PARTICIPATION OF FARMERS IN IRRIGATION SCHEMES IN TANZANIA: A CASE OF KWAMADEBE IRRIGATION SCHEME IN KONDOA DISTRICT

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF A MASTER OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

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ABSTRACT

The Agricultural and Livestock Policy of Tanzania gives high priority to the promotion of food sufficiency and security through irrigated agriculture. The aim of this study was to investigate factors affecting participation of farmers in irrigation schemes in Tanzania. The data were collected by interviewing farmers using semi structured questionnaire. Descriptive and inferential statistical analyses were done using SPSS version 12 as a tool of analysis. The findings reveal that the level of participation in the project was low. Participation of the respondents was high only in one area, and that is, the project implementation. Participation was low in other stages of the project. Factors affecting participation included lack of extension contact, poor access to credit facilities, poor access to markets, poor access to land and poor effectiveness of farmers' organization.

The respondents' individual characteristics; age, marital status, level of education and income had a statistically significant relationship with the level of participation in the project. On the other hand, sex did not have a statistically significant relationship with the level of participation. The study suggests that communities should put emphasis on implementing projects by involving them in all the stages of the project; extension services should be made available to provide the required assistance to agricultural related projects; communities should be encouraged to establish saving and credit facilities to help them finance agricultural related activities; and lastly, local governments should establish organized marketing channels.

DECLARATION

I, HASSAN RAMADHANI KISETO, do hereby declare to the Senate of Sokoine University of Agriculture that this is my original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

Hassan Ramadhani Kiseto **Date**

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The above declaration is confirmed

Prof. Dismas Mwaseba **Date**

(Supervisor)

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DEDICATION

To my beloved mother, Mahija Salim and my father, the late Ramadhani Kiseto for laying the foundation of my education.

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ABBREVIATIONS

AEE	Agricultural Education and Extension
ASDP	Agriculture Sector Development Programme
ASDS	Agriculture Sector Development Strategy
CIMMYT	The International Maize and Wheat Improvement Center
FAO	Food and Agriculture Organization
GDP	Grand Domestic Product
ILO	International Labour Organization
IO	Irrigators' Organization
KDC	Kondoa District Council
MAFSC	Ministry of Agriculture, Food Security and Cooperatives
NAP	National Agriculture Policy
NBS	National Bureau of Statistics
NIMP	National Irrigation Master Plan
SACCOS	Savings and Credit Cooperative Society
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
UN	United Nations
URT	United Republic of Tanzania
VEO	Village Executive Officer
WB	World Bank

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Internationally, there is a shrink of resources for social welfare services; an increase in population pressures changing priorities, an increase in economic competition and demands for greater effectiveness, all of which affect the course of social welfare (FAO, 2008). The utilization of non-professionals through citizen involvement mechanisms in addressing social problems has become more commonplace. The concepts of community development and community participation took shape in the 1950s when community development was perceived to be synonymous with community participation (Chowdhury, 2009). The situation has now changed to one in which there appears to be no clear understanding of the relationship between the two (Abbott, 2008). Clearly, this impacts on or changes the perception of what constitutes community participation and development. Participation is a rich concept with a variety of applications and definitions. The way participation is defined also depends on the context in which it occurs (World Bank, 2010).

Development agencies began to introduce the concepts of participation in projects and programmes in the late 1970s and early 1980s after lack of beneficiary participation was identified as a reason for the failure of many development efforts. Initially, the emphasis was on popular participation. In the past decade, the promotion of participation in development has become more widespread and the focus has widened to include other stakeholders as well.

Participation can take place in different phases of the project cycle and at different levels of a society, and take many different forms. These can range along a continuum from

contribution of inputs to predetermined projects and programmes, to information sharing, consultation, decision-making, to partnership and empowerment. Participation is both a means and an end. As a means, it is a process in which people and communities cooperate and collaborate in development projects and programmes. As an end, participation is a process that empowers people and communities through acquiring skills, knowledge and experience, leading to greater self-reliance and self-management (FAO, 2010).

In Tanzania, agriculture is the backbone of the economy. It is the major employer of the people, contributing about 24.7% to the gross domestic product and brings about 74% of the countries total foreign exchange earnings. Furthermore, food crop production in the country supports a population of more than 45 million of Tanzanians (NBS, 2012). To bring about rapid agricultural growth, the country has, since independence in 1961, embarked on various projects and programmes in rural development. However, despite government's investments and donor support in agricultural development programmes, the agricultural sector, mainly rain-fed crop production has not shown significant improvement (Lele, 2008). Many places in Tanzania receive less rainfall than the amount required by crops for sustainable growth. Only about half of the country receives at least 750mm of annual rainfall with 80% probability. It is therefore obvious that, the importance of irrigation development and proper management of the infrastructure as one of the effective and sustainable approaches to increase and stabilize food production, which contribute towards attaining food security and poverty alleviation in the country need not be overemphasized. But still there is no significant improvement in crop productivity, to some extent, lack of agricultural development in the country has been attributed to deficiencies in the farmers' participation (MAFSC, 2013a). Government leaders in the country, on the other hand, have emphasized that people should be given,

"…the freedom to participate in the making of all decisions which affect their lives" (Nyerere, 1968).

Government officials and rural development experts support the idea of participation in principal, but in practice, there is no common agreement on what participation entails. For example, one view of participation is people's contribution of their labour to the implementation of a project designed by planners (Rahman, 2009). This type of participation with all its good intension, may lead to serious flaws in project execution because it fails to address the complex nature of the farmer and his or her farm (Nagel, 2008).

In its true meaning, participation of people is non directive and does not impose ideas on them, it is based on dialogical process, it is educational and empowering; it starts from what people know and from where they are; it is based on resources mobilized by them, it relies on their collective effort and promotes self reliance but acknowledges the partnership among individuals and their change agents as their co- learners (Sicilima, 2010).

Therefore, contrary to the general practice in rural development, people's participation is not limited to farmers attending meetings or contributing their labour to the implementation of projects designed by officials. Participation also entails active involvement of people in the planning process and is enhanced by their interaction with experts through educational methods that increase the influence farmers can exert upon the programme planning process. However, it has been noted that the realities of Tanzania and other African countries may not support real participatory approaches (Douglah, 2010). This study is an attempt to provide further insights into the complex phenomenon of

participation by investigating its nature in the irrigation schemes in the country, how it incorporates participatory methodologies in planning, implementation and evaluation of their programmes.

1.1.1 The National Irrigation Strategic Framework

The National Irrigation Policy vision entails "A sustainable and dynamic irrigation sector that is a driving force in transforming agriculture into a stable, highly productive, modernised, commercial, competitive and diversified sector which generates higher incomes, increases food security and stimulates economic growth." With emphasis on a mission to facilitate the formulation and implementation of all types of smallholder irrigation development through participatory, demand - driven approaches and accelerated investment by the private sector in irrigated agriculture for increased and sustainable agricultural production, productivity and profitability to ensure food security, poverty reduction and national economic growth (MAFSC, 2013a)

Irrigated agriculture contributes about 40% of the global food production; about 260 million hectares of land are under irrigated agriculture, and about two thirds of which are from formal irrigation schemes. It is this realization that prompted the World Bank to initiate, among others, action on "Reforming Irrigation Institutions". The objective of this initiative is "to improve the performance of irrigation management in the projects by increasing efficiency, transparency, and accountability of the organizations in charge of providing irrigation services and increase participation of users and the private sector". The Irrigation Policy, among other things, has emphasized on the construction of dams for sustainability of irrigation schemes, livestock development and for domestic use to release more time to people to participate in productive activities (FAO, 2008). However, irrigation development in Tanzania is characterised by inadequate investments in water

abstraction and storage infrastructure, low level of funding by the Government for irrigation investments, inadequate capacity of beneficiaries to invest in the infrastructure for their irrigation systems, low rate of investment in irrigated agriculture by the private sector, inadequate capacity of the private sector to participate in irrigation development and failure of technology transformation. Currently, irrigation component takes cue from the National Irrigation Master Plan (NIMP) which was launched in 2002 as part of the Agriculture Sector Development Strategy (ASDS) aimed to increase agricultural productivity through sustainable irrigation development. The Agriculture Sector Development Programme (ASDP) has set a target of irrigating about one million hectares by 2016, but the past six years show that this target may not be achieved in the remaining four years. The area developed for irrigation increased from 150 000 ha in 2002 to 364 000 ha in 2013 (MAFSC, 2006).

Dodoma region has a total of 107 000 ha potential for irrigation, only 12 000 ha have been developed which is 14% of the total irrigable area (MAFSC, 2012) , it is for this reason that irrigation is considered necessary for providing protection against drought, a means of stabilising crop production and assurance of household food security. Irrigation practice is one of the effective means in increasing and stabilising food and cash crop production and productivity for curbing food shortages and increasing export of cash crop and its products.

People in Kondoa District entirely depend on agriculture and animal husbandry for livelihood. About 91% of the population in the District depend on agriculture. The District receives an annual average rainfall of between 500mm to 800mm which favour the production of maize, sunflowers, cowpeas and other rain fed crops. However, the rainfall in the District is erratic and unpredictable affecting crop production. This puts emphasis on the construction of irrigation schemes for ensuring food security and increasing

community income in the District. The District has 9520 ha potential for irrigation, 676 ha have been developed. Kwamadebe Irrigation Scheme is one among irrigation schemes in the district, was established in the year 2000 to respond to this demand; it has acreage of 60 ha and 102 beneficiaries (KDC Development Report, 2011).

1.2 Problem Statement and Justification

The growing demand for food leads to an increase in the importance of irrigated agriculture. The design of irrigation systems for long term stability must include not only engineering considerations but also land tenure systems, agricultural, socio-economic, political, legal, and environment aspects that may hinder farmers' participation in irrigation schemes. Smallholder participation in irrigation schemes is not only influenced by physical infrastructure alone but also by socio-economic variables which are an integral part of irrigation development (Morris, 2007).

Tanzania Government has invested a great deal in irrigation schemes to increase agricultural productivity. One such scheme is Kwamadebe Irrigation Scheme. This scheme has been operating for 13 years now. However, not much is known about the nature of participation of farmers in the scheme. Accordingly, this study is an attempt to provide further insights into the complex phenomenon of participation by investigating its nature in the irrigation scheme, characteristics of farmers who participate in the scheme, characteristics of farmers who do not participate in the scheme, the level of participation of farmers and the socio-economic factors that influence farmers' participation in the scheme programmes.

1.3 Objectives of the study

1.3.1 General Objectives of the study

To assess farmers' participation in Kwamadebe Irrigation Scheme in Kondoa District.

1.3.2 The specific objectives are:

i. To determine characteristics of farmers who participate in Kwamadebe Irrigation Scheme.

ii. To determine characteristics of farmers who do not participate in Kwamadebe Irrigation Scheme.

iii. To assess the level of participation of farmers in Kwamadebe Irrigation Scheme.

iv. To determine the extent to which socio economic factors influence farmers' participation in Kwamadebe Irrigation Scheme.

1.3.3 Hypothesis of the Study

The following are the hypotheses of the study,

Ho: There is no significant relationship between participation in irrigation scheme and socio- economic characteristics (age, sex, marital status, income and level of education) of the respondents.

Ha: There is significant relationship between participation in irrigation scheme and socio-economic characteristics (age, sex, marital status, income and level of education) of respondents.

Ho: There is no significant relationship between participation in irrigation scheme and institutional characteristics, namely extension contact, access to credit facilities, access to markets, access to land and perceived effectiveness of farmers' organization.

Ha: There is no significant relationship between participation in irrigation scheme and institutional characteristics, namely extension contact, access to credit facilities,

access to markets, access to land and perceived effectiveness of farmers' organization.

1.4 Conceptual Framework

The conceptual framework adopted for this study is presented in Figure 1. According to Figure 1, the dependent variable is the level of participation of farmers in the scheme. The dependent variable is one which is affected by other independent variables which are age, sex, marital status, income and the level of education, which are categorized as socio-economic factors; and extension contact, access to credit facilities, access to markets, access to land and perceived effectiveness of farmers' organization are categorized as the institutional factors.

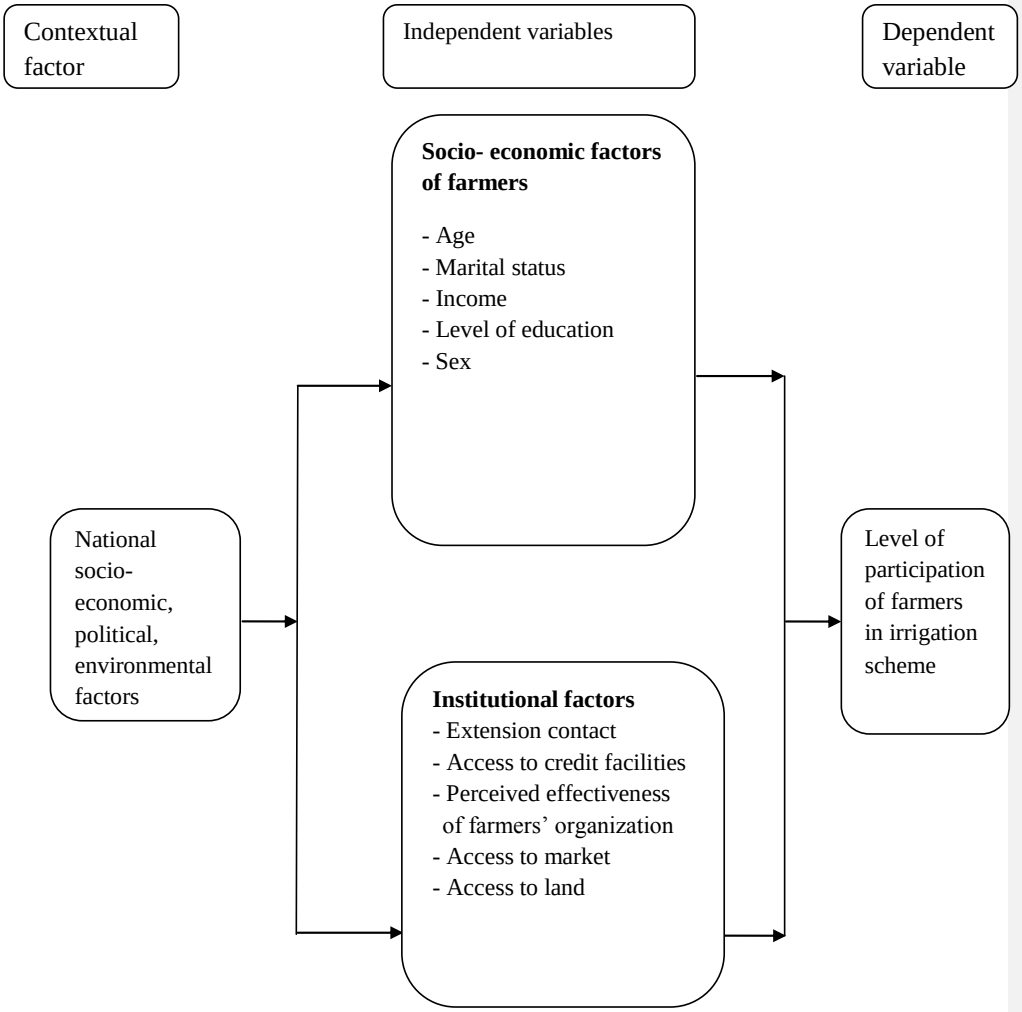

Figure 1: Conceptual frame work

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter is organized into seven parts. Part one focuses on some definitions of the concept of participation and gives the answer to why participation? Part two looks at categories of participation starting with the least category to the highest category. the former is 'passive participation' where people who participate are only told about what is going to happen or has already happened; the latter is 'self mobilization' where people participate by taking initiatives independent of external institutions to change the system in which they live. Part three covers levels of participation where people's extent of participation is explained, whether just sharing information, consult, decide or initiate action. Part four explains the dimensions of participation, who participate, what are the institutional arrangements for participation, autonomy versus control, timing of participation, role and role transformation, and self reliance. Part five presents the requirements for participation where the pre-requisites for participation are highlighted. Part six discusses the characteristics associated with participation. Part seven discusses the development of irrigated agriculture in the world and the last part discusses about the National Agriculture Policy.

2.2 The Concept of Participation

Participation is a social process whereby specific groups with shared needs and living in a defined geographic area actively pursue identification of their needs, take decisions and establish a mechanism of meeting these needs (Freedman, 2009).

According to Naika and Siddaramaiah (2006), participation includes management of skills, mobilization of community members, conflict resolution and institution building

among extension personnel. People's participation increases the actual benefits to beneficiaries; it decreases people's dependence on government support and makes the public self sustaining; it facilitates mobilization of local resources and simplifies implementation of the project at a micro level.

In rural development, people's participation in community projects varies widely; in most cases, women, men and farmers from different social- economic status do participate in different ways at different moments. In practice, there is no common agreement on what participation entails. For example, participation may be viewed as peoples' contribution of their labour and time to the implementation of a programme. One major aspect of ineffective farmers' participation and hence project failure is lack of a sense of ownership amongst the target beneficiaries (FAO, 2010). In the context of this study, participation refers to the involvement of farmers in Irrigators' Organization (IO) in various stages and activities, and in collaboration and interaction with external stakeholders.

Indicators of participation include farmers' possession and utilization of land in the scheme, attendance to beneficiaries meetings, paying membership fees and annual subscription fees, active discussion, decision making, planning, implementation and evaluation of the project.

2.3 Typology of Participation

Pretty (1994) classifies participation in seven categories: the first is "Passive participation", where people who participate are only told about what is going to happen or has already happened; then there is "Participation in information giving", people participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches; "Participation by consultation", people participate by being consulted and external agents listening to people's views; "Participation for material

incentives", people participate by providing resources, for example labour, in return for food, cash or other material incentives.

Next, is "Functional participation", people participate by forming groups to meet predetermined objects related to the project, which can involve development or promotion of externally initiated social organisation. Another is "Interactive participation", where people participate in joint analysis, which leads to action plans and formation of new local institutions or strengthening of the existing ones.

Lastly, is "Self- mobilization", where people participate by taking initiatives independent of external institutions to change the systems in which they live. Pretty's interactive participation and self–mobilization types evoke some of the professed goals of those who promote and use participatory approaches in community development. This study focuses on, "Functional participation" where, people participate by forming groups, in this case the Irrigators' Organization (IO), to meet the predetermined objective of increased productivity by overcoming weather challenges through irrigation scheme.

Table 1: Typology of participation in development program

S/N	Typology	Component of each type
1.	Passive participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management, without listening to People's responses. The information being shared belongs only to external professionals.
2.	Participation in information giving	People participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research are neither shared nor checked for accuracy.
3.	Participation by Consultation	People participate by being consulted, and external agents listen to views. These external agents define both problems and situations, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.
4.	Participation for material incentives	People participate by providing resources, for example labour, in return for food, cash or other material incentives. Much on-farm research falls into this category, as farmers provide the fields but are not involved in experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5.	Functional participation	People participate by forming groups to meet predetermined objects related to the project, which can involve the development or promotion of externally initiated social organization. Such involvements usually occur not at early stages of project cycle or planning but after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6.	Interactive Participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.
7.	Self mobilization	People participate by taking initiatives independent of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Such self initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

Source: Pretty (1994)

2.4 Levels of Participation

According to Mattee and Gebreyes (2013), participation has four levels or degrees:

(a) Information sharing: People are informed in order to facilitate collective individual action;

(b) Consultation: People are consulted and interact with an agency, which can then take account of their feedback;

(c) Decision making: People have a decision-making role, which may be theirs exclusively or jointly with others, on specific issues of a policy or project;

(d) Initiating action: People are proactive and able to take the initiative; from the above levels or degrees of participation, it can be noted that it is important that farmers get involved in collective decision making and work together as equals to achieve common goals.

2.5 Dimensions of Participation

The nature of participation can be examined using dimensions of participation (Mattee and Gebreyes, 2013).

(a) Whose agenda

Whatever the purpose, or ultimate goal of the project, people's interests, their needs and their wishes must be allowed to underpin the key decisions and actions relating to the project. Many problems require group decisions. Actions which solve the problems of some groups can harm other groups. Different groups should be encouraged to find solutions which are acceptable to all. The participatory approach recognizes that different groups within villages have different interests, and that the decision-making process must take all into accounts.

(b) Who Participates?

Participatory development should seek to improve gender inequalities through providing a means by which women can take part in decision making. Apart from women, participatory projects should deliberately target other disadvantaged sections of the society such as the youth, ethnic minorities, and the poor.

(c) Institutional arrangement for participation

The formation of institutions is part and parcel of participatory projects. It is usually emphasized to work with the existing local institutions. However, whenever this is not appropriate for any reasons, new institutions could be established.

(d) Autonomy versus control

As far as it is realistic to do so, participatory projects should seek to invest as much responsibility as possible with the local people, and thus avoid leaving absolute control in the hands of the project staff.

(e) Timing of participation

Participation which is initiated early in a community development project cycle is preferable, and enhances the opportunities for capacity building, empowerment and community ownership.

(f) Role and role transformation

Participating farmers could have different roles in the project: some could have specific roles, others non-specific or still others peripheral roles. However, participatory projects must facilitate development or empowerment of individuals in their roles as participants, and which would allow participants to increasingly take responsibility for more decision making, planning, organizing and implementation

over time. Although the village is a discrete geographic and administrative unit, it is not necessarily homogenous. People or groups sometimes have conflicting interests or perceptions. Development practitioners should be careful and give all socioeconomic groups equal weight in decision-making.

(g) Self reliance

Participatory project should seek every possibility to base its activities upon local resources, to avoid situation of dependence on external resources and also to help develop local capabilities, which will be important, if development is to be sustainable. Participatory approaches encourage the community to take responsibility for its own development agenda. Rather than wait for outside assistance, the community can undertake activities which they themselves regard as the highest priorities.

2.6 Requirements for Participation

In order for people to effectively participate, the environment as well as organizational structure must be right. Effective decentralization, which allows for local decision making processes to happen, and reduction of bureaucracy are essential. Groups at the local level need proper coordination under effective leadership (ILO Report, 2008).

People must know their potential and work in a democratic environment. The local planning mechanism in which people participate need only to have outsiders as facilitators, without the dominating influence of the rich and powerful in the society (UN Report, 2010).

2.7 Characteristics Associated with Participation

In their study on participation in irrigation schemes in Nigeria, Nxumalo and Oladele (2013) report that gender can be one of the factors influencing farmers' participation in

development programmes. Gender differences define how, in a specific social and cultural context, women and men interact and what is considered appropriate for either group, thus determining their development options and constraints. Oladele (2011) notes that it is widely believed that males are more dominant in the agricultural sector than is the case with females. Although females are not left out, they are more hands on in harvesting and processing. The sex of a farmer may have a negative or positive effect on the decision to participate in an agricultural project. Female farmers are usually more networked socially and may therefore be more likely to have links with an agricultural project. On the other hand, male farmers usually have more access and control over resources. Males are also usually the decision makers and are also therefore well placed to participate in agricultural projects. Also, marital status has a role in participation; married women are either rarely involved in the elaboration of policies or consulted when new technologies are introduced although such policies or technologies may have a direct impact on them (Wiley, 2010). A married farmer may have access to information and resources of the spouse and may therefore be more likely to participate in an agricultural project than may have been the case with unmarried farmer. As Nnadi and Akwiwu (2008) note, marriage increases a farmer's concern for household welfare and food security which are therefore likely to have a positive effect on their decision to participate in an agricultural project.

Age is a factor which can influence participation of an individual in development activities; age is a reflection of the characteristics of an individual in relation to ownership and control of resources such as land, cash, and labour. Young people are less conservative than older people and hence the former are more likely to participate in development activities than is the case with the latter (Mlelwa, 2010). A younger farmer is likely to participate in an agricultural project because younger farmers are usually innovative, risk takers and may want to try new concepts. On the other hand, older farmers

are usually more experienced and endowed hence they either may have experienced or may have observed the benefits of participating in an agricultural project. Also older farmers may not be resource constrained to participate in an agricultural projects. There is a positive relationship between age and participation in an agricultural project (Oladele, 2011).

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As Mlelwa (2010) notes, poor and less educated people generally lack confidence in their ability to improve their lives, people's level of education has a positive relationship to the level of participation. Education tends to broaden horizons beyond habits and traditions of an individual and hence positively influencing an individual into participating in development activities. This is in contrast with what Ogunbameru *et al*. (2011) observe that as the level of education increases, level of participation in agricultural programmes decreases, the higher the educational level of the farmer, the higher the chances of getting better paying jobs or the higher the tendency to be involved in politics and thereby decreasing the level of participation in agricultural programmes.

Kahn (2012) found that a person who owns large amount of property is considered to be rich; thus, wealth can be the basis for participation or can reinforce participation. Wealthy people can afford new technologies by either buying or hiring them.

Freedman (2009) in his study on participation of farmers in irrigation schemes in Tanzania found that lack of effectiveness in farmers' organization in terms of supervision and implementation of change leads to poor participation; ineffectiveness of farmers' organisation is largely a result of lack of skilled manpower and financial resources; the type of management has been very important in the performance of the schemes. All farmer managed schemes are doing well; on the other hand however, all government managed schemes are performing poorly. The reason for this is that farmers in farmer

managed schemes feel that the schemes belong to them and as such they participate and invest heavily in them. On the other hand in the government run schemes, farmers have no sense of ownership and are not worried about efficient utilization of resources.

Ogunbameru *et al.* (2011) in their study on irrigation schemes in Nigeria found that farmers who seek lucrative markets and good prices are doing better than those who prefer to sell locally; schemes in the former category attract more farmers' participation than those in the latter category. Accesses to market by the respondents influence their involvement in agricultural programmes. Similarly, the number of extension contacts has a positive influence on farmers' participation to projects; farmers who are not visited are more likely to make negative decision against participation in the projects. It was not surprising that extension contact was a good predictor of participation, given the important role being played by extension personnel.

2.8 Development of Irrigated Agriculture in the World

The world's cultivated area has grown by 12% over the last 50 years. The global irrigated area has doubled over the same period, accounting for most of the net increase in cultivated land. Meanwhile, agricultural production has grown between 2.5 and 3 times, resulting to significant increase in the yield of major crops. However, global achievements in production in some regions have been associated with degradation of land and water resources, and the deterioration of related ecosystem goods and services. Agriculture already uses 11% of the world's land surface for crop production. It also makes use of 70% of all water withdrawn from aquifers, streams and lakes. Agricultural policies have primarily benefited farmers with productive land and access to water, bypassing the majority of small-scale producers who are still locked in a poverty trap of high vulnerability, land degradation and climatic uncertainty. Land and water institutions have

not kept pace with the growing intensity of river basin development and the increasing degree of inter dependence and competition over land and water resources. Much more adaptable and collaborative institutions are needed to respond effectively to natural resource scarcity and market opportunities (FAO, 2011)

2.9 National Agriculture Policy

The importance of agricultural sector in the national economy cannot be overemphasized owing to its relationship between its performance and that of key economic indicators like GDP and employment. Since this relationship is there to stay for some time to come, it justifies the argument that any attempts to improve living standards of the people must give particular attention to increased production and productivity in the agricultural sector. The National Agriculture Policy 2013 (MAFSC, 2013b) revolves around the goals of developing an efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad based economic growth and poverty alleviation. The Government is committed to bring about a green revolution that entails transformation of agriculture from subsistence farming towards commercialization and modernization through crop intensification, diversification, technological advancement and infrastructural development. The NAP 2013 therefore, aims at addressing challenges that continue to hinder the development of the agricultural sector; these include low productivity, over dependence on rain-fed agriculture, inadequate agriculture support services, poor infrastructure, weak agro-industries, low quality of agricultural produce, inadequate participation of the country's private sector in agriculture, environmental degradation and crop pests and diseases. The NAP 2013 also takes into account the existence of huge potential and opportunities for development of the agricultural sector. Whereas 44 million hectares of land are suitable for agricultural production, only 10.8 million hectares (24%) are cultivated mostly under subsistence

agriculture. The latter consists of smallholder farmers cultivating between 0.2 and 2.0 hectares, a production scale that is too low to generate significant income streams to farmers for effective poverty reduction and agricultural development. The potential exists for expansion of agricultural area under cultivation for small, medium and large-scale farming in areas with available land for expansion while intensive farming shall be applied in densely populated areas with the aim of commercializing agriculture in Tanzania emphasizing on irrigated agriculture where out of 10.8 million hectares under cultivation only about 450 392 hectares are currently under irrigation. Potential land for irrigation is 29.4 million hectares out of which 2.3 million hectares are high potential, 4.8 million hectares medium and the 22.3 million hectares are low potential (MAFSC, 2013b)

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of the Study Area

Kondoa District is located in the north of Dodoma Region and is about 166 km from the capital town, Dodoma. The district lies between 35^{o} E and 36^{o} E and 4^{o} S and 5^{o} S. The District shares borders with Babati District in the north, Simanjiro in the northeast, and Kiteto District in the East. The district also shares borders with Manyoni District in the Southwest, Singida District in the West, Hanang District in the Northwest and Bahi and Kongwa districts in the South. The annual average rainfall ranges from 400mm to 800mm. The District has an area of 13 210 km^{2}. Administrative units of Kondoa District comprise 4 divisions, 28 wards and 108 villages.

3.2 Location

Sakami village where Kwamadebe Irrigation Scheme is located is about 44 km from Kondoa District Council Headquarters. Geographically, the village is 856 m above the mean sea level. Administratively, Kwamadebe Irrigation Scheme belongs to Kwamadebe hamlet within Sakami village, in Thawi Ward, Kolo Division, in Kondoa District, Dodoma Region.

3.3 Climate

Kwamadebe Irrigation Scheme lies within semi-arid zone, which is characterized by unimodal unreliable rainfall; the area receives rainfall ranging from 500 to 700mm per annum. The maximum temperature ranges from18^{0}C to 30^{0}C with rainfall season between the months of November and May.

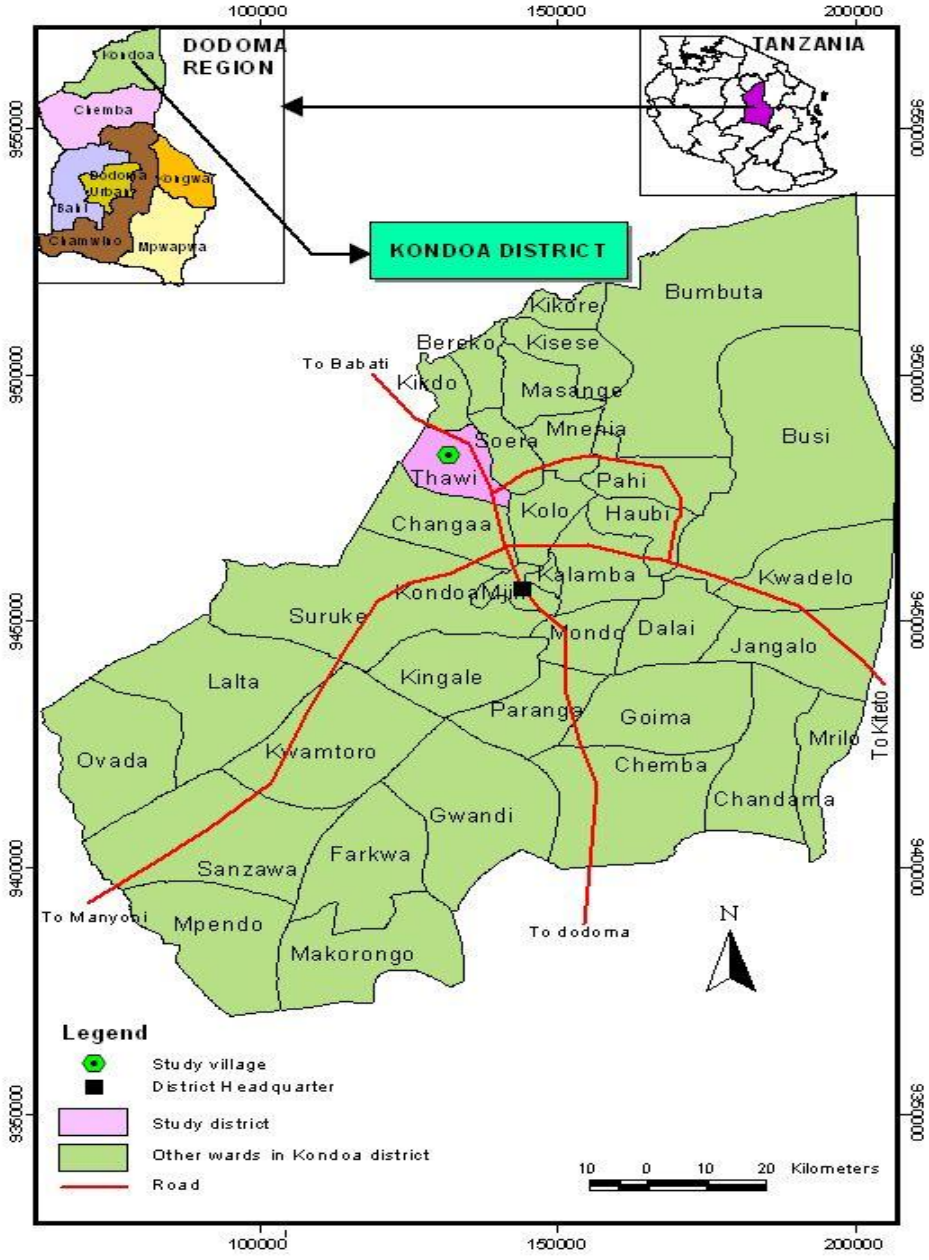

Figure 2: Description of the Study Area

3.2 Population Distribution

According to the 2012 National Population Census report, the District has a population of 501 958 (male 242 948 and female 259 010) with an average growth rate of 1.7% per annum and a population density of 34 km^{-2}. The average size of the household is 5 people. Sakami village comprises about 600 households in which Kwamadebe Hamlet comprises 125 households and the predominant tribe in the scheme area is the Asi (70%), others include Rangi (25 %) and Burunge (5 %).

3.3 Agriculture

The District is almost entirely depending on agriculture and animal husbandry for its economic survival. About 91% of the district population depends on agriculture. About 70% of the total area in the district is potential for agriculture while those entirely depending on livestock comprise 1.6%. The district has 7 irrigation schemes located in Kisese, Kikore, Kwamadebe, Mkurumuzi, Hurui, Madege and Mnenia villages.

3.4 Research Design

This study used a cross sectional survey design where data were collected at a single point in time. The method is less costly, less time consuming, and reliable.

3.5 Population and Sampling Procedure

The population for this study consisted of participating and non- participating farmers in the scheme.

3.6.1 Sampling of the population

Kwamadebe Irrigation Scheme was purposively selected as the oldest scheme out of 7 irrigation schemes in Kondoa District, other irrigation schemes in the District are located in Kisese, Kikore, Mkurumuzi, Hurui, Madege and Mnenia villages.

3.6.2 Sampling of farmers

Participating and non-participating farmers in Kwamadebe irrigation scheme were stratified according to sex and then selected randomly to make a total of required sample size.

Comment [HM2]: What was the required size?

The sample size was estimated using Yamane's formula (1967) which is enough for estimating a sample from a population (Babbie, 1990 and Kothari, 2006)

Yamane's (1967) formula

$$n = \frac{N}{1+ N (e)^2}$$

where n = sample size
N = population
e = level of precision

The scheme has a total of 102 beneficiaries; hence a sample of 50 farmers who were participating in the scheme and 50 farmers who were not participating in the scheme was drawn. From the list of scheme participants and that of non-participants, members were stratified into two groups of males and females. Each member was given a number starting from one, where those with even numbers were chosen until the required sample of 50 respondents was obtained from each group.

3.7 Data Collection Methods

3.7.1 Primary data collection

This involved quantitative survey research and qualitative data collection methods.

3.7.1.1 Quantitative data

A structured questionnaire with close and open- ended questions was used to solicit quantitative data from farmers and extension agents.

3.7.1.2 Qualitative data

Qualitative data are the data which describe items in terms of some quality or categorization (Dodge, 2009). Qualitative data such as perceived effectiveness of farmers' organization was obtained using non- participants observation done by the researcher.

3.8 Pre-testing of Questionnaire

The structured questionnaire was pre-tested on 30 respondents (15 males and 15 females) before the commencement of the research. The pre-testing was done in Kikore Irrigation Scheme with more or less similar characteristics with that of the area studied, located outside the area under study.

3.9 Questionnaire Administering

The questionnaire was prepared in English. The researcher was assisted by four interviewers who administered the questionnaire to selected respondents. These explained the objectives of the study to the respondents prior to conducting the interviews in order to have a clear understanding of the instrument.

3.10 Data Analysis Procedure

Primary data collected were coded, entered, cleaned and analyzed using computer software SPSS (Statistical Package for Social Science) version 12.0. Descriptive statistics such as frequencies, means, and percentages were calculated to determine the distribution of the study variables. Qualitative data such as perceived effectiveness of farmers' organization were sought, where farmers' opinions were tabulated and descriptive statistics of frequencies and percentages were used to summarize the data.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

4.1.1 Age of respondents

Table 2 shows that 94% of farmers who were participating in the scheme were between the age categories of 18- 28 years and 51-61 years, on the other hand, 66% of farmers who were not participating in the scheme were between the age categories of 18- 28 years and 51-61 years and 44% in the category of 62-72 years.

Table 2: Distribution of respondents by age (n=100)

Respondents	**Participants**		**Non-participants**		**Total**	
Age category	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
18 - 28	8	16	2	4	10	10.0
29 - 39	15	30	14	28	29	29.0
40 - 50	14	28	6	12	20	20.0
51 - 61	9	18	6	12	15	15.0
62 – 72	4	8	22	44	26	26.0
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

This analysis shows that, majority (94%) of the farmers who were participating in the scheme were below 61 years of age while 44% of farmers who were not participating in the scheme were above 61 years of age;. this is due to the fact that farmers are able to participate and take risk when they are young (Nanai,2009)

4.1.2 Sex of the respondents

Majority (80%) of the respondents who were participating in the project were males and (72%) of those who were not participating were males. The population of females who

were participating and that of females who were not participating were small, accounting for only 20%and 28% respectively; this is due to multiple roles women play apart from participating in the projects, and which include attending to all household duties (Mwaseba, 1991)

Table 3: Distribution of respondents by sex (n=100)

Respondents	Participants		Non-participants		Total	
Sex	**Freq**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
Male	40	80	36	72	76	76
Female	10	20	14	28	28	24
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

4.1.3 Marital status

Table 4 shows that 76% of the respondents who were participating in the scheme were married and the remaining 24% were single widowed or divorced. On the other hand, 90% of the farmers who were not participating in the scheme were married and the remaining 10% were single, widowed, or divorced.

This analysis shows that, both groups of farmers, that is, those who were participating in the scheme and those who were not participating in the scheme consisted of married participants. According to the culture of the dominating tribe in the study area, Asi, people get married as early as 18 years old, sometimes soon after completion of their primary education.

Table 4: Distribution of respondents by marital status (n=100)

Respondents	Participants		Non-participants		Total	
Marital status	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Married	38	76	45	90	83	83
Single	9	18	2	4	11	11
Widowed	2	4	1	2	3	3
Divorced	1	2	2	4	3	3
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

4.1.4 Level of education

Table 5 shows that 82% the respondents who were participating in the scheme attended primary education, 10% had non- formal education while 78% of the respondents who were not participating in the scheme attended primary education, and 20% had non-formal education. The analysis of these findings show that, both groups of those who were participating in the scheme and those who were not participating had attended primary education which is enough for empowering them to make necessary decisions (Mwaseba, 1991)

Table 5: Distribution of respondents by level of education (n=100)

Respondents	Participants		Non-participants		Total	
Level of education	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Non formal	5	10	10	20	15	15
Primary	41	82	39	78	80	80
Secondary	3	6			3	3
College	1	2	1	2	2	2
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

4.1.5 Monthly income

Table 6 shows that 36% of the respondents who were participating in the scheme had monthly income below 50 000 TZs monthly, 34% had an income of between 50 000 and

100 000 TZs and 14% had an income of between 100 000 and 150 000 TZs and 22% between 150 000 and 200 000 TZs

Table 6: Distribution of respondents by monthly income (n=100)

Respondents	Participants		Non-participants		Total	
Income/month (TZs)	**Frequency**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
0 - 50 000	15	30	38	76	53	53
50 000 - 100 000	17	34	9	18	26	26
100 000 - 150 000	7	14	3	6	10	10
150 000 - 200 000	11	22			11	11
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

On the other hand, 76% of the respondents who were not participating in the scheme had monthly income below 50 000 TZs, 18% had an income of between 50 000 and 100 000 TZs and 6% had an income of between 100 000 and 150 000 TZs. The analysis of this findings show further that 70% of the respondents who were participating in the project had high income of above 50 000 TZs monthly, 76% of the respondents who were not participating in the project were poor getting below 50 000 TZs monthly.

4.2 Level of Participation of the Respondents

The respondents were required to respond 'Yes' or 'No' to questions that sought to find out the level of participation to the scheme. These activities were problem identification, decision making, planning, implementation and evaluation.

Table 7 shows that 18% of respondents were involved in problem identification, 12% were involved in decision making, 10% were involved in planning, 86% were involved in the implementation and 16% were in the evaluation activity. This analysis shows that participation in problem identification, decision making, planning and evaluation as

related to the project was low (38%). Participation in implementation was reasonably high (86%). The respondents were not adequately involved in most stages of the project namely problem identification, decision making, planning and evaluation.

Table 7: Distribution of respondents according to participation in the scheme(n = 50)

	Response category				
		Yes		No	
Activity	**n**	**Frequency**	**Percent**	**Frequency**	**Percent**
Problem identification	50	9	18	41	82
Decision making	50	6	12	44	88
Planning	50	5	10	45	90
Implementation	50	43	86	7	14
Evaluation	50	8	16	42	84

Low participation of the respondents in project identification, decision making, planning and evaluation was due to lack of opportunity; respondents reported not have been given enough opportunity to participate. When asked about this, they claimed that project committee passed most of decisions on their behalf.

Mwaseba (1991) in his study on popular participation in rural development revealed that awareness, opportunity, and ability are crucial to participation for their presence or absence in some activities influenced the participation or non participation of the respondents. In his study observed further that the respondents' participation was high during implementation stage, since the activities were preceded by a mobilization drive with the aim of educating (awareness) people first on the importance and benefits associated with the project and the contribution expected of these ventures.

When it came to implementation, the respondents were involved (opportunity) in the activity and since they were required to contribute labour to the project, most were able

(ability) to participate. The net result was high participation in project implementation; this was in line with what this study revealed.

4.3 Factors Affecting Respondents' Participation in Irrigation Schemes

The respondents were asked to mention factors that prevented them from full participation to the scheme. The findings are summarized in Table 7. Only factors with significant percentage were included, 89% of the respondents cited poor income as a factor that hindered the respondents' participation in the scheme, which needed money for inputs, mechanization, hiring of labour, hiring a piece of land and transportation. About 73% of the participants cited poor extension contact as a factor. Agricultural training is one of the major components of agricultural extension service system, geared at educating and motivating the farmers about the application of scientific research and new knowledge of agricultural practices for agricultural development of the country (Sharma, 2006). Agricultural extension by its nature has an important role in promoting the adoption of new technologies and innovations (Shamsudin and Yap, 2011).

The number of extension contacts has a positive influence on farmers' participation to the projects; farmers who are not visited are more likely to make negative decision against participation in the projects. As mentioned earlier, it was not surprising that extension contact was a good predictor of participation, given the important role being played by extension personnel. Ogunbameru *et al*. (2011), in their study on factors influencing women participation in agriculture, identified extension contacts as a factor which affects farmers' participation in agriculture programmes.

Poor access to credit facilities is mentioned as a factor by 56% of the respondents. Mlelwa (2010) in his study on the role of input suppliers in agricultural extension revealed that

credit is an essential instrument for enabling farmers to acquire improved agricultural techniques and thus speeding up the adoption of new technologies. Accordingly, access to credit facilities hence has a positive impact on farmers' participation in agricultural projects.

Table 8: Distribution of respondents according to factors* hindering their participation (n = 100)

Factor	Frequency	Percentage
Poor income	89	89.0
Poor extension contact	73	73.0
Poor access to credit facilities	56	56.0
Poor access to markets	100	100.0
Poor farmers' organization	59	59.0
Personal commitments	3	3.0
Poor access to land for irrigation	84	84.0

* Multiple responses were given

In Tanzania, there are several sources of credits including formal and informal; it is notable that relatives, friends, neighbors and traders can be categorized as informal sources; while the banks and SACCOs are categorized as formal sources of credit. Access to credit facilities is of paramount importance to farmers' participation on agricultural activities (Saga, 2012).

All the respondents (100%) mentioned poor access to markets as a dominant factor hindering their participation. Limited transport and storage facilities made access to market a problem. Due to bulk nature of the crops, farmers are obliged to sell their produce at nearby markets mainly at reduced prices. Therefore, access to markets motivates farmers' participation (Mlelwa, 2010).

About 59% of the respondents mentioned poor farmers' organization as a factor that hindered them from participating in the scheme. Poor access to land for irrigation was mentioned by 84% of the respondents as a factor; according to the findings in Table 9 all 100% of the farmers who were participating in the scheme had plots for irrigation activities. Table 10 shows that 14% bought their plots, 58% inherited the plots from their ancestors, and 28% reported to have hired the plots from land owners. During focus group discussion of the respondents and scheme leaders, it was revealed that, the scheme did not have any land; all the plots used by the participants were owned by land owners; participants either used their plots for irrigation activities or bought/hired the plots from the land owners.

In the Irrigators' Organization it was revealed that, villagers were supposed to contribute their manpower during the construction of the scheme; and upon the completion, land owners were supposed to offer quarter of an acre to every villager who didn't have land in the irrigable area. For 13 years the Irrigators' Organization has failed to fulfill this promise, so the organization is perceived by the respondents to have poor land use management.

Table 9: Distribution of respondents by possession of plots in the scheme (n = 100)

Respondents	**Participants**		**Non participants**	
Ownership of plots for irrigation	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	50	100.0	0	0.0
No	0	0.0	50	50.0
Total	**50**	**100.0**	**50**	**100.0**

Table 10: Distribution of respondents by mode of acquiring plots for irrigation (n = 50)

Mode of acquiring plots for irrigation	Frequency	Percent
Bought	7	14.0
Inherited	29	58.0
Hired by land owners	14	28.0
Total	**50**	**100.0**

4.4 Hypotheses Testing

The following hypotheses were tested in this study

4.4.1 Hypothesis I

There is no significant relationship between participation in irrigation scheme and socio-economic characteristics of respondents, and these include age, sex, marital status, income and level of education.

The Chi- square values were calculated for the following socio- economic factors, named above. The aim was to determine whether these characteristics had any significant correlation with the level of participation of the respondents in the scheme. Cross tabulation was calculated to see percentage distribution of the factors and the level of participation. The results are summarized in Tables 11 to 15.

4.4.1.1 Age

The findings in Table 11 show that there was a significant relationship between age and the level of participation in the irrigation schemes. Therefore, the null hypothesis of no significant relationship between the two categories of variables is rejected. The level of participation in different stages of the project was 16% among the respondents in the age category of from 18-28 years, 30% among those in the age group of from 29-39 years,

28% for those between 40 and 50 years, 18% for those from 51to 61 years, and 8% for those from 62 to 72 years.

Table 11: Respondents' level of participation according to age (n = 100)

Respondents	Participants		Non-participants		Total	
Age category	Frequency	Percent	Frequency	Percent	Frequency	Percent
18 - 28	8	16	2	4	10	10.0
29 - 39	15	30	14	28	29	29.0
40 - 50	14	28	6	12	20	20.0
51 - 61	9	18	6	12	15	15.0
62 – 72	4	8	22	44	26	26.0
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

$\chi^2 = 9.297$ d.f 4 Sig. at $P \leq 0.05$

For non-participants the level was 4% among the respondents in the age group of 18-28 years, 28% for those in the age group of from 29-39 years, 12% for those in the age range of from 40-to 50 years, 12% for those from 51to 61 years, and 44% for those in the age of between 62and 72 years.

Ninety two percent of the participants were below 61 years of age as opposed to 44% of their counterparts the non-participants. This is in line with what Nanai (2009) in his study on peasant participation in community development project, who revealed that young and energetic farmers have proven to be active and ready to try innovative ideas. Older small-scale farmers have more experience in farming; however, their reception to new ideas and technologies decrease with an increase of age, people in the age group of 18- 61 years tend to be active, creative and innovative (URT, 2005).

4.4.1.2 Sex

The findings in Table 12 show that there was no significant relationship between sex and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is accepted. The findings show further that 80% of the male farmers were participating in the scheme as opposed to 20% of female farmers; this finding is attributed to multiple roles women play; apart from participating in the projects, they still have to attend to all household duties.

Table 12: Respondents' level of participation according to sex (n = 100)

Respondents	Participants		Non-participants		Total	
Sex	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Male	40	80	36	72	76	76
Female	10	20	14	28	28	24
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

$\chi^2 = 0.342$ d.f 1 Not Sig. at $P \leq 0.05$

4.4.1.3 Marital status

Table 13 shows that that there was a significant relationship between marital status and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected. The findings reveal further that 76% of the respondents with high level of participation were married which is in contrast with those who were in other categories; these were as follows singles (9%), widowed (2%) and divorced (1%); the married category of farmers also formed the majority (90%) among the non-participating farmers in the projects.

This analysis implies that married farmers formed the majority in both categories participating non participating framers in the projects. According to the culture of the

dominating tribe, people get married at their early age and thereby become compelled by family responsibilities to get engaged in productive activities to meet family needs.

Table 13: Respondents' level of participation according to marital status (n = 100)

Respondents	Participants		Non-participants		Total	
Marital status	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Married	38	76	45	90	83	83
Single	9	18	2	4	11	11
Widowed	2	4	1	2	3	3
Divorced	1	2	2	4	3	3
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

$\chi^2 = 14.372$ d.f 3 Sig. at $P \leq 0.05$

4.4.1.4 Income

In Table 14, the findings reveal that there was a significant relationship between income and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected.

Table 14: Respondents' level of participation according to income (n = 100)

Respondents	Participants		Non-participants		Total	
Income/month (TZs)	**Frequency**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
0 – 50 000	15	30	38	76	53	53
50 000 - 100 000	17	34	9	18	26	26
100 000 - 150 000	7	14	3	6	10	10
150 000 - 200 000	11	22			11	11
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

$\chi^2 = 13.482$ d.f 3 Sig. at $P \leq 0.05$

The findings reveal further that 36% of the respondents who were participating in the scheme had a monthly income of below 50 000 TZs , 34% had an income of between 50 000 and 100 000 TZs, 14% had an income of between 100 000 and 150 000 TZs, and 22% had an income of between 150 000 and 200 000 TZs; on the other hand, 76% of the respondents who were not participating in the scheme had a monthly income of below 50,000 TZs,18% had an income of between 50 000 and 100 000 TZs, and 6% had an income of between 100 000 and 150 000 TZs.

The analysis of data shows that 70% of the respondents who were participating in the project had high income of above 50 000 TZs per month, and 76% of the respondents who were not participating in the project were poor and were getting below 50 000 TZs per month. The wealthier farmers seemed to have better access to extension information and stand a better chance of using their own resources to experiment with the innovations (CIMMYT, 2011).

4.4.1.5 Level of education

Table 15 reveals that there was a significant relationship between the level of education and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected.

Table 15: Respondents' level of participation according to education levels (n = 100)

Respondents	**Participants**		**Non-participants**		**Total**	
Level of education	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Non formal	5	10	10	20	15	15
Primary	41	82	39	78	80	80
Secondary	3	6			3	3
College	1	2	1	2	2	2
Total	**50**	**100**	**50**	**100**	**100**	**100.0**

$\chi^2 = 2.529$ d.f 3 Sig. at $P \leq 0.05$

The findings reveal further that 82% of the respondents with high participation level had high level of education as opposed to those who had low level of education (10%), this finding is consistent with what Mwaseba (1991) found out in his study on popular participation; in that, those who have gone to school know how to read and write; this has a number of implications for rural development, key among them, is that change agents would be able to communicate easily on any change programme through a variety of communication channels including written materials, and hence contributing to smooth implementation of a given program.

Swanson, Roling and Jigging (1984) in their study on extension strategies for technology utilization in agricultural extension reveal that farmers' educational background is a potential factor in determining their readiness to accept and properly use an innovation. Education makes a farmer more open- minded to advice from an extension agent or more able to deal with technical innovation; and the more complex the technology, the more likely it is for education to play a major role in the adoption of such a technology (CIMMYT, 2011). This is finding is in contrast with what Ogunbameru *et al*. (2011) found in their study on factors influencing women participation in agriculture, in that as the level of education increases, the level of participation in agricultural programmes decreases; in other words, the higher the educational level of the farmer, the higher the chances of getting better paying jobs or the higher the tendency to be involved in politics and the less tendency of participating in agricultural programmes.

4.4.2 Hypothesis II

There is no significant relationship between participation in irrigation scheme and institutional characteristics, namely extension contact, access to credit facilities, access to markets, access to land and perceived effectiveness of farmers' organization.

The Chi- square values were calculated for the following institutional factors, namely extension contact, access to credit facilities, access to markets and effectiveness of farmers' organization. The aim was to determine whether these institutional factors were significantly related to the levels of participation of the respondents in the agricultural scheme activities. Cross tabulation was calculated to see percentage distribution of the factors and the level of participation. The findings are summarized in Tables 16 to 20.

4.4.2.1 Extension contact

Table 16 reveals that there was a significant relationship between extension contact and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected. The findings reveal further that those who have been contacted by extension officers, (47% of them had high level of participation as compared to their counterparts who were not contacted, who consisted of only 6%. Similar findings are reported in previous studies such as Mlelwa (2010), which reveals that an extension personnel is a change agent who assists farmers utilize their human and material resources; thus, the presence or absence of extension services, positively or negatively affect participation of farmers in the irrigation scheme.

Table 16: Respondents' level of participation according to extension contact (n = 100)

Extension contact	**Level of participation**				**Total**
	Below average		**Average and above**		
	N	**%**	**N**	**%**	
Low " Not contacted"	32	32	6	6	**38**
High " Contacted at least once"	15	15	47	47	**62**
Total	**47**	**47**	**53**	**53**	**100**

$\chi^2 = 27.168$ d.f 3 Sig. at $P \leq 0.05$

4.4.2.2 Access to credit facilities

Table 17 reveals that there was a significant relationship between access to credit facilities and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected.

Table 17: Respondents' level of participation according to access to credit facilities

(n = 100)

Access to credit facilities	Level of participation				Total
	Below average		Average and above		
	N	%	N	%	
Did not access credit facilities	12	12	35	35	**47**
Accessed credit facilities	1	1	52	52	**53**
Total	**13**	**13**	**87**	**87**	**100**

$\chi^2 = 12.341$ d.f 1 Sig. at $P \leq 0.05$

the findings further reveal that more respondents (52%) who participated in different stages of the project had access to credit facilities compared to those who did not participate, which consisted of only 35%. This was due to the fact that majority of local farmers prefer accessing financial support from informal sources like hiring from relatives, cash preserved in form of livestock or stored crops. This concurs with the previous study by Saga (2012) who observes that access to credit facilities is of paramount importance to farmers' participation in agricultural activities.

4.4.2.3 Access to markets

Table 18 shows that there was a significant relationship between access to markets and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected. The findings reveal further that more (28%) of the respondents who participated in different stages of the project had access to markets compared to those who

did not participate in any stage of the project, and who constituted only 13%, this supports the previous study by Mlelwa (2010).

Table 18: Respondents' level of participation according to access to markets (n = 100)

Access to markets	Level of participation				Total
	Below average		Average and above		
	N	%	N	%	
Did not access markets	34	34	13	13	**47**
Accessed markets	25	25	28	28	**53**
Total	**59**	**59**	**41**	**41**	**100**

$\chi^2 = 19.573$ d.f 1 Sig. at $P \leq 0.05$

4.4.2.4 Access to land

Table 19 shows that there was a significant relationship between access to land and the level of participation in irrigation schemes. Therefore, the null hypothesis of no significant association is rejected. The findings reveal further that few respondents who participated in different stages of the project had access to land (22%) as compared to those who did not participate in the project, and who constituted 25%.

Table 19: Respondents' level of participation according to access to land (n = 100)

Access to land	Level of participation				Total
	Below average		Average and above		
	N	%	N	%	
Did not access land	37	37	25	25	**62**
Accessed land	16	16	22	22	**38**
Total	**53**	**53**	**47**	**47**	**100**

$\chi^2 = 22.001$ d.f 1 Sig. at $P \leq 0.05$

4.4.2.5 Perceived effectiveness of farmers' organization

Table 20 shows that there was a significant relationship between perceived effectiveness of farmers' organization and the level of participation in irrigation schemes. Therefore the null hypothesis of no significant association is rejected. The findings reveal further that more respondents (44%) with negative perception on effectiveness of farmers' organization had very low participation level compared to farmers with positive perception, and who comprised 3%.

Table 20: Respondents' level of participation according to perceived effectiveness of farmers' organization (n = 100)

Perceived effectiveness of farmers' organization	Level of participation				Total
	Below average		Average and above		
	N	%	N	%	
Negative perception	44	44	27	27	**71**
Positive perception	3	3	26	26	**29**
Total	**47**	**47**	**53**	**53**	**100**

$\chi^2 = 22.031$ d.f 1 Sig. at $P \leq 0.05$

4.5 Summary of Chi – square (χ^2) test

Table 21 gives a summary of Chi- square (χ^2) test, as presented in the previous section, four independent socio- economic variables, namely age, marital status, income and level of education were found to be significantly related to the level of participation. Similarly, independent institutional variables, namely, extension contact, access to credit facilities, access to markets, access to land and effectiveness of farmers' organization were found to be significantly related to the level of participation of respondents in irrigation schemes. The remaining factor, namely; sex, did not have any significant relationship with the level of participation of the respondents.

Table 21: Summary of Chi-square (χ^2) test

Independent variable	Dependent variable	Chi-square (χ^2)	df	p value	Rmks
Socio-economic factors					
Age	Level of participation	9,297	1	0.045	S
Sex	Level of participation	0.342	1	0.559	N.S
Marital status	Level of participation	14.372	1	0.002	S
Income	Level of participation	13.482	1	0.004	S
Level of education	Level of participation	2.529	1	0.047	S
Institutional factors					
Extension contact	Level of participation	27.168	1	0.029	S
Access to credit facilities	Level of participation	12.314	1	0.000	S
Access to markets	Level of participation	19.572	1	0.011	S
Access to land	Level of participation	22.001	1	0.000	S
Effectiveness of farmers' organization	Level of participation	22.032	1	0.000	S

Key: N.S = Not significant, S = Significant

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study aimed at investigating participation of farmers in irrigation schemes. The findings shows, based on socio-economic characteristics for both groups of participating and non-participating farmers were more or less similar, in that, the level of participation through the project stages was low. Participation of the respondents was found to be high only at one stage, that is, project implementation, where the activity was preceded by a mobilization drive with the aim of educating people, first on the importance and benefits associated with the project and the contribution which were expected from them. When it came to implementation, the respondents were involved in the activity and since they were required to contribute manpower to the project, most of them were able to participate.

Participation of the respondents was low in the project identification, decision making, planning, and evaluation stages due to lack of opportunities. The respondents were not given enough opportunities to participate in such activities. The factors affecting participation of farmers in the scheme include poor extension contact, lack of access to credit facilities, lack of access to markets, lack of access to land and weak farmers' organizations.

On the basis of these major findings of the study, the following conclusions are drawn:

(i) Majority of people were not involved in project identification, decision making, planning and evaluation staged of the project.

(ii) Age, marital status, income and level of education of respondents had a statistically significant relationship with the level of participation while sex did not.

(iii) Extension contact, access to credit facilities, access to markets, access to land and perceived effectiveness of farmers' organization had a statistically significant relationship with the level of participation in the project.

5.2 Recommendations

In view of the above, the study recommends the following:

(a) Communities should be involved in all stages of the project to increase their participation for sustainability of such projects;

(b) Extension services should be facilitated to provide the required assistance to farmers on agricultural related projects;

(c) Communities should be encouraged to establish saving and credit facilities to help them finance agricultural related activities rather than sorely depending on informal sources, which are unreliable;

(d) The government should make necessary arrangements to assist farmers own land legally so that communities can invest in it and avoid unnecessary conflicts.

(e) Local governments should establish marketing channels after carrying out survey prior to implementation as well as infrastructures like feeder roads and communication systems to facilitate easy transportation and information dissemination of markets.

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APPENDICES

Appendix 1: Questionnaires for participants and non-participants

I. Questionnaire for Farmers' who participate in scheme and those who do not participate in the scheme.

SOKOINE UNIVERSITY OF AGRICULTURE

FACULTY OF AGRICULTURE

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

TITLE: PARTICIPATION OF FARMERS IN IRRIGATION SCHEMES IN TANZANIA. A CASE OF KWAMADEBE IRRIGATION SCHEME IN KONDOA DISTRICT

Respondents'no……..… Date……...Year……..……

Name of the village……

Ward…….... Division……

I would like to thank you for agreeing to meet us. My research attempts to determine factors that influence farmers' participation in irrigation schemes in Tanzania. It aims at determining suitable strategies for involving farmers in different irrigation activities.

The results of this study will help the community to come up with better ways of being involved in irrigation schemes.

All questions asked relate to research for my study and responses made will be kept confidential.

Sincerely yours,

HIIRakt[mk]

Hassan Kiseto

Researcher

SECTION A

Farmer Characteristics

A1. Age of respondent……. (in years)

A2. Gender of respondent……..

A3. Marital status (check one)

(a) Married [ ]

(b) Single [ ]

(c) Widowed [ ]

(d) Divorced [ ]

A4. What is your level of education?

(a) Non- formal education [ ]

(b) Adult education [ ]

(c) Primary education [ ]

(d) Secondary education [ ]

(e) College [ ]

A5. What is your monthly income, in TSHs?

(a) 0 - 50,000/- TSHs [ ]

(b) 50,001/- - 100,000/= TSHs [ ]

(c) 100,001/- - 150,000/- TSHs [ ]

(d) 150,001- 200,000/- TSHs [ ]

SECTION B

Institutional Factors

B1. For how many years have you lived in this village? …….. (number of years)

B2. Are the crops produced enough for your household needs for the whole year?

(a) Yes [ ] No [ ]

B3. If you produce more than the household needs, what do you do with the surplus?

(a) Selling [ ] (b) Any other uses [ ]

(c) Offer as a present to the relatives [ ]

B4. If you sell, is there an organized marketing system?

(a) Yes [ ] No [ ]

B5. Do you get access to sell your produce to the organized marketing system?

(a) Yes [ ] No [ ]

B6. If answer to question B5 is NO, where do you sell your crops?

(a) In the village market [ ] (b) Restaurant and hotels [ ]

(c) any other place [ ]

B7. Is there any government assistance in meeting production costs?

(a) Yes [ ] (a) No [ ]

B8. What assistance did you get this year?

(a)……..

(b) ……

(c) …….

(d) ……

B9. Is there an extension officer in the village?

(a) Yes [ ] (b) No [ ]

B10. How many times extension officer visited your plot this year?..... (number of times)

B11. How many times did you consult extension officer this year?..... (number of times)

B12. For what purpose did you consult an extension officer?

(a) ……

(b) ……

B13. Are you satisfied with the contacts made by the extension officer?

(a) Yes [ ] (b) No [ ]

SECTION C

Level of Participation of Farmers

C1. Where did the idea of establishing irrigation scheme originate?

(a) From among the villagers [ ]

(b) From the government [ ]

(c) From the NGO [ ]

(d) Any other, specify……...

C2. If the idea originate from among yourselves, what was the reason?

(a) Presence of water source in the village [ ]

(b) Severe effect of drought [ ]

(c) Other reasons, specify……

C3. If not among yourselves, where did you get the idea?

(a) VEO [ ]

(b) Village government [ ]

(c) Local government [ ]

(d) Central government [ ]

(e) Sponsors of the programme [ ]

(f) Others, specify…….

C4. Do you have a plot for crop production in the irrigation scheme?

(a) Yes [ ] (b) No [ ]

C5. If the answer to the question C4 is NO, explain why?

(a) Unable to pay the fees [ ]

(b) Not profitable [ ]

(c) The plot was taken by someone else [ ]

(d) Poor administration of the scheme [ ]

(e) Others, specify……..

C6. If the answer to question C5 is YES, how did you get it?

(a) Bought [ ]

(b) Inherited [ ]

(c) Hired by water user group [ ]

C7. Do you pay money for using the plot for crop production?

(a) Yes [ ] (b) No [ ]

C8. Are you a member of Irrigators' Organization (IO)?

(a) Yes [ ] (b) No [ ]

C9. If the answer to the question C8 is YES, how did you become a member of irrigator's organization (IO)?

(a) Appointed by village government [ ]

(b) Voted at a village meeting [ ]

(c) Joined voluntarily [ ]

(d) Selected by scheme administration [ ]

C10. Did you pay any subscription fee last year?

(a) Yes [ ] No [ ]

C11. If answer to question C10 is YES, how much did you pay? …… (in TSHs)

C12. How many IO meetings have you attended this year? .....

C13. Are you aware of any assistance given by the water user group?

(a) Yes [ ] No [ ]

C14. If your answer to question C13, is YES, what kind of assistance did you get?

(a) Facilitating availability of agriculture inputs [ ]

(b) Collecting subscription fees [ ]

(c) Management of the scheme [ ]

C15. In your opinion, has the scheme been beneficial to you?

(a) Yes [ ] No [ ]

C16. Has it been beneficial to some other members of the community?

(a) Yes [ ] No [ ]

C17. Mention the benefits of the scheme

Personal benefits	Community benefits
(a) ……	(a) ……
(b) ……	(b) ……

C18. Was there any campaign to mobilize the people before the implementation of the scheme?

(a) Yes [ ] No [ ] I don't know [ ]

C19.(i) Did you or do you participate in identification of the problem on the basis of which the project was established?

(a) Yes [ ] No [ ]

(ii) If the answer to question C19 (i) is YES, what role did you play in program identification?

(a) Initiator [ ]

(b) opinion giver [ ]

(c) opinion seeker [ ]

(d) information giver [ ]

(e) information seeker [ ]

(iii) If the answer in C19 (i) above is NO, who identified the problem?

(a) village leadership [ ]

(b) government agents/ donor agency [ ]

(c) other villagers [ ]

(d) don't know [ ]

(e) other, specify [ ]

C20. (i) Did you or do you participate in decision making regarding the development of the project?

(a) Yes [ ] No [ ]

(ii) If the answer to question C20 (i) is NO, why? ……..

C21. (i) Did you or do you participate in project planning?

(a) Yes [ ] No [ ]

(ii) If the answer to question C21 (i) is NO, why? …….

(iii) If the answer to question C21 (i) is YES, in what capacity did you participate in the planning process?

(a) Village member [ ]

(b) Resource person [ ]

(c) Village council member [ ]

(d) Village leader [ ]

(e) Other, specify……..

C22. (i) Did you or do you participate in implementation of the scheme?

(a) Yes [ ] No [ ]

(ii) If the answer to question C22 (i) is NO,

why?.....

(iii) If the answer to question C22 (i) is YES, what was or is your contribution to the implementation of the scheme? .....

C23.(i) Did you or do you participate in project evaluation?

(a) Yes [ ] No [ ]

(ii) If the answer to question C23 (i) is NO, why? ……

(iii) If the answer to question C23 (i) is YES, what kind of evaluation?

(a) In the election of leaders [ ]

(b) In assessing active membership of beneficiaries [ ]

C24. Do those failing to participate in scheme work get punished?

(a) Yes [ ] No [ ]

C25. If the answer to question C24 is YES, please mention some of the punishments meted on non-participants

(i) …..……

(ii) ……

C26. Are there incentives for active participants in the scheme?

(a) Yes [ ] No [ ]

C27. If the answer to question C26 is YES, please mention them

(i) ……

(ii) ……

(iii) ……..

C28. How do you perceive effectiveness of Irrigators' Organization?

(i) Very successful [ ]

(ii) Successful [ ]

(iii) Satisfactory [ ]

(iv) Unsuccessful [ ]

(v) Total failure [ ]

C28. Please, give factors that influence your participation in the project

(i) …….

(ii) ……

(iii) ……..

(iv) ……..

Thank you for your participation

Appendix 2: checklist for semi- structured interview for district and scheme leaders

1. How many members are in the Irrigators' Organization (IO)?
2. How many members are targeted in project long term plans?
3. What are the criteria needed for a farmer to join Irrigators' Organization?
4. How many Irrigators' Organization meetings have been conducted this year?
5. What organization structure is in place to facilitate day to day activities of the Irrigators' Organization?
6. In your opinion, what is the benefit of Irrigators' Organization to farmers?
7. What technical assistance is offered by village extension officer?
8. What assistance is offered by the government to the scheme?
9. Do farmers get access to markets of their produce? Where do they sell?
10. Do farmers get access to credit facilities to meet production costs?
11. Is there any difference in crop productivity between farmers participating in scheme and those who do not participate?
12. To what extent do farmers participate in scheme?
13. What are the rewards for those complying with the rules and regulations?
14. What are the punishments for those going against the rules and regulations?
15. What can you say about effectiveness of leadership of the Irrigators' Organization?
16. What tangible benefits could be counted on presence of the scheme?
17. What challenges do scheme face in its day to day activities?
18. What do you suggest on ways to improve participation of farmers in the scheme?

Thank you for your participation