improved seed use is low, as is fertilizer use and husbandry methods are lacking as are post harvest handling and storage methods (MOFA, 2007). It is realized that by virtue of the broad based nature of staple crop production; they can generate faster growth and poverty reduction.

Kwahu North district is the largest district in the Eastern region of Ghana and is also one of the 'food baskets' in the country. Greater part of the district experiences unimodal rainfall and therefore maize production becomes very imperative to farmers who depend on the maize as both staple and cash crop. Maize production in the district plays an important role in the economic life of the populace who are mainly resource-poor farmers hence the study area is considered very appropriate for the research.

The economic importance of agriculture in Ghana as an engine of growth earned her a special recognition. It is in this vein that the US developments fund, the Millennium Challenge Account (MCA) of 547million US dollars in 2006 was given towards poverty alleviation among smallholder farmers as an important

focus for development assistance because they comprise a large percentage of those involved in agriculture. The MCA helped to carry out the vision and policy of Food and Agriculture sector which engulfs key objectives of the Millennium Development Goals (MDG) that are agricultural and rural development related; it is equally explicitly connected to the Growth and Poverty Reduction Strategy (GPRS 11).

The agricultural project which ran between 2009 and 2010 was limited to three intervention zones in the country namely, Northern Agriculture Zone, the Afram Basin Zone and the Southern Horticultural Belt. The Kwahu North District (formerly known as Afram Plains District) is part of the Afram Basin Zone and it forms an important part both in land size and agricultural production in this zone. Maize is the most important cash and staple crop cultivated in the area and most farmers' livelihood depends on it. The Ghana compact of the MCA defined challenges and the best practices related to Farmer Based Organizations' (FBOs) commercialization as the engine of rural transformation in its training programme. Unfortunately, out of 154 maize FBOs that benefited from the MCA modular training, only 26 of them could access credit.

However, as indicated by IFAD (1989), if sufficient credit and technical assistance are provided to small scale farmers, they will be in a position to apply improved production techniques thereby increasing yields and production; which is true of the smallholder farmers in Ghana especially in the Kwahu North district Coincidentally, even though the Kwahu North district - a typical rural area, is dominated by agricultural production and contributes significantly towards

national production in terms of staple crops such as maize, cassava and yams, farmers' efforts are beset with lack of credit and extension services (Ghana districts, 2012).

Statement of the Problem

Despite the fact that agriculture has been, and continues to be, the mainstay of rural development and economy in Ghana, small subsistence farms dominate the agricultural landscape and the smallholder farmers continue to face many challenges predominant among which are lack of credit facilities and poor access to improved technology (FASDEP 11, 2009). For agriculture to be practiced on commercial basis for Ghana to achieve its Millennium Development Goal of poverty alleviation by 2015, maize farmers need to be helped with financial support and improved technologies that would lead them into modernized or commercial agriculture production with higher productivity and finally improved livelihood thereby ensuring poverty alleviation. .

It was right therefore that part of the US developments fund, the MCA Ghana compact was committed to improving the business capacity of smallholder farmers through economic growth and agricultural transformation. A five – year compact was signed between the Millennium Development Authority (on Ghana's side) and the Millennium Challenge Corporation of the United State of America which aimed at poverty alleviation among resource-poor farmers. Two main programme objectives to be achieved included: i, increase in the production and

productivity of high-value cash and food crops and ii, enhance the competitiveness of those high-value cash and food crops in local and international markets.

The programme was designed to take place in three invention zones (Northern agricultural area, Afram basin area of which the chosen study area is part, and Southern Horticultural belt area) in the country. Unfortunately, the hope of most maize farmers' in the study area to receive some credit to boost their agricultural production was lost as only few of the FBOs primed by the Ministry of Food and Agriculture had access. Nevertheless, most of the FBOs were trained in farm management including a lot of crop husbandry practices such as good sustainable land preparation, use of improved seeds, conduction of germination test, planting in rows, timely early weed control etc. (MOFA District Directorate Report, 2011).

The number of farmer based organizations that benefited from the MCA credit was highly limited due to the limited capacity of the only Rural Bank in the study area – the Afram Rural Bank. Also, the possibility of some groups having too many elderly farmers who were faced with risk aversion therefore could not work hard enough for improved performance to be able to repay credit hence presented them illegible for the credit existed (Cambell and Baker, 1997 and Nelson, 1981).

Even though some empirical studies have already been undertaken at the end of the first phase of the MCA project none was conducted yet to compare the effectiveness of the technical training with credit and training without credit packages that farmers had enjoyed in the district to inform policy on the type of

action to take in subsequent projects and programmes either in the district, region or the country at large. Therefore the major questions that this study seeks to answer are:

Has the MCA Ghana compact impacted positively on the performances of maize farmers through training and access to credit in the Kwahu North district? Are outputs obtained by beneficiary farmers of training with credit more satisfactory than those without credit?

Objectives of the Study

The purpose of this study was to investigate the effectiveness of the MCA Ghana Compact technical training and credit on the performances of maize farmer beneficiaries in the North Kwahu District of the Eastern Region, Ghana.

Specific Objectives

The following specific objectives were formulated to help achieve the purpose of this study:

1. Identify maize farmers' constraints in maize production before and after MCA compact implementation.

2. Determine farmers' perceived effectiveness of the MCA compact with respect to training and credit.

3. Explore farmers' previous and current practices in maize production

4. Compare the perceived effectiveness of performances of beneficiary farmers of MCA training with credit and without credit.

5. Describe farmers' demographic characteristics and examine the association between them and the effectiveness of MCA components.

Research Questions

1. What have been maize farmers' constraints in production before and after the MCA compact implementation?

2. What is farmers' perceived effectiveness of the MCA compact with regard to technical training and credit?

3. To what extent has the MCA compact helped improve the practices of maize farmers in the study area?

4. What is the perceived performance effectiveness of beneficiary farmers of MCA training with credit and training without credit?

5. Is there any association between maize farmers' demographics and effectiveness of MCA components?

Hypothesis of the Study

H_0: There is no significant difference in the levels of perceived effectiveness of training with credit and without credit on farmers' performances (maize yields).

H_1: There is a significant difference in the levels of perceived effectiveness of training with credit and without credit on farmers' performances (maize yields).

Significance of the Study

Small- scale farmers' hopes and productivity are often hindered or constrained by their inability to adopt continuously, recommended technologies due to lack of credit, which restrains their access to inputs. The findings of this study are significant to the extent that:

The results will help justify the use of the donor fund – the MCA which would otherwise have been used as public money on some other project. Actually the MCA was purposely meant to support the efforts of smallholder farmers to alleviate their suffering in a way by helping increase their purchasing power and its attendant increased productivity.

The results may be used to identify the strengths and weaknesses of the MCA compact which might serve as guide in the design and implementation of subsequent programmes. The strengths of the compact identified in the study will enable programme managers factor into future programmes/projects the most appropriate activities towards yielding positive results. The weaknesses identified however, will help put the right contingency measures in place.

The US government, who is the MCA donor would benefit by knowing how their assistance had been beneficial to the Ghanaian small-scale farmers as well as the nation as a whole and will know the next decision to take.

Also, policy makers may use the findings to review their policies in new perspectives in respect of other projects and programmes.

It would enable the government to put in place a policy framework to attract more local and external donors to invest more into the agricultural industry.

Beneficiary farmers of the programme would be made aware of certain facts of the findings that directly concern them with regard to undertaking technical training and the best use of credit.

Limitation

The main hindrance to the smooth collection of data for the study was the absence of adequate record keeping by majority of the respondents. The study however, relied on farmers, power of memory recall.

Delimitation

This study was limited to only the Kwahu North District of the Eastern Region, Ghana and is also concerned with only small-scale maize farmer beneficiaries of the MCA training and credit and training without credit.

Definition of Terms

This section provides the operational definitions of terms as used in the study.

Adoption: Farmers' acceptance and practice of innovations or technologies as taught them for more than a year.

Compact: Various plans or activities packed together for which the Millennium Challenge Account was used.

Effectiveness: the degree or extent to which the training and credit sub-components of the Millennium Challenge Account compact have been seen by farmers to have accomplished the purposes for which they were given.

Performance: Yields of maize experienced by farmers.

Productivity: Increase in per unit area of maize outputs by farmers.

Technology: Innovations or seemingly new tools employed by farmers in the production of maize.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter deals with the concepts and ideas, which have relevance to the study. In addition, the empirical studies which form the basis for the conceptual framework of the study as well as the variables concerned are also reviewed.

Definition and Theories of Perception

Perception has been defined by many scholars in different ways. Van de Ban and Hawkins (1988) defined perception as the process by which information is received from the environment and transformed into psychological awareness. Perception is a process of selecting, organizing, subjectively interpreting sensory data, in a way that enables us to make sense of the world. Therefore, perception involves the use of the senses to interpret the world or environment. However, Van de Ban and Hawkins assert perception involves more than the use of the senses alone. Perception is epitomized as the "I" behind the senses. By implication, what occurs in the real world may be quite "poles apart" from what is perceived to occur. In

other words, the interpretation of events may differ markedly from the actual events among different people (Gamble & Gamble, 2002).

Barbe, (1981) described perceptions as being relative rather than absolute. Barbe explained that for instance, when a person enters a darkened room during the screening of a film, he will see only the image on the screen and the bright light from the projector. After a minute or so, he will be able to see other people in the room. In other words, his or her initial perception of darkness in the room is relative to the amount of light outside. Perceptions are also organized. The sensory experiences are structured in ways that will be sensible to human beings.

Barbe (1981) said one form of organization is the figure and ground. The interpretation of the figure will often be determined by the ground. For example, a picture of a man with a dirty face, hands and old clothes can be interpreted as a lazy or poor person. The picture can also be interpreted as one of a hard-working farmer, if a farmyard is included in the background.

Morris (1991) collaborated this by saying that perceptions are very selective. At any moment, human senses are receiving a veritable flood of stimuli from the environment. Objects can be seen, noises can be heard and odours can be smelt. Despite their capacity to process vast amounts of information, the nervous system cannot make sense of all the stimuli available. Hence an individual pays attention only to a selection of stimuli.

Morris (1991) added by saying that several physical and psychological factors influence what an individual selects or pays attention to. Individuals select only those experiences that reaffirm existing attitudes, beliefs and values. They ignore or diminish the significance of those experiences that are inconsistent with

their existing attitudes, beliefs and values. Past experiences and training influences the selectivity of perceptions. Training can also provide an organized and structured set of experiences to influence perceptions.

Gamble and Gamble, 2002 viewed perceptions as being directed. Gamble and Gamble said for instance, a writer of an extension bulletin who starts with a brief summary of his or her article will set the reader to seek the key points in it. A caption or a heading in a slide presentation sets the viewer to observe those key points. However, perceptual set may be a major deterrent, when the communicator wants his or her audience to view or interpret a situation in a particular way. The tendency is to respond to stimuli through habit and these habitual responses are broken, if things are perceived in a new way.

However, Gamble and Gamble (2002), explained that perceptual set can be affected by age, motivation, past experience and educational level. Age alone does not determine the part played by experience. Even among people of the same age, past experiences differ and hence affect the way stimuli are perceived. In the case of education, it can sometimes become a barrier rather than a facilitator or aid to communication.

The concept of perception, according to Rao, Rangnekar, Dey and Van den Ban (1998) is which better describes one's ultimate experience of the world and typically involves further processing of sensory input. As stated by Rao, Rangnekar, Dey and Van den Ban the interpretation of information is called perception. These perceptions play an important role in decision making of people in general and farmers are no exception.

Perceptions are relative rather than absolute and they are influenced by the surroundings to a great extent. Due to past experiences, different people can interpret the same object differently, and this in turn affects their behavior. Perceptions can even differ among the family members on various aspects of farming, credit needs and the like. For example, men and women may differ on issues like an increased herd size which adds to the workload of women, while it may increase the cash flow for the man (Rao, Rangnekar, Dey and Van den Ban).

Since an individuals' perception differs markedly from another's in the same situation due to different cognitive styles (Barbe, 1981), this study adopts the use of the two categories of maize farmers who had benefited from the Millennium Challenge Account project training and credit to compare their perceptions about the aspect of the project benefits they had enjoyed. Perceptual set can also be affected by age, motivation, past experiences as well as educational levels (Gamble & Gamble, 2002) and for this reason the study equally explores the likely relationship between selected farmers' demographics and their perceived effectiveness of the three components namely training, teaching methods and credit of the MCA compact.

The Definition and Concepts of Effectiveness

Effectiveness is defined as a measure of the extent to which an activity achieves its objectives. Objective is a goal or end which describes what is to be accomplished if the training activity is to be effective. Relevance is the degree to which the rationale, objectives, and expected impact of an activity are, or remain

pertinent, valid and significant with regard to long-range objectives or identified priority needs and concerns (FAO, 1991).

On the other hand, Miller and Osinski (2002) defined relevance, in adult training context, as identifying and understanding the training content to be relevance-oriented in a sense that, the theories and concepts must be related to a setting familiar to training participants. Learners must see a reason for learning something. Learning has to be applicable to their work or other responsibilities to be of value to them. For measuring effectiveness of training various approaches are suggested in literature.

For instance, Mohan (2000) gives an update on one of the most popular techniques, the Donald Kirkpatrick model, which is one of the most popular methodologies, suggested four criteria to evaluate training programmes: (1) reaction, (2) learning, (3) behaviour, and (4) results. Each criterion is used to measure the different aspects of a training programme. Reaction measures how the trainees liked the programme in terms of content, methods, duration, trainers, facilities, and management. Learning measures the trainees' skills and knowledge which they were able to absorb at the time of training. Behaviour is concerned with the extent to which the trainees were able to apply their knowledge to real field situations.

According to Mohan (2000) results are concerned with the tangible impact of the training programme on individuals, their job environment, or the organization as a whole. Also, Kirkpatrick (cited in Mohan, 2000) found that, it is easy to measure training programmes related to technical and functional areas at level-3 and level-4. It is not easy to do this with behavioral skills programmes.

There are also mechanisms to measure effectiveness of behavioural skills at level-3. These are cumbersome to implement. It needs a fair amount of investment by the organization or a researcher undertaking it in terms of time and money.

Kirkpatrick (cited in Mohan, 2000) also suggested to organizations in particular that embark on measuring effectiveness of training to measure all programmes at level-1 and level-2. The measures at level-3 and level-4 can start with the functional skills, before moving on to the behavioral skills programmes.

John (1998) outlined variety of ways to measure training effectiveness including**,** prior to training, at the end of training**,** delayed impact (non-job), on the job behavior change as well as on the job performance change.

Crabtree and Miller (1992) also suggested two approaches to training intervention effectiveness research to uncover results without committing extraordinary resources. One approach employs triangulation (use of multiple data sources and methods) to gather data from prospective end users and combine qualitative data (e.g., from focus groups, interviews, and observations) with various forms of quantitative data (e.g., those from controlled study situations). Crabtree and Miller added that data are then used to assemble a valid argument for the interpretation of results. The other approach to effectiveness research explores cause-and-effect relationships that are pertinent to the learning process and have been established through years of training research, including meta-analyses.

Borich (1998) found out that for the purpose of training assessment, the cause-and-effect relationships of interest are those between the process, outcomes, and impacts of training. In these relationships, the process variables (e.g., training

methods and mediums used) are indicators of the outcomes (e.g. knowledge gained among trainees).

To identify the elements of training that are critical to increased effectiveness, the Education and Information Division (EID) of the National Institute for Occupational Safety and Health (NIOSH, 1999) of USA has developed a research guide known as the training intervention effectiveness research model (TIER model).

The NIOSH (1999) TIER model systematically structures training effectiveness research across four stages (see figure 1). Stages 1 and 2 are components of formative evaluation in which the objectives and processes of training are conceptualized, drafted, and refined. NIOSH noted that during these stages, researchers explore instructional alternatives to determine which are most appropriate for study. At stages 3 and 4 the institute realized are components of summative evaluation systematic attempt to determine whether the fully developed training intervention is meeting its objectives as planned or desired Scriven (1991) similarly noted four different stages in the evaluation process and suggested the following: stage 1; Formative Research: At this stage 1, training efforts are conceived, reviewed, and structured. This stage helps researchers understand the population to be served, its needs, and the aims of instruction. Stage 2 is on Process Research: At this stage 2, draft training materials, proposed instructional approaches, and research instruments are field tested in pilot sites. The qualitative and quantitative information that is collected from the field testing leads to the modification of materials and increased confidence in the approaches taken.

Stage 3 which is on Outcome Research, involves a controlled evaluation study. At this stage the results of the training effort are documented. These data provide the researcher with improved understanding of the various training approaches that can be applied to (1) the population trained, (2) the subject matter addressed, and (3) the instructional methods as Figure 1 model for training intervention effectiveness research. Stage 4 is on Impact Assessment: At stage 4, longitudinal studies are conducted. This stage will also examine the impact of study related materials (e.g., model curricula, published reports) as they are applied to practice. Overall, the training intervention effectiveness research model, a research project can systematically work through all stages the training before and during training.

Alternatively, Loos (1995) said, research can begin or occur at any stage or subset of stages of the model, depending on the state of the training materials and the nature of the research questions. The objective of reviewing and presentation of this model is to offer clue of related literature relevant to measuring effectiveness of training programmes in a given context. However, this model, as the name indicates is intervention research (field based action research) hence, does not have any link with the current thesis research as the objective is to measure effectiveness of the MCA training after only two years of implementation.

FAO (1991) on the other hand, defined evaluation of training as a process which attempts to determine as systematically and objectively as possible the relevance, effectiveness and impact of training activities in the light of their objectives set forth. According to FAO evaluation can be done during each

development phase of training and even at each step during the delivery of the training activity. The major types of training evaluation consist of evaluation for planning training needs assessment (TNA), methods, materials (evaluation for training methodologies), process evaluation (during training to make adjustments), and terminal evaluation (after the end of training) and follow-up evaluation (impact assessment).

FAO (1991) indicated that in this approach, effectiveness of training is measured in terminal evaluation. Terminal evaluation is used to determine the effectiveness of a training activity after it has been completed It is a method for collecting information on trainee and training activity achievement. The primary objective of terminal evaluation is to determine the degree to which the intended training objectives and goals have been met and to relate these findings to evaluation information collected earlier in the training process. It also includes interpretation of the outcome. In other words, the general question to be answered in the research would be whether the objective set for the training was actually achieved. If so, how well, and what areas still need to be strengthened? If not, why not?

According to Norman (1986), the main focuses of terminal evaluation are: Learner performance: - by comparing pre-training versus post-training measurements (learning gains), non-referenced method. By comparing what we intended the trainee to learn (objectives) against what has actually been learned (performance/competence) criterion referenced evaluation, organization facilities, and resources during the training. Trainees' overall impression: competency of trainees, communication, facilitation approach and trainees reaction to

training/instruction such as, relevance of contents methodologies, duration etc.

Norman (1986) said, this kind of evaluation information gives some idea as to the possible reasons for success or failure in achieving training goals such as measuring trainee knowledge, attitudes and skills. He added by saying that training programmes are designed to change trainees' knowledge, attitudes and skills. In terminal evaluation we want to see if our training has accomplished this goal and to what degree.

Norman (1986) again noted that the most common method used in a terminal evaluation is to test trainee's knowledge, attitudes and skills. Each of the three kinds of learning can be measured through some form of testing. Test results are then compared either with pre-determined standards (as specified in objectives), with entry level knowledge (as measured by a pre-test), or through certification tests where standards are set by someone else.

Norman (1986) also added that procedures in terminal evaluation are to develop or adapt existing data collection questionnaire or structured interview schedule. The researcher must then decide what type of test items should be included and then administer the valid instruments. The way in which these instruments are administered varies with many factors, such as audience characteristics (age, sex, education level etc), objectives being assessed, and type of assessment instrument before the results are interpreted.

Anthony (1983) outlined commonly used teacher-made test items to measure knowledge, attitude and practice levels such as: i, Fill in blanks*:* these are effective for measuring a wide range of simple learning outcomes; knowledge of facts, terminology, principles, methods and procedures, and interpretations of data.

ii, True/false: these are used to measure trainee ability to identify the correctness of statements of fact, definitions of terms, and statements of principles. iii, Matching: these too measure trainee ability to identify the relationship between two things.

This study has adopted the Kirkpatrick model (cited in Mohan, 2000) and centered the evaluation or assessment of effectiveness of the MCA training and credit beneficiary maize farmers' performances on the level 3 stage which is about functional or practical areas that are reflected at the third level or stage of the model and this is well adaptable to the maize farmers' situation as farmers are more practical oriented than theories.

This study therefore tries to explore the general impression of the maize farmers concerning part of the training process, training content, methods as well as some chosen practices relevant to their farming venture in maize production in the Kwahu-North district of the Eastern region of Ghana. The chosen recommended practices or technologies include varying land preparation methods such as the use of certified seeds and fertilizers (both chemical and organic), employing mechanized services, practicing row planting etc. It also considered the land area under cultivation as well as the final output or yield as farmers' performances because both the technical training and the use of credit can contribute a great deal in their expansion and improvement respectively.

For this reason the pre-training and post-training measurements are selected to see how far the objective of the project towards famers' change in behaviour in consideration of farming as a business or enterprise on its own therefore putting all that it takes to improve upon their performances. This can be

achieved as farmers accept and adopt most if not all the recommended cultural and agronomic practices in order to realize maximum yields from their fields – that is increasing yield per unit area or productivity. This is the only way the country's achievement of the millennium goal of alleviating extreme poverty by increasing food security and improving farmers' livelihood can be achieved.

Conceptualizing Performance

One of the pioneer researchers who conceptualized the term "performance" was Vroom (1995) who suggested an equation to picture performance and he narrated that it is a product of "personal ability" and "motivation" of an individual or performance = ability × motivation. Vroom's model explains that an individual who is thought to be highly motivated would not be able to perform a job well if he does not possess relevant skills, knowledge and attitudes (KSAs). In other words, both ability and motivation are essential ingredients to good employee or famer performance.

According to Vroom (1995), the formula to determine performance as drawn above can be implemented at various fields such as a management, education, and organization behaviour. For example, Armstrong (cited in Vroom, 1995) said the term performance is widely used in all fields of management using terms such as performance management measurement and evaluation or appraisal Murphy and Cleveland (cited in Vroom,) explained that performance is generally discussed within the contexts of a leaders' behaviour, motivation, task design, goal setting, and most other primary areas of organizational research. The performance of a system according to Svendsen and Small (1990) can be defined as its efficiency,

understood as the relation between actual results versus the expected results of the system (inputs and outputs).

In the case of Svendsen and Small's (1990) study, the expected result of the system would be the improvement of food security and of life conditions of farmers through irrigated agriculture. In the opinion of Svendsen and Small, the purpose of performance assessments is to achieve an efficient and effective use of resources by providing relevant feedback to the scheme management at all levels. According to Svendsen and Small there exist three categories of performance measures: process measures, output measures and impact measures.

The first category refers to the system's internal operations, such as policies, organizational and communicative processes. The second one, output measures, is used to evaluate irrigation services delivered to farmers, of essential importance given its impact on agricultural production and therefore on farmers' revenue (system's final output). Last category brings up the evaluation of the effects of system's outputs in a larger scale, in the social, economic and environmental dimensions.

This study, assumes the expected result of the MCA project would be the improvement in the adoption of recommended or improved practices and its attendant higher yields of MCA beneficiary maize farmers through the benefits they derived from both the modular technical training and their access to credit. Hence the study, looks at the farmers' performances in terms of their maize yields on comparative basis – the performances or the extent of adoption of improved agricultural practices that culminated into the yields of farmers who benefited from

both MiDA training and credit against those who benefited from only the training aspect.

The Concepts, Definition and Effects of Training

Several authors or theorists have provided different definitions to training even though the focus in all cases point to the same thing. The focal points in all the definition is about the fact that whether training (part of education) or education given to farmers, it is supposed to bring about some changes in their knowledge level, skills and attitude towards their agricultural production that will reflect in their performances and the general life improvement. Training is defined by Youdeowei and Kwarteng, (1995) as the process of providing knowledge and skills and bringing about desired changes in attitudes in order to improve the competence of people being trained. The goal of training, they assert, is to improve performance. Training, however, the authors say is different from education in that training usually takes short term, is narrowly focused and specific, usually designed to meet a specific need and has immediate application.

According to FAO (1991), training is a term which covers a wide range of activities. The length of a training activity can vary from a continuous employee improvement programme to an afternoon workshop. A training programme consists of several courses while a training course is composed of several sessions.

NIOSH (1999), defined training as communication directed at a defined population for the purpose of developing skills, modifying behavior, and

increasing competence. According to the institute, training generally focuses exclusively on what needs to be known.

On the other hand, Dersal (1962) defined training as the process of teaching, informing, or educating people so that (1) they may become as well qualified as possible to do their job, and (2) they become qualified to perform in positions of greater difficulty and responsibility. Training is the process of acquiring specific skills to solve a specific problem and perform a job better (Jucious, 1963). Training also helps people to become qualified and proficient in doing some jobs (Dahama, 1979).

According to Rama, Etling and Bowen (1993), there are three approaches to training: (1) the traditional (academic) approach, (2) the experiential approach, and (3) the performance-based approach. In the traditional approach, the training staff designs the objectives, contents, teaching techniques, assignments, lesson plans, motivation, tests, and evaluation. In the experiential approach, the trainer incorporates experiences where in the learner becomes active and influences the training process. This approach emphasizes real or simulated situations in which the trainees will eventually operate.

It is also the belief of Chayanov (1928) that the only way to improve farm efficiency and to increase agricultural production is to educate farmers even though there are times when it may be better to help farmers to solve a problem. For the purpose of commercialization, farmers need to get trained even as they must co-ordinate practices not only at different levels and in different domains, but also across different times. To him what a farmer does today needs to

be coordinated with what is expected to happen tomorrow, or the next month, season, year, decade and/or stage in the family cycle hence the need for him to get trained.

Additionally, training programmes in agriculture according to Famuyiwa et al. (2012) is designed to develop farmers so as to make them better entrepreneur and decision makers and to help them organize themselves into effective associations and institutions. Advancement in science and technology create demand for teaching and learning. The learning processes which were once effective sooner or later become obsolete. Therefore, in order to keep abreast with new innovations there is need for continuing training programmes to assist farmers understand new concepts and apply new knowledge in farming.

Famuyiwa, Adesoji and Lawal (2012) added that greater productivity could be achieved through improved knowledge or skills which could be achieved through proper training and development. It is obvious that farmers with requisite educational training and experience would help in using the knowledge, skill and attitude gained for a better performance. Alibaygi and Zarafshani (2008) opined that training helps in obtaining people with right skills, knowledge and attitude to run progressive and flexible entrepreneur. Hence, training can be conceived in the first instance to achieve higher performance in the job and also raise the level of development of the employee.

Jarvis (1987) saw learning and for that matter training as an integral part of everyday life. Jarvis emphasized that we all act and receive feedback from our environment which leads us to adapt our cognitions; and it is this kind of learning

that is crucial in the context of adult education. According to Jarvis this type of learning referred to as or coined 'social learning' is written about by several authors such as Dunn (1971); Friedman (1984); Roling, (2002); Woodhill, (2002).

According to Abraham (2011), training helps to empower through knowledge gain, and research studies tell us that people learn in different ways, and they prefer different learning styles. Learning can be defined as the individual's 'characteristic ways of processing information, feeling and behaving in learning situation. It was noted by (Zinnah, 2000) that adult's preferences include "hands on" learning, problem solving, visual materials and reading and starting with pieces of information to build a picture, learning by oneself, learning with others and learning in a step by step fashion. Because personal scheduling challenges, adult learners choose for themselves when they want to learn.

In a joint effort to reduce pesticides use for example, it was realized in the field of research and training that the programme had resulted in important changes through the introduction of non-formal education processes, of field-based experimental learning processes and of village-based participatory research projects among farmers, extension and universities ILEIA (1992).

Unilever Global (2013) believes that often farmers' cut off from access to training and education, results in their lack of knowledge of the techniques that would help them maximize their incomes. However, if smallholder farmers are helped to improve their practices, by giving them access to better-quality seeds,

training and fertilizers, they can significantly increase their yields – often doubling or even tripling them.

In the same way Unilever Global (2013) asserts that smallholder farmer training programme that looks at where we can increase agricultural entrepreneurship to support the next generation of farmers, strengthen women's economic development and support changing farm dynamics to facilitate human and labour rights improvements are needed. Through different training interventions farmers are helped to improve agricultural practices, capabilities and life skills. Such trainings include access in crop diversification, inputs into smallholders' lives such as developing better farmer organization models or the services provided to them (Unilever Global).

Whereas literature confirms that skill training and tertiary education have positive effect on enterprise performance (as indicated by the several authors), Akanji (2006) noted that many women lack this, especially in developing countries. This situation will not help bring about enough development in the agricultural sector because as highlighted by Shane (2003), the exploitation of entrepreneurial opportunity depends on the entrepreneur's level of education, skills or knowledge acquired through work experience, social network and credit hence the need for training as a micro-finance factor especially in developing economies.

This fact was also confirmed by empirical findings from four case studies on agriculture and enterprise in different developing countries including Ghana which revealed that traditional attitudes towards women and assumptions about

their role as child-bearers affected their access to training, and these attitudes must be explicitly addressed if women's needs are to be heard (Collett & Gale 2009).

Realizing the numerous positive effects that can be derived from training according to numerous contributions made by the various authors as already mentioned, this study includes the effectiveness of technical modular training offered by MiDA between 2009 and 2010 to see how these affects have been appropriated by maize farmers in the study area. Greater productivity can only be achieved through improved knowledge or skills acquired through proper training and development. It is obvious that farmers with requisite educational training and experience would help in using the knowledge, skill and attitude gained for a better performance as pointed out by Famuyiwa et.al. (2012).

Factors Affecting Adult Training, Approaches and Processes

The field of adult learning was pioneered by Knowles (Knowles, Holton and Swanson, 2005). On the other hand, Stephen (2000) noted that an effective training effort involves understanding how adults learn best. Compared to children and teens, adults have special needs and requirements as learners. Subject matter is brought into the situation, is put to work, when needed. The resource of highest value in adult education is the learners/ experience. If education is life, then life is also education.

Too much of learning consists of vicarious substitution of someone else's experience and knowledge. Experience is the adult learners' living textbook.

Swanson (2005) describes that, experiential learning approaches have the dual benefit of appealing to the adult learners experience base as well as increasing the likelihood of performance change after training.

The majority of people participate in adult training or education for that matter because of a relationship with a vocation. They want to improve on their current job. Some adults seek learning because of basic interest in a topic or for pure love for learning. An understanding of discrepancies between current and desired proficiencies is useful. Such discrepancies can also motivate an adult to engage in a learning activity (Zinnah 2000).

It is indicated in a training manual for farmers on the Sasha project in Western Kenya that adults may enter into learning or training programme due to the following reasons: Social relationships – make new friends or meet members of opposite sex; External expectations – complying with wishes/directives of somebody with authority; Social welfare – desire/want to serve others; Professional advancement – the pride of having a document that shows that s/he attended training so that s/he is recognized in the community. Escape/stimulation – getting involved as a way of alleviating boredom or escaping from home or work routine. Cognitive interests – for the sake of learning looking at the training as a source of useful information that will help solve an immediate need or problem being faced (Collette & Gale, 2009).

Elam (1971) asserts that trainers primarily serve as facilitators, catalysts, or resource persons. In the performance-based approach to training, goals are measured through attainment of a given level of proficiency instead of passing

grades of the trainees. Emphasis is given to acquiring specific observable skills for a task. This performance-based teacher education (PBTE) model, developed by Elam is mostly task or skill centered and is also applicable to non-formal educational organizations such as extension. There is disagreement between training approaches to be followed and practically done for the modular training in this study.

Wentling (1992) considered training as a circular process that begins with needs identification and after a number of steps ends with evaluation of the training activity. A change or deficiency in any step of the training process affects the whole system. Designing a training and development program involves a sequence of steps that can be grouped into five phases: needs assessment, instructional objectives, design, implementation and evaluation. According to him to be effective and efficient, all training programs must start with a needs assessment.

Training needs assessment is one of the crucial steps towards identifying the area of farmers' interest, design and development of curriculum that can best suit to the existing real conditions of farmers. Pholonngoe and Richard (1995) underscored the necessity of need assessment stating that if non-formal education trainers hope to foster meaningful development, they should bear in mind that the needs of adults constantly change. Thus, training assessment has to be carried to design relevant and need- based training programme that can accommodate changes over time.

Barbazett (2006), also noted that, long before any actual training occurs, the training institution must determine the .who, what, when, where, why and how

of training. Some changes are achievable using a training intervention, others are not. Some changes are more critical than others. Training needs assessment process helps determine the priority of changes in knowledge, skill, attitude and behavior that will provide the greatest impact on achieving organizational or individual goals.

Caffarela (2002) noted that, a systematic process of farmers' training must include; needs assessment, goal and objectives setting, organizing instructional methods and techniques, monitoring and evaluation. In some cases, however, we lack the knowledge, skills, or tools to conduct an effective assessment or we are confused about which approach to use, given the wide array of choices. He also noted that conducting training needs assessments is an exhaustive, time - consuming, and expensive process that yields tremendously important data.

McGhee and Thayer (1961) believed that training needs identification is possible through different analytical procedures. For instance, individual analysis aims at identifying specific training needs for an individual or group of people so that training can be tailored to their needs. This analysis centers on individuals and their specific needs concerning the skills, knowledge, or attitudes they must develop to perform their assigned tasks. The possible methods or techniques for individual analysis include performance appraisal, interviews, questionnaires, tests, analysis of behaviour, informal talks, checklist, counseling, critical incidents, recording, surveys, and observations.

Barbazett (2006) noted that once training needs have been identified and training activities have been decided as part of the solution, a needs analysis should be done to determine knowledge, skills, and attitude requirements and

performance deficiencies. The needs analysis procedure involves breaking down the "training problem" into its basic parts in different successive phases to identify and understand the important components in each phase. Ultimately it leads to identifying and understanding the training content to relevant and need based.

Miller and Osinski (2002) suggested that theories and concepts must be related to a setting familiar to participants. This need can be fulfilled by letting participants choose learning projects that reflect their own interests. Curriculum development is the most important part in a training programme after a need for training has been identified. The curriculum specifies what will be taught and how it will be taught. It provides the framework and foundation of training or training content.

For the learning objective, Miller and Osinki (2002) emphasized that its description must embody perceptible testable behaviour. According to him the best way of selecting this activity is by identifying what is to be able to do once the lesson is finished. He also suggested that the learning material must be defined as concretely as possible. The objectives should clearly define the applicability of the learning material.

Again, Miller and Osinki (2002) pointed out that the minimum performance must be defined whist the learning objective must give some indication of the standard of performance so the students or learners can be sure about how the task must be performed. He stressed that the frequency, quality and accuracy must be well specified. Also, in a learning objective Miller and Osinki said, the conditions under which the desired behaviour is expected must be defined as well as specify the circumstances under which the standards should be fulfilled.

Various Training Methods and their Effectiveness on Farmers' Performance

Farmers being adults require different teaching styles and principles as they tend to learn at their own pace and can learn better under very relaxed situations when combinations of teaching methods are used. Van den Ban and Hawkins, (1996) suggested that when teaching farmers for example fertilizer application, the extension agent or facilitator first can demonstrate the correct use, and then discuss what has been demonstrated, why it has been done this way and what the results are. They can then ask the farmers to try it themselves on a small part of their fields. Finally, they can help them to analyze the results they obtain and compare with traditional practices. It is asserted that whenever possible the facilitator should help farmers to learn from the processes they can observe in the field.

Yeodeowei and Kwarteng (1995) also noted that the translation of theory into action often is difficult in learning processes therefore presentations of new ideas should be combined, whenever possible, with experiments or demonstrations by farmers, visits to farmers who have tried these ideas to exchange their experiences regarding the application of the ideas. In the same vein, the authors, Yeodeowei and Kwarteng suggest that the facilitator or extension agent therefore should not only provide farmers with solutions to their problems, but also increase their knowledge and understanding in order to increase their skills in developing solutions which work well under their circumstances and help them to reach their own goals. Yeodeowei and Kwarteng emphasize by saying that the learning process of farmers depends largely on their active involvement.

Group discussions are used for many different purposes in different societies. Committee meetings are used in agricultural extension, as well as in community development and adult education programmes, to help members identify and find solutions to their problems. Van den Ban and Hawkins, (1996) affirm that group discussions are very important because they provide opportunities to influence participants' behavior. Group discussions, according to the proponents, usually, in groups of five to twenty members, also can play roles in extension training programmes for increasing knowledge, attitude change and behaviour change.

Van den Ban and Hawkins, (1996) found demonstrations as extension methods that may stimulate farmers to try out innovations themselves, or even may replace a test of the innovation by farmer. Van den Ban and Hawkins emphasized that demonstrations can show causes of problems and possible solutions without complicated technical details especially where the demonstration is of results of certain actions. Results demonstrations can be given on demonstration farms or demonstration fields to compare the results of traditional practices with a new practice or package of practices.

These assertions were confirmed by Abraham, (2011) who noted that demonstrations provide proven technologies to farmers in order to convince them of the feasibility and efficacy of new practices. It is Abraham's belief that demonstration is a very effective extension training method to disseminate new technology. There are also method demonstrations where a technique is shown to people who are convinced already and they want to see it. A method demonstration can show a number of different brands of the same machine

performing the same task in the same field, such as harvesting. This provides farmers with valuable information to choose the best brand for their situation.

A great advantage of demonstrations is seeing how a new method works in practice. They are also useful for convincing people who have not learned to think abstractly. However, it must be possible to present the central idea behind a demonstration in a visual form. It is emphasized that demonstrations must show clear differences between traditional and recommended practices, and they must be well managed.

Not only that but also Rogers (1995) opined that the adoption of technologies by farmers after being demonstrated to them depends on their characteristics (characteristics of the taught technologies): compatibility with the existing values and norms, complexity, observability, trialability, and relative advantage. This definition pertains to technologies in a variety of disciplines, and may be as relevant in other fields as it is in agricultural related technologies.

From the contributions outlined by the different authors it is noticed that several factors contribute to effective adult training and learning as well as the adoption rate of technologies. This implies that adult teachers or trainers must first of all be aware and be equally guided by the principles of adult learning thereby varying their training or teaching methods in order to achieve positive results. It also implies that even though farmers might be taught alright the use of some new technologies or innovations for instance, they might not readily accept and put them into practice due to certain factors that affects the adoption of such technologies as spelled out by Rogers (1995).

This study therefore set to investigate the perception of farmers on how some aspects of the training process, contents and training methods as well as the use of accessed credit helped maize farmers in the study area to accept and adopt improved technologies in maize production for Ghana government to realize its vision of achieving food security and poverty alleviation in the district and country at large. In order words, the study embraced the investigation of farmers' perception of effectiveness of the training and use of credit on comparative basis.

Measuring Training Effectiveness

Effectiveness is defined as a measure of the extent to which an activity achieves its objectives. Objective is a goal or end which describes what is to be accomplished if the training activity is to be effective. Relevance is the degree to which the rationale, objectives, and expected impact of an activity are, or remain pertinent, valid and significant with regard to long-range objectives or identified priority needs and concerns (FAO, 1991).

On the other hand, Miller and Osinski (2002) defined relevance, in adult training context, as identifying and understanding the training content to be relevance-oriented in a sense that, the theories and concepts must be related to a setting familiar to training participants. Learners must see a reason for learning something. Learning has to be applicable to their work or other responsibilities to be of value to them. For measuring effectiveness of training various approaches are suggested in literature.

For instance, Mohan (2000) gives an update on one of the most popular techniques, the Donald Kirkpatrick model, which is one of the most popular

methodologies, suggested four criteria to evaluate training programmes: (1) reaction, (2) learning, (3) behaviour, and (4) results. He said, each criterion is used to measure the different aspects of a training programme. According to him, reaction measures how the trainees liked the programme in terms of content, methods, duration, trainers, facilities, and management. Learning measures the trainees' skills and knowledge which they were able to absorb at the time of training.

Mohan (2000) noted that behaviour is concerned with the extent to which the trainees were able to apply their knowledge to real field situations whilst results are concerned with the tangible impact of the training programme on individuals, their job environment, or the organization as a whole.

Kirkpatrick (1976) found that, it is easy to measure training programmes related to technical and functional areas at level-3 and level-4. It is not easy to do this with behavioral skills programmes. Organizations that choose to measure training effectiveness can start with the former category before moving to measuring behavioural skills at level-3 and level-4. There are also mechanisms to measure effectiveness of behavioural skills at level-3. According to Kirkpatrick these are cumbersome to implement and needs a fair amount of investment by the organization or researcher in terms of time and money.

Kirkpatrick (1976) also suggested to organizations and researchers that embark on measuring effectiveness of training to measure all programmes at level-1 and level-2. He said, the measures at level-3 and level-4 can start with the functional skills, before moving on to the behavioral skills programmes.

John (1998) outlined variety of ways to measure training effectiveness including prior to training, at the end of training**,** delayed impact (non-job), on the job behavior change, and on the job performance change.

Crabtree and Miller (1992) also suggested two approaches to training intervention effectiveness research to uncover results without committing extraordinary resources. One approach employs triangulation (use of multiple data sources and methods) to gather data from prospective end users and combine qualitative data (e.g., from focus groups, interviews, and observations) with various forms of quantitative data (e.g., those from controlled study situations). He said, data are then used to assemble a valid argument for the interpretation of results.

Borich (1998) came out with another approach to effectiveness research that explores cause-and-effect relationships that are pertinent to the learning process and have been established through years of training research, including meta-analyses. For the purpose of training assessment, the cause-and-effect relationships of interest are those between the process, outcomes, and impacts of training. In these relationships, the process variables (e.g., training methods and mediums used) are indicators of the outcomes (e.g., knowledge gained among trainees).

To identify the elements of training that are critical to increased effectiveness, the Education and Information Division (EID) of the National Institute for Occupational Safety and Health (NIOSH, 1999) of USA has developed a research guide known as the training intervention effectiveness research model (TIER model). The TIER model is designed to (1) take into

account the challenges of identifying factors that make the training-learning-action continuum successful, (2) logically match research efforts with the nature of the question(s) at hand, (3) minimize training and curriculum development risks, and (4) concentrate research resources.

The TIER model, the institute said, is applicable to training interventions on a variety of topics. The TIER model systematically structures training effectiveness research across four stages (see figure 1). Stages 1 and 2 are components of formative evaluation in which the objectives of training are conceptualized, drafted, and refined. During these stages, researchers explore instructional alternatives to determine which are most appropriate for study. Stages 3 and 4 are components of summative evaluation systematic attempt to determine whether the fully developed training intervention is meeting its objectives as planned or desired.

Scriven (1991) also described another four-stage evaluation or measure of effectiveness including: i, Formative Research in which training efforts are conceived, reviewed, and structured. This stage helps researchers understand the population to be served, its needs, and the aims of instruction. Stage ii involves the Process Research in which draft training materials, proposed instructional approaches, and research instruments are field tested in pilot sites. He said the qualitative and quantitative information that is collected from the field testing leads to the modification of materials and increased confidence in the approaches taken.

At stage III, which includes the Outcome Research Scriven (1991) said, involves a controlled evaluation study. The results of the training effort are

documented. These data provide the researcher with improved understanding of the various training approaches that can be applied to (1) the population trained, (2) the subject matter addressed, and (3) the instructional methods as Figure 1 Model for training intervention effectiveness research stage 4: Impact Assessment

At stage IV, longitudinal studies are conducted. This stage will also examine the impact of study-related materials (e.g., model curricula, published reports) as they are applied to practice. Overall, the training intervention effectiveness research model, a research project can systematically work through all stages the training before and during training.

Alternatively, Loos (1995) noted that research can begin or occur at any stage or subset of stages of the model, depending on the state of the training materials and the nature of the research questions. He contributed that the objective of reviewing and presentation of this model is to offer clue of related literature relevant to measuring effectiveness of training programmes in a given context. However, this model, as the name indicates is intervention research (field based action research) hence, does not have any link with the current thesis research as the objective is to measure effectiveness of the modular training after a few years of implementation.

FAO (1991), on the other hand, defined evaluation of training as a process which attempts to determine as systematically and objectively as possible the relevance, effectiveness and impact of training activities in the light of their objectives set forth. Evaluation can be done during each development phase of training and even at each step during the delivery of the training activity.

The major types of training evaluation consist of listed by the organization include: evaluation for planning (TNA), methods, materials (evaluation for training methodologies), process evaluation (during training to make adjustments), terminal evaluation (after the end of training) and follow-up evaluation (impact assessment). In this approach, the organization said, effectiveness of training is measured in terminal evaluation. Terminal evaluation is used to determine the effectiveness of a training activity after it has been completed.

FAO (1991) assert that evaluation is a method for collecting information on trainee and training activity achievement. The primary objective of terminal evaluation, the organization emphasized is to determine the degree to which the intended training objectives and goals have been met and to relate these findings to evaluation information collected earlier in the training process. It also includes interpretation of the outcome. In other words, the assessment of effectiveness of a programme or an activity is trying to find out if the objectives intended to be achieved have been achieved. If so, how well, and what areas still need to be strengthened? If not, why not?

FAO (1991) also identified the main focus areas of effectiveness assessment or evaluation to be: Learner performance - by comparing pre-training versus post-training measurements (learning gains), non-referenced method: - by comparing what was intended for the trainee to learn (objectives) against what has actually been learned (performance/competence criterion referenced evaluation considering the organization's or trainers' facilities, and resources during the training.

Also is the trainees' overall impression which according to FAO (1991) includes: competency of trainers, communication, facilitation, approach and trainees' reaction to training/instruction such as, relevance of contents, methodologies, duration etc. This kind of evaluation information gives some idea as to the possible reasons for success or failure in achieving training goals.

According to Norman (1986) training programmes are designed to change trainees' knowledge, attitudes and skills. In terminal evaluation for instance we want to see if our training has accomplished this goal and to what degree. The most common method used in a terminal evaluation is to test trainees' knowledge, attitudes and skills. Each of the three kinds of learning can be measured through some form of testing. Test results are then compared either with pre-determined standards (as specified in objectives), with entry level knowledge (as measured by a pre-test), or through certification tests where standards are set by someone else.

The common procedures in terminal evaluation as declared by Norman (1986) are: develop or adapt existing data collection questionnaire and or structured interview schedule, decide what type of test items should be included and administer the instrument(s). The way in which these instruments are administered varies with many factors, such as audience characteristics (age, education level etc), objectives being assessed, and type of assessment instrument.

With the interpretation of results, Anthony (1983) outlined commonly used Teacher-made test items to measure knowledge, attitude and practice levels. Examples are: i, Fill in blanks – these are effective for measuring a wide range of simple learning outcomes; knowledge of facts, terminology, principles, methods and procedures, and interpretations of data; ii, True/false - used to measure

trainee's ability to identify the correctness of statements of fact, definitions of terms, and statements of principles; iii, Matching – used to measure trainee's ability to identify the relationship between two things. Multiple choices: used to measure different kinds of more complex learning: vocabulary, facts, principles, methods, and applications and interpretation of facts.

In order to achieve the objectives of this study however, after an in-depth review of the different approaches to measurement outlined in the related literature of training effectiveness, the terminal evaluation approach suggested by FAO (1991) was adopted. This measure of training effectiveness considers the overall impression including trainers' communication, facilitation approach as well as trainees' reaction to instruction such as relevance of contents, methodologies, duration etc. which were very relevant to measure effectiveness of the technical modular training offered in the study area by MiDA between 2009 and 2010. The research dwells on the outcome of the training which according to the module is the stage 3 evaluation, or research:

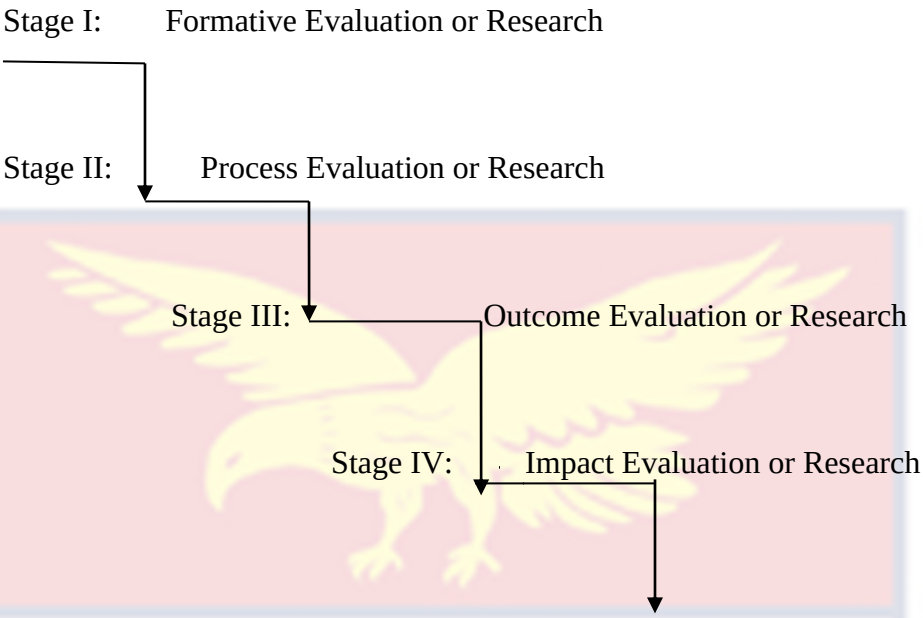

Figure 1: Module adopted for Technical Training Effectiveness Research

The Concept and Definition of Credit in Agriculture Production and Performance

Modern agriculture is essential for economic development. Employing modern agriculture is possible when farmers are provided with credit for purchasing modern inputs (Schultz (1964); and Zuberi (1989). Many developed countries had recognized the benefits of using modern farm technologies. However, Mellor (1966) found out that the application of modern farm technologies to increase agricultural output had increased financing needs of farmers.

Abedullah (2009); Okurut, Schoombee, and Van Der Berg (2004) noted that easy and cheap credit is the quickest way for boosting agricultural production. In the same way Yusuf (1984) maintained that credit is provided for relief of distress and for purchasing seed, fertilizer, cattle and implements. Use of modern

technologies increased demand for credit and resulted in increase in agricultural productivity of small farmers (Saboor, Maqsood and Madiha, 2009).

Access to credit promoted the adoption of yield-enhancing technologies. Governments used credit programmes to promote agricultural output, (Adams & Vogel 1990); Dantwala (1989) in estimating demand and supply of credit and its role in poverty alleviation in India emphasized on supply of credit and to increase technical assistance to farmers to increase agricultural productivity. They noted that the availability of credit to farmers in developing countries improved their agricultural outputs as it enabled them get access to modern agricultural technologies such as chemical fertilizers, recommended seeds, tractors and modern irrigation facilities etc. This point out that modern agricultural technology is capital intensive and hence demands credit.

Chambers, Parcey and Thrupp (1989) noted that, access to credit is one way to improve farmer access to new production technology and increase productivity. If appropriate technology is available but not being used by farmers, then the way credit is handled by government may be part of the problem. Understanding the credit context - government and bank policies, availability of credit, and the institutional relationships involved in its delivery - is important for both extension and farmers (FAO, 2005).

Nosiru (2010) proved in his research article on the topic ―Micro credits and Agricultural Productivity in Ogun State, Nigeria that micro credit enabled farmers to buy the inputs they needed to increase their agricultural productivity. However, the sum of credit obtained by the farmers in the study area did not contribute positively to level of output. This was as a result of non-judicious

utilization, or distraction of credits obtained to other uses apart from the intended farm enterprises.

Similarly, Siddiqi, Wasif and Kishwar (2004) reported that flow of credit to farmers had increased demand for inputs to increase crop production. The elasticity of amount of credit, No of tractors, irrigation, use of chemical fertilizer and pesticides etc with respect to dependent variable agricultural income on per cultivated as well as per cropped acre basis indicated that credit (production credit) and tube wells impacted positively and significantly at 95 percent confidence level. Number of tractors and use of fertilizers also contributed positively but insignificantly. It was because of inappropriate use of fertilizer and tractors.

According to the free on line dictionary (undated), credit transactions have been indispensable to the economic development of the modern world. Credit puts to use property that would otherwise lie idle, thus enabling a country to more fully employ its resources. The presence of credit institutions rests on the readiness of people to trust one another and of courts to enforce business contracts. The principal function of credit is to transfer property from those who own it to those who wish to use it, as in the granting of loans by banks to individuals who plan to initiate or expand a business venture. The transfer is temporary and is made for a price, known as interest, which varies with the risk involved and with the demand for, and supply of, credit.

Ozawa (2007) defines agricultural credit as encompassing all loans and advances granted to borrowers to finance and service production activities relating to agriculture, fisheries and forestry and also for processing, marketing, storage and distribution of products resulting from these activities. Another definition of

credit suggests, it is a contractual agreement in which a borrower receives something now of value and agrees to repay the lender at some date in future generally with interest.

The term also refers to the borrowing capacity of an individual or company. This is explained to be the amount of money available to be borrowed by an individual or a company is referred to as credit because it must be paid back to the lender at some point in the future. For example, when you make a purchase at your local mall with your VISA card it is considered a form of credit because you are buying goods with the understanding that you'll need to pay for them later (Investopedia, 2012).

Credit was defined by Ellis (1992) credit as a sum of money in favor of the person to who control over it is transferred, and who undertakes to pay it back. Moreover, Beckman and Forster (1969) defined credit as the power or ability to obtain goods or services in exchange for a promise to pay later. Similarly, Foster said credit is a power or ability to obtain money by the borrowing process, in return for a promise to repay the obligation in the future.

According to the free on line dictionary, Encyclopedia (undated), credit means Faith and it comes from the Latin ‘credito’. An agreement, by which something of value-goods, services, or money-is given in exchange for a promise to pay at a later date. Credit is a transaction between two parties in which one, acting as creditor or lender, supplies the other, the debtor or borrower, with money, goods, services, or securities in return for the promise of future payment. As a financial transaction, credit is the purchase of the present use of money with the promise to pay in the future

according to a pre-arranged schedule and at a specified cost defined by the interest rate.

Importance of Credit in Agriculture Production and Performance

A number of researchers (Adams & Graham, 1981; Gongalez-Vega, 1977; FAO, 1996) reported the requirement of credit facilities to small holders of less developed countries for production and consumption smoothing. Governments of less developed countries like Ghana and aid agencies have spent a large amount of money to this sector. The motivation has been the belief that loans are an essential part of various input packages that were prescribed as part of agricultural investment projects designed to introduce modern technologies and thus stimulate change and growth in agriculture.

It is also widely reported that access to credit enhances the development of knowledge acquired in training. Access to credit helps poor farmers and business people to plan. They are also able to undertake more diverse activities. According to Petrick, (2004) rural development and, in particular, farm productivity, can be influenced by several factors access including credit. Access to credit may affect farm productivity because farmers facing binding capital constraints would tend to use lower levels of inputs in their production activities compared to those not constrained.

Improved access to credit may therefore facilitate optimal input use and have a major impact on productivity. This problem is even worse for smallholder farmers and can impact negatively on the application of skills and is often worse

for women because they lack collateral, such as land and other assets (Commission for Africa, 2005; Okunade, 2007; Palmer, 2007).

Credit can also have wider impacts on access to extension services especially where private extension services prevail, as a lack of assets impacts on the time available for activities other than production for the home. According to Kebede (1995), credit makes traditional agriculture more productive through the purchase of farm equipment and other agricultural inputs, the introduction of modern irrigation system and other technological developments. Credit can also be used as an instrument for market stability. Rural farmers can build their bargaining power by establishing storage facilities and providing transport system acquired through credit.

Kebede (1995) emphasized that credit plays a key role in covering consumption deficits of farm households. This would, in turn, enable the farm family to work efficiently in agricultural activities. Credit can farther be used as an income transfer mechanism to remove the inequalities in income distribution among the small, middle, and big farmers. Moreover, credit encourages savings and savings held with rural financial institutions that could be channeled to farmers for use in agricultural production. Credit also creates employment opportunities for rural farmers.

Rural development and, in particular, farm productivity, can be influenced by several factors including access to credit. Access to credit may affect farm productivity because farmers facing binding capital constraints would tend to use lower levels of inputs in their production activities compared to those not

constrained (Feder et al. (1989); Petrick, 2004). Improved access to credit may therefore facilitate optimal input use and have a major impact on productivity. Thus, access to credit allows farmers to satisfy their cash needs induced by the agricultural production cycle and consumption requirements.

Cash purchasers are free to seek better discounts on purchases than those who seek to delay their payments until after harvest or when the lambs are sold. Selling directly after harvest because of financial need can lead to a low sale price. While merchants are usually seen as the problem farmers can suffer the same effects from their cooperatives.

Generally the accessibility of a good financial service is considered as one of the engines of economic development. The establishment and expansion of financial service is also one of the instruments to break the vicious circle of poverty. Governments of less developed countries have frequently practiced the policy of providing cheap credit to the agricultural sector through financial intermediaries. This cheap credit, it was hoped, would lower the dependence on the rural money lenders (Pinaki, 1998).

The provision of credit has increasingly been regarded as an important tool for raising the incomes of rural populations, mainly by mobilizing resources for more productive uses. As development takes place, one question that arises is the extent to which credit can be offered to the rural poor to facilitate their taking advantage of the developing entrepreneurial activities. However, at low levels of income, the accumulation of such capital may be difficult. Under such circumstances, loans, by

increasing family income, can help the poor to accumulate their own capital and invest in employment-generating activities (Hossain, 1988).

Credit provision is one of the principal components of rural development, which helps to attain rapid and sustainable growth of agriculture. Rural credit is a temporary substitute for personal savings, which catalyses the process of agricultural production and productivity. To boost agricultural production and productivity farmers have to use improved agricultural technologies. However the adoption of modern technologies is relatively expensive and small farmers cannot afford to self finance. As a result, the utilization of agricultural technologies is very low. It is argued that enhanced provision of rural credit would accelerate agricultural production and productivity (Briquette, 1999).

Adegeye and Ditto (1985) stated that Agricultural credit enhances productivity and promotes standard of living by breaking vicious cycle of poverty of small scale farmers. Adegeye and Ditto described agricultural credit as the process of obtaining control over the use of money, goods and services in the present in exchange for a promise to repay at a future date. The crucial role of credit in agricultural production and development can also be appraised from the perspective of the quantity of problems emanating from the lack of it. In modern farming business in Ghana, provision of agricultural credit is not enough but efficient use of such credit has become an important factor in order to increase productivity.

Ogunfowora Essang and Olayide (1972) noted that credit is not only `needed for farming purposes, but also for family and consumption expenses;

especially during the off season period. Credit has also been discovered to be a major constraint on the intensification of both large and small scale farming (Von-Prisckieke 1986).

Pointing out the importance of credit in the life of the rural poor, Padmanabhan (1996) noted that at a certain stage in agricultural development, agricultural credit clearly does become a strong force for further improvement – when a man with energy and initiative who lacks only the resources for more and more efficient production is enabled by the use of credit to eliminate the one block on his path to improvement. Padmanabhan said, financial credit is the most flexible form of transferring economic resources to the poor. One can buy anything that is for sale with cash obtained through credit.

Credit Provision, Utilization and Performance by Smallholder Farmers in Ghana

Even though credit is generally reported to play major roles in agricultural transformation and modernization especially in developing countries the poor recovery of such loans from beneficiaries actually place other smallholder farmers who actually need the credit at great disadvantages. Additionally, the demand of collaterals from the smallholder farmers by the financial institutions makes it harder for former to access the credit for improvement of their farms.

For instance, it was reported by the Ministry of Food and Agriculture (2008) that out of the total annual disbursement of loans, agricultural production receives far less than 10%. In addition, interviews with groups of farmers revealed that very few small scale farmers are able to meet bank's criteria to access credit and as a result very little utilization of formal credit occurs by small scale farmers for maize production.

The provision of collateral and being part of a registered cooperative with an acceptable accounting system is often beyond the reach of most small scale farmers. However, a number of informal loaning activities occur for often short and very specific activities; for example by maize shelling service providers to farmers, who are paid once the crop is sold. Very occasionally, inputs have been provided on credit to small-scale maize farmers (MOFA Draft Report, 2008).

The implication of the above registration is that only a small fraction of smallholder maize farmers can obtain credit on their own for their farming ventures especially for maize production which apparently does not yield much dividend to smallholder farmers. It was therefore a good opportunity for smallholder farmers who benefited from the Millennium Challenge Account project (both credit and or training) to make good use of it towards increased production and productivity hence more income and poverty reduction.

Factors Affecting Credit Accessibility, Utilization and Performance

Alamgir and Elhaut's study (as cited in Amoah, 2004) assert that poor recovery of loan was mostly due to lack of staff to monitor borrowers' activities of

agricultural production loan to farmers. It has been noted that close supervision following accurate appraisal is conducive to high rate for loan recovery for financial investment institutions. Mobilization of savings and delivery of credit of a cohesive group enhances the borrowers' sense of partnership, and also facilitate supervision, ensures effectiveness and reduces the incidence of risk.

Neduru's findings (as cited in Amoah, 2004) stated that the timeliness of loan disbursement is critical especially if the loan is being used for seasonal activities such as in agricultural production. If a programme of seasonal loan is in place which farmers utilize to buy inputs, and then complicated appraisal and approval procedures which might delay disbursement are unhelpful. Farmers cannot carry out their farming activities when they wish to and the usefulness of the credit to them is much reduced. This can in turn worsen the prospects of repayment if they are likely depended on agriculture for income.

Obayadullah (2000) opined that if a borrower is required to begin repayment only a week after obtaining the loan, even though it is doubtful that her investment begins to yield income by then repayments sometimes came from sources other than income from investment. Loans for longer periods over 10years are subject to higher term risk.

Obayadullah (2000) emphasized that the reason for short term loan for the poor is that, the poor are more prone to income variations. They are affected more by shocks such as drought and sickness. Loans for longer periods may reduce their ability to repay the loan. In addition, they may be more adverse to development than richer people and as a result short-term loans are more appropriate.

The affirmations of the authors point out to the fact that credit access by individuals especially smallholder is equally a risky job for the financial institutions as repayment in most cases becomes a big problem for the farmers hence their demand for collaterals that most of these farmers often cannot afford. This is one clear situation that prevents most Ghanaian smallholder farmers from accessing credit on individual basis except their farmer based organizations. The persistence of such situation will in the long run tend to negatively affect farmers' production levels as acreages cannot be expanded as well as inputs purchase becomes very difficult.

Interest Rate and Performance

Proctor, (1996) defined interest as money that is charged by a financial organization such as bank to people who have borrowed from them or the profit which is made on money invested in financial organization. Srinivasm, (1995) defines interest rate simply as the price of money. As a price, it is made of a number of components as far as the lender is concerned. It is the means that which the lender pays for the cost of the funds that are being lent (cost of capital); if those are from savers, the savers are likely to expect a return which will at least cover inflation and so maintain the value of their savings. The lender recovers the (cost of administration) costs of providing the service and also covers losses as a result of those who default on their loans (costs of defaults).

Interest rate is one of the most factors that borrowers consider when accessing credit. In Burkina Faso, Marzin's report (as cited in Amoah, 2004) stated that each member of Rural Credit Promotion (RCP) paid 10% interest rate for

micro finance they received. The low interest rate attracted more customers. The project which initially employed not many people reached 33906 by the end of the second phase in 1999.

However, Amoah (2004) noted that keeping interest rate below the market level quickly leads to abuse and malpractices. According to authors, interest rate is relatively minor criterion in deciding whether loan is needed. The chairman of Kintampo Rural Bank was also reported to have cautioned that high interest rate will not reduce poverty but will compound existing poverty levels and will result in high rate of default by clients.

Credit Timeliness, Monitoring Duration for Repayment and Performance

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Linkages between Farmers' Training, Use of Credit and their Performance

Sullumbe, 2004 opined that education is a major determinant of a nation's economy. Sallumbe further argues that the level of formal education attained by an individual goes a long way in shaping his personality, attitude to life and adoption of new and improved practice. Education or training has also been regarded as an investment in human capital, which is capable of raising the skill and quality of the man, narrow his information gaps and increase his locative efficiency thereby leading to more productive performance as emphasized by Patel (1985).

It has been proven by Baklouti and Abedelfettah (2013) that microfinance or credit programs have a great contribution in reducing poverty. More

importantly, it has been proven that microfinance can be viewed as a development strategy tool by enabling poor entrepreneurs to initiate their own business, teaching or training them how to protect the credit they have, to deal with risk, and to expand the circle of their economic activities. Availability of a microcredit schemes increases the number of small enterprises, which in turn creates employment opportunities for the poorest and stimulates therefore economic development and social inclusion.

Similarly, Unilever Global (2013) affirmed that one of the elements in their work with smallholder farmers is to protect small-scale producers from climate vulnerability. Unilever claims the way that they do this is by training farmers so they better understand the choices they make on their farm. For example, whether to pay for more fertilizer, how to reduce the risks of wasting fertilizer by splitting applications and taking account of weather forecasts, and taking advantage of savings schemes when times are good. This implies, if farmers are well trained they can take the right decision at the right time knowing what exactly they are supposed to do in order to make their faming ventures profitable to crown their efforts.

It is also indicated by The Hunger Project (2013) that by providing women food farmers easy access to credit, adequate training and instilling in them the importance of saving, the Hunger Project (THP) enables them to engage in income-generating activities to increase their incomes and invest in their businesses, pay their children's school fees, construct pit latrines, purchase medicines, pay for health care, and make home improvements or build new homes.

Furthermore, through participation in the program, women leaders develop self-confidence and assertiveness, gaining elevated status in their households and communities.

The Hunger Project (2013) highlighted again that the programme is creating a new future where women and men farmers are equal partners in the development of the well-being of their families and their community. To demonstrate THP's commitment to all members of the community, THP also is said to offer men the opportunity to participate in the Microfinance Program, following the same principles and procedures. All these happen as a result of both the training and credit facilities that women and men enjoy from the Hunger Project and it is a very good sign of bringing about transformation in both business and living conditions.

From the above affirmations therefore, it can be said with certainty that the introduction of new ideas and adoption of new innovations or technologies in a country that emphasizes training or education will be easy. This will in turn increase agricultural production and productivity in general, increases yield, income and finally reflect in farmers' improved livelihood.

Access to credit on the other hand is one way to improve farmer access to new production technology and increase productivity. Farmers' ability to purchase inputs such as improved seed and fertilizer is particularly important. If appropriate technology is available but not being used by farmers, then the way credit is handled by government may be part of the problem. The affirmations prove that both

training and credit are prerequisites for improvement in the performance of farmers to achieve effectiveness or the realization of their set objectives (The Hunger Project, 2013)

Training can empower the farmer to know how to obtain credit and be able to use it efficiently. Similarly, access to credit can also help the farmer get trained in the application of technology to improve his performance effectively. The implication therefore is that for the achievement of the country's poverty alleviation programme to become a reality, the Ghanaian smallholder farmers who form the majority need to be given regular training through agricultural extension (because technology is changing fast) as well as be supported with some form of credit either cash or kind for better performance.

Land Tenure System, Fertilizer use and their influences on Farmers' Performance

It has been documented that beautiful initiatives, plans, programmes, strategies can only achieve their intended results in an even balanced land tenure regime in the country. Most of Ghanaian lands are vested in the authority of stools and skins, chiefs and kings, queen mothers and other important traditional institutions for its management, allocation, tenure and distribution thus making it very difficult for individual investors to get land for agricultural ventures (Tsikata, 2005).

With that said, the financial requirements to acquire a plot of land in Accra, cities and towns around the country is such that it will take the average civil servant and other low income earners-who are in the majority-a lifetime savings to acquire a parcel of land to even consider a two-bedroom house to shelter him/her after serving mother Ghana in all truthfulness. There is no gainsaying that this

unbeatable desire can only be achieved by most Ghanaians at the very sunset of their lives. Many are those who will not be able to achieve it at all. Those who even dare take the burdensome step of acquiring lands for housing and other development purpose dread the notorious land guards who will fall short of nothing to even take lives unlawfully to protect what is supposed to be protected by law and traditional customs. Chiefs and traditional leaders cannot disassociate themselves from these dreadful and disgraceful acts of these bravados.

In Ghana, secured land rights, access and tenure are regarded as central to poverty reduction especially in rural areas where subsistent production dominates. Research has shown that about 60% of Ghana's population depends on land for agriculture. The poor, in particular women often have weaker land rights and as a result are among the most vulnerable in the society. Also, land tenure insecurity and disputes over land have had a major impact on investment in land and agriculture. Furthermore, growing populations and new opportunities for commercial agriculture have all increased demands and pressures on land at various levels (GPRSP II, 2006-2009).

The demands as well as pressures on the land lead to its fragmentation and the subsequent impoverishment of most farming soils especially for maize production which calls for the use of fertilizers. Guy (1989) indicated that like all plants maize requires fertilizers for all its soils at the right time and in the right quantities. Fertilizing inevitably takes account of required yields and systems of cultivation, it must pay for itself, that is, produce an increase in the crop which offsets the cost of purchasing and spreading the fertilizers. However, maize

productivity has become a major goal of the Ghana government. According to Mosier and Syers (2005), currently there is a dearth of empirical knowledge on the relationship between fertilizer use, yield response and profitability, under a range of environmental management and market condition. Mosier and Syers assert that fertilizer supply is limited and the cost is prohibitive for sub-Sahara Africa (and Ghana is no exception) farmers because fertilizer may cost as much as five times the global market price. This situation tends to prevent most subsistence farmers from either not using the fertilizers at all or short use it with its attendant low yields experiences.

Some Important Factors and Potential Inputs in Accelerating Maize Performance

According to Fajemison (1992), maize production in west and central Africa is influenced by diverse agro-climatic and socio-economic factors. A large production of maize in these regions is grown in the forest zone. In this agro-ecology, maize production is intense, but yields are limited by numerous diseases, insects, and high temperatures. Maize is traditionally intercropped and small-scale farmers dominate.

It is for these reasons scientists and researchers emphasize improved agronomic and cultural practices by farmers. Improved plant establishment helps farmers to realize their yield potential of the land by avoiding leaving unnecessary spaces which could take much seed hills thereby increasing the plant population. OSUE (1995) and Wych (1998) found out that uneven plant spacing and

emergence can reduce yield potential. Seeds should be spaced as uniformly as possible within the row to ensure maximum yields and optimal crop performance regularly of plant population and planting date.

OSUE (1995) and Wych (1998) stressed that maize planting next to a gap in the row may produce a larger ear or additional ears (if the hybrid has a prolific tendency) compensating to some extent for missing plants. Thomison (2010), suggested that as a general guideline in grain production, yields are reduced by an additional 5% there are gaps of 4.6ft in the row and an additional 2% for gaps of 1 – 3 ft. According to Thomison recent studies suggest that maize growers could improve yield from 4 – 12 bags per acre if within row spacing were improved to the best possible uniformity (depending on unevenness of the initial spacing variability).

Morris et al. (1999) also noted that of all the inputs used in agriculture, none has the ability to affect productivity more than improved seed. If farmers can obtain seeds of modern varieties (MVs) that perform well under local conditions, the efficiencies with which other inputs are converted into economically valuable outputs increases and productivity rises. For this reason, adoption of MVs often serves as catalyst for adoption of improved crop management practices which is precisely why Ghana Grains Development Project (GGDP) placed such a heavy emphasis on plant breeding research. This was confirmed by Aflakpui, Abdulai, Berchie, Ennin and Sallah (2005) as well as Ibrahim (2008) that seed is the best agricultural input. It is emphasized that seed is the unit for distribution and maintenance for plant population.

Maize Production in Ghana

In Ghana, seed development has not been the only effort made by the government. Although yields are still very low, there have been several attempts from national and international initiatives since the through the 1990s to date, to address the situation. There are details of some chronological attempts at improving maize yields as a result of research and dissemination of the results (often via demonstration plots). For example between 1979 and 1994 the Ghana-Canadian International Development Agency (CIDA), Ghana Grains Development Project (GGDP) ran for 15 years. It is believed to have had a more comprehensive outlook and impact on the industry than other projects. It is credited with all the technologies – fertilizer application, plant population, weed control, varietal seed development, and dissemination of research results to farmers (MOFA, 2008).

According to a draft report in 2008 on maize value chain in the country, clearly, the agricultural sector in general and the maize in particular, has seen some efforts through project implementation aiming at yields improvement. Given the above results, some may even argue that the rate of return of these demonstration activities to disseminate technologies for yield improvement has been minimal: especially when one compares the efforts and investments in the maize industry with the resulting yields achieved. The consistent low or poor loan recovery through the years may have other historical and other experimentations but one cannot disregard the fact that low yields are perhaps the most important issue.

The Role of Group Marketing

The concept of group marketing is explained by Abraham (2011) in simple terms, is marketing managed by farmers' groups. As the name implies, the major focus is to empower and facilitate the farmers to take more effective decisions with regard to the marketing of their produce. She views the concept of group marketing as a means to provide the member farmers better access to markets and therefore a greater share in the consumers' purchasing power come together to establish a farmers' market which caters for the needs of a great number of farmers of a community. It is also asserted by Nehru and Jayachita (2003) that the financial performance of such markets is satisfactory.

It has become important therefore for smallholder farmers such as those in the study area to remain in formidable groups and plan together both the sales of their produce as well as purchase of farm inputs. To link and engage in any sensible dialogue with the rest of the society, these farmers need their farmers' organizations, structured from grassroots to the international level, as their legitimate voice as pointed out by Pertev (1993).

Demographic Characteristics that Influence Farmers' Usage of Technology

It is recorded in literature that some demographic characteristics have been identified to have some sort of influence on farmers' acceptance of the usage of technologies. Those personal characteristics of an individual are said to play a

major role in all behavioural patterns of that individual. It is therefore estimated that the demographic characteristics of farmers in terms of their sex, age and educational level can contribute to their adoption behaviours. The sex of farmers can influence adoption. For example, males and females have been found to differ in their responses to different innovations. Accordingly, Nelson (1981) opined that in designing farming technologies, it is wrong to assume that technologies used by males will equally be appropriate for women's use. This is because in farming, men and women have different needs and desires.

Overholt, Anderson, Cloud and Austin (1984) argued that in the agricultural sector in all developing countries and most industrialized countries, men monopolize the use of more efficient types of equipment operated by animal or mechanical power, while women perform simple manual tasks. Often, men apply modern scientific methods to cultivate cash crops, while wives continue to cultivate food crops by traditional methods. Feldstein and Poats (1997) maintained that in farming, men and women have different needs and desires and therefore admonished that appropriate technologies should be developed and included for women in extension programmes.

Campbell and Barker (1997) added that recognition must also be given to the particular functions such as planting, replanting, weeding, seed selection and storage, that women perform within the farming system and their work schedule in the household environment. With regards to the attributes and character traits of men and women that influence their use of technology, Gamble and Gamble (2002) canvassed that men and women perceive different realities, have different

expectations set for them and while women are categorized as emotional, men are classified as rational.

The age of farmers has been identified as another demographic characteristic of farmers that contribute to their adoption behaviours. Swanson, Bentz and Sofranko (1997) noted that older farmers have more experiences, resources or authority for trying a new technology, while younger farmers are likely to adopt a new technology, because they are more educated and cosmopolitan than the older generation. This means that some technologies would have greater appeal to older and more experienced farmers, while others would be more attractive to the younger farmers.

Swanson, Bentz and Sofranko (1997), maintained that generally in most developing countries, a significant proportion of the agricultural activities take place in the rural areas, where 20 to 80 percent of the population may live. Agriculture equally has a low status, because of the low level of technology it employs and low income-earning capacity. This has caused vast migration of young people from the rural to the urban areas. As a result, more old people are engaged in agriculture in the rural areas.

Campbell and Barker (1997), therefore cautioned that extension should therefore consider age as an important characteristic for targeting not only the youth, but also, other age categories. Extension programmes (training programmes) should also aim at increasing the level of technology used and income earning capacity. If this can be done, then there is a good chance that the young people will remain in the rural areas. The influence of formal education on technology adoption is not a straightforward issue. According to Byrness and

Byrness (1978), education enhances one's ability to receive, decode, understand, process and interpret information, which are important for performing many jobs.

Byrness and Byrness (i978), added that a farmer's level of education to some extent, determines the types of tasks he or she is capable of undertaking in any programme and therefore his or her level of participation. Farmers with low education therefore, require greater extension efforts to attract them to participate in innovative programmes and help them accept and use improved technologies. Aryeetey (2004), espoused the arguments of Byrness and Bryness by canvassing that the educational level of farmers to a greater extent influences the types of technologies that they may choose or adopt in an agricultural programme.

Röling (1990), also emphasized that the quality of innovativeness in farming is clearly related to the level of formal education of the farmer and the competency of the agricultural extension workers. Chung (1991), noted that the literacy level among farmers is highly correlated with the utilization of modern technology. In effect, communities whose farming population is better educated are more likely to adopt and use innovative technologies for agricultural production. However, Gamble and Gamble (2002), countered that the high level of education can sometimes became a barrier, rather than a facilitator or aid to communication. Gamble and Gamble said, it is sometimes realized that people with lower levels of formal education are able to carry out some agricultural activities and practices more efficiently and effectively than people with higher education.

Leonard (1977), found in Kenya that farming technologies that are quite simple and do not involve complicated activities are easily adopted by farmers

with low literacy levels. Leonard said agricultural extension agents who have only attained the tertiary education have a clear tendency to know more and to explain better than those with either secondary education or only lower primary schooling. This curved tendency is evident in all technical areas of agricultural extension. However, the more complicated a skill is, the higher the educational level at which the best performance can be achieved. This implies that, although it is possible for agricultural science teachers in Junior Secondary Schools for instance to adequately influence the dissemination of simple farming technologies in the farming communities, the more complicated problems would require the attention of agricultural experts with the members of the community especially the opinion leaders or power actors who can easily influence their colleague farmers.

The Millennium Challenge Account, Ghana Compact

The Ministry of Food and Agriculture played some major roles in the accomplishment of the agricultural aspect of the MCA compact signed between Ghana and the American governments since it works directly with farmers throughout the country. MOFA was actually concerned with the priming of FBO who were the main target group in consultation with MiDA: i, selecting of FBOs for the MiDA training through the district directorates in the areas concerned. In this case it was MOFA's responsibility to identify, sensitize and categorize the FBOs that met the eligibility for FBO training criteria that were later validated by the regional directorates. Some MOFA staff was also directly involved in offering technical training to the FBOs in all the three intervention zones.

Besides offering training to FBOs to increase their knowledge, skills and attitudes towards modernized agriculture production, it also MOFA's responsibility to: i, Establish a limited number of retention ponds and weirs requested by the FBOs in the area of irrigation development; ii, Improve tenure security for existing land users and facilitate access to land for higher value agricultural crops in the Intervention Zones; iii, Improve post harvest handling and Value Chain Services; iv, and lastly Improve credit services for on-farm and Value Chain Investments: MOFA's responsibilities in this regard were so crucial so far as the achievement of the set objectives for modernized agriculture is concerned. However, as MOFA's roles are more or less catalytic then much also depended upon the famers for their dream to be realized. This implies that it was not just enough for the farmers to receive technical training and credit but more importantly put both into practical use. In other words their application is even more important if they are to be of benefit to the farmers in the long run (hence the importance of adoption of technologies by farmers) it is only then that they can actually realize maximization of yields and profit (higher performance) as has been the aim of the MCA compact.

Adoption and Diffusion of Innovations

Adoption studies indicate that adoption of innovation is not something that works overnight, but rather that it is the final step in the sequence of ideas of the stages. Ideas varied about the precise number, nature and sequence of stages through which people progressed. However, the most widely used characterization

of stages in connection with the adoption of innovations derives from Rogers (1995); Leeuwis and Van den Ban (2004) identified the following stages:

1. Awareness of the existence of a new innovation
2. Interest collecting further information about it
3. Evaluation reflecting on its advantages and disadvantages
4. Trial testing innovations/ behaviour changes on a small scale
5. Adoption /acceptance applying innovations/behavior changes

1. On the basis of their score, adoption researchers typically classified people into five different categories as: 1, Innovators 2.5% 2, Early adopters 13.5%, Early majority 34.0% 4. Late majority 34.0% and 5. Laggards 16.0

The percentages according to Leewis and Van den Ban, (2004), represent a standardized average of percentages found in different studies when using one or two standard deviations from the mean as boundaries between categories.

However, the results of some empirical researches reveal that in most developing countries, the impact of rural development programs and agricultural technology adoption by farmers are based on ex-post analysis of the intervention programs. The farmers are rarely consulted, a priori, about their specific circumstances, priority problems and their preference for type of intervention. Therefore the adoption behavior study comes after costs are incurred and the programs have been defused. Prior identification of farmers' preferences can help design more acceptable and cost effective development intervention programmes (Bekele 2004).

Agricultural intervention programmes meant to bring about changes in the livelihood of farmers' require early adoption of the technologies that such programmes bring about but very often this is not so. Sometimes, even after a period of persuasion adoption remain standstill due to certain barriers or factors that affect adoption e.g. scarcity of land for expansion of farms or non-compatibility of technologies (Rogers, 1995).

Summary of related Literature of the Study

This study focuses on the MiDA technical modular training and credit given to smallholder maize farmers between 2009 and 2010 in Kwahu-North district of the Eastern Region of Ghana. The main focus was on the effectiveness of the key areas of training and credit use in the improvement of farmers' performances in the area of maize production as one of the high value crops selected under the project. The cardinal points underlying the study were: perception, effectiveness, adoption, training, credit and performance.

It is believed that for agriculture transformation to occur in order for food security country-wide to be achieved, our numerous resource-poor farmers' needs especially those producing the staples like maize must be addressed. One way to achieve this is by equipping them with the pre-requisites such as training and credit culminating into modernized agricultural production through their effective and efficient applications of recommended practices or technologies that result in their output – yields.

Training inputs and activities including the process, content, method and context are presumed to cause or influence certain training outcomes. These variables could include timing and frequency, format (organization), training content to impart knowledge and skills, training methods like group discussion and demonstration, and location of training, (Gagnï, 1985). The focus in this study however, was not on the training process but rather on the contents that benefited maize farmers as well as the methods employed during the training sessions. Nevertheless, sometimes confounding variables such as changes in institutional support services, inputs supply, facilitation of product marketing, and other non - training factors could also influence learning outcome.

Training methodology is the instructional styles used in imparting farmers training. If the appropriate methods are used with the farmers' full involvement or participation, much is expected to be remembered and both the effectiveness of the technical training and the learning processes will be of immense benefit to farmers when they adopt the innovations they were taught (Chung, 1991). Training is equally expected to change or improve farmers' or trainees' level of perception because they tend to interpret information differently altogether as there will be more logic in their presentations of information.

Credit on the hand has much influence on the level of adoption of training content. Improved technologies normally require the use of different or new inputs which in most cases can be obtainable by the use of extra fund that the resource-poor farmer might not have unless through borrowing. Training becomes very beneficial to the trainee after the training contents have resulted into an outcome

that is expected by the training organizers and this is made possible in most cases through the use of credit. An efficient use of credit to implement knowledge acquired from training results in good performance - higher production and productivity hence both efficiency and effectiveness are achieved.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter describes the study area, study design, population, sample size, the research instruments and sampling procedure. It also captures the techniques used in data collection, data processing and analysis as well as the rationale behind the choices.

Study Area

The Kwahu North district (formerly known as Afram Plains) is located in the northern – most part of the Eastern Region. It covers an area of 5040 sq km and is the largest district in the region in terms of landmass and is mainly dominated by agricultural production (Ghana districts 2012). Kwahu North district shares boundary to the north with Kwahu South District, to the east with the Volta River, to the west with two Districts in the Ashanti Region precisely the Sekyere-East and Asante-Akim Districts. To the north it shares boundaries with two districts in the Brong Ahafo Region namely Sene and Atebubu.

There are two main entrances into the Kwahu North by road: namely through Nkawkaw-Mpraeso-Bepong-Kwahu Tafo and Adawso from where the

three km wide Afram River is crossed to Ekye-Amanfrom by ferry operated by the Volta. Lake Transport Company (VLTC). The second entrance is through Kpandu-Torkor in the Volta Region from where the Volta Lake is again crossed by one-and-a-half-hour portion journey to dock at Agordeke from where one can travel by road through Amankwa and Adeemra to the district capital. There is another minor entrance into the district from Atebubu in the Brong Ahafo Region into Ntonaboma, which was ceded out of the Atebubu District and put administratively under the Kwahu North (Afram Plains).

The only high ground is the Donkorkrom plateau. The District is drained by the Afram River in the west, the Volta Lake in the east and the Obosom River in the north which flow continually throughout the year and can be used for both domestic and agricultural purposes.

The district falls within the savannah vegetation zone comprising the savannah transition zone and savannah woodland. This is characterized by short deciduous fire resistant trees often widely spaced and a good flora composed of varying heights. Riverine forests occur along the major rivers and streams of the savannah zone and the larger stretches are cultivated by farmers who settle near them.

Part of the district is characterized by double maxima rainfall in June and October while other parts including the district capital experience unimodal rainfall. The first rainy season is from May to June, with the heaviest rainfall occurring in June while the second season is from September to October with little

variations within the sub-district. Temperatures in the district are high and range between 26° C and 30°C.

The main soil type identified is classified as hatplic wivisols which constitutes about 40% of the land area and belongs to the Ejura Series. They are developed from Voltain clay shale and occur under both forest and savannah vegetative sites. In the absence of bushfires, they contain considerable reserves of organic matter and are suitable to a range of crops (Ghana District, 2012).

Research Design

A descriptive-correlation survey research design was used as appropriate design for the study because it provided relatively efficient way to obtain information about a wide variety of different variables pertaining to the study and also enable comparison between two categories of maize farmers who benefited from training and credit on one hand, and just training on the other hand (Gravetter and Forzano, 2009). The descriptive survey enabled data collection on self-reported answers about attitudes, opinions, and personal characteristics and behaviours, some of which may be very difficult to describe in any other way.

Additionally, the survey research helped to obtain an accurate picture of the individuals being studied. Surveys typically, gather data at particular points in time and describe the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events (Cohen, Manion and Morrison 2007). Morrison

(1993, p.38-40) noted that "Survey is said to have several characteristics and claimed attractions; typically is that it is used to scan a wide field of issues, populations, programmes etc. in order to describe any generalized features."

However, Bimose and Bayne (1995); Morrison (1997), emphasized that in survey, critical attention must be paid to rigorous sampling, otherwise the basis of the survey's applicability to wider contexts is seriously undermined. The dependent variable of the study was the effectiveness of the MCA components whereas the independent variables were demographic characteristics of farmers examined including sex, age, educational levels and working experience. The correlation component of the research design was to examine the relationship between dependent and independent variables of the study.

Population of the Study

The population of the study included maize farmers in 154 groups in the Kwahu North district who benefited from the MCA Ghana compact either in the form of training, or both training and credit towards the production of maize.

Sampling Procedure and Sample size

A combined sampling strategy of non-proportional stratified and simple random sampling procedures was employed for the study to optimize the chances that the chosen sample was representative of a widely dispersed population

(Gravetter and Forzano, 2009). Four (4) communities: Abotanso No. 1, Kayera, Alavanyo and Tease were selected out of 60 maize growing communities that benefited from the compact using non-proportional stratified sampling method. Communities that benefited from both training and credit were twenty-two (22) whiles those that that benefited from only training were thirty-eight (38). Two (2) communities were non-proportionately but randomly selected from each stratum or group using ballot papers making a total of four (4) communities. for the study. This was to help make fair comparison between the two strata. According to Hopkins; Hopkins and Glass (1996), equal numbers from strata enables a fair and effective comparison between groups to be made.

Generally, researchers agree that when simple random sampling method is employed, larger sample sizes are better than small sample sizes because the larger the sample size, the smaller the magnitude of sampling error and greater the probability of getting a representative sample of the population. According to Best and Kahn (1988, p. 17) "There is no fixed number or percentage of subjects that determines the size of an adequate sample." This assertion was confirmed by Ofori and Dampson (2011, p. 19) also who opined that "A sample may be small or large but generally is determined by the nature of the study, manageability and accessibility."

A total of 120 maize farmers who had benefited from the MiDA training and credit were randomly selected from four communities as shown in Table 1. Cohen, Manion and Morrison (2007), assert that the number of variables researcher set out to control in their analysis and the types of statistical tests that

they wish to make must inform their decisions about sample size. Cohe, Manion and Morrison said, as a "rule of thumb", one must be assured of having a minimum of 30 cases for each variable. Therefore if there were four (4) independent variables then a minimum of one hundred and twenty cases were needed for reliability and generalization.

Table 1: Population and Sample Size used for the Study

Community	Total No. of Maize Farmers	Training and Credit Beneficiaries	Training only Beneficiaries	Sample Size Selected
Abotanso No.1	190	100	90	30 (15 + 15)
Alavanyo	98	50	48	30 (15 = 15)
Kayera	100	50	50	30 (15 =15)
Tease	347	155	192	30 (15 + 15)
Total	735	355	380	120

Source: Field Work, 2012.

Instrumentation

A structured and validated interview schedule was used as instrument for the study for flexibility, collection of in-depth information as well as provision of room for more explanation and application (Kumar 2005). Face and content

validity were ensured by the researcher and her supervisors respectively (supervisors from the Department of Agricultural Economics and Extension, University of Cape Coast).

The structured interview schedule consisted of four main parts embracing the constraints of respondents and their practices (both previous and current practices), respondents' perceived effectiveness of the components of the MCA Ghana compact (training and credit; and training) on their performances as well as the demographic and farm related characteristics of the respondent farmers.

Part one looked at the possible constraints that the respondents face in the course of carrying out their production activities such as poor access to credit, unavailability of labour, poor AEA contact, poor access to mechanized services, inadequate rainfall, unavailability of certified seeds, prevalence of pests and diseases and also lack of ready market for farm produce.

In part two where the respondents' perceived effectiveness of the two sub-components of training with credit on one side and only training on the other side were considered, a five point Likert- type scale (ranging from Very Effective to Ineffective) was developed to measure the effectiveness of the compact on farmers' performances. Over here, some chosen training contents and the various teaching methods used in the conduction of training such as lecture, group discussions, practical hands-on and demonstrations as well part were considered whiles timely access to credit, credit enabling timely carrying out of farm

practices, credit access procedure, mode of credit repayment, duration for repayment and credit interest rate were considered for the credit part.

Part three which sought to explore the cultural and agronomic practices of farmers (both previous and current practices), looked at the type of land preparation, type of seeds sown, conduction of germination tests, type of planting, timely weeds control, practice of crop rotation, use of cover crops and fertilizer use.

Part four concentrated on the demographic and farm related characteristics of respondents as relevant to the research namely age, sex, level of education, farm land size, years of experience and yields of respondents. Personal information was placed last as the respondents were more likely to provide answers readily to these when they had already invested time and energy in answering the rest of the form (Dawson, 2002; Gravetter & Forzano, 2009). On the whole, the structure of questions in the instrument (structured interview schedule) assumed different forms being: close ended, open-ended and partially close ended. This was done so that respondents could raise new issues as well as making coding easier in some cases (Dawson, 2002). Table 2 shows the Likert-type scale and the interpretations.

Table 2: Interpretation of Likert-type Scale

Ratings	Interval	Perceived Effectiveness
5	4.6– 5	Very Effective
4	3.6 – 4.5	Effective
3	2.6 – 3.5	Fairly Effective
2	1.6 – 2. 5	Poorly Effective
1	1.00 – 1.5	Ineffective

Source: Author's Construct, 2013.

Pre-testing of Research Instrument

A pre-test study was conducted in a different community, Abotanso No. 2. To ensure that the selected respondents for the pilot test share similar characteristics with respondents for study, 15 maize farmers who had had the MCA training with credit and 15 maize farmers who benefited from only training were randomly selected. A total of 30 respondents were selected for this pilot study.

The pilot study was conducted to pre-test the structured interview instrument to determine its internal consistency or reliability and stability. With the help of Predictive Analytics Software (PASW) formerly known as Statistical Product and Service Solution version 16, Cronbach's alpha co-efficients were calculated to determine the internal consistency of the Likert-type scales. The two main sub-scales, training effectiveness and credit effectiveness of the MCA

compact had Cronbach's alpha co-efficient of 0.83 and 0.614 respectively indicating that the instrument with respect to these variables was reliable. The final structured interview schedule was developed for the collection of the main data thereafter. The pre-testing of instrument was conducted in the first week of January, 2013.

Data Collection

With the help of two assistants or enumerators, who were given prior training, on data collection for accuracy as well as to ensure inter-rater reliability and as to avoid instrumentation threat, data were collected using face–to-face interviews or person-to-person interaction. The training involved not only the administration of the questions but also their meanings as well as their interpretations into the local dialects.

A period of one week was used for the administration of the interview schedule for the data collection. Data collected covered all variables per the analytical framework. The data were collected in the first week of February, 2013. By the nature of the instrument (structured interview schedule), it was easy to make 100% response rate possible.

Data Analysis

Data collected was analyzed using tools from the PASW (Predictive Analytics Software) version 16. Objective one was to identify Maize farmers'

constraints on maize production before and after MCA compact implementation. Frequencies and percentages were used to analyze the situation as per farmers' answers provided.

Objective two aimed at determining farmers' perceived effectiveness of the MCA compact with respect to training and credit. Frequencies and percentages were again used in the data analysis. Additionally, a five-point Likert-type Rating Scale was developed with a scale ranging from 1-5 whereby means and standard deviations were used in analyzing farmers' perceived effectiveness of the MCA compact. This was to help identify the various attitudes respondents have towards the sub-components of the project as well as produce numerical values that could be treated as measurements from an interval scale as pointed out by Kumah (2005) and Gravetter, and Forzano (2009) respectively.

Frequencies and percentages were computed to analyze farmers' previous and current practices in maize production in the study area which was objective three of the study.

Objective four was to compare farmers' performances with regard to the two sub-components of the compact; mainly training with credit and training only. Paired Sample t-test was employed in determining farmers' performances in terms of land sizes and yields before and after the MCA compact training. Independent sample t-test was also used to determine whether significant differences existed between the two sub-components of the MCA compact beneficiaries outputs after Appropriate statistical procedures were adopted to

generate frequencies, percentages, means, and modes, standard deviation, and independent sample t-test, to describe the outputs of the data.

the project implementation. The only hypothesis in the study was at this juncture was rejected whiles and the null hypothesis accepted.

The fifth and the final objective tried to describe the demographics of respondents and examine the correlation between them and the effectiveness of MCA components. Cross tabulation of frequencies and percentages were used to examine farmers' responses on their sex, age, educational levels as well as their working experiences. This ended up in using three different correlation methods: Point Biserial, Spearman's rho and Pearson's Product Moment to examine the correlation or relationship between farmers' demographic characteristics and the effectiveness of the MCA components. Using the Point Biserial correlation, the sex variable was re-coded as 0 for female respondents and 1 for male respondents.

Table 3: Summary of Statistical Tools Used for Analyzing the Data

Specific Objectives	Statistical Tools for Analyzing Data
1.Identify Maize farmers' constraints on maize production before and after MCA compact implementation	Frequency, Percentage
2. Determine maize farmers' perceived effectiveness of the MCA compact with respect to training and credit	Mean, Standard Deviation
3..Explore the previous and current practices of the two categories of maize farmers in the study area	Frequency, Percentage
4.Compare the effectiveness of performances of beneficiary maize farmers of the MCA training with credit and training without credit	Paired Sample t-test, Independent Sample t-test
5. Describe farmers' demographics and examine the association between them and the effectiveness of MCA components .	Frequency, Percentage, Point Biserial, Spearman's rho, Pearson Product Moment correlations

Source: Author's Construct, 2013

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results and discussion of the study with respect to the reviewed literature. The chapter focuses on four main sections including the challenges facing the respondents in the production of maize before and after the implementation of the MCA project, maize farmers' perceived effectiveness of the Millennium Challenge Account compact training, teaching methods and credit, farmers' level of adoption of improved or recommended agricultural practices. It also tries to look at the background of the maize farmer respondents with respect to credit receipt and the examination of association these demographics and the effectiveness of MCA components under review.

The study analyzes effectiveness of training in terms of farmers' perception about its relevance to their job, duration, topics treated, skill as well as the knowledge acquisition and the training methods. The effectiveness of credit was also viewed by the beneficiaries from the angle of its attributes such as timeliness, access procedure, mode of payment, duration for repayment and interest rate.

Farmers' Perceived Constraints on their Performances Before and After the MCA Project Implementation

Table 4: shows the results of the analysis of the main constraints or challenges the maize farmers in the study area - being Kwahu North district in the Eastern region of Ghana face in the course of producing maize. The results are presented on two categories of farmers who had benefited from the MCA training with credit and those who enjoyed training without credit.

Indications from the results are that poor access to credit registers the highest percentage of a total of 86.7 percent with beneficiary farmers' of training and credit scoring the higher percentage of 90.0 even after the MCA project and it shows an increase of 20 percent over the percentage before the project implementation. The high percentage score for this category of maize farmers raises some doubt as to whether they could really identify their felt need. This implies the farmers were not only thinking about their maize farming venture but also about some other family responsibilities as well.

This attitude of MCA credit beneficiaries from the study area proves the assertion by Ogunfowora, Essang and Olayide (1972), that credit is not only needed for farming purposes, but also for family and consumption expenses; especially during the off season period.

Table 4: Farmers' Perceived Constraints on their Performance Before and After Project

Constraints	Categories of Farmers				Total Percentage	
	Without Credit		With Credit		Before	After
	Before	After	Before	After		
Poor AEA contact	48.3	58.3	40.0	58.3	44.2	58.3
Poor access to credit	85.0	83.3	70.0	90.0	77.5	86.7
Poor labour	65.0	55.0	65.0	80.0	65.0	67.5
Poor access to mechanized services	75.0	78.3	75.0	85.0	75.0	81.7
Unavailability of certified seeds	28.3	20.0	10.0	23,3	19.2	21.7
Prevalence of pests and diseases	41.7	33.3	46,7	50,0	44.2	41.7
Inadequate rainfall	61.7	61.7	65.0	65.0	63.3	63.3
Lack of ready market for farm produce	78.3	81.7	70.0	75.0	74.2	78.3

n=120

The 83.3 percentage scored by farmers without credit shows a difference of 1.7 percent less than their score before project implementation is an indication that credit is highly needed by maize farmers in the study area. This is evidenced in the fact that credit plays very important roles in agricultural production and

productivity especially where modernization or commercialization is concerned. Rural development and, in particular, farm productivity, can be influenced by several factors access including credit. Access to credit may affect farm productivity because farmers facing binding capital constraints would tend to use lower levels of inputs in their production activities compared to those not constrained (Petrick, 2004). The provision of credit has increasingly been regarded as an important tool for raising the incomes of rural populations, mainly by mobilizing resources for more productive uses. As development takes place, one question that arises is the extent to which credit can be offered to the rural poor to facilitate their taking advantage of the developing entrepreneurial activities (Hosain, 1986).

On the other hand, the drop in the score of farmers without credit from 85 percent before project implementation to 83.3 percent after project means that few of them realized the benefits derived from the MiDA training was enough to bring some changes in their performance without credit. It also means that the training needs assessment or analysis before project initiation was able to meet those farmers' performance deficiency level to some extent which is a sign of good work done (Barbazett, 2006).

Poor mechanized services in the study area surfaced scoring the highest percentage with a total of 81.7 for both categories and 85.0 and 78.3 respectively for access to credit group and without access group after project implementation. Before the MCA project the two groups had the same score 75.0 and 75.0 each which is an indication of having the same perception levels. Mechanized services

are necessary to break ploughs and also to provide fine soil tilth to enhance plant development.

This finding disagrees with the assertion of Barbe (1981), that an individuals' perception differs markedly from another's in the same situation due to different cognitive styles Modernized agriculture calls for mechanized services especially in the area of expansion in which case larger acreages needed to be cultivated. Better performance or efficiency can only be achieved if and only if good and free soils are used in the production of crops like maize. Additionally, as Wych (1988), indicated, any soil has the potential to form a compacted layer and therefore if a confined layer is detected it should be broken using the appropriate implement to ensure better drainage, conservation and utilization of water which all go to benefit the maize plant in question – a condition that promotes higher productivity and efficiency.

Also of much importance as indicated in the results from Table 4 is the lack of ready market for harvested maize carrying a total score of 78.3 percent and 75.0 and 89.7 respectively for credit beneficiaries and those without it after the project. The effectiveness of farmers' performance in the area of maize production in the study area becomes redundant and their efforts become unfruitful as buyers refuse to purchase harvested maize after a period of storage. Agricultural production should necessarily begin with market survey in order to supply what exactly buyers need.

Nevertheless this is one area that the smallholder farmers are lacking in which is likely due to lack of knowledge and information to meet quality standards, market specification and contractual arrangement as opined by Mazoya (2001). The implication is that the persistence of lack of market for maize farmers to sell out their harvest will result in their impoverishment rather than improvement in living conditions as the MCA project focused else they resort to other alternatives like group marketing. Group marketing is a sure sway that helps empower farmers overcome produce glut on markets.

The concept of group marketing as explained by Abraham (2011), is simply marketing managed by farmers' groups which is supposed to empower and facilitate them to take more effective decisions with the regard of marketing their own produce. In this way the farmers are sure to have better access to market and therefore a greater share in the consumer's purchasing power as well as enjoy the satisfactory financial performance of such markets as asserted by Nehru and Jayachita (2003).

The other farmers' constraints of concern included unavailability of labour, inadequate rainfall and poor AEA contact having totals of 67.5 percent, 63.3 percent and 58.3 percent respectively. Apart from unavailability of labour which indicates a difference of 25 percent between the two categories' score after the project implementation, the others show not much difference both before and after access to the MCA training and credit. Unavailability of labour prevents farmers from performing well leading to the non-achievement of efficiency. Farmers' own strength cannot clear large acreages for maize production for the achievement of

efficiency in any way unless either people are available to provide manual service or tractors for mechanized services in the absence of practicing minimum tillage.

The findings of this study revealed that farmers can make appropriate choices of training contents and topics that have relevancy and harmony with their farming systems. Varying of land preparation method becomes very important over here as maize farmers in the study area can easily shift to practicing minimum tillage for better and faster results.

The least score evident from the Table 4 was recorded for unavailability of certified seeds. Unavailability of certified seeds has 21.7 percent as the total percentage for the two farmer categories. Both categories have scores of 23.3 and 20.0 after project for access to credit category and no access to credit category respectively. These results show that so far as certified seeds are concerned, maize farmers in the study area do not face much problem. It also implies that certified seeds are readily available for farmers to purchase according to their needs and financial strength without difficulty.

Certified seeds have the potential to influence good yields or farmers' performance hence efficiency in the crop sub-sector. As pointed out by Morris et al., (2008) of all the inputs used in agriculture, none has the ability to affect productivity more than improved seed. If famers in the study area can obtain seeds of modern varieties that perform well under local conditions, the efficiency with which other inputs are converted into economically valuable outputs increases and productivity rises. For this reason, adoption of modern varieties often serves as the catalyst of improved crop management practices which is precisely why much

emphasis on plant breeding research. It is in the light of this that Aflakpui et al., (2005) recommend seed as the best agricultural input.

Additionally, even though credit according to several authors, is supposed to have the ability in changing farmers' situations severally cannot in any way eliminate all of farmers' problems. For example Abedullah (2009); Okurut, Schoombee, and Van Der Berg (2004) noted that easy and cheap credit is the quickest way for boosting agricultural production. In the same way Yusuf (1984) maintained that credit is provided for relief of distress and for purchasing seed, fertilizer, cattle and implements. Despite access to credit by some of the maize farmers there has not been any significant level of change in their constraint scores compared with those without credit benefit. This implies that whether training and or credit, farmers will still face some difficulties ('killer assumptions') that they cannot easily solve on their own.

The implication drawn from the findings of the general results shown concerning maize farmers' constraints in the study area both before and after the MCA project implementation is that access to training and credit is not the end to the achievement of efficiency even though they can both influence or improve it for the better. Often managers of different organizations like these maize farmers face some critical or 'killer assumptions' that they themselves can do nothing about unless the intervention of government comes in.

Farmers' Perceived Effectiveness of MCA Training, Teaching Methods and Credit

The highest mean of 4.65 was for row planting of maize and lowest of 4.10 went to fertilizer application together with standard deviation scores of 0.48 and 0.35. This means that the farmers generally perceived row planting of maize as a very effective way of improving upon their maize yields as they realized that it actually resulted in substantial increases in plant population. Row planting helps to do away with uneven plant spacing as in the case of haphazard plating that farmers used to practice. The standard deviation was 0.48 which equally was quite low indicating agreement on the part of farmers in the answers they provided. This general perception of farmers about row planting as an innovation capable of helping then realize substantial difference in their yields by doing away with the creation of uneven spaces agrees with the assertions of Wych (1988); OSUE (1995) and Thomison (2010) that uneven plant spacing and emergence can reduce yield potential.

The rest of the training contents considered in this study e.g. conduction of seed germination test, choosing good seeds for planting, applying good land preparation methods, crop rotation, timely weeding and fertilizer application also had good mean scores ranging between 4.43 and 4.10 respectively (standard deviations also ranged between 0.51 and 0.35). This is evidence that the MCA beneficiary maize farmers in the study area perceived the training they enjoyed as being effective meaning its reflection is likely to show in their performances.

Table 5: Farmers' Perceived Effectiveness of MCA Training

Components of Training	Mean	Std Deviation
Training given was very beneficial	4.43	0.49
Topics treated were relevant to the job	4.42	0.49
Enough time was allocated to topics	4.27	0.46
Topics treated were well explained	4.45	0.49
Taken through good land preparation methods	4.20	0.51
Taught how to choose good seeds for planting	4.29	0.47
Taken through how to conduct seed germination test	4.43	0.51
Taught how to plant in rows	4.65	0.48
Taught how to do timely weeding	4.13	0.38
Taught to use fertilizer when necessary	4.10	0.35
Taught to practice crop rotation	4.13	0.39
Acquired some skills which improve performance	4.16	0.41
Have acquired some new knowledge	4.13	0.33
Training methods used generally were good	4.18	0.42
Weighted Mean	4.28	0.22

n=120. Min. = 2 Max. = 5

Scale: Very Effective = 4.6 - 5, Effective = 3.6 – 4.5 Fairly Effective = 2.6 – 3.5, Poorly Effective = 1.6 – 2.5, Ineffective = 1.00 – 1.

This is in consonance with the emphasis by Patel (1985) that education or training has also been regarded as an investment in human capital, which is capable of raising the skill and quality of man, narrow his information gaps and increase his locative efficiency thereby leading to more productive performance. It also indicates that the farming technologies that the farmers were introduced to are quite simple and do not involve complicated activities and therefore were easily adopted by the farmers (Leonard, 1977). The implication is that farmers must be introduced to simple farming technologies that they can easily adopt and even introduce other non-trainees to them afterwards through the power actors or opinion leaders in the farming communities.

However, the lowest mean of 4.10 registered for fertilizer application is something worth considering. Even though maize farmers realized its importance they could not easily afford it as reflective in their comparatively low yields. Farmers are likely to be aware of the empirical knowledge of the relationship between fertilizer use, yield response and profitability in maize production but either fear the fertilizer supply was limited and or the cost was prohibitive for their use (Mosier & Syers, 2005).

The aspects of the training process e. g. time allocated to each topic and topics being well treated equally gained good mean scores of 4.27 and 4.45 with their corresponding standard deviations of 0.46 and 0.49 respectively. It is an indication that the MiDA trainers did a good job in training the maize farmers in the study area during the training period. The competency of trainers'

communication, facilitation, as well as the approach has been proved by respondents' perception results in Table 5.

The general perception of farmers in the study area as indicated in Table 5 is that the training sub-component of the MCA compact has been 'effective' or beneficial so far as maize production was concerned with means ranging between 4.10 and 4.65 and weighted mean being 4.28 which is quite high according to scale used. The overall relatively low standard deviations ranging between .33 and .52 indicate the respondents' greater agreement in views especially concerning the specific components of the training. These results are indications that the intended training objectives and goals for only the training facet of the MCA have been met.

Maize Farmers' Perceived Effectiveness of Teaching Methods

The results from Table 6 indicate that among the four (4) teaching methods, practical hands-on was perceived by the respondents to be very effective (according to the scale provided in table 6) which is very good or high with an average score of 4.46 and standard deviation of .77. This was followed by demonstration, group discussion and then lecture in descending order; all having mean scores of 3.93, 3.19 and 2.34 respectively and corresponding standard deviations of .83, .87 and .77. The weighted mean of 3.48 gaining standard deviation of 0.81 is an indication of an overall use of effective teaching methods by trainers during MiDA training.

Table 6: Farmers' Perceived Effectiveness of Teaching Methods

Training Methods	Mean	Standard Deviation
Practical Hands-on	4.46	.77
Demonstration	3. 93	.83
Group Discussion	3.19	.87
Lecture	2.34	.77
Weighted Mean	3.48	0.81

Source: Field Survey Data, 2013

Scale: Very Effective = 4.6 - 5, Effective = 3.6 – 4.5, Fairly Effective = 2.6 – 3.5, Poorly Effective = 1.6 – 2.5, Ineffective = 1.00 – 1.5

The finding from this result is that maize farmers in the study area perceived the practical hands-on to be very effective because it is practical-oriented and comparatively helped them most to be able to apply the training contents on their various farms. The registered mean for demonstration also showed effectiveness of the teaching method. Farmers perceived the group discussions as a method that helped them to a substantial degree whiles lectures gained a moderate effectiveness according to the Likert-type scale provided. Their corresponding standard deviations equally showed agreement in views of the respondents. The finding means that there was a combination of the teaching methods during the training in which farmers were allowed to practice technologies after being demonstrated to them (as suggested by Van den Ban &

Hawkins, 1996) accompanied by interactive lectures and also some time was allowed for group discussions.

It was appropriate that the four teaching methods were combined during the training. Youdeowei and Kwateng (1995) assert that learning experiences must always be planned and also suggested the combination of teaching methods for better results as none of the teaching methods is necessarily better than the other. Similarly, other authors, Abraham (2011); Yahya and Kwateng (1997) also believe that the best way to teach adult farmers is to combine the teaching methods with emphasis on practical hands-on and demonstrations to be very critical in addition to field trips which was not included in this study.

Farmers' Perceived Effectiveness of MCA Credit

The results in Table 7 clearly show that generally, farmers' perception about the effectiveness of credit was lower than that of the training. The highest mean was 3.10 (with standard deviation of 1.18) for 'receiving credit on time' as compared to 4.65 in the case of training. The lowest mean was 2.40 (standard deviation of .99) for 'pleased with credit interest'. These means ranging from 2.40 – 3.10 indicate that on the whole, the respondents (credit receivers) failed to perceive the credit component of the compact as being effective but fairly effective according to the scale provided. The timeliness of the release of credit, which was also perceived by farmers as fairly effective was very important since the money was meant for agricultural production. According to Neduru (as cited in Amoah,

2004) timeliness of disbursement is critical especially if the loan is being used for seasonal activities such as agricultural production but the credit users failed to take advantage of that.

Table 7: Farmers' Perceived Effectiveness of MCA Credit

Components of Credit	Mean	Std. Deviation
Received Credit on time	3.10	1.18
Credit received enabled timely farming practices	3.07	1.05
Found Credit access procedure ideal	2.91	1.15
Pleased with Credit mode of repayment	2.84	1.96
Pleased with duration for payment	2,75	0.94
Pleased with Credit interest rate	2.40	0.99
Weighted Mean	2.8	0.59

n = 120. Min. = 1.67, Max. = 4.00

Scale: Very Effective = 4.6 - 5, Effective = 3.6 – 4.5, 2.6 – 3.5 Fairly Effective = 2.62 – 3.42, Poorly Effective = 1. 6 – 2.5, Ineffective = 1.00 – 1.5

The lowest mean registration of 2.40 for 'pleased with interest rate' together with its corresponding standard deviation of .99 is very significant because apart from 'duration for payment' which had a standard deviation of .94 the other variables registered standard deviations above 1. This means that there was stronger agreement among the credit receivers that the interest rate was not in their favour as smallholder farmers who were already resource-poor.

The finding from this result is that even though the maize farmers in the study area received the credit on time, the interest rate was high for them to enable them register any profit margin differently from their previous incomes from maize production. Similarly, the respondents perceived the other facets of the sub-component of the credit package e.g. mode of credit advancement and repayment to be fairly effective therefore not very helpful to them. Standard deviations ranging between 1.18 and 1.96 for the various facets of credit indicated the diversity of views of the respondents just as Gamble and Gamble (2002) pointed out that the interpretation of events may differ markedly from the actual events among different people.

The implication of this finding is that since the credit receivers never perceived it as an effective means of improving their performance, there is no likelihood that they would either make any meaningful or significant changes in their maize production and productivity or their level of income for poverty alleviation or improved living conditions in the study area as intended for the MCA training and credit.

I realized from personal interactions with the farmers that the credit advanced to farmers in the study area had rather put them into indebtedness. Out of the 60 respondents from the study area only three of them (2.5%) claimed to have finished their credit repayment. Most of them could not even repay half of the amounts given them. Coincidentally, in Abotanso No.1 (one of the enumeration areas) exactly on the day of data collection, police men sent by the Afram Rural Bank had been there earlier to make arrests of credit defaulters. The situation in

the other communities had not been different as was reported from inter-personal interactions and- observations with the respondents. The respondents actually regretted they had 'entangled' themselves with the credit issue (P. M. K. Botsoe, personal Communication, February 7, 2013).

If the assertion of Baklouti and Abedelfettah (2013) that microfinance or credit programmes have a great contribution in reducing poverty is actually true, then it did not work for the maize farmers in the study area. I however, agree with Alamgir and Elhaut's (as cited in Amoah, 2004) assertion that the poor recovery of the loan was likely due to lack of staff to monitor borrowers' activities of agricultural production loan to farmers. It has been noted that close supervision following accurate appraisal is conducive to high rate for loan recovery for financial investment institutions. The consideration of all the facets of credit to farmers especially is equally very important. As pointed out by Obayadullah (2000) for example that if a borrower is required to begin repayment only a week after obtaining a loan, when her investment will not begin to yield income, then repayment has to come from other sources which most Ghanaian smallholders do not have

This finding is in contrast with the assertions of some researchers. For example, Marzin (1999), reported of a Rural Credit Promotion in Burkina Faso in which customers were expected to pay an interest rate of 10% therefore attracted so many customers so much so that the initial number of people increased to 33906 by the end of the second phase. Nevertheless, Bravermangue and Huppi (1991) argued that keeping interest below the market level quickly leads to abuse

and malpractices and therefore relatively a minor criterion in deciding whether loan is needed.

Farmers' Previous and Current Practices in Maize Production

Table 8 depicts maize farmers' previous and current practices in the production of maize in the study area. The results in Table 8 evidenced a clear picture of vast improvement in the overall practices of maize farmers in the study area after the MCA project over their previous practices before the project implementation. Combining the two categories of farmers with and without credit access, seed germination test tops with a total of 83.8 percent as difference between their two scores before and after project implementation. Farmers without access to credit scored higher percentage in conduction of seed germination test than those with credit even though with a small margin of 11.7 percent yet quite appreciable. Conduction of seed germination test actually relieves farmers from wastage hence saves money for other important activities for higher performance.

Row planting tops second after seed germination test by scoring a total of 73.3 percent. Whereas farmers with access to credit scored 70 percent of performance in row planting, their counterpart without credit scored 76.7 percent with an increase of 6.7 percent over the score of the former. Row planting enables farmers obtain even plant spacing and emergence of seeds that result in higher plant population with its attendant higher yields as a sign of efficiency. Recent studies suggest that maize growers could improve yield from 400kg to 1200kg per

acre if within row spacing were improved to the best possible uniformity (depending on unevenness of the initial spacing variability) (Thomison, 2010).

Table 8: Farmers' Practices Before and After MCA Project

Practices/Technologies	Categories of Farmers				Total Percentage	
	Without Credit		With Credit		Before	After
	% Before	% After	% Before	% After	%	%
Vary land preparation	45	88.3	36.7	90.0	40.8	89.2
Row planting	18.3	95.0	20.0	90.0	19.2	92.5
Use of certified seeds	16.7	90.0	15.0	76.7	15.8	83.3
Conduct seed germination test	5.0	95.0	5.0	83.3	5.0	89.2
Timely weed control	70.0	100.0	63.3	100.0	66.7	100.0
Use of fertilizer	23.3	93.3	11.7	86.7	17.5	90.0
Crop rotation	40.0	70.0	15.0	73.3	27.5	71.7

n= 120

Source: Field Survey Data. 2013

Fertilizer use tops third with a score line of 90.0 percent. It shows a difference of 72.5 percent after the project above the level of use (17.5%) before

the project. Farmers with credit scored 75 percent as against 70 percent in the case of those without credit. With this registration one is tempted to believe that there would be some improved performance in yields of the maize farmers after the project as indicated in literature. Several studies have shown the potential of inputs like fertilizer in accelerating crop productivity which the farmers in question are likely to be aware of. But whether the right quantity was applied to the maize plants for full benefit to be realized is another thing all together. Due to high prices of fertilizer, the economically application rate varies with the relative change in its prices as indicated by Morris et al. (1999).

Certified seed usage scored a total of 83.3 percent with a difference of 67.5 percent between the period of before and after MCA project implementation. The percentage is quite significant as seed has a high ability to influence yield of maize especially. Farmers without credit scored 73.3 percent whereas those with credit had 61.7 percent for the use of certified or modern variety of maize seed and this is very significant for farmers aiming at efficiency in their performance.

Other practices of importance that were included in study comprised varying of land preparation with a score line of 48.4 percent, crop rotation with 44.2 percent and lastly, timely weeding having 33.3 percent. For the two categorized groups of credit beneficiaries and those without credit, the scores were 53.3 and 43.3 percentages; 58.3 and 30 percentages and 33.3 and 30 percentages respectively. Generally it is seen form the results that the adoption rate of farmers without credit was a bit higher than those with credit.

The findings from Table 8 indicate a general high adoption of recommended or improved practices or technologies by maize farmers in the study area meaning the technologies were compatible with their existing values and norms as pointed out by Rogers (1996). The continuity of this attitude is expected to result in better performances and in turn efficiency of MiDA training. This output of MiDA training beneficiary maize farmers proves effective need assessment and appropriate needs analysis was done to determine knowledge, skills, and attitude requirements and performance deficiencies (Barbazett, 2006). It also indicates the relevancy of training contents to solve their problems.

Findings equally evidenced that farmers understood lessons taught, accepted them and therefore expressed interest and willingness to adopt recommended practices with good scores from both categories of maize farmers under study even though one would have expected the credit beneficiaries to have done far better than their counterparts particularly in the use of certified seeds. A number of the credit beneficiaries tend to use local maize varieties instead of improved or modern varieties and there was a difference of 11.6 percent between them and their counterparts which clearly shows misapplication of the credit received. But whether the frequency, quality and accuracy in the implementation of the adopted innovations will be sustained is another area of concern. This is because according to Pholonngoe and Richard (1995), to foster meaningful development, trainers need to bear in mind that the needs of adults constantly change.

The good performance of the maize farmers by way of adopting recommended practices is also an indication that the theories and concepts of training were related to a setting familiar to MiDA training participants. Their need was fulfilled by letting them choose learning projects that reflect their own interests as opined by Miller and Osinski, (2002). Similarly, the results proved that prior identification of farmers' preferences can help design more acceptable and cost effective development intervention programmes and projects as opined by Bekele (2004). On the basis of adoption score, one can say the maize farmers fell into the category of early adopters but with a score higher than 34% which disprove the adoption categorizations of Rogers (1995) and Leeuwis and Van den Ban (2004).

Comparison of the Effectiveness of Performances of Beneficiary Farmers of the MCA Training with Credit and Training without Credit

Table 9 provides the dependable t-test of maize farmers' estimated yields before and after the MCA compact implementation.

Paired Sample t-test of Farmers' Performances Before and After MCA Project

The results in Table 9 revealed that there were statistically significant (0.000 at 0.05 alpha level) differences between both the mean land sizes and mean yields of maize farmer beneficiaries before and after the MCA compact. The

mean land sizes before the project was 0.94 whiles that after the project stood at 1.14 indicating a difference of 0.47 hectares. The mean yield before the project was 319.17kg whereas that after the project was 514 .17kg indicating a difference of 195.00kg. The standard deviations for the estimated land sizes before and after the project were quite low (S.D. 0.44; S. D. 68) which means the increases in farmers' land sizes within groups were almost at same levels.

Table 9: Paired Sample t-test of Farmers' Performances Before and After Project

Farm Characteristics	Related	Mean	S. D.	Std. Error Mean	Mean Difference	t-ratio	Sig
Land Size	Before	0.94	0.44	0.04	0.47	9.44	.000*
	After	1.41	0.68	0.06			
Yield	Before	319.17	141.59	12.93	195.00	14.43	.000*
	After	514.17	208.35	19.02			

*p-value < 0.05 n = 120

Source: Field Survey Data. 2013

However, the standard deviations for the estimated yields of the respondents were quite big (S. D. = 141. 59; 208. 35) implying there were great variations in their levels of perception in estimations. The great differences in yield estimations among the farmers is likely to be due to influences of perceptual set by farmers' ages, past experience and or level of education as opined by Gamble and

Gamble (2002). It can also be due to the differences in the interpretation of information by the individual farmers in both groups (Rao et al. 1998). The implications in both cases is that the MCA compact had some significant level of effectiveness on the estimated land sizes and yields of maize farmer beneficiaries even though the improvements were below expectations as mentioned earlier on in the discussion.

Independent Sample t-test for Categories of Beneficiary Maize Farmers of MCA Compact

Table 10 depicts the independent Sample t-test conducted which compared yields of beneficiary farmers of training without credit and those with training and credit of MCA Project. The results from the independent sample t-test indicated that there were little differences in both land sizes of the two categories of maize farmers before and after the project implementation at 0.05 alpha levels.

These differences were however, not statistically significant apart from the yields after the project which showed statistical significant difference in the mean yields (40 -101. 67). The little differences in land sizes is likely to be due to the fact that land tenure system in Ghana makes it very difficult for individual investors to acquire land for agricultural purposes especially as pointed out by Tsikata (2005).

Table 10: Independent Sample t-test for Categories of Beneficiary Maize Farmers of MCA Compact

Variables	Categories	N	Mean	S.D.	S.E.M.	Mean Dif	t-ratio	Sig
Land Sizes Before Project	Without Credit	60	.97	0.48	0.06	0.05	0.62	0.54
	With Credit	60	.92	0.40	0.05			
Land Sizes After Project	Without Credit	60	1.41	.74	.096	0.00	0.000	1.00
	With Credit	60	1.41	..61	.078			
Yields Before project	Without Credit	60	.34	154.89	19.99	40.00	1.56	0.12
	With Credit	60	.29	125.04	16.14			
Yields After Project	Without Credit	60	.59	233.12	30.09	101.67	2.75	0.01
	With Credit	60	.46	167.19	21.58			

*p<0.05 n=120

Source: Field Survey Data. 2013

The figures for yields showed a difference of -78.33 between the beneficiary farmers of MCA training with credit and farmers with only training. This means that the technical training sub-component of the MiDA programme

helped the farmers in their productivity more than the credit advanced to some of them. It also means that training helps to empower through knowledge gains.

We therefore reject the null hypothesis which states that "There is no statistical significant difference in the levels of perceived effectiveness of training with credit and without credit on farmers' performances ".The alternative hypothesis therefore was accepted.

The findings show that beneficiary farmers of the MiDA training had actually translated the knowledge and skills gained into practical terms on their various farms that had resulted into yields difference. It is also clear from the results that the beneficiary farmers of training and credit were likely to have misapplied the credit they had received on other things of interest or value to them hence could not have enough positive impact on their performances (yield) in maize production.

Demographic Characteristics of Maize Farmers Based on Credit Receipt and Correlation with the Effectiveness of MCA Components

Table 11 presents the sex distribution of beneficiary farmers of MCA. The figures revealed that men who received credit were twice the number of women (40, 20) who benefited from it In other words; the ratio of men to women who received the MCA credit was 2:1. This means that the women sort of shy credit as they are more emotional and would therefore not like to fall into the defaulter category. Some of the women were likely not to be interested in loan acquisition because they did not consider it an

immediate need as their ability to obtain agricultural inputs is sometimes constrained by gender discrimination.

Additionally, it had been noted by some researchers that both the quantity and quality of inputs applied by both men and women may differ (Hughes, 2005; IFPRI, 2010).

Table 11: Frequency Distribution of Sex of Farmers Based on Credit Receipt

Sex	Farmer Categories				Total	
	Without Credit		With Credit			
	Freq	%	Freq	%	Freq	%
Females	29	43.3	20	33.3	54	41
Males	31	56.7	40	66.7	66	59
Total	60	100	60	100	120	100

n= 120

Source: Field Survey Data. 2013

Feldstein and Poats (1997) maintained that in farming, men and women have different needs and desires and therefore admonished that appropriate technologies should be developed and included for women in extension programme. For the fact that both sexes were well represented implies that the MCA programme was geared towards creating a new future where women and

men farmers would be equal partners in the development of the well-being of their families and their community (Hunger Project, 2013)

Frequency Distribution of Age of Farmers Based on Credit Receipt

Table 12 provides the ages of maize farmers based on their credit receipt. The results show that most farmers who received credit fell within the age range of 36 – 50 years and they were 24 in number representing 40.0 percent. Following closely was the age range of 51 – 65 years that had 21 farmers representing 35 percent which was quite promising. This revealed that a good number of those who received the MCA credit in the study area fell within the age category of farmers supposed to be physically strong and dynamic enough to work hard for increased agricultural production and productivity as noted by Tauer (2000). Only 2 of the credit receivers were above 80 years representing 3.3 percent.

This finding is consistent with the assertions of Bonabana-Wabbi (2002); Xiong and Luo (2010) and the University of Illinois Extension (2012) that as farmers advance in age, risk aversion increases, they experience quick onset of fatigue, reduced vision and slower reaction time that are part of normal aging process and can risk among older agricultural workers.

Table 12: Frequency Distribution of Age of Farmers Based on Credit Receipt

Age in Years	Farmer Categories				Total	
	With Credit		Without Credit			
	F	%	F	%	F	%
Up to 35	8	13.3	9	15.0	17	14.7
36 – 50	24	40.0	26	43.3	50	41.7
51 - 65	21	35.0	22	36.7	43	35.8
66 - 80	5	8.3	3	5.0	8	6/7
81 and above	2	3.3	0	0	2	1.7
Total	60	100	60	100	120	100

n= 120

Source: Field Survey Data. 2013

Frequency Distribution of Educational Levels of Respondents Based on Credit Receipt

Table 13 provides the educational levels of farmers based on their credit receipt. The results in Table 13 show the frequency distribution of educational levels of farmers based on receipt of credit. The figures revealed that those who received the credit were mostly Middle School or Junior High School leavers (32 representing 53.3%). Only one (1) person representing 1.7 percent had had tertiary

education. The results also revealed that 84.2 percent of all the respondents had some form of education and 15.8 percent had no formal education.

Table 13: Frequency Distribution of Educational Levels of Respondents Based on Credit Receipt

Educational Level	Farmer Category				Total	
	Without Credit		With Credit			
	F	%	F	%	F	%
No Formal Education	12	20	7	11.7	19	15.8
Primary School	7	11.7	16	26.7	23	19.2
Middle School/JHS	34	56.7	32	53.3	66	55
SHS	6	10	4	6.7	10	8.7
Tertiary Education	1	0	1	1.7	2	1.7
Total	60	100	60	100	120	100

n=120

This implies there was the possibility of those with some level of formal education to be able to understand lessons taught and therefore be in better positions to manage credit to some extent. However, due to their low level of education, it was also likely they might not use the credit efficiently enough.

The majority of respondents attaining low levels of education confirmed the findings of Bureau of Labour Statistics (2002) that the agricultural production industry is characterized by a large number of workers with low level educational attainment.

Frequency Distribution of Farmer's Working Experience Based on Credit Receipt

Table 14 presents maize farmers' working experience in relation to their credit receipt. The results show that some of the farmers, 17 of them representing 28.3 percent had working experiences between 10 and 19 years which is quite good. Sixteen (16) representing 26.7 percent of the farmers also had working experiences up to between 30 - 39 years.

The number of years of experience in maize production by the respondents means they actually know their faming venture very well. The rich experience of the maize farmers implies there is great hope for future farmers as they have older farmers to learn from.

This implies their rich experiences would help them understand the facets of the programme and would equally apply lessons learnt to their farming business to their own benefits. This finding supports the findings of Adeisina and Baidoo-Forson (1995), Bonabana-Wabbi (2002) and Dibba (2010) who opined that experienced farmers are assumed to have tried a variety of profitable technologies.

Table 14: Frequency Distribution of Farmer's Working Experience Based on Credit Receipt

Farmers' Working Experience	Farmer Category				Total	
	Without Credit		With Credit			
	F	%	F	%	F	%
Less than 10 years	7	11.7	12	20.0	19	15.8
10 – 19 years	22	36.7	17	28.3	39	32.5
20 -29 years	13	21.7	12	20.0	25	20.8
30 -39 years	9	15.0	16	26.7	25	20.8
40 – 49 years	6	10.0	3	5.0	9	7.5
50 -59 years	1	1.7	0	0	1	.8
60 -69 year	2	3.3	0	0	2	1.7
Total	60	100	60	100	120	100

n=120

Source: Field Survey Data. 2013

Relationship between Farmers' Demographic Characteristics and Effectiveness of MCA Components

Table 15 presents the relationships between the selected demographics characteristics of respondents and the effectiveness of MCA components considered in the study. Since the demographic characteristics were not measured on the same scale, different correlation approaches were used to determine their

relationships with the MCA components. The Point Biserial correlation coefficients used for the degree of association between sex and effectiveness of the MCA components revealed that the overall effectiveness of MCA components had indirect and weak statistical significant relationship with sex of the respondents. This was however significant ($r = -.210$, $p < .05$) though the individual components (training, teaching methods and credit) did not have significant relationships with sex. The result indicates that, on the whole, females tend to perceive the effectiveness of the MCA higher than their male counterparts. Thus the tendency for male respondents to rate the overall effectiveness of the MCA components was low.

This was further corroborated by an independent sample t-test statistic (Appendix B) which showed that females rated training and credit higher than the males while the males also rated the teaching methods higher than the females. However, there were no statistical significant differences between both sexes except the combined effect (overall mean) which showed statistical significant difference where the female respondents rated the overall effectiveness higher than their male counterparts.

Spearman's rho correlation coefficients likewise showed no statistical significant relationship with farmers' educational levels and effectiveness of MCA components of training, teaching methods as well as credit. However, those with lower educational levels had higher perceptions of both the teaching methods as well as the credit than those with higher levels of education.

Table 15: Correlations between Farmers' Demographics and Effectiveness of MCA Components

Demographics	Training	Teaching Methods	Credit	Overall Effectiveness
Sex	-.020	.064	-.243	-.210*
Age	-.019	-.007	.077	.065
Educational Levels	.072	-.044	-.073	.054
Working Experience	-.056	.057	.059	.016

*p< 0.05 (2tailed); n= 120

Source: Field Survey Data, 2013.

Pearson's Product Moment correlation coefficients also revealed that there were no statistical significant relationships between either farmers' age or working experience and farmers' perceived effectiveness of MCA components being considered but farmers with less number of years of experiences had higher perception of the training than those of higher number of years of experience.

The implication of the female farmers' higher perceived effectiveness of the MCA components than their male counterpart is that male and female actually see things from different perspectives. Van de Ban and Hawkins (1988) defined perception as the process by which information is received from the environment and transformed into psychological awareness. Even though both men and women study together they may differ in their ways of interpreting the results because they

use different processes to transform the same message as their selections and organizations of aspects of issues differ. This confirms the assertion by Rao et al., (1998) that perceptions can even differ among the family members on various aspects of farming, credit needs and the like. Rao et al. also opined that for example, men and women may differ on issues like an increased herd size which adds to the workload of women, while it may increase the cash flow for the man.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter gives a summary of all key findings, their corresponding conclusions and recommendations. It also gives suggested areas for further studies.

Summary

Maize is one of the most important staples in Ghana and ranks first in importance and production among the grains produced in the country. The maize industry takes over 20% of all the total population engaged in agricultural production in the country and also a very rich source of vitamins, carbohydrates, protein, potassium, phosphorus and magnesium. Despite all the wonderful roles that maize production plays in the country, production stills remains in the hands of smallholders using rudimentary methods in production.

The relatively important roles played by maize despite its low yields at an average of 1.6 tons/hectare as against the potential yields of 4-5tons/hectare warranted its recognition to earn part of the MCA compact between 2008 and 2010 of which the Kwahu North district maize production was an important component.

Maize farmers in the district therefore benefited from both technical training and credit towards agricultural modernization and its attendant food security and emergency preparedness as well poverty reduction through increased production and productivity. This study therefore attempted to compare the effectiveness of the MCA compact sub-components of training with credit and training without credit on the performances of maize farmers in the Kwahu North district of Eastern Region of Ghana.

The study was conducted in the Kwahu North of the Eastern Region of Ghana employing a descriptive-correlation survey research design. One hundred and twenty (120) maize farmers were selected through a non-proportional stratified and simple random sampling; all the respondents being beneficiaries of the MiDA training out of which 60 had credit in addition. Measures of central tendency such as means, and mean difference, standard deviation, frequency, percentage, paired sample t-test, and independent sample t-test were the statistical tools employed in the analysis of collected data from the study area. Major findings as they relate to the specific objectives were as follows:

The main perceived constraints identified by maize farmers in the study area before the MCA compact implementation included lack of credit for farmers without credit and lack of mechanized services for those with credit even though the two groups had the same scores for lack of mechanized services. This was followed closely by poor labour and lack of ready market for both categories of farmers. Also of importance was inadequate rainfall. The lowest scores were recorded for non availability of certified seeds for both farmer categories.

Farmers' perception concerning training and credit varied. Whereas the MCA training receivers considered' it to be effective together with its teaching methods, the credit component receivers never perceived it to be effective.. In other words, even though the technical training given to farmers helped them increase their maize outputs the credit could not help those who benefited from it make the needed difference in their yields.

In the area of farming practices, farmers did very well in improving upon their practices after the implementation of MCA compact. The mean scores for all the recommended and taught practices were effective according to the scale provided indicating quite high adoption rates which could have positively translated into better performances in maize production generally.

A comparison of both the cultivated acreages and maize yields of MCA compact beneficiaries of training without and training with credit before and after the project implementation revealed that the mean values for both categories of farmers were statistically significant after the project. However, the mean yield of farmers without credit was greater than that of credit receivers after MCA compact implementation. This was unexpected and could be attributed to misapplication of the credit received by those received the credit.

Findings revealed that more middle-aged men whose educational level was quite low but with high number of years of working experiences tended to benefit from the MCA credit than females. Finally, it was realized that the only relationship of statistical significance which existed between farmers'

demographics and their perceived effectiveness of the MCA components was the female farmers' perception of the overall effectiveness of the components of MCA. The female farmers perceived the overall effectiveness of the MCA components to be more effective than their men counterpart.

Conclusions

The following conclusions were drawn from the study based on the results and findings:

1. Pertaining to objective one, maize farmers' constraints before and after the MCA project showed no differences. The identified constraints that hindered their smooth agricultural production included poor access to credit, lack of ready market, poor access to mechanized services, erratic rainfall, poor access to labour, and lastly poor AEA contacts after the project.

2. For objective two, maize farmers generally perceived MCA compact with regard to training contents and teaching methods as very effective in helping to bring some positive changes in their performances whereas the credit sub-component was perceived to be only moderately effective by its beneficiaries.

3. The MCA compact has helped maize farmers in the Kwahu North district in the Eastern Region of Ghana improve upon their farm practices considerably even though its effect did not reflect much in performances as expected. Respondents actually accepted and adopted almost all the recommended farming practices or

technologies towards improvement of their performances in the cultivation of maize.

4 The perceived performance effectiveness of the MCA compact beneficiary farmers of training without credit was higher and better than that of their counterparts. Farmers who benefited from the MiDA training only tended to outperform those who benefited from both training and credit and this was likely to be due to misapplication of the credit.

5 Beneficiary farmers of MCA credit were men and women having enough physical strength for work who had had low level of education (Middle school/ Junior High School certificate) which probably affected their credit use even though they had quite a long period of farming experience (exceeding ten years).

Apart from the sex of farmers which indicated indirect and low statistical significant influence on the effectiveness of the overall components of the MCA, the rest of the characteristics showed no statistical significance. The female respondents in the study area perceived the overall performance of the MCA components under consideration to be more highly effective than their men counterpart.

Recommendations

Based on the findings of the study, the following recommendations were made for consideration and implementations for greater effectiveness of technical trainings and advancement of credit:

1. Farmers need to be encouraged by stakeholders to form well consolidated Farmer Based Organizations and build social capital through monthly contributions or otherwise to help one another and the group as a whole in order to overcome most of their problems that hinder the smooth running of their farming business.
2. It is advisable that financial institutions that advance credit to farmers equally provide them with training so that they make conscious efforts to use the credit obtained for farming ventures solely for that purpose in order to realize better performances in agricultural productions.
3. Farmers need to be given constant trainings by AEAs in recommended agronomic and cultural practices for better results that will translate into better income levels hence their living conditions.
4. Beneficiary Farmers of Credit (in FBOs) have to be taught efficient use of money by the Department of Cooperatives at the District Assembly levels especially in running farming businesses.
5. Different criteria need to be adopted by credit advancers to farmers especially, in order to ensure its effective use and overall benefits to them (the latter) and prompt repayment. This is one way modernized agriculture and poverty alleviation among our numerous subsistence farmers can be realized in Ghana.

Suggested Areas for Further Studies

1. I suggest that further studies be carried out to find out why farmers are unable to use efficiently and also repay credit advanced to them for farming ventures.
2. Studies should also be conducted into how best farmer groups can be consolidated to develop social capitals and be able to organize group purchases and sales to avoid complete reliance on government at all times.

REFERENCES

Abedullah, N., Mahmood, M., Khalid, I. & Kouser, S. (2009). The role of agricultural credit in the growth of livestock sector: a case study of Faisalabad Pakistan, *Veterinary Journal*, *29*(2), 81-84.

Abraham, J. A. (2011). Measurement of Social empowerment of farmers in SHGS*:* Evidence from India, *Academic Journal*, Retrieved July 6, 2012, from http://www.academicjournals .org

Adam, D. W. & Vogel, R. C. (1990*). Rural financial markets in low-income countries* (2nd ed.). Baltimore, MD: The John Hopkins University Press.

Adams, D., & Ghahan, J. (1981). A critique of traditional agricultural project and policies*. Journal of Development Economics 8,* 344 - 500

Adegeye, A. J., & Dittoh, J. S. (1985). *Essentials of agricultural economics.* Ibadan: Impact Publishers Limited.

Aduba, J. J. (2013). Relationship between farmers' socio-economic characteristics and maize production in Nigeria. *The chasm Global Journal of Current Research*, *1*(4), 124-131.

Aflakpui, G. K. S., Abulai, M. S., Berchie, J. N., Ennin, S., & Sallah, P. Y. K. (2005*). Maize production guide.* MOFA Food Crops Development Project. Ahinsan-Kumasi: Amayen Press.

Aflakpui, G. K. S., & Ewool, M. (2007*). New maize varieties in Ghana*. Kumasi: Training Communication and Publication Unit.

Akanji, O. O. (2006). Microfinance as a strategy for poverty reduction: *Central Bank of Nigeria Economic and Financial Review*, *39*(4).

Alibaygi, A., & Zarafshani, K. (2008). Training needs of Iranian extension about sustainability: The use of Borich's need assessment model. *International Journal of Agricultural Research, 3,* 681-687.

Amoah, D. F. (2004). *Perceived effects of microfinance on women engaged in the fishing industry in selected fishing communities in the Western Region of Ghana*. Unpublished master's thesis, University of Cape Coast, Cape Coast.

Anthony, J. (1983). *Educational tests and measurement:* an introduction. New York: Brace Jovanovich Inc.

Aryeetey, E. (2004, February). *Household asset choice among the rural poor in Ghana, Accra*: Institute of Statistical, Social and Economic Research (ISSER). Proceedings of workshop for the project on Understanding Poverty in Ghana.

Baklouti, I. & Abdelfettah J. (2013). Corporate finance and financial theory (ACRN) *Journal of Finance and Risk Perspective*, (2), 9-24

Barbazette, J. (2006). *Training needs assessment, methods, tools, and techniques.* San Francisco: Pfeiffer USA.

Barbe, W. B. (1981). Teaching to modality strengths, *Don't give up yet: Ways of Perceptions*, *16*(3), 4-6.

Bekele, W. (2004, March). *Analysis of farmers' preferences for development intervention programs:* Paper presented at a forum of the African Development and Poverty Reduction Committee on a case study of Subsistence Farmers from Eastern Ethiopian Highlands, Somerset West, South Africa.

Best, J. W., & Khan I. V. (1998) *Research in education (8th ed.*). Needham Heights, MA. USA: Allyn and Bacon.

Bimrose, J., & Bayne, R. (1995). A multicultural framework in counselor training: A preliminary evaluation. *British Journal of Guidance and Counseling, 23*(2), 259- 65.

Bonabana-Wabbi, J. (2002). *Assessing factors affecting adoption of agricultural technologies: The Case of Integrated Pest Management (IPM) in Kumi District, Eastern Uganda*: Blacksburg.

Borich, G. (1998). *Effective teaching methods*, New York: MacMillan Publishing Co.

Briquette, (1999). Better practices in Agricultural lending. *Greener Journal of Agricultural Sciences, 3*(2), 120 -127

Bureau of Statistics, US Department of Labour: *Career guide to industries*, 2002-03, Edition of agricultural production. Retrieved April 2012, from http://www.bls.gov/

Byrness, F. C., & Byrness, K. J. (1978). *Agricultural extension and education in developing countries:* Rural development in a changing world. London: Macmillan Publishing Company.

Caffarela Roaemary, S. (2002). *Planning Programmes for Adult Learners*: A practical guide for educators, trainers and staff developers; (2nd ed.). San Francisco: John Weley and Sons.

Campbell, D. A., & Barker, C. (1997). *Selecting content and methods in agricultural programme delivery.* Rome: FAO

Chayanov, A. (1928). *The theory of peasant economy*. Homewood: Irwin.

Chambers, R., Pacey, A., & Thrupp, L. (1989). *Farmer first:* farmer innovation and agricultural research. London: Intermediate Technology Publications.

Chiremba, S., & Masters, W. (2008). *The Experience of resettled farmers in Zimbabwe:* African Studies Quarterly. Retrieved October 16, 2012, from file:///C:/Users/rlg/Documents/farmer%20expe.htm#_ednref58

Chung, F. (1991). *Educational policies and agricultural development.* Retrieved August 16, 2012, from http://www.eng.unesco-iicba.org/sites/default/files/Capacity%2520Building%2520framework.pdf

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education:* (6th ed.). New York: Routeledge.

Collet, K. & Gale, C. (2009). *Training for rural development: Skills for women smallholders.* Retrieved July 24, 2012, from http://www.skillsdevelopment.org/pdf/Training-for-rural-development-research-report.pdf

Commission for Africa, (2005). *Our commission international report of the commission in Africa:* Department for international development, Commission for Africa.

Crabtree, B. F., & Miller, M. L. (1992). *Doing qualitative research*. USA, Newbury Park, CA: Sage.

Dahama, O. P. (1979). *Extension and rural welfare.* New Delhi: Ram Parsad and Son.

Dantwala, M. L (1989). Estimates of demand for credit and its role in poverty alleviation. *Indian Journal of Agricultural Economics, 3,* 416-422.

Dawson, C. (2002). *Practical research methods*: A User-friendly Guide to Mastering Research. Trowbridge, Wiltshire: Cromwell Press

Dibba, L. (2010). *Estimation of NERICA adoption rates and impact on productivity and poverty of the small-scale rice farmer in the Gambia:* Kwame Nkrumah University of Science and Technology (Master's Thesis); Retrieved July 6, 2012, from http://depaee.knust.edu.gh:8880/xmhi//bitstream/hande/123456789/222/LaminDibba'sThesis.pdf?Sequence=/

Elam, S. (1971). *Performance based teacher education:* What is the state of the art? Washington DC: AACTE.

Ellis, F. (1992). *Agricultural policies in developing countries*. University of East Angelia, Cambridge University Press.

Encyclopedia *Credit Management.* (n.d.). Retrieved August 16, 2012, from http://www.thefreeonlinedictionary_.com/credit

Etling, A. W. (1995). *Preparing community-based educators.* Ph. D Thesis Pennsylvania State University, Pennysylvania.

Famuyiwa, B. S.; Adesoji, S. A., & Lawal, J. O. (2012). Training needs of smallholder cocoa farmers in integrated pest management techniques: An antidote to sustainable cocoa production in Osun State, Nigeria. *International Journal of Applied Research Technology, 1,* 37-46

FAO, (2005). *World agriculture towards 2015/2030*: An FAO Perspective. Rome: FAO.

FAO, (1991). *Improving training quality:* A trainers' guide to evaluation. Rome: FAO.

Gagni, R. M. (1985). *The conditions of learning and theory of instruction*: (4th ed.). New York: Educational Resources Information Center.

Gamble, T. K., & Gamble, M. (2002). *Communication works* (7th ed.). New York: McGraw-Hill/Irwin-Inc.

Ghana Districts, (2012). *Eastern Region* in perspective. Retrieved April 12, 2012, from http://www.ghanadistricts.com/district

Ghana (2006-2009). *Growth and Poverty reduction Strategy (GPRS II*): National Development Planning Commission.

Ghana Statistical Services, (2012). *A repository of all districts*: Eastern Region; Retrieved April 12, 2012, from http://ghanadistricts.com/district

Gravetter, F. J., & Forzano, L. B. (2009). *Research methods for the behavioral sciences* (3rd ed.). Canada: Nelson Education Ltd.

Gongalez-Vega, C. (1977). Interest rate restrictions and income distribution. *American Journal of Agricultural Economics*, *59*(5), 973 -76

Holton, E. F. (1996). New employee development: *A Review Re-conceptualization Human Resource Development Quarterly*, *7*, 233.252.

Hopkins, K. D. Hopkins, B. R., Glass, G. W. (1996). *Basic statistics for the behavioral sciences:* (3rd ed.). Boston, MA: Aliyn & Bacon

Hossain, M. (1988). *Credit for the alleviation of rural poverty*: The Grameen Bank in Bangladesh, IFPRI Research Report 65.

Inter –personal Conversation, (2013). *Casual conversation between maize farmer beneficiaries of MCA compact and researcher about Loan issues*: Afram Plains, Ghana.

Investopedia, (2012). *Definition of "credit*:" Accounting, personal finance. Retrieved September 18, 2012, from file://C:/ Users/rlg/Documents /credit.asp.htm

IFPRI, (2010). *Understanding gender differences in agricultural productivity in Uganda and Nigeria:* Discussion Paper 01003; Washington DC. Retrieved July 6, 2012, from http://www.ifpri.org/sites/default/files/publications/ifpridp01003pdf

ILEIA, (1992). *From teaching to learning and a whole professionalism*. Retrieved August 12, 2012, from http://www.fao.org/docrep/w5830e/w5830e0m.htm

Jarvis, M. (1987). *Jarvis learning process theory*. Retrieved August 16, 2012, from www.irma-international.org/viewtitle/53847/

Jucious, M. J. (1963). *Personnel management (*5th ed.). Homewood IL, Richard D: Irwin.

John, S. (1998). *Human resource management*, College of Business, San Francisco: State University.

Kebede, K. (1995). *Agricultural credit analysis*. Paper presented at the meeting of the Planning Committee on Agricultural Education. Ethiopia.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The adult learner*: The Definitive Classic in Adult Education and Human Resource Development, (6th ed.). California: USA.

Kumar, R. (2005). *Research Methods – A step-by-step guide for beginners*. London: SAGE Publication Ltd.

Leeuwis, C. & Van den Ban, A. (2004*). Communication for rural innovation*, (3rd ed.). Australia: Blackwell Publishing Ltd.

Leonard, D. K. (1977). *Reaching the peasant farmer: Organization theory and practice in Kenya*. Chicago: University of Chicago Press.

Lindsay, P., & Norman, A. D. (1977*). Human information processing: An Introduction to psychology*, Ethiopia.

Loos, G. (1995). *Field guide for international health planners and managers*. London: Janus Publications.

McGhee, W., & Thayer, P. W. (1961). *Training in business and industry*. New York: John Wiley and Sons.

Maes, J. (2007). *Linkages between CAREs VSLA with Financial institutions in Rwada.* Retrieved August 28, 2013, from http://www.seepnetwork.org/ linkages-between-care-s-vsla-s-with-financial-institutions-in-rwanda-resources-691.php

Marzin, J. (1999). Rural group lending systems in Burkina Faso, *The Challenge of growth of Agriculture and Rural Development, 6*(51).

Mazoyer, M. (2001, September). *Protecting the small farmers and the rural poor in the context of globalization*, A paper presented at the world summit on What Productive Resources do the Poor really Need to escape Poverty?, Born.

Mellor, J. W. (1966). *The economics of agricultural development.* Ithaca Cornell: University of Credit Press.

MiDA, (2009). *Commercial development for farmer based organizations*: A Guide to Business Planning for Facilitators and FBO Organizations Accra: State Publishing Corporation.

Miller, J. A., & Osinsiki, D. M. (2002). *Training needs assessment:* SHRM Training and Development Committee, UK: SPHR Press.

MOFA, (2007*). Beneficiary assessment of agricultural services sub-sector investment programme.* Accra: MOFA.

MOFA-SRID, (2008). *Strategic plan 2008-2010*. Accra: MOFA.

MOFA-SRID, (2008). *Maize Value Chain Study in Ghana*: Enhancing efficiency and competitiveness. Accra: MOFA.

MOFA, (2009). *Food and agriculture sector development policy.* (FASDEP 11), Accra: MOFA.

MOFA, (2010). *Medium term sector investment plan (METASIP).* Accra: MOFA.

MOFA, (2011). *Annual report for year 2010* (Extension Directorate). Accra: MOFA.

Mohamed, K. (2003). *Access to formal and Quasi – formal credit by smallholder farmers and artisan fishermen*: A case of Zanzibar, Dares Salam: Mkukina Nyota Publishers.

Mohan, B. (2000). *Measuring the effectiveness of training*. Mombai: Indian Express Group.

Moris, J. (1991). E*xtension alternatives in tropical Africa*, London: Overseas Development Institute.

Morrison, K. R. B. (1997). *Planning and accomplishing school-central evaluation*. Dereham, UK: Peter Francis.

Morrison, K. R. B. (1993). Researching the need for multicultural perspective in counselor training - a critique of Bimrose and Bayne. *British journal of Guidance and counseling, 25*(1), 135-42

Nehru, M., & Jayachitra N. K. (2003. *Farmer owned horticultural markets*, A case of Kerala in agribusiness and extension management. India: Concept Publishing Company.

NIOSH, (1999). *A Model for research on training effectiveness*, Washington: US Department of Health and Services.

Nelson, N. (1981). *African women in the development landscape*. London: Case & Company Ltd.

Norman, E. (1986). *Measurement and evaluation in teaching*. New York: MacMillan Publishing Company Inc.

Nosiru, M. O. (2010). Micro credits and agricultural productivity in Ogun State, Nigeria: *World Journal of Agricultural Sciences* 6(3), 290-296

Obayodullah, M. A. (2000). *Grameen bank's delivery mechanisms for women*, Retrieved September 18, 2012, from http;//www.org/icm/grameenbank.htm /oco/cy/cgs00/.htm.

Ofori, R., & Dampson, D. G., (2011). *Research methods: Statistics using SPSS*. Amakom-Kumasi: Payless Publication Ltd.

Ogunfowora, O., Essang, S. M., & Olayide, S. O. (1972). *Capital and credit in Nigerian agricultural development*: Nigerian Rural Development Study Paper No. 6, University of Ibadan, Ibadan, Nigeria.

Ohio State University Extension, (1995). *Ohio Agronomy Guide* (13th ed.). Bulletin 472, OSUE, Columbus OH.

Okurut, N., Schoombee, A., & Van Der Berg, S. (2004, October). *Credit demand and credit rationing in the informal financial Sector in Uganda*. Paper

presented at DPRU/Tips /Cornell conference on African Development and Poverty Reduction, Nairobi.

Overholt, C., Anderson, M. B., Cloud, K., & Austin, J. E. (1984). *Gender roles in development projects.* West Hartford, CT: Kumarian Press.

Ozowa, V.N. (2007*). Information needs of small-scale farmers in Africa*: Retrieved July 12, 2012, from Rhttp://www.worldbank.org/html/ cgiar/newsletter/june97/9nigeria.html.

Padmanabhan, K.H. (1996). *Rural credit*: lessons for rural bankers and policy makers, London: FAO.

Palmer, R. (2007). *Skill Development the enable environment and informal micro-enterprise in Ghana*: Ph D. Thesis, University of Edinburgh, Edinburgh.

Patel, S. J. (1985). Educational miracle in the third world -*1950 to 1981: Economic and Political Weekly 20*(31), 17

Petrick, M. (2004). A micro econometric analysis of credit rationing in the Polish farm sector: *European Review of Agricultural Economics, 31*(1) 101.

Pholonngoe, M. B., & Richard, L., (1995). *Training manual for non-formal and* adult *education trainers:* Extension Educator, Maseru: Lesotho Association of NFP.

Pinaki, B. (1998). Formal and Informal sector interaction in rural credit markets, *Journal of Development Economics, 56,* 265-280.

Proctor, P. (1966). *Cambridge international dictionary of English*. London: Cambridge University Press.

Rama, B. R., Etling, A. W. W., & Bowen, B. E. (1993). *Training of farmers and extension personnel*: In R. K. Samanta (3rd ed.). Extension strategy for agricultural development in 21st century, New Delhi: Mittal Publications.

Rao, S.V.N., Rangnekar, D.V., Dey, R., & Van den Ban, A.W. (1998). *Farmers' perceptions of innovations*: Retrieved August 12, 2014, from http://library.wur.n1/file/wurpubs/wurpublikeatie-100360123- 001.pdf.

Rogers, E.M. (1995). *Diffusion of innovations. (*3rd ed.). New York: The Free Press.

Röling, N. G. (1990). *Extension science.* Cambridge: Cambridge University Press.

Saboor, A., Maqsood, H., & Madiha, M. (2009). *Impact of micro credit in alleviating poverty*: *An Insight from rural Rawalpindi*, Pakistan, *Pakistan Journal life Society of Science 7*(1), 90-97

Schultz, T. W. (1964). *Transforming traditional agriculture*. New Haven: Yale University Press.

Scriven, M. (1991). *Evaluation thesaurus*, (4th ed.). Newberry Park, CA: Sage.

Shane, S. (2003). *The effect of training on women entrepreneurs' performance*. Retrieved August 12, 2012, from http://www.ijbssnet.com/journals/ Vol._1_No._2_November_2010/21.pdf

Siddiqi, M.; Wasif, M., Kishwar, N. B. (2004*).* Institutional credit: A policy tool for enhancement of agricultural income of Pakistan. *International Research Journal of Arts & Humanities (IRJAH) 37.*

Srinivasan, S. (1995). *An assessment of the operations of rotational savings and credit.* Retrieved September 12, 2012 from http://thejournalofbusiness.org/ index.php/site/article/viewFile/262/258

Stephen, L. (2000). *Principles of adult learning*: South Mountain Community College. Retrieved April 22, 2012, from http://teach-usda.ahnrit.vt.edu/ principles of adult learning /pdf.

Svendsen, M., & Small, L. E. (1990). *A framework for assessing irrigation performance*. Retrieved August 12, 2012, from http://link.springer.com/ article/10.1007%252FBF01103710

Sullumbe, I. M. (2004). *Resources use efficiency in cotton production under sole cropping system in Adamawa State of Nigeria:* (Master's Thesis) Maiduguri University, Maiduguri.

Swanson, E. B.; Bentz, R. P., & Sofranko, A .J. (1997). *Improving agricultural extension: A reference manual*. Rome: FAO.

Tauer, A. (2000). *Women at the Center:* Grameen bank borrowers after one decade, Oxford: West View Press.

Thapa, N. B., (2002). The *pattern of Loan advancement and recovery*. The Nepal: Kathmandu press.

The Hunger Project, (2013). *Microfinance programme in Africa*. Retrieved August 15, 2013, from http://www.thp.org/what_we_do/key_initiatives/ microfinance/overview

Thomison, P.R., (2010). *Cultural practices for optimizing maize seed yield and quality in production fields*. Retrieved September 6, 2012, from http:// www.ag.ohio-state.edu~corn/agcrops.html

Tsikata, Y. P. (2005). *Our land tenure system our development bane*. Retrieved September 6, 2012, from http://www.modernghana.com/news/118546 /1/our-land-tenure-system-our-development-bane.html

UNESCO, (2012). *Empowering Youth through policies:* Section for Youth of the Bureau of Strategic Planning. Retrieved April 12, 2012, from http://www.Unesco.org/youth

University of Illinois Extension, (2012). *Senior farmers at risk on the farm*: Facts Sheet; Retrieved August 16, 2012, from http://web.extension.illinois.edu/agsafety/factsheets/srfarm.cfm

Unilever Global, (2013). *Livelihood for smallholder farmers*. Retrieved April 21, 2014, from http://www.unilever.com/sustainable-living-2014/enhancing-livelihoods/inclusive-business/livelihoods-for-smallholder-farmers/

Van den Ban, A. W., & Hawkins H. S. (1996*). Agricultural extension*, (2nd ed.). USA: Blackwell Science Ltd.

Van Dersal, W. R. (1962). *The successful supervisor*. New York: Harper and Row.

Von-Pischike, J. D.(1991, March). *A critical survey of approaches to the role of credit in small holder development*. Paper presented at the Institute for Development Studies, on Land Policy Analysis, University of Nairobi, Nairobi.

Vroom, V. H. (1995). *Work and motivation*. Retrieved August 12, 2012, from http://www.jgbm.org/page/47%2520Ismail.pdf

Warren, P. (2005) *Improving agricultural extension*: A reference manual. Retrieved August 18, 2013, from http://www.fao.org/docrep/w5830e/w5830e05.htm

Weir, S. (1999). *The effects of education on farmer productivity in rural Ethiopia*. Retrieved August 16, 2012, from http://www.lifesciencesite.com/lsj/life0802/66_4805life0802_498_501.pdf

Wentling, T. L. (1992.) *Planning for effective training;* A guide to curriculum development. Rome: FAO.

Wiggins, S. (2008). *The future of smallholder agriculture*: Global Donor Platform for Rural Development. Platform Policy Brief 2.

World Bank, (2007). *Agriculture for development.* World Development Report 2008. Washington DC: World Bank.

World Bank, & IBRD (2009). *Gender in agriculture*: Sourcebook, Washington DC: World Bank.

Wych, R. D. (1988). Growing small farms: Retrieved May, 2012, from http://www.seedconsortium.org/PUC/pd%20files/16%20Cultural%20practices%20for%20optimizing 20maize%20seed….pdf. pdf?

Xiong, Y., & Luo, M. (2010*). Research on farmers' production willingness of safe Agricultural Products and its influence factors*: An Empirical Analysis in China: Retrieved April 12, 2012, from http;//www.sciencedirect.com/

Yahya, I., Kwarteng, J. A., & Zinna, M. M. (2007). *Community communication, extension and development methods*: A Draft Reference Manual, Cape Coast: University Press Compact.

Youdeowei, A., & Kwarteng, J. A. (1995). *Development of training materials in agriculture*: A course Manual, WARDA United Kingdom: Sayce Publishing.

Yusuf, M. (1984). *Farm credit situation in Asia*. Tokyo: Asian Productivity organization.

Zinnah, M. M. (2000). *A reference manual on introduction to supervised enterprise project*. Cape Coast: University Press Compact.

Zuberi, H. A (1989). *Production function, institutional credit and agriculture development in Pakistan*. Paper presented at a review meeting of the Pakistan Institute of Development Economics Committee on Credit Management, Islamabad.

APPENDICES

Appendix A: Research Instrument for Data Collection

UNIVERSITY OF CAPE COAST

SCHOOL OF AGRICULTURE

DEPARTMENT OF ECONOMICS AND EXTENSION

Introduction

This study seeks to help maize farmers in the Kwahu North district in particular to discover their standing with regard to technical training and credit. It will also enable policy makers and for that matter the government review policies on farmers' projects to their benefits.

Please, this is for purely academic purposes therefore any information given will be given the highest confidentiality and anonymity greatly guaranteed.

Thanks a lot for your cooperation:

THE EFFECTIVENESS OF MILLENNIUM CHALLENGE ACCOUNT TRAINING AND CREDIT ON THE PERFORMANCE OF MAIZE FARMERS IN THE KWAHU NORTH DISTRICT OF EASTERN REGION, GHANA

PART ONE

Production Constraints of Farmers

(1) Please indicate which of the following are some of the production constraints you face in the course of your work?

Farmers' Major Constraints	Response (Yes or No)	
	Before Project	After Project
A. Poor contact with AEA B. Poor access to credit C. Unavailability of labour D. Poor access to mechanized services E. Unavailability of certified seeds F. Prevalence of Pests and Diseases G. Inadequate rainfall H. Lack of ready market for farm produce		

PART TWO

Farmers' Perceived Effectiveness of MCA Training and Credit Training

(2) Please use the ratings below to indicate your perception of MiDA training and credit:

5 = Excellent 4 = Very Good 3 = Good

2 = Fair 1 = Poor

A Training given was very beneficial to you. [ ]

B. Topics treated were relevant to your [ ]

C .Enough time was allocated to the topics treated [ ]

D. Topics were well explained [ ]

E. You were taken through good method of land preparation. [ ]

F. You were taught how to plant in rows. [ ]

G. You were taught how to choose good seeds for planting. [ ]

H. You were taken through how to conduct seed germination test [ ]

I. You were taught to do timely weeding. [ ]

J. You were taught to use fertilizer when necessary. [ ]

K. You were taught to practice the use of cover crops. [ ]

L. You were taught to practice crop rotation [ ]

M. You have acquired some skills which will help improve your performance. [ ]

N. You have acquired some new knowledge [ ]

O. The training helped you to have more yield from your farm. [ ]

P. The training methods generally used were good [ ]

Credit

1. You received the credit on time for your farm activities [ ]

2. The credit received enabled you carry out your farming practices timely

3. You find the credit access procedure to be ideal. [ ]

4. You were pleased with the mode of credit repayment (monthly, seasonally etc [ ].

5. You were pleased with the duration for repayment [ ]

6. You were pleased with the interest rate. [ ]

7. How much credit were you given? GH¢----------

8. How much was the interest rate? GH¢----------

9. How much are you left with to repay? GH¢----------

10. Please, give reasons/s why you were not able to repay on schedule------
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11. How many credit monitoring were done in a year?

(3) Indicate in order of effectiveness your perception of the following teaching methods employed in your training:

a. Lecture [ ] b. Group discussions [ ]

c. Practical hands-on [ ] c. Demonstrations [ ]

PART THREE

ADOPTION OF IMPROVED PRACTICES

(4). Indicate which of the following practices you adopt before and after the MCA project:

Farmers' Practices	Responses	
	Before Project	After Project
A. Vary yearly land preparation method		
B. Practice row planting of maize		
C .Use certified seeds		
D. Conduct seed germination test		
E. Practice timely weed control		
F. Use of fertilizer (Organic & Inorganic)		
G.. Practice crop rotation		

I. Kindly indicate your farm acreages before and after the project------ ------ acres.

J. Indicate your yields before and after the project-------- ------bags/acre

K. Please, indicate the type of land preparation method/s you use:

a, Mechanical: (The use of tractor) [ ] b, Chemical: (the use of herbicides) [ ] c, Manual: (the use of cutlass) [ ]

L. Indicate the name(s) of maize variety (/ies) you use ----------

M. Which crops do you use in rotation with maize? ----------

N. How many years crop rotation do you practice? ----------

PART FOUR

Farmers' Demographics

1. Name of Farmer ----------

2. Age of Farmer as at December, 2012 ----------

3. Sex of Farmer: a, Male [ ] b, Female [ ]

4. Educational level attained:

a, Primary School [ ] b, Middle/ JHS [ ] c, Secondary School [ ]

d, Vocational/Technical School e, Tertiary Institution [ ]

Any other ----------

5.. Indicate the size of your farm before project in hectares ----------.

6. Indicate the size of your farm after project in hectares ----------

7. Indicate your maize yield before project in kilograms ----------

8. Indicate your maize yield after project in kilograms ----------

9. How long have you been producing maize ---------- (in years)?

Appendix B: Independent sampled t-Test distribution between female and male respondents on effectiveness of MCA components

	Sex of farmers (Dummy: Female = 0, Male = 1)	N	Mean	Std. Deviation	Std. Error Mean	Mean difference	t	Sig.
Effectiveness of the training	Females	54	4.3942	.28630	.03896	.01215	.221	.825
	Males	66	4.3820	.30983	.03814			
Effectiveness of teaching methods	Females	54	3.4907	.06804	.00926	.00926	.696	.488
	Males	66	3.5000	.07596	.00935			
Effectiveness of credit	Females	20	3.3167	.49824	.11141	.27083	1.910	.061
	Males	40	3.0458	.52703	.08333			
Overall effectiveness	Females	54	3.8676	.20419	.02779	.10291	2.400	.021
	Males	66	3.7647	.26534	.03266			