

# **\\ EFFECTIVENESS OF AGRICULTURAL EXTENSION EDUCATION ON RICE FARMING AT AHERO IRRIGATION SCHEME //**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF EDUCATION IN EDUCATIONAL FOUNDATIONS,  
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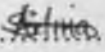


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## DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

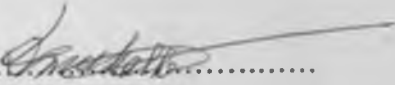
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This research project is submitted for examination with my approval as the university supervisor

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## **DEDICATION**

This project is dedicated to my husband Elmad Songe Odero , my children Gift Atieno, Nicole Achieng', Joshua Aluoch Songe and Edwin Lescort Amollo Songe and my dearest parents Richard Buruku Adika and Joyce Andisi Adika for their encouragement and moral support throughout my academic endeavor.

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>FAO</b>	Food and Agricultural Organisations.
<b>FFS</b>	Farmer Field Schools.
<b>NGOs</b>	Non Governmental Organisations.
<b>T and V</b>	Training and Visits.
<b>FOS</b>	Farmers' Organisations

## ABSTRACT

This study aimed at assessing the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. Specifically, the study focused on: the type of agricultural extension education provided to rice farmers at Ahero irrigation scheme, organizations and agencies providing agricultural extension education, strategies used in providing agricultural extension education extent to which rice farmers at Ahero irrigation scheme participate in agricultural extension education and the impact of agricultural extension education on rice farming at Ahero irrigation scheme.

This study used case study design where both qualitative and quantitative data was collected. Interview schedules were used to collect data from the district agricultural extension officer of Muhoroni and two heads of departments of Ahero irrigation rice scheme all of whom were purposively sampled. Questionnaire was used to collect data from fifty rice farmers in the scheme. The farmers were randomly selected to participate in the study.

Data obtained from open-ended items in the questionnaire and interview schedules were analysed and reported qualitatively through narrative form. Data obtained from close-ended items were analysed and presented quantitatively through frequency tables and percentages. Some of the key findings of the study were that: 94 percent of the farmers indicated that they had been provided with agricultural extension education. The respondents also indicated that a number of strategies had been used to provide agricultural extension education to rice farmers in the scheme including : field days, use of group leaders, group or team work, visiting other rice irrigation schemes, lectures by

experts, use of pamphlets and videos and also the use of workshops and seminars. Furthermore, the district agricultural extension officer indicated that the agricultural extension education had a great impact on rice farming as it had increased rice production from 10 bags to 20 bags per acre of land .

From the findings of the study, conclusions were derived indicating that majority of the farmers were involved in agricultural extension education programmes . However, a certain percentage of the farmers were not involved in such programmes . In addition, the agricultural extension education provided to farmers at Ahero rice irrigation scheme was effective despite facing a number of challenges which need to be addressed. Based on the findings and conclusions, recommendations were made including the need for the scheme management to involve farmers in the scheme to come up with suitable criteria that will ensure participation of all farmers in agricultural extension education programmes. The organizations and agencies providing agricultural extension education to rice farmers in the scheme should promote the use of modern technology such as mobile phones in giving information to rice farmers. Moreover, the management of the scheme should partner with other stakeholders to ensure that all farmers in the scheme embrace new methods of farming and marketing of their produce in order to enjoy maximum benefit.

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## CHAPTER ONE

This chapter consists of: background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitations and delimitations of the study and definition of significant terms.

### 1.0 Background to the Study

The development of extension education can be traced back to the ancient civilizations such as those in Mesopotamia, ancient Egypt and China. The first known example of disseminating relevant information and advice to farmers was in Mesopotamia dating around 1800 BC .Clay tablets unearthed by archaeologists indicate inscribed advice on watering crops and getting rid of rats (Bne 1990). Such advice would help to mitigate loss to farmers .Ancient agricultural writings also indicate that advice was given on avoiding crop damage and loss of life from the Nile floods in Egypt and practical farming experience which aimed to help Roman land owners to maintain and improve estates and their revenues (White, 1977). In China the Han dynasty (25- 220AD), Sung and Yuan dynasities (960- 1368), Ming dynasity (1368- 1644) and Chiing dynasity (1644- 1912) recognized the importance of well coordinated extension work on agricultural recommendations for optimal achievement (Delman et al 1991). Local administrators in these dynasities organized and promoted agricultural research, extension work, teaching of agriculture and sericulture.

In England, extension is linked to the educational outreach services offered by Oxford and Cambridge universities to the surrounding population in the industrial areas (Jones,

1994). It began by providing lectures on literary and social topics before peripatetic lectures started to offer agricultural related lectures in the rural areas (Jones, 1994). By the 1890s, similar activities began in the United States where comparable out of college lectures began to be established (Garthforth,1993. For instance ,the extra mural work of the land grant colleges which targeted farm families expanded and became more organized. However, it should be noted that the notion of “extending” relevant and useful information to the adult population predates the university extension movement.

According to smith (1972), Lord Henry Brougham, a British Politician founded the society for the diffusion of useful knowledge in 1826, whose objective was to impart useful information to all classes of the community. This was carried out by producing low priced publication and establishing local committees throughout the country. Similar other societies with the same objective were later established in other European countries, India, China, Malaysia and the United States (smith 1972 ibid).

The first agricultural extension service of a modern kind came into existence as a result of an outbreak of potato blight in Europe in 1845 (Jones,1982).Due to this crisis the new British viceroy appointed to Ireland in 1847 wrote a letter to the president of the royal agricultural improvement society of Ireland urging the society to appoint itinerant lectures to travel around the most distressed districts to inform and show small farmers in simple terms how to improve their cultivation and how to grow nutritious root crops other than potatoes.

By late nineteenth century, agricultural extension systems modeled to a considerable extent had been established in Germany, Denmark 1870. Netherlands 1890s. Italy 1886 and France 1879(Jones 1981).In the recent years, public sector extension in developing countries is undergoing major reforms. According to Bashaasha et al 2011, the reforms in Uganda involved privatization of funding, delivery of extension and decentralization of authority .The country has adopted private extension approach whose components include decentralization. outsourcing .farmer empowerment. market orientation and cost recovery(Anderson 2007).In this approach ,the farmer is expected to pay some of the extension cost with the hope that public outlays on extension will be reduced(Anderson and Crowder 2000).However, the sustainability of such an approach is a challenge because majority of small scale farmers may not be in a position to pay for extension services.

In Kenya, the training and visits (T and V) model came into use and according to Purcell and Anderson (1997), it was some how seen as satisfactory. However. Gautam (2000) later found out that although T and V had some benefit in terms of staff training, increased geographical coverage and improved linkages with research. the overall system was inefficient, ineffective and not financially sustainable.

Another extension model used in Kenya was the integrated rural development project (IRDP).Owens et al (2003) point out that this model was introduced in1970s with the support of the World Bank to implement an integrated extension approach .The goals were to address the constrains of small holders by working synergistically in health, nutrition, agriculture and education.

Regarding agriculture, it had inputs such as extension, research, irrigation, credit, roads, water, electricity and sometimes schools and health centers. However Anderson (2002) points out that IRDP had several weaknesses which include a being supply driven, inflexible and disregarding many institutions including Non Governmental Organizations (NGOS), being multi-sectoral but not holistic disregarding cost recovery or privatization and had limited sustainability.

The other model used in Kenya is the farmer field school (FFs). According to Abate and Duveskog (2003), this approach was adopted following its success in training Asian farmers on integrated pest management .The approach was first introduced in 1995 by the Food and Agricultural Organization (FAO) special programme for food security . According to (Abate and Duveskog , 2003) ,the approach was used in western Kenya to promote technology for integrated pest management of maize ,vegetables and poultry production, soil fertility management, water harvesting, dairy cattle production and management of HIV/AIDS .The government of Kenya has since recognized the approach as a promising participatory extension method worth incorporating in the National Agricultural and Livestock Extension Programme (Sones, et al 2003). The approach has also been adopted by Kenya agricultural research institute (KARI) as an up scaling approach for its promising technologies and by the end of 2003, Kenya agriculture research institute had initiated 60 farmers field schools (FFS) and trained 800 farmers (Mureithi , 2003).

According to (Khisa 2003), the FFS approach is truly a participatory methodology as it recognizes farmers as adult learners whose training is enhanced by using non-formal adult education method. In addition, the training covers the entire crop or livestock

production cycle to enable farmers fully understands all components of the technology. It also focuses on group training of about 25- 30 people to bring individual experience and strengths and provides individuals with group support in trying new things. Furthermore, individuals are enabled to focus more on basic processes through field observations, analysis, discussion and presentations. Finally, farmers get the opportunity and validate technologies during the sessions. Farmers are therefore empowered with the skills to experiment and to solve their daily problems as individuals or as a community (Dilts 2001). Although such an approach has been used in Kenya to improve farmers productivity, little information is available on the effectiveness of agricultural extension education provided to improve rice farming at Ahero irrigation scheme.

### **1.1 Statement of the Problem**

According to the World Bank (2007), majority of the rural population in developing countries rely on agriculture for their livelihood. Agriculture remains the main source of income for around 2.5 billion people in the developing world (FAO, 2003).The impact of agricultural sector is wide ranging and extends to economic growth, food security, poverty reduction, livelihood, rural development and the environment(Green et al 2005). Anderson (2007) points out that agricultural extension and advisory services support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods. A number of studies have been conducted to assess the effect of several aspects of extension including knowledge diffusion, adoption of improved technology and productivity (Birkhaeuser et al 1991)



They observe that from their analysis, extension can have significant relationships with these outcomes however; little information is available on the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. This study was conducted to assess effectiveness of the agricultural extensions education on rice farming at Ahero irrigation scheme.

## **1.2 Purpose of the Study**

The purpose of this study was to assess the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme.

## **1.3 Objectives of the study**

**This study was guided by the following objectives:**

1. To determine the type of agricultural extension education provided to rice farmers at Ahero irrigation scheme.
2. To identify the organizations and agencies providing agricultural extension education to rice farmers at Ahero irrigation scheme.
3. To determine the strategies used in providing agricultural extension education to rice farmers at Ahero irrigation scheme.
4. To determine the extent to which rice farmers at Ahero irrigation scheme participate in agricultural extension education.
5. To determine the impact of agricultural extension education on rice farming at Ahero irrigation scheme.

6. To make recommendations on how to implement best agricultural extension education practices at Ahero rice irrigation scheme.

#### **1.4 Research questions**

**The following research questions guided this study:**

1. What type of agricultural extension education is provided at rice farmers at Ahero irrigation scheme?
2. Which organization and agencies provide agricultural extension education to rice farmers at Ahero irrigation scheme?
3. What strategies are used to provide agricultural extension educations to rice farmers at Ahero irrigation scheme?
4. To what extent are the rice farmers at Ahero irrigation scheme involved in agricultural extension education?
5. What impact does agricultural extension education have on rice farming at Ahero irrigation scheme?

#### **1.5 Significance of the study**

The study identified the type of agricultural extension education provided to rice farmers at Ahero irrigation scheme. This is useful for organizations and agencies interested in

supporting rice farmers to determine if such extension education types are appropriate. Furthermore, this study also unraveled the strategies used to educate the rice farmers in the scheme. Such information is useful to interested organizations and agencies to enable them implement or strengthen the most effective strategies. In addition the study revealed the extent to which agricultural extension education provided has impact on rice farming. Consequently, recommendations made from the findings are expected to assist both farmers and organizations and agencies that provide agricultural extension education to come up with best practices that would improve rice farming and the general livelihood of the rice farmers.

### **1.6 Limitations of the study**

This study was limited to Ahero rice irrigation scheme therefore other rice irrigation schemes were not included in the study. The study only focused on effectiveness of agricultural extension education thereby leaving out other aspects of agricultural extension education in the scheme. Due to poor infrastructure in the scheme, the researcher encountered difficulty to reach the farmers to participate in the study.\

### **1.7 Delimitations of the study**

Due to the fact the researcher lives and works in the locality. She had better knowledge of the area. The researcher was also able to communicate with the participants without difficulty and the researcher also had enough time to collect the data.

## **1.8 Definition of significant terms**

a) **Reliability** is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda 1999).

b) **Validity** is the accuracy and meaningfulness of inferences which are based on the research results (Mugenda 1999).

c) **Agricultural extension education** this is education which is provided by a set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technology to improve their livelihood and well being (Birner et al 2006).

d) **Agriculture** it is the work, business or study of farming ( Macmillan 2007).

## **CHAPTER TWO: REVIEW OF RELATED LITERATURE**

### **2.0 Introduction**

This chapter deals with literature review on models for evaluating extension education programmes, the role of farmer's organizations in extension education , technology for agriculture and extension, summary of literature review and theoretical framework.

### **2.1 Models for Evaluating Extension Education Programmes**

Scholars have identified different models for evaluating extension education programmes. One such model is the expert model as put forward by Eisner (1983). In this model, a team of experts from different extension systems make judgment and comparisons regarding strengths and limitations of a programme. This model may have limitations as it may fail to capture the views of the beneficiaries in this case the farmers.

Provus (1971) proposes the attainment of objective model which assumes that the success of a programme can be determined by measuring a programme's outcomes against its own goals and objectives. It begins by clarifying measurable objectives and then gathering data that validate the extent to which these objectives have been met. However, the challenge here is when programmes set objectives which are quite low so that the outcomes will be met easily while ignoring major challenges.

The other model is the goal-free model which relies heavily on open-ended interviewing and observation by persons who do not have a vested interest in the programme (Scriven 1972). In this model, the focus point is to identify environmental and farming conditions

and then to compare these needs with what people are actually experiencing as a result of the extension programme. This approach is limited in involving the beneficiaries in the evaluation programme.

Gold (1988) proposes the management decision model which assumes that evaluation should be geared to decisions during programme initiation and operation stages to make results more relevant at each particular stage. One limitation of this model is that the decision of major stakeholders can be viewed as more important than those of various types of farmers.

The other model is the experimental model. According to Goldstein (1986), this approach determines whether changes in programme outcomes were due to the contributions of the programme and not just to life's experiences or from other influences. Rossi and Freeman (1982) assert that the model should be used only when major changes are expected or when a major failure is anticipated in pilot efforts where causal claims are central to making major programme investment. Brunner and Guzman (1989) have also put forward the participatory model which assumes a democratic participatory process along with autonomy on the part of educators and learners at the local level. In this model, the extension educator and farmers themselves initiate a critical reflection process focused on their own activities.

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According to Uphoff (1992) when farmers are involved in planning, implementation and evaluation, it will show them that they are regarded as responsible, capable individuals and not passive beneficiaries. However, farmer's lack of experience is sometimes said to be an impediment to participatory evaluation. On the contrary, Uphoff (1992) argues that

this need not to be an obstacle if the process whereby people gain experience can be planned for and invested in. Murphy and Merchant (1988) propose naturalistic model whose purpose is to diagnose or identify the causes for certain behavior on the part of some farmers , agencies staff or other development actors. The model also assumes that programmes are negotiated realities among the significant stakeholders and that evaluation serves this value –laden negotiation. The participatory and naturalistic models of evaluation seem favourable for farmers because they are involved as significant stakeholders in an effective agricultural extension programme.

## **2.2 Role of Farmers' Organizations in Extension Education**

Farmers' organizations (FOS) can provide rich platforms for agricultural extension education. One such type of (FOS) is the community-based resource oriented (FOS) which could be a village level cooperative or association dealing with inputs needed by the members. Gupta (1989) observes that these groups of organizations can generate income from the sale of inputs and outputs. He further suggests that the income can then be put back into the organization by spending it on extension, data generation, business planning and administration. Another type of FOS is commodity based market-oriented FOS which specialize in a single commodity and opt for value-added products which have expanded market. In order to maximize the investment of members, they engage in research, input supply, extension, credit, collection of produce, processing and marketing.

According to Gaikward (1994) the profits generated are used to provide supplementary and supportive services at reduced costs to encourage members to use them. Shingi and Bluhm (1987) identify issues influencing participation in FOS to include the degree of

the farmers dependence on the output of the organized activity, the degree of certainty of the availability of the outputs, the extent to which the outputs will be available only as a result of collective action, the extent to which the rewards associated with collective action will be distributed equitably, the extent of availability of rewards within a reasonable time frame and the extent to which the rewards are commensurate with the costs associated with continued participation.

It is worth noting that agro-climatic variations, infrastructure development and the strength of market forces determine variations in the roles of FOS in extension education for instance FOS operating in desert regions, single crop rain fed areas and predominantly irrigated areas will have different occupational and extension needs (Gupta 1989) . Therefore, variable response patterns to extension have to be anticipated. Similarly FOS operating in food deficit and surplus stages will have different roles, expectations and returns. Therefore effective agricultural extension education provides a platform in which FOS play their significant roles in meeting the needs of the farmers.

### **2.3 Technology for Agriculture and Extension**

Many agricultural extension practitioners recognize that an information technology revolution is unfolding, with tremendous and largely unrealized potential for rural development, even for the poorest farmers. ICT (e-mail, internet, phone, radio, television, blogs and print) are tools that are underutilized in extension strategies Nodumo Dhlamini (2010) . He points out that short message system (SMS) ,interactive voice response , radio programmes , closed user groups and blocks for sharing content ICT



tools applied and tested with farmers in the south western Uganda to improve communication with rural farming communities.

The World Bank (2009) indicate that with the mobile phone being used in services such as banking ( for paying bills, sending money and paying school fees) , the technology could play a key role in extension services and information delivery. The use of computers and access to internet services is increasing and that agricultural extension system is using these technologies to reach farmers. There are many responsibilities for potentials in application of the technology in agricultural extension (FAO 1993; Zipj 1994). It will bring new information services to rural areas over which farmers, as users, will have much control than over current information channels. This will not make extension worker redundant; in their new roles, they will be able to concentrate on tasks and services where human interaction is essential in helping farmers individually and in small groups to diagnose problems, to interpret data and to apply their meaning (Leeuwis, 1993). It is therefore clear that the use of technology is necessary for an agricultural extension education program to be effective in supporting farmers to increase yields and improve their standards of living.

## **2.4 Summary of Literature Review**

Various types of agricultural extension education have been used in Kenya with the aim of assisting farmers to improve production. These include training and visits model and the integrated rural development project. Although they had positive benefits, studies by scholars such as Gautam (2000) and Anderson (2002) point out that these models were unsustainable. The farmer field school model has also been introduced in Kenya and has

been praised for providing farmers with skills to experiment and to solve their daily problems as individuals or as a community.

Scholars have also identified different models of evaluating extension education programmes. The most favourable models of evaluation are naturalistic and participatory models as proposed by Murphy and Merchant (1988) and Uphoff (1992) respectively. This is because farmers are involved as significant stakeholders.

The involvement of farmer's organizations and use of technology in extension education have also been identified as significant components of effective agricultural extension education programme. However, little information is available on the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. This study assessed the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme.

## **2.5 Theoretical Framework**

This study adopted empowerment theory in its framework. The empowerment role can be a cornerstone of the new approach to extension. According to (FAO 2003) extension personnel need to develop a new philosophy where their role is to help farmers and rural communities organize themselves and take charge of their growth and development. According to (Chamala, 1990) showing adults what to do triggers the imagination, involving them gives understanding and empowering them leads to commitment and action. In fact, the term empower means to enable, to allow or to permit and can be viewed as both self-initiated and initiated by others.

Empowerment comes from releasing the latent energy hidden in the community and building collective actions for the common good. Consequently, farmer's organizations (FOS) can help harness this synergetic power for its members' survival, growth and development. Towards this end, Manalili (1990) points to the fact that empowered FOS can act as convergent platforms for solving local problems and mobilizing human and financial resources for sustainable development. This study adopted empowerment theory because if rice farmers at Ahero irrigation scheme are empowered through an effective extension education programme, they will continuously increase their produce and in turn improve their standards of living.

## CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

### 3.0 Introduction

This chapter deals with research design, study locale, target population, sample and sampling procedures, research instruments, piloting of research instruments, the procedures for data collection and analysis.

### 3.1 Research Design

This study employed a descriptive case study design. Abagi (1995) argues that descriptive research attempts to describe what was or what is in the social system. The methodology involved in such design is mostly qualitative in nature producing descriptive data. Merriam (1998) and Yin (2003) point to the fact that a case study allows researchers to retain the holistic and meaningful characteristic of real life events. Yin (2003) argue that a case study investigates a contemporary phenomena with its real life context, especially when the boundaries between phenomenon and context are not clearly evident. In addition, case study allows for the use of all methods of gathering data from testing to interviewing (Merriam 1998). In fact case study combines qualitative with quantitative methods which grant the researcher the opportunity to use variety of methodological procedures from different knowledge areas and philosophical approaches.

Agricultural extension education as a discipline has some premises that converge with some of the major building blocks of case study as a research methodology. This view is supported by Barrick (1989) who asserts that agricultural education involves application in real setting and serves as a bridge between agricultural science and other disciplines. In

fact, Williams (1997) argues that application in real settings and the interdisciplinary approach are two major tents in which agricultural extension education and case study research methodology converge. Burriack and Shinn (1993) identify four research problems areas in agricultural extension education .These include knowledge base for teaching and learning, curricular and programme planning, deliveries methodology, programme relevance and effectiveness. This study assessed the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme.

### **3.2 Study locale**

This study will be conducted at Ahero rice irrigation scheme, Muhoroni district of Kisumu County. Ahero rice irrigation scheme will be selected because of accessibility to the researcher. The scheme was established in 1966 but became operational in 1969. It is currently placed under the ministry of water and irrigation.

### **3.3 Target population**

The target population for this study was the scheme manager, heads of departments, rice farmers and agricultural extension officer in Muhoroni district.

The agricultural extension officer was chosen for this study because he is the key agent for implementing the major agricultural extension education services. He receives, interpret, package and disseminate the required information to the farmers. It is his responsibility to effectively deliver the required information to the farmers. On the other hand the heads of departments and scheme manager were important in this study because they have impact on the agricultural extension. The scheme manager plays a vital role in the coordination and planning for the agricultural extension education service.

The scheme manager and the heads of departments assist the agricultural extension officer to reach the farmers in the scheme. The scheme manager may also choose to sponsor or not to sponsor agricultural extension education service; hence the scheme manager and the heads of departments can facilitate or hinder effective provision of agricultural extension education. Farmers were very important for this study because they are the main recipients of agricultural extension education services. They were able to express their views regarding the effectiveness of the kind of agricultural extension education they receive.

### **3.4 Sample and sampling procedures**

The sample for the study included: the scheme manager and the four heads of departments of engineering, accounts, irrigation and agronomy. In addition the agricultural extension officer of Muhoroni district was also sampled to participate in the study. The scheme manager, the four heads of departments and the district agricultural extension officer were purposively sampled. Purposive sampling was preferred by the researcher because of its relative advantage of time, money and manageability.

Fifty rice farmers in the scheme were selected to participate in the study through random sampling. Kerlinger (1973) points out that a sample drawn at random is unbiased in the sense that no member of the population has any more chance of being selected than any other member. Thus by randomly choosing the fifty rice farmers to participate in the study, it means that all the farmers within the irrigation scheme stood the same probability of being selected.

### **3.5 Research instruments**

Two types of research instrument were used in the study: interview schedules, and questionnaires.

#### **3.5.1 Interview schedules**

Interviewing was used because it helps the interviewer to cover all the dimensions of the investigation through probing of the participant. Kerlinger (1973) notes that more people are willing to communicate orally than in writing and therefore provide data more readily in an interview. Interview schedules were administered to the scheme manager, the four heads of departments and the district agricultural extension officer.

#### **3.5.2 Questionnaires**

Questionnaires were administered to all the fifty farmers selected to participate in the study. Questionnaires were useful in obtaining objective data. This is due to the fact that the participants were not manipulated in any way by the researcher as they fill in the questionnaires.

### **3.6 Piloting of research instruments**

The interview schedules and questionnaires were piloted in west Kano rice irrigation scheme in Nyando district. The purpose of piloting the research instrument was to assess the clarity and suitability of the language used. It was also carried out to determine the validity and reliability of the items.

### **3.7 Data collection procedure**

The researcher first sought permission from the ministry of higher education science and technology to carry out the study. The researcher then visited Ahero rice irrigation scheme to create rapport with the management and to familiarize herself with the scheme. The researcher self administered the instruments.

### **3.8 Data analysis**

Response to the open-ended items in the research instruments were analyzed qualitatively while those from the closed-ended items were analyzed and presented using simple statistics such as frequency tables and percentages.



## CHAPTER FOUR : DATA ANALYSIS AND INTERPRETATION

### 4.0 Introduction

The purpose of the study was to assess the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. Data was collected from the Muhoroni district agricultural extension officer, two heads of departments at Ahero irrigation scheme and 34 rice farmers in the scheme. This represented 50% of the targeted management of the scheme and 68% of the rice farmers who were targeted for the study.

### 4.1 Data analysis and interpretation

Respondents were asked to indicate the type of agricultural extension education provided to rice farmers in the scheme. The district agricultural extension officer indicated that the farmers were provided with trainings and demonstrations on the new methods of rice farming. The farmers also received information from research that has been conducted on rice farming and that farmers are also educated on how to access and manage credit facilities. The two heads of departments indicated that the farmers were provided with agricultural extension education through field days and seminars. On the side of farmers, they were required to indicate if they had received any form of agricultural extension education on rice farming. The responses were as shown in table 1 below.

**Table 1: Responses of rice farmers if they had received agricultural extension education.**

Response	Number of farmers	Percentage
Yes	32	94
No	2	6

From table 1 above, it is clear that majority of the rice farmers in the scheme had received some form of agricultural extension education. Majority of the farmers indicated that they had received agricultural extension education focusing on new farming methods, forming scheme groupings, selection of better seeds, proper use and management of irrigation water & use of chemicals and fertilizer. These were done through seminars and workshops, training and also visiting other irrigation schemes.

Regarding the question on the various organizations that provide agricultural extension education to the rice farmers in the scheme, the respondents indicated that the organizations and agencies included research institutes, financial institutions, government agencies and farmers organizations. Specifically, the organizations and agencies were mentioned to have been conducting agricultural extension education to rice farmers in the scheme included: national irrigation board, ministry of agriculture, ministry of water and irrigation, experts from other countries such as India, Kenya agricultural research institute, Moi university, Jomo Kenyatta university of agriculture and technology, irrigation water union association and Ahero irrigation research station. This is a clear indicator that a number of organization and agencies are involved in the provision of agricultural extension education to rice farmers in the scheme. The two heads of departments in the scheme pointed out that the scheme management organizes the training and also identifies and collaborates with the organization that provide agricultural extension education to the farmers.

The study sought to find out the strategies used to provide agricultural extension education to rice farmers in the scheme. The district agricultural education officer indicated that agricultural extension education is provided to farmers every growing season. The respondents indicated that the strategies used by organizations to provide agricultural extension education to rice farmers in the scheme include: field days where farmers are exposed to demonstrations on various practices which they are expected to implement in their own farms. Another strategy identified by the respondents is the use of group leaders who are trained and provided with skills which they are expected to transfer to their group members who then implement in their farms. One of the practices which has worked well with this strategy is accessing and managing credit facilities. The other strategy used to provide agricultural extension education to rice farmers in the scheme is that of group or team where farmers are organised into groups, teams or blocks. A few of the members were trained in certain skills and techniques in which they are expected to practice together with the members of the groups, teams or blocks. The respondents also indicated that farmers receive agricultural extension education on rice farming by visiting other rice irrigation schemes such as Mwea. They also receive lectures by experts from universities and from other countries such as India. The other strategies identified by the respondents were that farmers are given useful information through pamphlets and video. However, most respondents indicated that workshops and seminars were the frequently used strategy.

Regarding the extent to which rice farmers are involved in agricultural extension education, the district agricultural extension officer indicated that at least 1,500 farmers participate in agricultural extension education every year. She pointed out that the

farmers participate in agricultural extension education through mobilizing fellow farmers for the various agricultural extension education activities, taking part in barazas, training fellow farmers on new skills learned and carrying out demonstrations. It was also indicated by the respondents that the farmers are given opportunity to express their personal feelings and opinions regarding farming activities. Regarding this question, farmers gave responses as indicated in table 2 below:

**Table 2: Responses on extent to which farmers are involved in agricultural extension education**

Response	Number of farmers	Percentage
Yes	32	94
No	2	6

From table 2 above, 94% of the farmers who participated in the study indicated that they were involved in agricultural extension education activities. However, the views of the remaining 6% who indicated that they were not involved in agricultural extension education activities should not be ignored because an effective agricultural extension education programme should ensure participation of all the farmers. Majority of the farmers indicated that they participated in seminars, workshops, training fellow farmers and also interacting with farmers in other rice irrigation schemes.

The study also intended to find out if the agricultural extension education provided to farmers in the scheme was effective. The district agricultural extension officer indicated that the agricultural extension education was to a great extent effective. This was echoed by the two heads of departments in the scheme who pointed out that the agricultural

extension education program was very effective. Regarding this question, the farmers gave their responses as indicated in table 3:

**Table3: Responses on extent to which farmers agree that agricultural extension education provided is effective.**

Response	Number of farmers	Percentage
Strongly agree	13	38
Agree	21	62
Disagree	0	0
Strongly disagree	0	0
Any other (specify)	0	0

From table 3 above 62% of the farmers who participate in the study agree that the agricultural extension education provided in the scheme is effective. Another 38% of the farmers strongly agree that the agricultural extension education provided in the scheme is effective. Due to the fact that both responses are positive, it can be argued that the strategies that have been employed so far are to a great extent effective.

Regarding the question on the impact of agricultural extension education on rice farming in the scheme, the district agricultural extension officer indicated that there has been increase in rice production from 10 bags to 20 bags per acre of land. She also pointed out that the improved yields per acreage has improved the livelihoods of the majority of the farmers. The two heads of departments in the scheme supported this view and added that farmers in the scheme have learned new methods of farming hence improving their

production per acre. Regarding this question, farmers gave responses as indicated in table 4 below:

**Table 4: Responses on the extent to which farmers agree that agricultural extension education provided has improved rice production.**

Response	Number of farmers	Percentage
Strongly agree	12	35
Agree	20	59
Disagree	0	0
Strongly disagree	2	6
Any other (specify)	0	0

From table 4 above, 59% agree that the agricultural extension education provided has helped farmers to improve on rice production. Another 35% strongly agree that the agricultural extension education provided has helped farmers to improve on rice production. This confirms the statistics given by the district agricultural extension officer which indicated that rice production had increased from 10 to 20 bags per acre of land. However, 6% of the farmers who participated in the study strongly disagreed with the fact that agricultural extension education provided helped farmers to improve on rice production. This is a clear indication that a certain population of the farmers have not benefited from agricultural extension education to enable them improve on rice production or they are not putting into practice the knowledge, skills and techniques acquired from the agricultural extension education programme. This calls for enhancement of agricultural extension education programmes to support such farmers.

## Summary of the findings

The other issue that the study sought to find out is challenges regarding agricultural extension education in the scheme. In response to this question, the district agricultural extension officer indicated that the officers in her department were facing the challenge of transport to enable them carry out regular contact with farmers in the scheme.

This is coupled by the poor road network in the area which are inaccessible especially during the rainy season. She also stated that most of the rice farmers are not the owners of the land which makes them not to take keen interest in the proper management of the land. The district agricultural extension officer also pointed out that the farmers have not embraced better marketing techniques due to middlemen who offer immediate cash. This has caused the farmers to sell their produce at very low prices. On the other hand, the two heads of departments in the scheme indicated that their major challenge is funds for organizing regular agricultural extension education programmes due to the limited allocation from the government.

On the side of farmers, one major challenge that was identified is inadequacy of the agricultural extension education activities. Farmers mentioned that the programs were irregular and would only come once in a year. Farmers also indicated that the criteria used to select farmers for agricultural extension education programmes was unfair thereby creating inconsistencies in follow up. Due to the fact that a significant number of the farmers are illiterate, language barrier was mentioned as a major challenge in delivering agricultural extension education programmes. Most of the farmers were facing difficulties in understanding some of the concepts and new practices which they were

expected to implement. Another challenge identified by the farmers is the fact that some of them were not willing to change from the traditional methods of farming. This hindered such farmers from implementing new farming methods and techniques that are taught through the district agricultural education programmes. They were also reluctant in adopting marketing techniques which would benefit them directly. This leaves them at the mercies of the middle men who offer them low prices. Despite the efforts that have been put in place to ensure effectiveness of agricultural extension education in the scheme, the foregoing challenges were identified and therefore required address.



## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.0 Introduction**

This chapter consists of the summary of the findings, conclusion, recommendations and suggestion for further research.

### **5.1 Summary of the Findings**

- i) Ninety four percent of rice farmers in the scheme who participated in the study indicated that they were provided with agricultural extension education. However, 6% of the farmers who participated in the study indicated that they had not received agricultural extension education.
- ii) The type of agricultural extension education provided to rice farmers in the scheme included new methods of rice farming, research that has been conducted on rice farming, how to access and manage credit facilities, how to form scheme groupings, selection of better seeds, proper use and management of irrigation water, use of chemicals and fertilizer and marketing of their produce.
- iii) The organizations and agencies that have provided agricultural extension education to rice farmers in the scheme include: the staff of Muhoroni district agricultural extension office, national irrigation board staff, ministry of agriculture, ministry of water and irrigation, experts from other countries such as India, Kenya agricultural research institute, Moi university, Jomo Kenyatta university of agriculture and technology, irrigation water union association and Ahero irrigation research station.

- iv) The strategies used to provide agricultural extension education to farmers in the scheme include: organizing field days, use of group leaders, group or team work, visiting other rice irrigation schemes, lectures by experts, use of pamphlets and videos and also use of workshops and seminars. The agricultural extension education was provided to farmers every growing season and reached at least 1500 rice farmers every season.
- v) Ninety four percent of the farmers who participated in the study indicated that farmers were involved in agricultural extension education programmes. However, 6% of the farmers who participated in the study indicated that they were not involved in agricultural extension education programmes.
- vi) Farmers participated in agricultural extension education programmes through mobilizing fellow farmers, taking part in barazas, training fellow farmers and carrying out demonstrations. Farmers also participated in seminars, workshops and also interacting with farmers from other rice irrigation schemes.
- vii) Majority of the respondents indicated that the agricultural extension education provided to the farmers in the scheme was to a great extent effective. In fact 62% of farmers who participated in the study agreed that the agricultural extension education provided in the scheme is effective. Another 38% of the farmers strongly agreed that the agricultural extension education provided in the scheme is effective.
- viii) The agricultural extension education provided to farmers in the scheme had great impact. The district agricultural extension officer and the two heads of

departments indicated that rice production had increased from 10 bags to 20 bags per acre of land. They also indicated that there was improvement in the livelihoods of the majority of the farmers. Thirty five percent of farmers who participated in the study strongly agreed that agricultural extension education provided to them had improved rice production. Another 59% agreed with the fact that agricultural extension education had helped farmers to improve in rice production. However, 6% strongly disagreed with the fact that agricultural extension education provided had helped farmers to improve on rice production.

- ix) Agricultural extension education provided to farmers in the scheme faced numerous challenges which include inadequate transport for agricultural extension officers at the district, poor road network to the farms, inadequate marketing of the produce resulting to low income to the farmers and poor management of land because most farmers are not the land owners. In addition, the agricultural extension education provided was not regular and therefore inadequate to enable the farmers to be consistent with the new practices. Farmers also noted that the criteria used to select farmers for agricultural extension education was unfair and that many farmers did not understand some of the concepts and techniques due to language barrier occasioned by the fact that majority of them are semi illiterate. A significant population of the farmer were not willing to change from the traditional methods of farming thereby being reluctant to adopt the new methods and techniques taught through agricultural extension education. The major challenge pointed out by the scheme management

was inadequate funds to organize regular agricultural extension education programmes.

## **5.2 Conclusion**

**From the findings of the study, the following conclusions can be derived:**

- i) Majority of rice farmers at Ahero irrigation scheme were provided with agricultural extension education. However, a certain percentage of the farmers had not received this kind of education.
- ii) The agricultural extension education which was being provided to farmers at Ahero irrigation scheme was not regular and therefore inadequate.
- iii) Various strategies were being employed to provide agricultural extension education to rice farmers at Ahero irrigation scheme. However, modern technology such as use of mobile phones has not been embraced.
- iv) Majority of farmers were involved in agricultural extension education programmes. However, a certain percentage of the farmers were not involved in such programmes.
- v) The agricultural extension education provided had helped majority of the farmers in the scheme to improve on rice production.
- vi) To a great extent, the agricultural extension education provided to farmers at Ahero rice irrigation scheme was effective despite facing a number of challenges which need to be addressed.

### 5.3 Recommendations

From the foregoing findings and conclusions, the following recommendations were made:

- i) The management of Ahero rice irrigation scheme should ensure that all the farmers in the scheme are provided with agricultural extension education.
- ii) The management of Ahero rice irrigation should involve farmers in the scheme to come up with suitable criteria that will ensure participation of all farmers in agricultural extension education programmes.
- iii) The organizations and agencies providing agricultural extension education to rice farmers in the scheme should promote use of modern technology such as mobile phones in giving information to rice farmers.
- iv) The management of Ahero rice irrigation scheme should seek more funds from the government and other development partners in order to provide regular and adequate agricultural extension education to rice farmers in the scheme.
- v) The management of the scheme should partner with other stakeholders to ensure that all farmers in the scheme embrace new methods of farming and marketing of their produce in order to enjoy maximum benefit.
- vi) The management of the scheme should partner with government agencies and other stakeholders in improving infrastructure in the area to allow easy accessibility.

#### **5.4 Suggestions for further research**

This study focused on effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. Research could be conducted focusing on the following: Knowledge base of the agricultural extension education provided to the rice farmers and how the training programmes are planned, methodology of delivering agricultural extension education knowledge, relevance of the agricultural extension education knowledge, skills and attitudes to the rice farmers.

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**APPENDICES**

**APPENDIX 1**

**INTRODUCTION LETTER TO THE DISTRICT AGRICULTURAL EXTENSION  
OFFICER, MUHORONI DISTRICT**

UNIVERSITY OF NAIROBI

DEPARTMENT OF EDUCATIONAL FOUNDATIONS

P.O BOX 30197

NAIROBI

DEAR MADAM,

**RE: PERMISSION TO CARRY OUT RESEARCH**

I am a student at the University of Nairobi pursuing a masters degree (MED) in the department of educational foundations. I am requesting your office for permission to carry out research in the district on the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme.

The information obtained will be used for no other purpose but academic and the responses will be treated as confidential.

Yours faithfully,

ADIKA KASUVU SUSSY.

## **APPENDIX II**

### **Interview schedule for scheme manager**

This interview is conducted to gather information on the effectiveness of agricultural extension education on rice farmers at Ahero irrigation scheme. Please respond to all the question items. The information provided will solely be used for this study.

1. County
2. District
3. Name of the scheme
4. Designation
5. Sex
6. Which year was the scheme started?
7. How many farmers are in the scheme?
8. What type or types of agricultural extension education is provided to farmers in the scheme?
9. How many farmers in the scheme are provided with agricultural extension education in a year?
10. Which organizations and agencies do provide agricultural extension education to farmers in the scheme?

11. How regular is agricultural extension education provided to farmers in the scheme?
12. What strategies are used to provide agricultural extension education to farmers in the scheme?
13. In what ways are farmers in the scheme involved in agricultural extension education?
14. How effective is the agricultural extension education provided to farmers in the scheme?
15. What impact does agricultural extension education have on rice farming in the scheme?
16. What are the challenges encountered in the provision of agricultural extension education to farmers in the scheme?
17. What recommendations would you suggest regarding best practices of implementing agricultural extension education?

## APPENDIX III

### Interview schedule for heads of department

This interview is conducted to gather information on the effectiveness of agricultural extension education on rice farmers at Ahero irrigation scheme. Please respond to all the question items. The information provided will solely be used for this study.

1. County
2. District
3. Name of the department
4. Designation
5. Sex
6. What type or types of agricultural extension education is provided to farmers in the scheme?
7. What role does the department play in providing agricultural extension education to farmers in the scheme?
8. Which organizations and agencies do provide agricultural extension education to farmers in the scheme?
9. How regular is agricultural extension education provided to farmers in the scheme?

10. What strategies are used to provide agricultural extension education to farmers in the scheme?
11. In what ways are farmers in the scheme involved in agricultural extension education?
12. How effective is the agricultural extension education provided to farmers in the scheme?
13. What impact does agricultural extension education have on rice farming in the scheme?
14. What are the challenges encountered in the provision of agricultural extension education to farmers in the scheme?
15. What recommendations would you suggest regarding best practices of implementing agricultural extension education?



## APPENDIX IV

### **Interview schedule for the district agricultural extension officer**

This interview is conducted to gather information on the effectiveness of agricultural extension education on rice farmers at Ahero irrigation scheme. Please respond to all the question items. The information provided will solely be used for this study.

1. Designation
2. How long have you worked in your current position in the district?
3. How many rice irrigation schemes are there in the district?
4. What type or types of agricultural extension education is provided to rice farmers at Ahero irrigation scheme?
5. How many rice farmers at Ahero irrigation scheme are provided with agricultural extension education in a year?
6. In what ways is your staff directly involved in providing agricultural extension education to rice farmers at Ahero irrigation scheme?
7. Which other organizations and agencies do provide agricultural extension education to rice farmers at Ahero irrigation scheme?
8. How regular is agricultural extension education provided to rice farmers at Ahero irrigation scheme?

9. What strategies are used to provide agricultural extension education to rice farmers at Ahero irrigation scheme?
10. In what ways are rice farmers at Ahero irrigation scheme agricultural extension education?
11. How effective is the agricultural extension education provided to rice farmers at Ahero irrigation scheme?
12. What impact does agricultural extension education have on rice farming at Ahero irrigation scheme?
13. What are the challenges encountered in the provision of agricultural extension education to rice farmers at Ahero irrigation scheme?
14. What recommendations would you suggest regarding best practices of implementing agricultural extension education to rice farmers at Ahero irrigation scheme?

## APPENDIX V

### Questionnaire for rice farmers

This questionnaire is designed to gather information on the effectiveness of agricultural extension education on rice farming at Ahero irrigation scheme. Please respond to all the question items. The information provided will solely be used for this study.

1. County

2. District

3. Name of irrigation scheme

4. Sex

5. How long have you engaged in rice farming in the scheme? Tick as appropriate.

a) 0-5 years

b) 6-10 years

c) 11-15 years

d) 16-20 years

e) 20- above years

6 a) Have you been provided with agricultural extension education in your engagement as a rice farmer?

Yes

No

b) Please explain your answer in a above.

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7. What type of agricultural extension education is provided to you as a rice farmer in the scheme?

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8. Which organizations and agencies do provide agricultural extension education to you as a rice farmer in the scheme?

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9. How regular is agricultural extension education provided to you as a rice farmer in the scheme? Tick as appropriate.

a) Once every month

b) After every three months

c) After every six months

d) Once every year

e) Any other (specify)

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10. What strategies are used to provide you with agricultural extension education?

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11. In what ways are you involved in agricultural extension education program?

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12. To what extent do you agree that agricultural extension education provided to farmers at Ahero irrigation scheme is effective?

Tick as appropriate:

a) Strongly agree

b) Agree

c) Disagree

d) Strongly disagree

e) Any other (specify)

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13. To what extent do you agree that agricultural extension education provided have helped farmers to improve on rice production?

Tick as appropriate:

a) Strongly agree

b) Agree

c) Disagree

d) Strongly disagree

e) Any other (specify)

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14. What challenges do you encounter regarding agricultural extension education on rice farming in the scheme?

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15. What recommendations would you suggest regarding the best ways to provide agricultural extension education to rice farming in the scheme?

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