PERCEPTION OF FARMERS ON EFFECTIVENESS OF AGRICULTURAL EXTENSION AGENTS IN KNOWLEDGE TRANSFER TO MAIZE GROWERS IN KILINDI DISTRICT

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ABSTRACT

The interaction between extension agents and farmers and the extent to which farmers perceive extension agents as useful to them is paramount to bringing about change in agriculture output. However, little information is available in Kilindi District; therefore, this study was conducted to assess farmers' perception on the effectiveness of their extension agents in knowledge transfer to maize farmers in Kilindi District. Specifically, the study intended to: identify socio-economic factors affecting knowledge transfer to maize growers; identify problems associated with low maize yield in the study area and determine farmers' perception on the effectiveness of their extension agents in obtaining required knowledge on maize growing. Data were collected from 121 households, using cross-sectional research design. A General Linear Regression was used to estimate perceived effectiveness of AEAs in knowledge transfer using a five point likert scale. Results show that age, household size, farm size, and AEAs contacts had significant influence on technological transfer to maize growers in the study area. It was also found that 25.6%, 95.9%, 43%, and 75.2%, of respondents were impacted by plant diseases and pests, low market prices and low yields, respectively. Again, 63% to 96.6% of the respondents strongly disagreed on the effectiveness of AEAs in knowledge transfer, 90.9% to 99.2% of respondents had negative perceptions on the advantages of AEAs. It is therefore recommended that local government should enforce equitably distribution of agricultural extension services in rural areas as well equipping AEAs with knowledge and skills on pest and diseases control and training them on new technologies to maximize farmers yield hence increasing income. The local government should support and facilitate easy access of AEAs to rural farmers.

DECLARATION

I, **Anna Charles Mcharo**, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted to any other institution.

…… ……

ANNA CHARLES MCHARO Date

(M.A. Rural Development candidate)

The above declaration is confirmed

_____ _____

Dr.Kizito K. Mwajombe Date

(Supervisor)

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DEDICATION

To my beloved mother, Rose Lukas Mcharo for her gracious involvement in all levels of my education. Similarly I should like to dedicate this work to my loving sisters Mary, Janneth, Blandina, Francisca, and my brother Deogratius for their inspiration during my study period.

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LIST OF ABBREVIATIONS AND SYMBOLS

AEAs	Agricultural Extension Agents
ASDS	Agricultural Sector Development Strategies
ASPS	Agricultural Sector Programme Support
DADPs	District Agricutural Development Projects
DASIP	District Agricultural Sector Investment Project
FAO	Food and Agriculture Organization
KM	Kilometre
NSGRP	National Strategy for Growth and Reduction of Poverty
PADEP	Participatory Agricultural Development and Empowerment Project
SSA	Sub- Saharan Africa
URT	United Republic of Tanzania

CHAPTER ONE

1.0 Introduction and Background Information

Agriculture plays an important role in reducing poverty and serves as an engine for growth in developing countries. Additionally, it contributes in socio- economic well-being of the people through food production and employment (Aker, 2010). It is estimated that 70% of the labour force in sub-Saharan Africa (SSA) work in agriculture while 67% of the labour force in South Asian are employed in the same sector (Maxwell, 2001).Based on its importance, several countries in SSA including Tanzania have put efforts to improve the sector. These efforts include the provision of extension services to change farmers' attitude so as to enhance their efforts on productivity (FAO, 1993).

Agricultural extension services have an important role in increasing quality of the production (Hossein*et al.*, 2008). The extension agents intervene to bring about change by providing knowledge and information that enable farmers to understand and adopt particular practices (Oakley and Garforth, 1985). Additionally, they play a vital role in technology transfer and promoting technology development (Moris, 1991). Extension facilitation is difficult and potentially a costly undertaking that is regularly provided by the government and partly by private agents. As argued by Van den Ban and Hawkins (1996) a government will invest in extension if it believes it has value to achieve government goals such as increasing food production, stimulating economic growth, increasing the welfare of farming rural households and promoting sustainable agriculture. Therefore, the interaction between the extension agents and the farmers and the extent to which farmers perceive extension agents as useful to them is vital to bringing change in agricultural output and could explain the dynamics embedded in advices adopted by farmers in a given locale. For example, the frequency of contact by extension agents is crucial because it is through this that, important and useful information about improved

and recommended agricultural practices are disseminated to farmers (Sarker and Itohora, 2009). The amount or type of useful information disseminated to farmers could be used to determine the effectiveness of extension agents in transferring knowledge needed by farmers to improve production.

Accordingly, Kilindi District efforts have been made to provide agricultural extension services to farmers growing maize through provision of input subsidies, training farmers and provision of advisory services on proper agronomic practices. Despite these efforts, adoption of maize agronomic practices is still low leading to low productivity (Lokina*et al.,* 2011).This is probably due to the fact that AEAs are not effectively transferring knowledge on good agronomic practices in maize production. Therefore, more information was required to assess the effectiveness of the extension agents in providing advisory services on proper agronomic practices to maize growers. Therefore, this study intended to investigate the perception of farmers on how they view their extension agents on their effectiveness in transferring knowledge to maize growers in Kilindi District.

1.1 Problem Statement

Traditional farming is the most predominant practice adopted by many farmers in Kilindi District. It has been noted that, maize yield has been declining, whereas in 2008/2009 the total national maize production was 3 424 984 metric tons while the actual demand was 4 131 782 metric tons making a deficit of 706 797 metric tons (MAFC, 2009). The blame on the observed decline in maize productivity was caused by dependency of farmers on traditional agricultural technologies and producing mainly for subsistence (MINAG, 2004). Based on this, a wide range of policies, strategies, and approaches were formulated by the Tanzanian government to reverse the worsening food and agricultural trends towards sustaining agricultural growth. These included, introducing a range of

agricultural initiatives and the Agricultural Sector Development Strategy (ASDS). Other initiatives were the implementation of District Agricultural Development Projects (DADPs), District Agricultural Sector Investment Project (DASIP), Participatory Agricultural Development and Empowerment Project (PADEP), Agriculture Sector Programme Support (ASPS), and *Kilimo Kwanza* (URT, 2009).

Despite all these efforts, farmers seem to have not benefited from agricultural sector initiatives and maize growers of Kilindi in particular have failed to benefit from services delivered by agricultural extension agents under the introduced initiatives. According to Saidia*et al. (*2010), maize growers in rural areas have been experiencing low yields per unit area and this has been attributed by lack of extension services, as a result, over the years farmers have continued to use traditional methods in producing maize leading to low yields being realised. This study therefore, gathered information about the extent to which farmers viewed their extension agents as being effective in transferring the required information and knowledge necessary to enable them grow maize and obtain higher yields.

1.2 Justification for the Study

A strong relationship between extension agents and their farmers is necessary for ensuring enough and reliable knowledge transfer. According to Pauw and Thurlow (2010), slow expansion of food crops and maize in particular explains weakness in the relationship existing between extension agents and farmers in achieving agricultural growth outcomes in rural areas. Increase in agricultural productivity will reduce income poverty for both men and women in rural and urban areas as stipulated in the National Strategy for Growth and Reduction of Poverty (NSGRP), Cluster 1; Goal number 4 and 5 which aimed at ‘Reduce Income Poverty of both Men and Women in Rural and Urban Areas (URT, 2007).

Results from the study could help the government and policy makers to re-structure and modify the organization of the extension services delivery to promote maize productivity. Farmers' perceptions on how they view the effectiveness of their extension agents in knowledge transfer to maize farmers facilitates assessment of the performance of agricultural extension agents in transferring knowledge to maize growers so as to increase productivity in the District. The results also notify extension agents and other actors on their effectiveness and enable necessary corrections to be made during implementation of their day to day activities.

1.3 Objectives of the Study

1.3.1 Overall objective

The overall objective of this study was to assess effectiveness of agricultural extension agents in knowledge transfer to maize growers in the District.

1.3.2 Specific objectives

The specific objectives of the study were to;

(i) Identify socio-economic factors affecting perceived effectiveness of AEAs in knowledge transfer to maize growers in Kilindi district.

(ii) Identify problems associated with low maize yields in the study area.

(iii) Determine farmer's perceptions on effectiveness of AEAs in obtaining required knowledge on maize growing in the study area.

1.4 Research Questions

iWhat are the socio-economic factors affecting farmers' adoption of maize technology?

iiWhat are the production problems encountered by maize growers in the District?

iiiTo what extent have the extension agents assisted farmers in obtaining correct knowledge on maize growing?

ivHow do maize growers perceive the effectiveness of AEAs in transferring knowledge on maize production?

1.5 Scope of the Study

The purpose of the present study is to assess farmers' perception on the effectiveness of AEAs in knowledge transfer to maize growers in the District. This study involved maize growers, key informants, and focus group discussions so as to verify the validity of information provided. To achieve the objectives, financial matter was a key roadmap in which Mangidi,Msente, Michungwani, and Tuliani villages from Jaila and Mabalanga Wards were surveyed in the District.

1.6 Limitations of the Study

During data collection, the researcher faced some constraints, hitherto financial was the foremost key restraint and this limited time for data collection and the exercise was delayed. Moreover, there were problems in covering larger areas because households were scattered and rural roads were impassable to reach most farmers from one village to another and in some cases the researcher hired a motorcycle to facilitate reaching more farmers.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Effectiveness of Agricultural Extension Agents in Knowledge Transfer

Effectiveness in agricultural knowledge transfer refers to the extension systems ability to achieve goals (Schwartz and Kampen, 1992). On the other hand, Cornea and Tepping (1977) defined effectiveness as a yardstick for measuring the merit or worth of a programme. According to Bennett (1977) indicators used for measuring effectiveness may be in the form of; the number of farmers who adopt a particular practice, the number of contact farmers reached by extension agents, the number of visits made by extension workers, total crop output, and spread of key practices.

In the same view Aphuna and Otoikhian (2008) found that the ability to communicate, attitude to extension work and frequency of contact between farmers and field extension agents are pre-conditions for extension agents to be effective and this can be examined from the viewpoint of the farmers. As Bello and Salau (2009) observed, effective extension delivery system and acceptance of new technologies by farmers is a pre-condition for agricultural extension and rural development.

2.2 The Influence of Farmers Knowledge and Skills on Improving Effectiveness of AEAs

Farmers are known to have accumulated knowledge about their environment and their farming systems, but AEAs could bring them additional knowledge and information which they lack in improving their practices (FAO, 1993). According to Anderson and Ferder (2002), knowledge delivered by extension agents could be information embodied in inputs or equipment (e.g improved seeds or machinery) or more abstract disembodied information on agricultural practices. Similarly, Mirani and Memon (2011) report that

the use of farm visits and result demonstration methods of technology transfer are perceived as means of improving effectiveness in knowledge transfer by the AEAs. However, Arshed*et al.* (2012) observed that use of group discussions was found to be the best method in improving effectiveness of the AEAs in transferring knowledge to maize growers, followed by use of lecture and demonstrations. Findings by Tesfaye*et al.* (2010) revealed that training of farmers received from AEAs improved farmers' knowledge in potato, onion, durum wheat production knowledge, attitude of farmers, and their level of practice compared to farmers who did not receive training.

Furthermore, Rasouliazar and Fealy (2011) observed that apple growers had problems in the stage of planting, harvesting, warehousing, and marketing. These problems caused by lack of sufficient information and knowledge on apple production. They also showed their interest in practical educational methods; despite insufficient apple production knowledge and lack of suitable cultivars and knowledge on management techniques was identified as a major constraint to growers. Likewise, Badrage*et al*. (2009) found that technical knowledge of wheat farmers who visited on farm demonstration was higher than those who did not visit the sites. But, little is known about the effectiveness of knowledge and skills transferred to maize growers.

2.3 The Role of AEAs in Knowledge Transfer to Farmers

The success of extension programmes depends on the competency of extension workers in transferring new ideas intended and offering technical advices intended to the rural people (Neda, 2009). In the past, the role of extension agents in many countries was seen as to transfer new technologies from research centres to farmers (Van de Ban and Hawkins, 1996). However, the roles of extension personnel to rural household farmers include the provision of relevant and sufficient information.

Similarly, Samel (2000) reported that the extension agents are responsible for providing knowledge and information that will facilitate farmers to acquire new knowledge and skills that encourage them to make independent decisions. Furthermore, Van den Ban and Hawikins (1996) explicitly states that the role of agricultural extension agents is to help farmers form sound opinions and be able to make decisions by communicating with them so as to get information needed.

2.4 Farmers Socio-economic Factors Affecting Effectiveness of AEAs in Knowledge Transfer

The pattern for adoption rate between farmers of different socio-economic status reflects a trend when looking for assistance from AEAs (Kyaruzi 2008). As observed by Arene (1994) in Nigeria on smallholder rice production, level of formal education, farm size, and age of farmers were significantly related to the farmers' adoption rate and the extent to which they perceived their AEAs as being able to effectively transfer knowledge. Again, high-adoption of farmer groups showed positive attitude towards the extension agents whereas young farmers fell under early adopters. According to findings by Rogers (2003) in United State on diffusion of innovation, observed that socio-economic statuses were positively correlated with innovations uptake and hence enhancing knowledge transfer. That is, farmers with higher socio-economic status were seen to adopt technologies faster and henceimproved knowledge transfer from AEAs.

Similarly, Mlozi (1994) on inequitable agriculture extension services observed that farmers with high income were able to facilitate their agricultural and livestock extension field officers to perform their duties more in their areas than those who had low income. Further, Msuya and Bengesi (2005) found that farmers with higher income were able to purchase required inputs as compared to those with low income and this facilities

knowledge transfer to them. Equally, a study by Rogers (2002) in US on diffusion innovations found that farmers with large farm size tended to be earlier adopter compared to those with small sized unity.

According to Ekpere (1976) when studying on organizational determination of differential programme on effectiveness in extension services found that large scale farm have more flexibility and opportunity to use new practices on a trial basis and more ability to deal with risk and uncertainty associated with adoption. While Ohajianyo*et al.* (2003) when studying evaluation of the effectiveness of Imo state fisheries extension programme in Nigeria, found that education in fisheries enables farmers to seek and obtain information about improved practices required by them. These results were found to be consistent with the views of Nweke (1981) when studying Agricultural progressive in the small Holder in Nigeria that literate farmers are less skeptical of new ideas and are able to evaluate available information on new technologies and make decision.

2.5 Factors Affecting Knowledge Transfer to Farmers by AEAs

There are several factors that affect AEAs ability to effectively transfer knowledge on a given innovation to farmers. Findings obtained by Sezgin*et al.* (2010) in Turkey on factors influencing agricultural extension staff effectiveness in public institution showed that age, marital status, education level, extension education, number of villages served, in service training received were the key determinants of effective extension service delivery. It is expected that young AEAs are more energetic, mobile, dynamic and flexible to receive introduced and intended changes and perform their duties effectively compared to older extension agents, yet, aged AEAs can perform better based on their vast experiences accumulated over a period of time on a given practice (Bembrige,1984).

Supe (1983) found that highly trained graduates and post graduate degree personnel have more professional development capacity and ability to perform better in extension functions of transferring knowledge on a given innovation. In addition, Supe (1983) argues that income of AEAs has an impact on their effectiveness in transferring knowledge and overall service delivery to farmers. Findings by Kyaruzi (2008) show that low salaries encourage AEAs to engage in other alternative sources of income generation. Consequently, the author stated that by being involved in several activities, most of AEAs are being reported as truants for being not available to execute their duties.

2.6 Perception of Farmers on the Effectiveness of their AEAs

Most scholars have studied perception of farmers on the effectiveness of AEAs. For instance, the study by Mac Donald and Hearle (1984) in Kenya on communication skills for rural development found that farmers tend to mistrust outsiders who take ready made plans to them to follow without prior consultation because they feel; they are being directed or told what to do rather than being helped to make their own decisions.Findings by Oladosu (2006) in Nigeria on farmers' attitude towards extension agents have also shown that farmers complained about the lack of regular contacts and the duration of the visit was too brief for meaningful exchange of idea and this might have affected effectiveness of AEAs in transferring knowledge to them.

According, toOladosu (2006) in Nigeria on farmer attitude found that farmers complained that AEAs were using unfamiliar terminologies to explain recommended agricultural practices to them and this made them fail to comprehend what was intended by AEAs. According to Francis et al(1987) in Northern Namibia when studying extension system and small scale farmers they found that most farmers consider access to resources such as credit and inputs rather than to technical knowledge was the main

constraint affecting knowledge transfer and hence affecting production. Similarly, a study by Igben (1987) in Nigeria on extension services revealed that, on evaluating effectiveness of AEAs proportion of farmers reached by AEAs, the scope of advice given by AEAs, availability of demonstration plots and the relative number of farmers adopting new technologies need to be assessed.

2.7 Theoretical Framework

This study on effectiveness of AEAs in transferring knowledge is guided by the adoption-diffusion theory developed by Rogers (1995) which explains why farmers choose to adopt new ideas. The time needed and the rates of adoption depend on the innovation itself and the characteristics of the receivers. According to Van den Ban and Hawkins (1996) Adoption-Diffusion theory is useful in extension as it predicts how and at what rate an innovation will be adopted by farmers in a community. Additionally, by using the theory, the AEAs could assist farmers to develop a receptive mind, hence improve knowledge transfer to them on given technologies and decide to accept or reject innovation (Van den Ban and Hawkins, 1996).

2.8 The Conceptual Framework

This study adopts and modifies the conceptual framework of diffusion as a linear model (Rogers, 2003) that shows a linear relationship between the background variables (socio-economic), independent variables, and dependent variables. However, socio-economic context include variables such as age, gender, marital status, income, and education level those are thought to affect thinking and perceptions of farmers on effectiveness of AEAs.

In addition, socio-economic variables interacts linearly with independent variables which indicate that scientific knowledge transfer to maize growers depends on the ability of

extension agents to deliver the services to farmers. Service delivery by extension agents is influenced by factors such as whether the extension agents have acquired extension education in crop production or attended in-service training. Further, frequency of contact with farmers in seasonal basis (frequently, occasionally, rarely or never) and ability to provide updated information are key variables which has an effect on the chain of knowledge transfer to the consumers of the service.

Also, improved practices which involves the technical knowledge transferred by AEAs to maize growers such as improved seeds and seeds treatment, pests and disease control methods, fertilizer application, proper time for planting and sowing methods, weed control and maize storage has an effect on farmers perception on effectiveness of AEAs. Moreover, enhanced farmers' perception on the effectiveness of extension agents on knowledge transfer (PEKT) is a key determinant on the overall knowledge supply chain which is influenced by socio-economic context and explanatory elements (see Appendence 1).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of Study Area

Kilindi is one of the eight districts of Tanga regionTanzania. It is bordered by Handeni district to the east, to the north and west by Kilimanjaro region and Morogoro region to the south. The district covers an area of 7 091 square kilometres. It has a potential arable land of about 290 030 hectares while land under crop production is estimated to be 101 935 hectares. This study was conducted in Mangidi, Tuliani, Msente, and Michungwani villages of Kilindi district.

According to population and housing census of 2002 its population was estimated to be 165 005 in 2006. The district is administratively divided into four divisions, 15 wards, and 64 villages. Crop production and Livestock keeping are the major economic and food production activities undertaken by the majority. About 49 184 (72%) of the total households in kilindi depend on agriculture while 19 266 (28%) depend on non-farm activities (Population and Housing Census, 2002).

Maize is one of the main staple foods and cash crops grown by the majority in the district on average their farm sizes range between 1-2ha and majority depend on family labour. Many policies and strategies such as ASDS, DADPs, DASIP, PADEP, and AMSDP have been implemented in Kilindi district through involving AEAs aiming at raising crop productivity.

3.2 Research Design

This study adopted cross-sectional research design as data were collected at one point in time and usually was the simplest and least costly alternative (Newman, 2007). Similarly,

Babbie (1990) proposes that cross-sectional research design is suitable for description purposes as well as for the determination of relationship between variablesand it is cost effective and saves time.

3.3 Sampling Frame

Sampling frame included households engaged in maize production in four villages. Maize growers were selected purposively to ascertain the perceptions of AEAs from family households' viewpoint as a unit of assessment. Also, similar check-list of questions was used in Focus Group Discussions and AEAs so as to validate information obtained from households' and individuals viewpoints.

3.4 Sampling Procedure and Sample Size Determination

3.4.1 Sampling procedure

Multi-stagerandom sampling approach was used to select a representative sample of maize growers, because respondents chosen were believed to be a good source of information and possessed varied experience in the village to represent farmers in the district (Krysik and Finn, 2007). The first stage involved arandom selection of two divisions out of four. The second stage involved a random choice of two wards in which Jaila and Mabalanga were selected. The last stage involved a random selection of four villages from selected wards.This method gave no room to biasses and the degree of accuracy obtained allowed for making inference applicable to a wider population (Kothari, 2009). Furthermore, from a list of all maize growers, a required sample was selected from the four villages.

3.4.2 Sample size determination

Krysik and Finn (2007) describe that as a general rule in non-probability sampling, the researcher selects elements until no new insights or observations are revealed. In

purposive sampling design which this study employed, the sample size was determined by the variation in experience, knowledge, and attitudes the researcher considered important to represent characteristics of maize growers in the study area (Krysik and Finn, 2007). Therefore, a sample size of 121 was collected from four randomly selected villages: Mangidi, Msente, Michungwani, and Tuliani from Jaila and Mabalanga Wards in which about 30 maize growers were interviewed from each village.

3.5 Data Collection

Both primary and secondary data onperception of farmers on effectiveness of agricultural extension agents in knowledge transfer to maize growers were collected. Combinations of both qualitative and quantitative methods were used in which primary data was collected from maize-growers and agricultural extension agents. A structured questionnaire comprising of both open and closed ended questions was used to gather information (see appendix 3).Further, a check-list (see appendix 4) was administered to the Focus Group Discussions (FGD) that comprised 6 – 8 respondents so as to cross check information provided by the households and key informants. Participants in FGD were different from those involved in questionnaire interviews. Also, primary data was complemented by secondary data that was obtained from District Agricultural and Livestock Development Office (DALDO).

3.5.1 Sources of data

Primary data were collected from maize growers on knowledge transfer in maize production by using a questionnaire, Focus Group Discussions, key informants interview, and observations. However, secondary data were collected from district agriculture and livestock development office in Kilindi District.

3.5.2 Types of data collected

The study intended to obtain information on the various aspects that could be attributed to perception of farmers on effectiveness of agricultural extension agents in knowledge transfer to maize growers. Primary data collected include socio economic characteristics of growers such as age, gender,level of production, and household income which were thought to be related to perception of farmers on effectiveness of AEAs. Also, agricultural information on land ownership, acreage farming distribution, farming experience, and presence or absence of village AEAs was collected. Other information collected include: availability of agricultural extension services, distance for accessing extension services, frequency of contacts per season, sources of information on production, and maize yield. In addition, information was gathered on problems associated with low maize yield such as pests and diseases, and farmers' perceptions on effectiveness on agricultural extension agents in transferring knowledge.

3.5.3 Procedure of data collection

One enumerator from Mabalanga village with appropriate extension skills was trained before the pilot study. However, the number of enumerators was kept to a minimum level so as to avoid information inconsistency and financial constraint. Permission letter for data collection was obtained from the Districts Executive Director (DED).

3.5.4 Pre-testing

The questionnaire was pre-tested in Mafuleta village in Jailaward in which 12 (10% of 121) maize growers were interviewed these excluded from the targeted sample size. The researcher and enumerator had meaningful observations. The enumerator was encouraged to make comments and suggestions concerning instructions, clarity of

questions and relevance. Pilot-testing the questionnaire was useful as unwanted and long questions were revealed and rephrased to enhance the validity of the instrument. In addition, comments and suggestions made by the respondents were incorporated to improve the questionnaire.

3.6 Data Analysis

3.6.1 Descriptive statistics

Data were summarized, coded and analyzed to obtain descriptive statistics including frequencies, percentages, mean, standard deviation and cross-tabulation in which χ^2 test was used to determine the association between the observed and expected outcomes. Coefficient of determination (R2) and variance inflation factors (VIF) are used to determine the goodness of fit of the model; Measures of standard error estimate detected the extent of multicollinearity problem (Studenmund, 2001; Mukras, 1993).

3.6.2 Measurement of perception on effectiveness of AEAs

Five points Likert scale was used to measure perception of farmers regarding to the effectiveness of their AEAs in knowledge transfer based on possible improved agricultural practices. These was done by scale ranging from strongly agree, agree, undecided, disagree, and strongly disagree. According to Bernard (1994), Likert- scale type of interview items results in a single score that represents the degree to which a person is favourable or unfavourable responding with respect to the question asked. However, effectiveness of AEAs was done by looking on perceived ability of AEAs to provide updated information to farmers, frequencies of contact with farmers', technical knowledge transferred by AEAs and ability to solve farmer's problems.

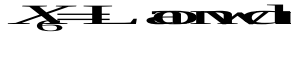
3.6.3 Factors influencing farmers' perceptions on effectiveness of AEAs in Knowledge transfer

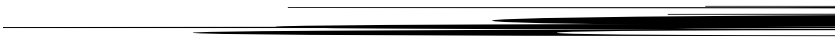
In order to ascertain the extent of relationship between farmers' perceptions on effectiveness of AEAs with their socio-economic characteristics, the present study used linear regression model, specified as perceived effectiveness in Knowledge transfer (PEKT) as a function of Age of maize growers, sex, marital status, education level of maize growers, household size, land ownership, farm size, frequencies of AEAs visits to maize growers for knowledge transfer as shown in the following equation:

…….(1)

β_0 = constant term;  are coefficients of variables that were estimated;

X_1 = Age of maize growers measured in years,





The model was tested for multi-collinearity problems and coefficient determination estimated the model fit. Also, correlation and t-statistics are employed to estimate the degree of relationship and its extent of association between the dependent variable and predictor variables.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-Economic Characteristics of Respondents

Table 1 shows that 54.5% (66) and 15.7% (19) of the households interviewed were aged between 30-44 and 15-29 years, respectively. This indicates that respondents in these age categories are mostly likely to participate in maize production as compared to those aged sixty years and above. The findings also show that maize growers interviewed from the study area, 53.7% and 46.3% were male and female, respectively. These proportions of respondents suggest that males are more likely to participate in maize production than their counterparts. Probably, males have higher chances of accessing land and farm inputs than female respondents.

Results in Table 1 also show that81%and 9.9% of the respondents are married and divorced respectively. This indicates that married respondents are the most participants in maize production in the study area. This could be attributed to the necessity of the married counterparts to meet family basic needs such as food self-sufficiency. Further, findings show that, 57% and 24% of interviewed respondents have household size ranging from 5-8 and 1- 4, respectively. The results indicate that majority of households in the study area have large household size in the category 5- 8 are more likely to participate in maize production than other categories so as to meet food requirements.

The results in Table 1 show that 69.4% of respondents interviewed had attained primary school education level while 27.3% have informal education. These suggest that primary education leavers are likely to participate more in maize production followed by those with informal education. Probably, the majority of maize production participants have

low chances to search for highly paying job opportunities in urban areas as compared to those with higher education levels.

Table 1 also shows that 99.2% of respondents depend on farm activities. This suggests that the majority of respondents entirely depend on farm activities as their source of income. Probably, this is caused by the lack of off-farm employment opportunities in the study area. Likewise the finding shows that 39.7% and 31.4% of respondents have income between 100 000 - 250 000 and 251 000 - 400 000 respectively. The findings indicate that 71.1% of maize growers have low income (100 000 to 400 000 TZS) per year compared to 2.5%. This could be attributed to differences in accessing agricultural extension services to enhance maize productivity.

Table 1: Socio-economic characteristics of the respondents (n=121)

Variable	n	%
Age of the respondents		
15 - 29	19	15.7
30 - 44	66	54.5
45 - 59	17	14.0
60 - 74	11	9.1
75 - 90	8	6.6
Sex of the respondents		
Male	65	53.7
Female	56	46.3
Marital status of the respondents		
Single	7	5.8
Married	98	81.0
Divorced	12	9.9
Widow	4	3.3
Household size distribution		
1 - 4	29	24.0
5 - 8	69	57.0
9 - 12	18	14.9
13 -16	5	4.1
Education level		
Informal education	33	27.3
Standard seven	84	69.4
Form four	3	2.5
Form six	1	0.8
Income category (Tshs)		
100 000 - 250 000	48	39.7
251 000 - 400 000	38	31.4
401 000 – 550 000	11	9.1
551 000 – 700 000	7	5.8
701 000 – 900 000	14	11.6
1 151 000 - 1 300 000	3	2.5
Main source of income		
Farm activities	120	99.2
Business	1	0.8

4.2 Agricultural Information and Extension Services

Table 2 shows that60.3% and 21.5% of land used for crop production in the study area were obtained through inheritance and renting, respectively. These indicate that most of land used by majority of respondents for agricultural activities is merely inherited than other mode of land ownership. Table 2 also shows that 86.8% of respondents use land between one to four acres for crop production. Results show that the majority of respondents interviewed use small- piece of land to sustain their livelihoods. Probably, small piece of land distribution among majority is partly attributed by fixed land shared through inheritance among family members.

Table 2 shows that 46.3% and 43.0% of respondents had an experience ranging from 1 – 15 years and 16-30 years in maize production in the study area. The number of year's respondents has been practicing maize cultivation. This indicates that as experience exceeds 30 years, participation in maize production tends to diminish. Probably, this could have been attributed by low profit obtained from maize farming compared to costs incurred. Table 2 also shows that 84.3% and 15.7% of respondents never have the respondent had or rarely have they had contact with extension agents on a seasonal basis. Present findings reveal that the majority of maize growers in the study area have no contact with AEAs at all in seasonal basis; however, a minority of them infrequently have a contact. This suggests that the extension services are costly to access; this could have been attributed by unreliability of AEAs. That's why the majority almost never have contact with extension agents for improvement of maize production in the study area. Also, this was supported by focus group discussion that they never have contact with AEAs on seasonal basis.

Results in Table 2 show that 92.6% of respondents have other sources of information other than AEAs. This indicates that agricultural information on maize production can be obtained from different sources as reported by 55.4% and 43% of respondents in the study area that they access maize production technologies from their neighbours / friends / relatives and radio, respectively. This reflects that neighbours /friends/relatives and radios are the main sources of information on maize production technologies other than AEAs similar information was provided by Focus Group Discussion. Probably, this could be attributed by liberalized information dissemination through mass media.

Table 2: Agricultural information and extension services in Kilindidistrict(n= 121)

Variable	n	%
Land ownership		
Purchased	18	14.9
Inherited	73	60.3
Rented	26	21.5
Own farm 4	3.3	
Farm size		
1-4 acres	105	86.8
5-8 acres	12	9.9
9-12 acres	4	3.3
Farming experience (Years)		
1-15	56	46.3
16-30	52	43.0
31-45	8	6.6
46-60	5	4.1
Frequency of AEAs contact		
Rarely	19	15.7
Never	102	84.3
Other sources of information on maize production		
Do you have other source of information		
No	9	7.4
Yes	112	92.6
Sources of information		
Radio	52	43.0
Books	2	1.7
Neighbours / friends/relatives	67	55.4

4.3 The Relationship of Socio-economic Factors on Perceived Effectiveness of AEAs in Knowledge Transfer to Maize Growers

Estimation of socio-economic factors on knowledgetransfer reflects that there is no multi-collinearity problems since the variable inflationary factor (VIF) values fall in the range of 1.06 - 1.44. Also, the mode summary indicates 38.13% (adjusted R^2) of technological transfer in maize production is explained by socio economic factors. Meaning that, there are other variables that can explain technological transfer in maize production in the study area. However, Gujarati (2004) argue that if R^2 is lower than 0.10 then the instruments are most likely to be inappropriate, though, low R^2 does not mean that the model is weak but the logical and theoretical relevance do matter.

Also, results in Table 3 show that age of respondents have a negative significant effect ($P<0.01$) on perceived effectiveness of AEAs in knowledge transfer. This suggests that technological transfer decline as maize growers in the study area become older. This fact could have been attributed by the inability of aged respondents in accessing information and farm inputs. Similar findings by Dlova*et al.(*2004) and Bembridge (1984) found young famers are more ready to adopt technology while the older ones become more conservative to accepting risk.

Results in Table 3 indicate that household size had a significant positive effect at ($P<0.05$) level on the perceived effectiveness of AEAs in knowledge transfer. This indicates that there is a proportionate effect between perceived effectiveness of AEAs in knowledge transfer and household size of respondents in the study area. This suggests that as household size of maize growers increases, it leads to an increase in technological transfer so as to meet food self-sufficiency. Similarly, findings in Table 10 show that farm size is strongly and statistically significant ($P<0.01$) and is inversely correlated with

technological transfer. Meaning that as technological transfer is attained by 1%, respondents tends to reduce their farm sizes by 16.79%. This fact could have been attributed by the opportunity of maize growers to use little effort in agricultural inputs to maximize outputs.

Moreover, frequency of AEAs contact has strong positive significant effects (P<0.01) on technological transfer. This indicates that as 1% increase in AEAs contact with maize growers, it will lead to 165% increase in knowledge transfer. Therefore, frequency of contact between farmers and agricultural extension agents in the study area is a key determinant of knowledge transfer among other socio-economic factors. Study findings concur with observations made by Leonard (1970) and Sarker and Itohora (2009) that there is a strong relationship between contact and technological transfer for improving the effectiveness of extension services through reliable information.

Table 3: Regression of socio economic factors on farmers perceived effectiveness of knowledge transfer of AEAs (n=121)

Variable	β	Std Error	t-value
Age	-0.0190	0.0065	2.90***
Sex	-0.0123	0.1884	0.07
Marital status	0.2590	0 .1961	1.32
Education level	0.0791	0.1330	0.59
Household size	0.0778	0.0349	2.23**
Land ownership	0.0704	0.0627	1.12
Farm size	-0.1679	0.0585	-2.87***
AEAs contact	1.6481	0.2651	6.22***
Constant	9.7431	1.2193	7.99

***, *** indicate significant at 5% and 1% respectively* n = 108;

R^2 = 0.4276;

Adjusted R^2 =0.3813

4.4 Problems Associated with Maize Production in Kilindi District

Results show that maize pests were the major problem facing maize growers in Kilindi District. As shown by 95.9% of the respondents reported that maize pests affect their crops in three stages: during planting their seeds; when the maize plants grow and the last stage when maize is at taselling stage. Table 4 also shows that problems associated with low maize yield among maize growers are strongly statistically significant at $p<0.01$ level. This means that there are differences on problems associated with low maize production among maize growers at the study area. The differences on these problems could be attributed to differences on knowledge on maize production among farmers due to inaccessible AEAs. Furthermore, respondents reported that stalk-borer is the most serious maize pests. Other field maize pests include monkeys, insects, wild pigs, and birds. Yet, they do not use pesticides, herbicides or insecticides (agrochemicals) due to the high costs of these agricultural inputs, services, and lack of knowledge on how to use it.

Also, Table 4 shows that 74 .4% of the respondents are not affected by maize diseases in their fields while only 25.6% face maize diseases and they do not know how to control. Findings suggest that maize diseases are among the problems facing maize growers at low rate when compared with pests. Study findings presented are similar to the information provided by focus group discussions that pests and diseases affect maize production in the study area.

Table 4: Problems associated with low maize yield in Kilindi District (n=121)

	Yes		No		χ
Problems	**n**	**%**	**n**	**%**	
Pests	116	95.9	5	4.11	152.3***
Diseases	31	25.6	90	74.4	154.3***
Low yield	91	75.2	30	24.8	171.9***
Low rainfall	93	76.9	28	23.1	154.1***
Low market price	52	43.0	69	57.0	160.7***

***, *** indicate significant levels at 5% and 1% respectively*

Further, results show that low yield per acre is a major problem facing majority of maize growers in the study area. Table 4 indicates that 75.2% of respondent get low yield per acre while 24.8% obtain high yield. The respondent reported that low yield is due to continuous cultivation without fertilizing soil, poor knowledge on how to control pests, diseases, and depending on traditional methods of farming.

Similarly, present findings show that 76.9% respondents are affected by low rainfall which leads to low yield and only 23.1% benefit from dependency on rainfall variation. Findings reveal that maize growers in Kilindi District depending on rain feed seems to be another major constrain facing farmers to obtain high yield, the same information was reported by the focus discussion groups.

Moreover, results show that 43% of respondents sell their maize at low price at the market while 57% benefit from selling their in the market prevailing price. This suggests that price for maize is another problem facing maize farmers especially during the harvesting season. This could be attributed by the fact that farmers sell their maize at low price which lead to failure of buying farm inputs and other services during the sowing and weeding season.

4.5 Farmers Perceptions on Effectiveness of AEAs in Transferring Knowledge to Maize Growers

The overall objective of this study was to assess farmers' perception on the effectiveness of AEAs in knowledgetransfer to maize growers. Toachieve this study Lirket scale-type of interview wereused. Set of questions were asked to respondents to find out whether AEAs transfer improved practice to farmers such asnew varieties of maize seeds, proper time for planting, weed control methods, pest control methods, disease control methods, irrigation practice, fertilizer application, harvesting and demonstration methods. Respondents were requested to indicate whether they strongly agreed, agreed, were neutral, disagreed or strongly disagreed with each statement.Strongly agreed and agreed were treated as positive perception towards effectiveness of AEAs in transferring knowledge to farmers, and strongly disagreed and disagreed were treated as negative perception towards AEAs while neutral items showed that farmers knew nothing. Therefore, Table 5 shows that 77.3 % to 98.4.6% of respondents interviewed in the study area strongly disagree that they are advised by AEAs on new varieties of maize seeds, proper time for planting, weed control methods, pest control methods, disease control methods, irrigation practice, fertilizer application, harvesting and demonstration methods, contrary to 1.6% to 9.0% of interviewed respondents.

Findings indicate that, majority of respondents are not advised on the possible agricultural practices to enhance their livelihoods thus they have negative perception on effectiveness of AEAs. These suggest that over 77.3% of maize growers never access advice from AEAs to enhance knowledge transfer hence maize growers have negative perception on the effectiveness of AEAs in transferring knowledge. This fact could have been attributed by poor AEAs distribution in the study area. Therefore, perception of maize growers on the effectiveness of AEAs in knowledge transfer is poor as confirmed

by failure of possible improved practices. Further, Table 5 shows that perception of maize growers on effectiveness of AEAs in knowledge transfer is statistically significant at $p<0.05$ and $p<0.01$ levels. This means that there are differences on maize growers towards effectiveness of AEAs in knowledge transfer. The differences on perception could be attributed to information asymmetry on knowledge transfer on maize production among farmers.

Table 5: Percentage distribution of maize growers towards effectiveness of AEAs in knowledge transfer (n=121)

Possible improved practices	Percentage score on the scale (%) Strongly Agree (%)	Undecided (%)	Strongly Disagree (%)	χ^2value
AEAs advice about new varieties of maize seeds	7.8	12.0	80	121.00***
AEAs advice on proper time for planting	9.0	13.0	78	31.34***
AEAs advice on seed treatment	6.6	11.1	77.3	6.2**
AEAs advice on weed control methods	3.4	10.0	86.6	6.2**
AEAs advice on pest control methods	3.4	0.0	96.6	6.2**
AEAs advice on disease control methods	5.0	0.0	95	6.2**
AEAs advice on irrigation practices	3.4	1.6	96.6	28.73***
AEAs advice on fertilizer application	1.6	0	98.4	14.24***
AEAs advice on harvesting practices	5.0	2.4	92.6	17.97***
AEAs advice through demonstration methods	8.2	0	91.8	45.49***

***, *** indicate significant levels at 5% and 1% respectively*

Table 6 shows advantages of AEAs as perceived by maize growers in Kilindi district. Results show that 91.7 % of respondents reported that there is no possible advantages of AEAs in increasing farm management skills, 91.7% of farmers showed that AEAs failed to transfer knowledge on maize production,91.7% of the respondents reported that AEAs failed to help them in solving problems associated with maize production, 92.6 of respondents said that AEAs failed to help them in increases maize production, 92.6 of the respondents said that AEAs failed in improving their bargaining power in maize markets contrary to 0.8% to 9.1% of respondents who perceive to have gained advantages of AEAs in maize production. The difference in perception was probably due to variation in location and purchasing power of maize growers to access information and farm inputs. The differences in their perceptions was found to be statistically significant at $p<0.01$ levels. This means that there are differences on perception of advantages among maize growers.

Table 6: Advantage of AEAs as perceived by maize growers (n=121)

	Yes		No		χ^2 value
Possible advantages	n	%	n	%	
It increases farm management skills of farmers	10	8.3	111	91.7	122.00***
It increase knowledge of farmers on maize production	10	8.3	111	91.7	120.00***
It help to solve problems associated with maize production	10	8.3	111	91.7	60.592***
It changes the attitude of maize growers	10	8.3	111	91.7	122.00***
It increases farm income of maize farmers	11	9.1	110	90.9	122.00***
It increases maize production	9	7.4	112	92.6	122.00***
It increases bargaining power of farmers on maize markets	1	0.8	120	99.2	122.10***

***, *** indicate significant levels at 5% and 1% respectively (2-tailed levels),*

Df = Degree of freedom

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

- From the study findings the following conclusions are drawn;
- There were minimal contacts with maize growers and this was found to be a key determinant to the ineffectiveness of AEAs in knowledge transfer on maize production among smallholder farmers growing maize in Kilindi district
- Plant diseases, pests and low market prices were the main constraints and highly impacted on maize production in the study area.
- Majority of smallholder farmers growing maize had negative perception on the effectiveness of AEAs in knowledge transfer and thought AEAs had little advantage to them. However, the effectiveness of AEAs varied with respect to particular possible improved agricultural practices. Moreover maize growers had little contacts with their AEAs which could have been caused by lack of resident village AEAs.

5.2 Recommendations

It is therefore, recommended that;

(i) Local government should enforce equitably distribution of agricultural extension services in all areas in Kilindi district.

(ii) AEAs should impart knowledge on pests and diseases control and training on how to use new knowledge to maximize maize yield and hence improved farmers' income.

(iii) Farmers should seek advices from AEAs on maize production, knowledge and skills to increase yields

(iv) Local government should enforce easy accessibility of AEAs to rural farmers so as farmers can access services from AEAs.

5.4 Area for Further Study

Based on findings from this study, the author recommends a study on problem facing AEAs to effectively transfer knowledge to farmers in Kilindi district.

REFERENCES

Anderson, J. R. and Feder, G. (2002).*Rural Extension Services.*Agriculture and rural Development Department, Washington DC.World Bank. 33pp.

Aker, J. C. (2010). "Dial 'A' for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries." Tuft University, Economics Department.55pp.

Aphunu, A. and Otoikhian, C. S. O. (2008).Farmers' perception of the effectiveness of extension agents of Delta State Agricultural Development Programme (DADP), Nigeria.*African Journal of General Agriculture* 4(3): 121-130.

Arene, C. J. (1994). Economic impact analysis of the Training and Visit System of Agricultural Extension on Small Holder Rice Production in Nigeria.*"Quarterly Journal of International Agriculture* 33(4): 393-403.

Arshed, A.W., Iqbal, M. and Hussain, A. (2012). Effectiveness of extension education methods used by Rafhan maize products for information dissemination to maize growers of Central Punjab, Pakstan. *Journal of Food Science* 22(1): 36-39.

Babbie, E.R. (1990). *Survey Research Methods Wadsworth*. Publishing Company, California. 395pp.

Badrage, A., Dinpanah, G., Aboeye, F. and Sinaki, J. M. (2009). An investigation of effective factors involved in perception of wheat farmers regarding on-farm demonstration in Isfahan Township, Iran. *American –Eurasian Journal of Agricultural and Environmental Science* 6(5): 616 - 624.

Bello, M. and Salau, E. S. (2009). *A case for participatory (cost sharing) approach to agricultural extension delivery in Nigeria*. *Journal of Agricultural Extension 13(1):84-94.*

Bembridge, T.J (1984). A Systems Approach Study of Agricultural Development Problems in Transkei. Ph.D. Thesis, University of Stellenbosch. 685 pp.

Bernard, H .R (1994).Research methods in Anthropology. *Qualitative and Quantitative Approaches*.Sage publications, London.585pp

Bennett C.E (1977). Analysing impact of extension programs, Washington D.C. Extension service, US. 55pp

Cornea, M.M and Tapping, B.S. (1977).A system for monitoring and evaluating Agricultural extension project.*World Bank staff working paper No.272*, Washington D.C. 66pp.

Dlova, M.R., Fraser, G.C.G., and Belete.A. (2004). Factors affecting the success of farmers in the Hertzog Agricultural Cooperative in the central Eastern Cape. Fort Hare Papers 13:21-33.

Ekpere, J.A. (1976).Organization determinant of Differential Programme Effectiveness in Extension Services.*Journal of Rural Economics and Development* 10(1): 201-210

Francis, P. and Rawlins,M. J. (1987).“The Extension System and Small Scale Farmers in Northern Namibia.”*Agricultural Administrationand Extension*, 26(4): 185-196.

Hosseni, J.F., Mirdmadi, M., Dehyouri, S and Ahmdi, S. (2008). Perception of Extension Specialists about the Role of Extension in the Production and Adoption of the Genetically Modified Crops in Iran. American *Journal of Biochemistry and Biotechnology,* 4(4):431-437.

Igben, M. S. (1987). Issues and problems in the administration of the Ministry of Agriculture based extension services in Nigeria. *AgriculturalAdministration and Extension* 27(4): 215-230.

Krysik.J. l. and Fian, J. (2007).Research for effective social work practice.McGraw Hill 387pp.

Maxwell, S. (2001). Agricultural issues in food security, *Food Security in Sub-Saharan Africa*. London, UK: IT Publications.55pp

Mirani, Z. and Memon, A. (2011). Farmers’ assessment of the farm advisory service of public and private agricultural extension in Hyderabab District Sindh.Pakstan*Journal of Agricultural Research* 24(1-4):56-64.

Moris, J. (1991*). Extension alternatives in Tropical Africa*. Agricultural Administration.*Occasional Paper 7.*Overseas Development Institute 184pp.

Mlozi,M.R. (1994). Inequitable Agriculture Extension Services in the Urban Context: The case of Tanzania. In: *Education in urban Areas: Cross – National Dimension*. (*Edited by stromquist, N.P.*), Publishers, West port. Pp 121-124.

Mukras, M.S. (1993). *Elementary Econometrics*: Theory, application, and policy. East African Educational Publishers. Nairobi, Kenya. 647pp.

McDonald, I. and Hearle, D. (1984).*Communication Skills for Rural Development.*Nairobi: EvansBrothers Ltd.221pp.

Mlozi, M.R.S (1994). In equitable Agriculture Extension Services in Ubarn Context. The case of Tanzania .*In;Education in UrbarnArea.Cross-National Dimesion.*United states of America pp121-124.

Msuya, B.C.P (2005). Factors that affecting the adoption hybrid Maize in Mwanga District.*Implications for continuing Education journal of continuing Education and Extesion,Sokoine University of Agriculture, Morogoro, Tanzania*2(1);31-42.

Neda, T. (2009). The importance of cultural competency for agricultural extension workers in Malaysia, The journal of international social Research 2(8) 412-421

Newman, W. L. (2007). Social Research Methods: Qualitative and Quantitative Approaches. Pearson Education, 6th edition. 592pp.

Nweke, F. I (1981).Determinants of Agricultural Progressiveness in smallholders cropping system of South East Nigeria 8(3) 163-176

Oakley, P. and Garforth, C. (1985). Guide to Extension Training. Food and Agricultural Organization of the United Nations. 22pp

Oladosu, I. O. (2006). Implications of farmers' attitude towards extension agents on future extension programme planning in Oyo state ofNigeria.*Journal of Social Science* 12(2): 115-118.

Ohajianya, D.O, Onu, D.O and Echetama, J.A. (2003) Education of the effectiveness of Imo state fishering extension programme, JASR 3(2):108-125.

Pauw,K. and Thurlow, J. (2010).*Agricultural growth, poverty and nutrition in Tanzania*.Discussionpaper 00947. Development Strategy and Governance Division. 40pp.

Rasouliazar, S. and Fealy, S.(2011).Identifying the problems of Apple production from viewpoint of Apple Growers in West Azerbaijan Province, Iran.*World of Applied Sciences Journal* 15(7): 915-920.

Rasouliazar, S., Hosseini, S. H., Hosseini, S. J. F. and Mirdamadi, S. M. (2011). The investigation perception of agricultural extension agents about effective factors on effectiveness of agricultural advisory services companies in Iran. *Journal of American Science* 7(2):445-451.

Rogers, E. M. (2003). *Diffusion of innovation.*5th Edition. Free Press, New York.551pp

Saidia, S.C, Alexander, and Maro, F. (2010).*Evaluation of EMtechnology on maize Growth, Development and Yield* in Morogoro, Tanzania. Research Report. 68pp.

Samuel, G., (2000). A study on the impact of integrated rural development programme (IRDP) in Medak district Pradesh. *Ph.D. Thesis*. Ranga. 366pp

Sezgin, A., Kaya, T.E., Atsan, T. and Kumbasaro, H.(2010).Factors influencing agricultural extension staff effectiveness in public institutions in Erzurum, Turkey. *African Journal of Business Management* 4(18), 4106-4109.

Sarker, A. and Itohara Y. (2009). Farmers' Perception about the Extension Services and Extension Workers: The Case of Organic Agriculture Extension Program: American *Journal of Agricultural and Biological Sciences* 4 (4): 332-337

Studenmund, A. H. (2001). *Using Econometrics*: A practical Guide. Addison Wesley Longman. 625pp.

Super, S. V (1983). *An introduction to Extension Education*. Oxford and IBH Publishing Company,New Delhi.166pp.

Swart, L.A and Kampen, J. (1992).Agricultural Extension in East Africa.*World Bank technical paper No 164* .International Bank for Reconstruction and Development Washington D.C. 59pp.

Tesfaye, T., Karippai, R. S. and Tesfaye, T. (2010). Farmers training effectiveness in terms of changes in knowledge and attitude: A case of Holeta, melkassa and DebreZeit agricultural research centers, Ethiopia. *Journal of Agricultural Extension and Rural Development* 2(5):89-96.

URT (2009).Guidelines for the preparation of medium term plan and budget framework for 2009/10 - 2011/12.Ministry of Finance and Economic Affairs.

URT (2007).Poverty and Human Development report for 2007/12: Ministry of Planning, Economy and Empowerment.

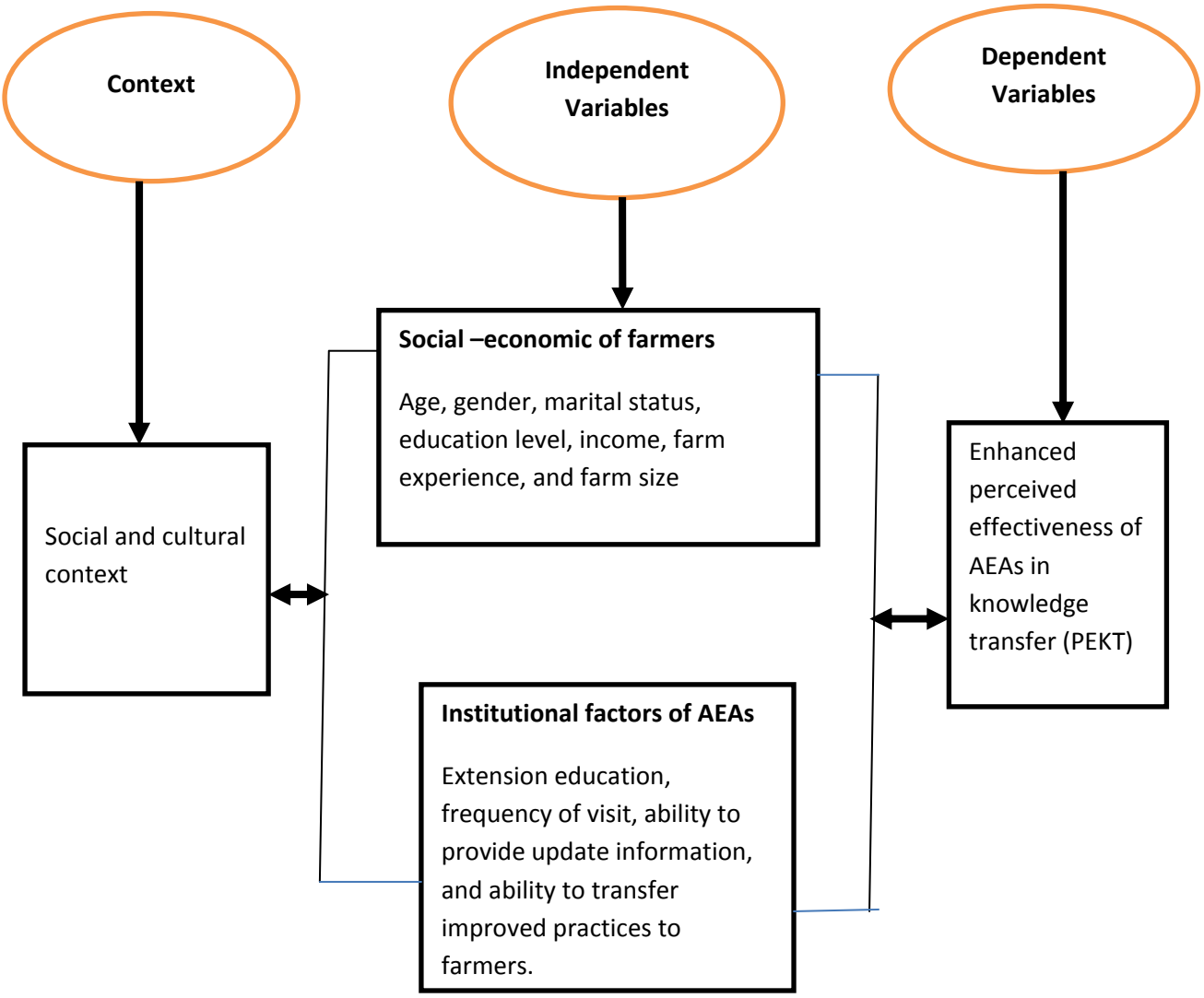
Van den Ban, A.W. and H.S. Hawkins (1996), *Agricultural Extension*, 2nd edn., Blackwell science publications oxford.293pp.

Roger, E.M.(1995). *Diffusion of innovation*.4th Edition.Free Press, Publishers New YorkUSA. 519pp.

APPENDICES

Appendix 1: Conceptual framework Adopted from Diffusion as a linear model

Source: Rogers (2003)



Appendix 2: Questionnaire for Maize growers

INTRODUCTION

This questionnaire is intended to gather information that will facilitate for assessing perceptionfarmers' on the effectiveness of agricultural extension agents in knowledge transfer to maize growers in Kilindi District for Masters award of Mcharo, Anna Charles at Sokoine University of Agriculture. Any information that will be volunteered will be used purely for academic purposes and the confidentiality of the participants will not whatever be disclosed. However, the results of the assessment may be available to other institutions and individuals.

GENERAL INFORMATION

Date……Division……..Ward……Village……

SECTION 1: BASIC INFORMATION

1. Name of respondent……

2. Age of Respondent……Years

3. Sex of respondent [1] Male [2] Female

4. Marital Status: [1] Single [2] Married [3] Divorced [4] Widowed

5. Highest level of education

[0] Informal education [1] Standard seven [2] Form four [3] Form six [4] Other specify

6. What is your household size?.....(Number)

7. What is your main source(s) of income?

[1]Farm activities [2] Off-farm activities [3] Family remittances [4] Business

8. Estimate your total annual income from maize production……..

9. What mode of ownership of farm land for crop production?

[1]Purchased [2] Inherited [3] Rented [5] Village government [6] others, specify.....

10. What is the size of your farm that you cultivate maize…… (in acre)?

11. Years of experience in maize production activities……

12. Does the village have resident AEAs? [0] Yes [1] No

13. If the answer is No in 12 above, how far is a nearest AEAs (in Kilometer)…….

14. Indicate the number/frequency of contact with Extension agents on seasonal basis.

[1] Several times [2] Occasionally [3] Rarely [4] Never

15. Apart from the AEAs, do you have other sources of information on maize production technologies?

[0] Yes [1] No.

16. If the answer is yes in 15 above, indicate the sources of information on maize technologies?

[1] Radio [2] Books [3] Neighbors/friends/relatives

17. What was the yield of maize obtained in recent seasons? ……..

S/N	Season	Acres cultivated	Yield (in 100kg)
1	20011/2012		
2	2010/2011		

18. What problems/challenges do you face in maize production activities?

a) ……..……

b) ……..…..

c) ……

SECTION 2: GENERAL MAIZE PRODUCTION KNOWLEDGE OF THE FARMER

19. How do you do in land preparation? [1] Ploughing [2] harrowing [3] burning [4] hand hoe

20. Which variety do you grow? [1] Local [2] hybrid varieties

21. Are you aware of other maize varieties [1] Yes [2] No

22. If the answer is yes in 21 above, indicate them [1]Staha [2] Kito [3]Katumani [4]Others, specify…….

23. What spacing do you use when planting maize [1] 30 x 90 cm [2] 30 x 75cm [3]

24. How many seeds do you plant per hole? [1] One [2] two [3]three

25. What are the main sources of maize seed that you normally grow?

[1]AEAs [2] radio [3] fellow farmers

26. Do you use fertilizers in maize production? [1] Yes [2] No

27. Which kind of fertilizer do you use in maize production? [1] Organic [2] in organic

28. If you use inorganic, how much did you apply per acre?...Kg

29. How do you control weeds? [1] Herbicides [2] physical weeding

30. What do you do to control diseases maize [1] chemical [2] cultural

31What do you do to control pests in maize [1] chemical [2] cultural

32. What are the main sources of information on maize technologies?

[1] AEAs [2] Radio [3] Books [4] fellow farmers

33. How do you store you maize harvest?…….

SECTION 3: PERCEPTIONS OF MAIZE GROWERS ON THE EFFECTIVENESS OF AGRICULTURAL EXTENSION AGENTS IN KNOWLEDGE TRANSFER

34Indicate the technical knowledge transferred by agricultural extension agents to maize growers

Percentage score on the scale (%)					
Possible improved practices	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
AEAs advice about new varieties of maize seeds					
AEAs advice on proper time for planting					
AEAs advice on seed treatment					
AEAs advice on weed control methods					
AEAs advice on pest control methods					
AEAs advice on disease control methods					
AEAs advice on irrigation practices					
AEAs advice on fertilizer application					
AEAs advice on harvesting practices					
AEAs advice through demonstration methods					

35. Indicate the advantages of AEAs as perceived by maize growers

Item	**[1] Yes**	**[2] No**
Increasing farm management skills of farmers	[ ]	[ ]
Increasing knowledge of farmers on maize production	[ ]	[ ]
Helping to solve problems associated with maize production	[ ]	[ ]
Changing the attitude of maize growers	[ ]	[ ]
Increasing farm-income of maize farmers	[ ]	[ ]
Increasing maize production	[ ]	[ ]
Increasing bargaining power of farmers on maize markets	[ ]	[ ]

Appendix 3; Questionnaire for Agricultural Extension Agents

I: DEMOGRAPHIC DATA

Location; Village.....Ward.....Division.....

1. Gender .....(1= Female, 2 = male)
2. What is your highest level of education?

   [0] Informal education [1] Standard seven [2] Form four [3] Form six [4] Post-secondary education with training [5] others, please specify…….

3. Whatis your educational qualification?

   [1] Certificate [2] Diploma [3] Degree [4] Others, specify.....

4. What specific duty do you perform to assist maize growers?.....

. How longer have you worked as extension agents?.....(Years).

5. Haw many villages do you save?.....

6. How many farmers do you save?.....

II: Effectiveness of AEAs

7. Please, indicate whether the following components affect AEAs (Put X against it)

Factor name	**Variables**
Policymaking factors	Lack of subsidies and grants from the government for farmers [ ]
	Lack of executive power of AEAs [ ]
Structural factors	Lack of cooperation from other institutions and organizations with AEAs [
	Lack of expert and technical personnel in AEAs [ ]
	Lack of coordination in the activities of public and private extension services [ ]
	Lack of necessary facilities (vehicle) by the consultants [ ]
Socio-Economical factor	Lack of credit and financial power of farmers[ ]
	Little attention to the needs of small farmers [ ]
	Illiteracy of farmers [ ]
	Low performance in yield produce [ ]

III: Problems facing AEAs

8. What problems do you face in executing your duties?
   (Please place an "X" in the appropriates spaces that apply to you)

   i. Lack of transport [ ]
   ii. Lack of resources/facilities [ ] Please specify.....
   iii. Low salary [ ]
   iv. Too many farmers to handle [ ]
   v. Too much work [ ]
   vi. Poor access to relevant information [ ]
   vii. Lack of motivation [ ]

Appendix 4: Focus Group Discussion check-list questions for maize growers

1. What are the major farming problems experienced by farmers?
2. How many times do extension agents visit farmers per season?
3. Are your AEA effective in their day to day activities in addressing maize production practices and management?
4. Does the Agricultural Extension agent support farmers on maize technologies?
5. Is your AEA helpful in terms of solving farmers' problem related to maize production?
6. What are your main sources of information on maize technologies?