

**FARMER'S PERCEPTIONS ON THE EFFECTIVENESS OF COOPERATIVES IN
DISSEMINATING AGRICULTURAL TECHNOLOGIES IN ETHIOPIA:
A CASE OF ADEA DISTRICT**

BY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
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ABSTRACT

For a long period of time within different political systems cooperative societies have served as farmer organizations to give credit and to disseminate agricultural inputs in order to attain increased production and productivity of smallholders. However, dissemination of agricultural technologies were forcibly transferred using top-down approaches with minimum participation and giving less emphasis to the priority needs of the farmers. This study examines farmer perceptions on the effectiveness of cooperatives in disseminating agricultural technologies with emphasis on major factors that limit technology dissemination in selected primary cooperatives in Adea district in Ethiopia. The study is based on literature review, interviews and collecting data using semi-structured questionnaire. A cross-sectional survey method was employed for the study. From the sample frame, six cooperatives were selected purposively by setting specific criteria. From each cooperative society 15 members and 5 non members were selected randomly and purposively, respectively. In the study descriptive statistics like frequencies, mean, percentage, chi-square test, correlation and t-test were employed to analyze the data using Statistical Package for Social Sciences (SPSS). The main finding of this study show that cooperative have a serious shortage of working capital, work seasonally and focuses mainly on input distribution during planting time and purchasing agricultural products from farmers living in respective cooperative areas during harvesting time. This limitation is due to poor planning and management, lack of credit, irregular extension service, loose linkage with stakeholders, and lack of market information. Furthermore, survey results revealed that empowerment of farmers through farmer organizations and farmer's priority needs were given less attention. Therefore, from the findings of the study it is recommended and insists that policy makers and concerned institutions should design a system that can enable cooperative to work all year round, improve market information, credit system, extension service based on regular program, and priority needs of the farmers.

DECLARATION

I, ALEMAYEHU SHISHIGU MEKURIA, do here by declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work, and has never been submitted, nor concurrently being submitted for higher a degree award at any other University.

Alemayehu Shishigu Mekuria
(MSc. Candidate)

Date

The above declaration is confirmed.

Prof. Z. S. K. Mvena
(Supervisor)

Date

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<i>ATVET Agricultural Development, Vocational Education and Training.....</i>	<i>xvii</i>
<i>CACC Central Statistical Census Commission.....</i>	<i>xvii</i>
<i>CADU Chilalo Agricultural Development Unit.....</i>	<i>xvii</i>
<i>DA Development Agent.....</i>	<i>xvii</i>
<i>DAP Di-Ammonium Phosphate.....</i>	<i>xvii</i>
<i>FAO Food and Agricultural Organization.....</i>	<i>xvii</i>
<i>FDRE Federal Democratic Republic of Ethiopia.....</i>	<i>xviii</i>
<i>FNG Federal Negarit Gazeta.....</i>	<i>xviii</i>
<i>FTC Farmers’ Training Centre.....</i>	<i>xviii</i>
<i>IFAD International Fund for Agricultural Development.....</i>	<i>xviii</i>
<i>KG Kilogram.....</i>	<i>xviii</i>
<i>KM Kilometer.....</i>	<i>xviii</i>
<i>MoA Ministry of Agriculture.....</i>	<i>xviii</i>
<i>MoARD Ministry of Agriculture and Rural Development.....</i>	<i>xviii</i>
<i>MPP Minimum Package Program.....</i>	<i>xviii</i>
<i>NEIP National Extension Intervention Program.....</i>	<i>xviii</i>
<i>NGO Non Governmental Organization.....</i>	<i>xviii</i>
<i>SDPR Sustainable Development and Poverty Reduction.....</i>	<i>xviii</i>
<i>SG-2000 Sasakwa Global-2000.....</i>	<i>xviii</i>

<i>SIDA</i> Swedish International Development Agency.....	xviii
<i>SMS</i> Subject Matter Specialist.....	xix
<i>SPSS</i> Statistical Package for Social Sciences.....	xix
<i>SUA</i> Sokoine University of Agriculture.....	xix
<i>T and V</i> Training and Visit.....	xix
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LIST OF ABBREVIATIONS AND ACRONYMS

ADD	Agricultural Development Department
ADLI	Agricultural Development-Led Industrialization
AED	Agricultural Extension Department
ATVET Training	Agricultural Development, Vocational Education and Training
Birr	Ethiopian Currency
CACC	Central Statistical Census Commission
CADU	Chilalo Agricultural Development Unit.
DA	Development Agent
DAP	Di-Ammonium Phosphate
DC	Development Centre
DCOO	District Cooperative Organization Office
Derg	Military Government
DZARC	Debre Ziet Agricultural Research Centre
EDRI	Ethiopian Development Research Institute
EEA	Ethiopian Economic Association
EEC/EU	European Economic Community/ European Union
EEPRI	Ethiopian Economic Policy Research Institute
ESE	Ethiopian Seed Enterprise
FAO	Food and Agricultural Organization
FBSPMS	Farmer Based Seed Production and Marketing Schemes
FCA	Federal Cooperative Agency
FDG	Farmer Development Group

FDRE	Federal Democratic Republic of Ethiopia
FNG	Federal Negarit Gazeta
FTC	Farmers' Training Centre
Ha	Hectare (10,000 sq. meter)
IAR	Institute of Agricultural Research
IFAD	International Fund for Agricultural Development
KG	Kilogram
KM	Kilometer
masl	meter above sea level
MoA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
MoFED	Ministry of Finance and Economic Development.
MPP	Minimum Package Program.
NEIP	National Extension Intervention Program
NGO	Non Governmental Organization
PADEP	Peasant Agricultural Development Project
PADETES	Participatory Demonstration and Training Extension System
PASDEP	Agricultural Policy Programs And Targets for a plan for Accelerated Sustainable Development to End Poverty
PHASE	Pioneer Hybrid Seeds Ethiopia
Quintal	100 kilograms
REFAC	Research-Extension-Farmer Advisory Council
SDPR	Sustainable Development and Poverty Reduction
SG-2000	Sasakwa Global-2000
SIDA	Swedish International Development Agency
Skm	square kilometer

SMS	Subject Matter Specialist
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
T and V	Training and Visit
UN/EUE	United Nations/European Union Economic
VEW	Village Extension Worker
WADU	Walita Agricultural Development Unit

CHAPTER ONE

INTRODUCTION

1.1 Background information

Ethiopia is a large country which has an area of 1.1 million sq. kms. Agriculture is practiced by more than 85% of the population and a major source of livelihood for the majority of the people (CACC, 2002). The country has different agro-ecological zones producing various cereals, pulses, oil crops, vegetables, root crops, and perennials. It generates over 45% of the Gross Domestic Product (GDP) and 90% of the total export earnings of the country. The sector is characterized by its low productivity and subsistence. The low level production is attributed to limited use of technologies and traditional practices as well as the declining soil fertility due to poor management. Most farmers produce mainly for home consumption and not for the market. Agriculture is largely dependent on nature, when there is a change of environment agricultural production fails and the farmers are subjected to food insecurity. To improve production and productivity of subsistence farming system, extension services has been given high attention.

In Ethiopia, technology dissemination was started in 1956 when Alemaya, Jimma and Debre Ziet research stations are opened to give way for the beginning of formal extension service. Then cooperative societies were established to increase the productivity of subsistence agriculture by facilitating input distribution like improved seed, fertilizer, agro-chemicals, and farm implements through provision of credit. Cooperative societies could further help in enhancing the bargaining power of farmers by linking between production, marketing and processing. To address these objectives, during Imperial Regime cooperative societies were established to give marketing and credit service for the farmers (Asfaw, 2003). In this period 116 cooperative societies were organized and mainly engaged in

marketing of members produce. Although very few of these societies are savings and credit cooperatives these were established in a few towns (FCA, 2007). The regime favored only land owners and it was very difficult for poor landless to be a member of cooperative society and to get service. The main objective was to solve the problem of agriculture by reducing cost of input, increase production, and minimize the risk and uncertainties of the farmers (Asfaw, 2004). The cooperative societies were mainly participating in commercial farming for export purposes. The size of the business was very small and only attempted to export coffee and oil crops like sesame.

When Socialist economic system came into existence in the country, land reform proclamation was issued and abolished the tenant-land lord relationship and private ownership of the land (EEA/EEPI, 2006). The proclamation was enacted for the formation of one Peasant Association (PA) in 800 hectares and one Service Cooperative for 3-5 PAs. At present, due to the restructure of '*Keble*' or PAs one cooperative society is found in one peasant association. For the first time in the history of Ethiopia farmers got their own organization for empowerment and bargaining. In 1981 working with model farmers was replaced by service cooperatives which have become the focal points for introducing innovations (EEA/EEPI, 2006).

From 1 PA and Cooperative, three to five selected farmers were trained at Farmers Training Centre (FTC) to facilitate the process of technology dissemination by Village Extension Workers (VEWs). One VEW is assigned to 10-15 PAs to give information on technology utilization. Asfaw (2004), pointed out that, the Military Government enacted another law in 1978, which defined the principle of cooperative and to enhance the socialist economy transformation with the objectives of developing self reliance, promoting interest of the

farmers, and increasing production by strengthening research and extension, accumulation of capital, and increasing income.

According to MoA (1992, 1994), cited by Samson (2007) to strengthen extension service through cooperative, the Training and Visit (T and V) agricultural extension system was initiated and adopted as pilot project in 1983 with the assistance of the World Bank in Arsi (Tiyo and Hitossa) and Shoa (Adea and Lume). In 1986 when Peasant Agricultural Development Project (PADEP) was launched in selected food surplus districts to attain self sufficiency in food production; it was decided to assign VEWs at each cooperative society to give information and advise farmers on improved technologies. Belay (2003), has indicated that extension service was given low priority in giving the service to producer cooperatives and VEWs were ordered to perform various activities like tax collection, repayment, political mission and other administrative issues. Extension program planning was highly centralized, less flexible and top down. Technology dissemination to benefit the small scale farmer was very weak and supported by inappropriate development policy, research, input supply, and credit and marketing system. According to Habtemariam (2004), cited by EEA (2005) that during the period of Military Government, the extension service mainly focused on grain production and community forestry, while horticultural and livestock extension did not receive adequate attention. This implies information and technology dissemination was carried out only with a few VEWs in food surplus districts and there was a lack of improved technology.

During Project Extension Approaches Chilalo Agricultural Development Unit (CADU), Walaita Agricultural Development Unit (WADU), and Minimum Package Programs (MPP I and MPP II) extension was linked with research to disseminate information and technologies. After discontinuity of linkage between research and extension for a decade at

the time of PADEP Research, Extension, Liaison Committee (RELC) was reestablished between Institute of Agricultural Research (IAR) and Agricultural Development Department (ADD) to coordinate information and technology dissemination (EEA, 2004). PADEP employed a modified T and V extension system by dividing the country into eight agro-ecological or project areas. EEA (2004) indicated that the project was supported by different donors like then European Economic Community (EEC), World Bank, International Fund for Agricultural Development (IFAD) and Sweden International Development Agency (SIDA) for technology dissemination and utilization. The experience of linkage was taken from modified T and V agricultural extension system. The aim was to disseminate information and technologies by giving monthly training for district Subject Matter Specialists (SMSs) and quarterly training for regional SMSs. Feedback was given from field through SMSs for researchers to give solution to production constraints. Even though, different extension approach have been implemented through assistance from donors at different periods of time; they didn't bring any significant change on the farmers' lives.

In 1990, there were 4052 cooperative societies with 4.5 million members in all parts of the country, their organizational structure and management were very weak (FCA, 2007). The cooperative societies were disseminating different kinds of fertilizer, improved seed, and agricultural chemicals according to the demand of farmers identified by the VEWs. However, due to political instability, price control policy and free movement of agricultural product and incidence of drought the cooperative societies were misused and only required to purchase food grain for the government and give commodity services to their members (EEA/EEPI, 2006).

In general, the modified Ethiopian T and V program adopted at least 50% of the principle of the classical T and V approach in its 15 years period under the Military Government under

pressure. However, under pressure from the donors, 1988 the Military Socialist Government made policy change on price controls, allowed free movement of goods and provided better security tenure (Habtemariam, 2007). According to Habtemariam (2007), even if, some of the development strategies of the Military Government like organization of farmers into peasant associations, establishment of cooperative societies, and establishment of farmers training centers in principle of human resource development perspective of extension staff is acceptable. The military regime did not have trust on VEWs. It employed its own production and political cadres, who had only a three months training to implement its rural development strategies marginalizing extension professionals and other experienced experts.

When a new economic policy was introduced, it provided an opportunity for cooperative societies and extension in terms of pluralism and decentralization to deliver services. For the first time cooperatives which could follow the principle of cooperative were established, which provided an opportunity to strengthen the previous cooperative societies with full autonomy. Hence, the interference of outsiders was reduced compared to the previous experience. Now they are running their own businesses and disseminating different types of technologies according to the demand of the members. The cooperative societies took advantage of the current situation to establish different types of cooperatives. Most of the agricultural cooperative societies were and still are multipurpose. They are dealing with activities like supply of inputs, credit and saving, marketing food grains, coffee processing and marketing, milk processing and marketing, etc.

In 1993, Sasakawa Global 2000 (SG-2000) made a listing of available technologies in collaboration with IAR and Agricultural Extension Department (AED) and initiated another strategy for extension service. Due to use of these technologies the yield of maize and

wheat per hectare in the different agro-ecological zones were tremendously increased and farmers were motivated by the change. To compliment the strategy, the Participatory Demonstration and Training Extension System (PADETES) was proposed as a new extension system after evaluating the previous extension management approach by setting mission, goal, and objective for the first time to encourage farmer participation in planning and implementation. Since 1995, the rural centered agricultural development approach using PADETES and the modified SG-2000 approach called National Extension Intervention Program (NEIP) has been adopted as national extension system in the country (Tesfaye, 2003). The linkage between research, extension and farmers for the exchange of information and technology dissemination was stronger compared to the pervious, but it lacked coordination among actors. In addition, infrastructure, strong farmer organization, rural finance and marketing were a bottleneck for the success of extension.

According to MoFED (2002), cited by Samson (2007) to further improve the productivity of the agricultural sector, the country designed an economic strategy called Agricultural Development Led Industrialization (ADLI), which has been a long term strategy to achieve faster growth and economic development by making use of technologies that are labour using but land argumentation, such as fertilizer, improved seed, and other cultural practices. The main objective of ADLI is to promote productivity of agricultural sector by improving extension service and technology utilization and there by improving the living standards of rural communities. To achieve this strategy through technology dissemination and adoption Research-Extension- Farmer Advisory Councils (REFACs) were established at national, regional, and research centre level to improve linkage and feedback mechanism to make research demand driven and to involve users. The advisory councils are mandated to review research projects and to evaluate the performance of technologies at research centers and on farmers' field.

In different periods of time and with different extension approaches, cooperatives play an active role in disseminating agricultural inputs and marketing output to farmers through VEWs. According to FCA (2007), there are 112 Cooperative Unions and 19 147 different types of primary cooperatives found in Ethiopia, they have a total capital of *Birr* 154.2 million and *Birr* 4.4 billion, respectively. From the total number of primary cooperatives 2303 were members of cooperative unions, the rest 16 844 were not members of cooperative union. The total member of primary cooperatives has reached 4.6 million. Nowadays, within each primary cooperative 2-3 VEWs are assigned in areas of crop, livestock, and natural resource management to give extension service for 650-900 households.

The country was politically isolated for a long period of time from the outside world due to political ideology. During the change of Military Government in 1991, there were only about 2500 VEWs deployed to give extension service to about 11 million households. To fill the gap, the Government planned to develop human resource capacity to transform the small scale farming by establishing 25 Agricultural Technical Vocational Education and Training (ATVET) colleges and enrolled 30 000 students each year (AED, 2003). By 2007, about 49 444 VEWs have been graduated, from ATVET while 20 236 VEWs were on training session to give extension service in the future.

The Development Centre (DC) which previously provided information and advice on technology dissemination and utilization only is replaced by FTC. The FTCs besides giving information and advice for the farmer, they are giving skill training. The main objective of FTC is to give skills training for farmers to bridge the gap between farmers' knowledge and production technology, to create farmers who are business oriented, skilled, motivated,

environmentally conscious and agricultural practitioners (AED, 2003). FTCs are the integral part of ATVET program for implementing rural development strategy. A few of the FTCs are already established and have started to train the farmers. Moreover, in the country a total of 18 000 FTCs would be on operation including the previous to disseminate information and technology in the near future (AED, 2003). The training has been done to 60 farmers for six months in three areas of crop, livestock, and natural resource management. The training is given for two days per week for two hours per day. To support skills training and to make training meaning full, different types of demonstrations are prepared within the FTC campus.

Currently, the government extension strategy indicates that three VEWs will be deployed per PA that is 720-900 farm families. According to Habtemariam (2007), the PA will be divided into three zones, where each VEW will be responsible to about 240-300 households. The zonal and PA extension unit which has a total of 10 people in each unit established consists of VEW and some selected farmers including women. The main responsibility of the group is used to prepare plans and implement zonal and PA's development plans. The other most important feature of the strategy for information, and technology dissemination and utilization is the establishment of Farmers Development Groups (FDG) consisting of 20-30 farmers. This indicates that there will be 8-10 development teams per VEW and 30-40 per PA. The strategy clearly intends to make extension service more participatory and demand driven, however this was not implemented in the study area.

In general, rural development programs, particularly agricultural extension give high priority to improve productivity and production and give less emphasis on empowering farmers through farmer organizations. However, primary cooperative societies are currently

playing a vital role in agricultural input dissemination and output marketing in supporting agricultural extension service. Extension needs to empower the farmer through cooperatives in order to disseminate technologies by establishing worthy and friendly relationship with farmers. Most of the time, this could be influenced technically, financially, psychologically, culturally, and socio-economically which could limit the frequency of contact between farmers and VEWs to disseminate technologies.

1.2 Problem statement

Cooperative societies have been established in order to benefit its members by reducing risk and uncertainties to maximize profit. Even though, the cooperative societies are reorganized for a number of times on the principle of cooperative philosophy, they are not working as expected due to a number of problems. These problems include lack of commitment, lack of capital, lack of skilled management, lack of market information, low effectiveness in disseminating technologies and loose linkage between extension workers and cooperatives. In the study areas observation made shows that cooperatives are experiencing with shortage of credit, even if they are interested to invest on project like fattening cattle, poultry, vegetable production, etc. The members cooperative societies also have a problem on grain marketing, which is created by middle-men called brokers who agitate farmers to sell their product at unfair price.

Faced with these many problems, the effectiveness of cooperative societies in the dissemination of technologies is likely to be jeopardized. It is therefore paramount that this situation is thoroughly understood if we are to improve the effectiveness of cooperatives in disseminating agricultural technologies. So far no study has been done to know farmers perception on the effectiveness of cooperative societies in disseminating agricultural technologies. This study seeks to bridge this knowledge gap with the ultimate aim of

improving effectiveness in disseminating agricultural technologies by cooperative societies. Moreover, the results of this study will provide information on technology dissemination.

1.3 Justification of the study

Cooperatives are important farmer organizations that disseminate different technologies according to the demand in order to increase income. According to EEA/EEPRI (2006), the availability and utilization of technologies could be enhanced if there is an effective and link between extension and research and also involve the farmers as an important factor for technology dissemination. EEA/EEPRI (2006), indicated that the level of availability and access to agricultural inputs, capital, market, infrastructure, etc could also limit the extent of success of extension program. The use of inputs and adoption of improved agricultural technologies have given rise to increase the demand for agricultural credit (Kedir, 1999). The effectiveness of cooperatives can be determined by providing input distribution and marketing output as necessary condition for extension workers to deliver technology dissemination.

This study through cooperatives shed light on the strength and weakness of disseminating agricultural technologies through cooperative with the intention to improve effectiveness of technology dissemination to members. Hence the finding of this research will boost agricultural productivity by improving the effectiveness of cooperative societies in disseminating agricultural technologies. Therefore incomes of the beneficiaries will eventually improve.

1.4 Scope and limitation of the study

This study was designed to focus on dissemination of agricultural technologies through cooperative that has been delivered by district agricultural extension program. The coverage

of the study included six cooperatives and 120 respondents were selected purposively and randomly. The study was concentrated to determine factors that affect technology dissemination. Hence the finding of this study would help policy makers, cooperative organizer and extension workers to focus on the factors which have been identified as main constraint which would make cooperative ineffective.

However, this study has some limitation which appear from shortage of time, unwillingness of the farmers to be interviewed unless paid, because of previous experience from NGOs and a few of the farmers were not willing to respond to some of the questions due to fear. These problems were resolved through discussion with the PA leaders and respondents.

1.5 Objectives of the study

1.5.1 Overall objective

To examine the effectiveness of cooperative societies in disseminating agricultural technologies in Ethiopia.

1.5.2 Specific objectives

- i. To identify the mechanisms used by cooperative societies in disseminating agricultural technologies.
- ii. To assess farmers perceptions on effectiveness of cooperative societies in disseminating agricultural technologies.
- iii. To identify limitations of cooperative societies in disseminating agricultural technologies.

1.6 Research hypothesis

To achieve the above objectives of the study, the following research hypothesis assumed to be tested in order to identify association of socioeconomic variables in disseminating agricultural technologies through cooperatives.

Ho: There is no significant relationship between institutional, resource and infrastructural factors on effectiveness of cooperative society in disseminating agricultural technologies.

1.7 Operational definitions

The following terms which are used frequently in the text are defined to provide common understanding.

- (i) Peasant Association (PA): are defined as farmer organization which has an average of 500-750 household. It is the first stage in local government administration structure and has its own council. It has permanent task force such as social court, administrative and security, development, and health committee. It has the responsibility to approve credit and collection of repaid loan that has been taken from Primary cooperatives. The relationship between cooperatives and PAs are basically horizontal.
- (ii) Farmer Training Centre (FTC): is a farmer institution found in the vicinity of each PA which is used to give skills training to farmers for a period of six months for two days and two hours per week. In one intake 60 farmers take training on crops, livestock, natural resource management, cooperatives and animal health. Finally, they are awarded with green certificates.
- (iii) Village Extension Worker (VEW): is an extension agent who is assigned at PA level, who has a responsibility for skill training in FTCs, pass relevant information and give advice on technology dissemination and utilization.
- (iv) Cooperative Society: is a society established by individual on voluntary bases to collectively solve their economic and social problems and to democratically manage the same.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews the literature pertinent to this study and covers the following: what are cooperatives, cooperative movement in Ethiopia, role of cooperatives in agricultural development, technology dissemination through cooperatives and determinants for technologies dissemination.

2.2 What are Cooperatives?

A cooperative society is defined as an organized body of not less than ten persons voluntarily associated on equal terms to work together for their own betterment (Savile, 1965). The Socialist Cooperative School defines cooperative as the part of transformation from capitalism to socialism and eventually to communism (Helm, 1968). This indicates cooperatives serve as a means of capital accumulation to transform rural community to socialism. In broad sense, cooperative means any form of two or more persons working together to achieve economic or non economic gains. What will be common to all instances is only that two or more persons are involved in the process (FCA, 2006).

According to Proclamation No. 147/ 1998 Cooperative Society means a society established by individual on voluntary basis to collectively solve their economic and social problems and to democratically manage the same (FNG, 1998). Cooperative societies are self help group which are voluntary joined together to meet the common need of members. It is a business oriented organization primarily to earn minimum profit and share according to their contribution.

The meaning of cooperative varies in each economic system. It is very difficult to have a common definition of cooperative due to flexibility of organization to achieve its objective in different circumstances.

2.3 Cooperative movement in Ethiopia

In Ethiopia the word cooperative has been known for a long period of time. The traditional farmers' organizations have a long history particularly through groups like *Jige*, *Wonfel*, and *Iqib*. These are self help groups which jointly carry out activities and saving money in rotation, but they are not developed into modern societies.

In 1958, the first farm cooperative was established in the southern part of the country in Walaita district. In 1960, the Cooperative Legislation was enacted to promote the organization of modern cooperatives as Farmers' Workers Cooperative Decree (Asfaw, 2004; Yenealem and Nigusse, 2005). At the end of the second five year planning only a few cooperatives were formed due to shortage of trained manpower, lack of budget and credit. Due to low achievement, the *Farmers' Workers Cooperative* was revised to include all types of cooperatives and, the decree was replaced by cooperative society. In 1966, new legislation of cooperative was issued under the title of *Cooperative Society Proclamation* No.241/1966 which was issued for improving the standard of living of farmers, better business performance and improved methods of production by reducing the cost of goods and services for production and consumption and minimizing and reducing individual impacts of risk and uncertainties for farmers (Yenealem and Nigusse, 2005). During this period the government gave attention to promote cooperatives and measures were taken like establishment of National Cooperative Board, cooperative training centre to train leaders of cooperatives, and establishment of national cooperative investment fund. However, the establishment of cooperatives was slow and restricted only in cash crop growing areas.

During the Imperial Rule, cooperatives were created to support agricultural production for export purposes. Their members included farmers with large land holdings while smallholders were excluded from membership.

After, the overthrow of the Imperial Regime, the socialist government issued land reform proclamation by giving legality of peasant associations and cooperative societies in the form of communes '*Yehiberet Ersha*' in 1975 (Asfaw, 2004). The proclamation gave right to form all types of cooperatives. Since the cooperatives societies were formed unwillingly and spontaneously, they didn't meet the criteria of cooperatives. They were directly controlled by the government cadres for political purposes. During the military rule, the government established a wide network of cooperatives to organize the peasants, monitor agricultural prices, levy taxes, extend government control at all levels and promote socialist ideology through forced participation.

In 1991, when a Free Market Economy system was introduced as a new policy, it encouraged the previous cooperatives to be strengthened and others to be formed. At present, cooperatives have pyramid shape, the federation at the top, while primary cooperative at the bottom and in between are the unions (Sharma, 1981). For now, cooperatives in Ethiopia have three levels of structure that is primary, union, and federation. These cooperative societies are formed at village, district and national level. Since 1994, the Federal Government of Ethiopia has expressed renewed interest in cooperative development to support smallholder's participation in the market economy. The Proclamation No.85/1994 distinguishes three important features from the predecessors i) they should be based on "peasants free will to organize"; ii) they should have such power to fully participate in the free market and iii) they should be rid of the government intervention in their internal affairs (FNG, 1994). More recently, Proclamation No. 147/ 1998 extending the cooperatives

to non agricultural organization and then stated that it has become necessary to establish cooperative societies which are formed on the bases of individual voluntary basis and who have similar needs for creating savings and mutual assistance among themselves by pooling their resources, knowledge and property, it has become necessary to enable cooperative societies to actively participate in the free market system (FNG, 1998).

This was later reaffirmed in the Sustainable Development and Poverty Reduction Program (SDPRP) in which one of the main measures proposed for agricultural sector was to organize, strengthen and diversity autonomous cooperatives to provide better marketing services and serve as bridge between small farmers (peasants) and non-peasant private sector. This thrust has continued into current poverty reduction strategy, which explicitly emphasizes the need to support the cooperatives as a means of strengthening and empowering smallholders' market participation in the liberalized market environment (MoARD, 2005). Cooperatives are also expected to render vital services other than those related to agricultural marketing, including the following: i) expanding financial services in rural areas; ii) purchase of agricultural machinery, equipment and implements, and lease them to farmers; iii) setting up of small agro-processing industries where agricultural products with greater value added could be produced and iv) establishing various institutions to provide different kinds of social services. [<http://www.itpric.cigiar.org/conferences/2006>].

At present, most of the agricultural cooperative societies are multipurpose they are dealing with activities like input supply, selling and buying of farm products, provide tractors and milling services. A few of them are engaged in processing coffee, milk, wheat flour, and oil crops. Rolling (1990) contended that farmer organizations are important from different perspective to ensure active utilization of sub-systems. Utilization requires input provision,

credit, marketing, processing and other services besides technological information. Such services require organization. To benefit small scale farmers in Ghana, farmers in irrigated areas organized themselves into cooperatives to have option of selling any surplus paddy. [http://www.fao.org/AG/ags/subjects/en/market_linkages/coops, htm].

2.4 Role of cooperatives in agricultural development

In developing countries, the majority of the farmers depend on subsistence agriculture to feed their families and small surplus that can be sold to get cash for purchase of non-agricultural products. Farmers mainly organize themselves around agricultural production related activities, thus allow themselves to have access to credit facilities. Cooperative societies enable its members to have access to credit and ensure the availability of new technologies. Beside these, cooperative societies enable small scale farmers by offering program like soil and water conservation, afforestation; improve indigenous livestock by giving bull services and artificial insemination (Helm, 1968). In order to promote innovations cooperatives require assistance from external sources with resource and technology.

In Kenya agricultural cooperatives are used as a tool to facilitate commercialization of smallholder farm sector. Agricultural cooperatives were given wide ranging powers in organizing farmer's cooperatives to deliver necessary services. Most smallholders own coffee and dairy farms, they are producing for the commercial market. Establishing cooperatives without mobilization or with out paying attention to training is unlikely to leave lasting results (Rolling, 1990). It requires mobilization and training of members to update and to end up with success. Most of farmers' cooperatives strongly rooted in traditional societies, they manage the relationships of their members within the society and mainly focus on redistributing resources, reducing risk (saving and credit) and securing the

basic condition for sustainable farming (Wennick and Heemskerk, 2006). Farmer organizations have to play a role of basic and support function for effective dissemination and use of knowledge. Basic function is related to innovation, it includes identifying problems and need of innovation; and creating knowledge and supply of information for solving problems and responding to needs. Supporting functions facilitate effective use of new knowledge like guiding the direction of the innovation process and sharing of knowledge (Wennick and Heemskerk, 2006). Hence the basic function could be implemented by research and farmer and supportive part could be facilitated by extension worker and other stakeholders.

Farmer organizations are voicing the problem and the needs of the members by directing knowledge and information about technologies. Farmer's voice cannot be heard without farmer organizations. It represents members by participating in policy and decision process for creating good condition and building the capacity of institutions to fast technology dissemination. According to Rutatora and Rwenyagira (2005), there is strong connection between farmers and their organizations for collective action for empowerment, which is enhanced through participatory approaches. Farmer organizations have two central functions regarding extension: i) to provide extension services for their members (farmer to farmer extension) and ii) to serve as a link between farmers and other agencies (public and private) offering extension services.

Peterson (2006), emphasizes the importance of farmer organizations particularly at grass root level as part of the utilization component; they offer an effective channel for extension contacts with a large number of farmers as well as opportunities for participatory interaction with extension organizations. In addition to promote member owned and controlled cooperative in Ethiopia cooperatives establish rural saving and credit cooperatives, raising

environment awareness and improving natural resources management at the farm level. Hence, in an environment where a farmer organization is strong, extension service delivering for its members in technology dissemination will be high.

2.5 Technology dissemination through cooperatives

Agricultural Cooperatives is a farmer organization which is established primarily to benefit its members. It is established to achieve a pre-determined goal that is disseminating technologies and give services like grain milling, tractor and commodity services according to the demand. An organization is created to work on routine task for the purpose it was established and to leading to stability of human relationships (Rogers, 1983).

At present, primary cooperative disseminate technologies like improved seed, inorganic fertilizer, herbicide, etc which is needed by members to raise productivity. Before technology dissemination the VEWs have to provide information to create awareness and to motivate individuals or organization to reduce uncertainty for use. According to Habtemariam (1999), the most important element of technology dissemination includes: i) realistic size demonstration plot; ii) physical availability of technology package; iii) farmer's need to implement technology package; iv) participation; v) hand-on practical training and vi) research and extension linkage. It means technology dissemination is the process which requires interaction of different actors and supportive mechanism at all stages. Much information is needed to solve farmers problems with their decision-making will come from research, extension, policy maker and other farmers that are related to input, price, etc (Van de Ban and Hawkins, 1996).

In any organization innovation process is divided into initiation and implementation. In the initiation stage it needs information gathering, conceptualizing and planning for adoption

and at implementation stage action and decision are required for use (Rogers, 1983). The VEWs have to play catalyst role in advising, convincing, demonstrating and finally to make farmers adopt the technologies. In fact, most farmers will not adopt technologies unless they try and determine its usefulness in their own situation. In any organization in many cases, an individual cannot adopt a new idea and opinion until cooperative leaders have previously adopted (Rogers, 1983). Opinion leaders in cooperatives can influence individuals and organization in determining the rate of adoption of technologies or to spread innovation in a community. A new idea can enter to the cooperatives by VEWs, stakeholders, and innovative members. Linkages are key importance as they create channels through which products, data, information, knowledge, and wisdom are exchanged between various partners in the development process and utilization (Rutatora and Rewenyagira, 2005). This will enhance effective communication among actors and facilitate possibilities for feedback to give solution.

Members' demands could be presented to primary cooperatives by extension workers. However, before planning for inputs adequate knowledge and information is required. After the demand as approved by cooperative, technology would be disseminated for use through credit. Issues like collective input supply and marketing, organization building, multi-functional agriculture and venturing into new market typically require new forms of coordinated action and cooperation among farmers, and between farmers and other stakeholders (Leeuwis, 2004). Innovation dissemination requires the integration of ideas, knowledge, experience, and creativity from variety of actors such as research, extension workers, farmers, service providers, etc (Leeuwis, 2004). This implies cooperatives alone cannot successfully disseminate technologies unless organized, mobilized and linked with other stakeholders.

The extension workers and cooperative organizers have to play active roles in disseminating agricultural technologies starting from identifying, advising, organizing, planning and disseminating by facilitating all necessary requirements like skills training, credit, and market information. Government extension workers constitute the most important instrument in the dissemination of technologies. They are considered as knowledge brokers between technology generators and users (EDRI, 2004). A member of a cooperative should decide to support organization for the use of innovation and knowledge. The innovation dissemination is effective only to the extent to which, it is embodied in the community structure (Rolling, 1990). For utilization of technologies which is disseminated by cooperatives, it requires technical assistance and credit from extension workers and external sources respectively to make the technology work. Extension workers organize village group meetings and demonstrations to inform and create awareness of farmers to use improved technologies. Farmer organizations also play a valuable role in the process by formulating the information need of their members and stimulating research institution, extension services and other actors to provide information.

2.6 Determinants for technologies dissemination

The main factors that affect technology dissemination are credit, technology availability, output marketing, extension contact, human resource development, and infrastructure. The determinants are as discussed below:

2.6.1 Credit

According to Berthold (1996); FACET (2000); Safara and Goulk (1997), cited by Kasambala (2007) credit means money/ goods/ services lend to borrowers with an interest. It involves process of raising funds and advances from any source, retaining and utilizing it for specific time and repayment and interest to the lender. The financial condition of most farmers in developing countries is poor. Cooperative can play role by bringing together this resource to poor farmers. Experience indicated that credit at reasonable interest rate through

cooperative can stimulate development. Ethiopia has a long history of credit policy, which has been passed to different government structures. Cohen (1987) contended that from 1950-1974 credit policy of agricultural sector during Imperial Regime was focused on commercial farm; it was considered that commercial farms could feed the growing urban population. But, it failed to promote adequate production due to low absorptive capacity of capital. According to Franzel and Houten (1992), from 1975-1991 under economic policy of Socialism, again the focus was on state farms, service cooperatives and producer cooperatives. Individual small holder farmers were neglected. Institutional credit priority was given to the state farms and collective producer cooperative.

The current economic policy of the Ethiopian government is known as Agricultural Development-Led Industrialization (ADLI). The strategy of ADLI focuses primary on agricultural development, which is to be attained through improvement of productivity of both small holdings and expansion of large scale private farms (Teketel, 1996). The financial reforms of 1991 include elimination of preferential access to credit, interest rate liberalization, structuring and introduction of profitability criteria, reduced direct government control financial intermediaries and limit of bank loans to the government (EEA, 2005). The policy allows domestic private financial institutions to give credit as intermediaries. In addition to this, the government adopted a policy that expands microfinance institution in rural areas to meet the need of smallholders. However, the lack of collateral to take loans still is the bottleneck for investment.

Farmers need credit to meet short and long term working capital to invest on agricultural production and income generating activities. They need financial resource to buy improved seed, fertilizer, and farm implements. Also, they need credit for income generating activities like poultry, fattening cattle, vegetable production, etc. According to EEA (2005),

in rural areas, agricultural activities are seasonal; the small holders need credit to narrow down the seasonal fluctuations in earning income and expense. EEA/EEPRI (2006), strongly argued that access to favorable credit services encourages use of modern inputs that would increase production and productivity. A cooperative society has responsibility to address the need of the farmers by facilitating credit for the members. However, in the study area cooperatives do not have direct contact with financial institution to give credit service to the members due to lack of collateral and credit system. According to by-laws adopted by a society shall receive loans for its members or organization from known financial institution to address the need of the farmer (FNG, 1998). However, this is not implemented in the study area. Credit is important to small holders to reduce these uncertainties. Credit facilitates an important role in the development of agriculture. The present agriculture can not improve without credit. Hence, in rural areas where financial problem exist, technology dissemination could be easily affected.

2.6.2 Technology availability

One of the factors that affect technology dissemination is the lack of technologies that could be introduced to the farmers. Extension workers particularly, VEWs should get improved cultural practices and new technologies which could increase production and productivity to disseminate information and technologies to farmers. However, the technologies are either absent or scarce.

According to Belay (2002), more than 92.3% of extension workers selected from different regions of the country report that insufficiency of relevant technologies as one of the constraints to agricultural work. Not only the availability of technology but also other factors like cost of inputs, yield of technology and price of products can influence technology dissemination and sustainable use of them where there is no availability of technology such as improved seed, livestock, and farm implements, fertilizers, etc

technology dissemination will not be expected. In Ethiopia to tackle the shortage of certified seed, the basic seed is distributed by ESE to regional and district bureaus of agriculture through cooperative union and cooperatives to multiply the certified seed on individual farm on contract base. Thus representing a new channel for seed certification by small scale farmers is more feasible by strengthening the decentralized certification procedure and capacity of the staff involved to make the seed available [<http://www.academiJournals.org/AJAR/PDF/pdf20%2008/April/Alemu%/20%et%>].

Availability is the most important component of technology dissemination, if technology is not physically available in the market, then we do not waste time in promoting the information alone (Habtemariam, 1999).

2.6.3 Output marketing

Marketing is the performance of activities that seek to accomplish an organizations objective by anticipating customer needs and directing a few of needs satisfying and services from producer to customer (Perreault and McCarthy, 2000). Cooperative would give priority for objective of organization in output marketing to satisfy both the need of producers and consumers. The low level of agricultural performance in Ethiopia is partly attributed to the weak agricultural input and output marketing system that has prevailed in the country (EEA, 2005). The weak agricultural product marketing system does not offer sufficient incentives for farmers. This has resulted due to low development of infrastructure and communication which is required for proper market function. Marketing is a system in a chain, all the way from producer to consumer of the product, involving the physical exchange, the exchange of the marketing information and implementation of regulatory measures (MoARD, 2005). Farmers' decision and responses to technology dissemination and adoption depend on existing market and market related institution. Technology

dissemination and utilization is depending on existing market performance by how far it is profitable.

EEA (2005), contended that marketing is one of the critical components of technology dissemination and utilization, which should be emphasized by VEWs by giving market information to improve market knowledge and skill of bargaining in developing record keeping habit and analyzing market information to build price prediction ability of the farmers. This will encourage farmers to produce market demanded products. Mostly, output marketing problem get intensified after the harvest of the crop, when farmers want to sell their produce in the market in order to fulfill their financial need for different purposes. Cooperative society can solve the problem of output marketing by: i) Giving training for the members on marketing to create awareness; ii) Giving service for supply inputs and output marketing; iii) Promoting standardization, grading, quality and certification of the product; iv) Creating value add for products of small scale to link to the terminal market; v) Promoting modernization system of product distribution and vii) Obtaining market power for members in public market.

2.6.4 Extension contact

Agricultural extension service is one of the main public sectors which provide relevant information to the farm community on market, inputs, farm implements and technologies to make the wheel of cooperative moving. Extension is an instrument that introduces improved cultural practices and new technologies to farmers after technology generation by research centre. The contribution of extension service in dissemination of information and technologies may be influenced by a number of factors such as extension approach, policy, budget, infrastructure, extension program planning, extension monitoring and evaluation. Besides, commitment of VEWs to work with farmers number of contact, coverage and

participation of farmers in extension program have significant role for technology dissemination.

The envisaged FTC should not only aim at introducing the new techniques and knowledge, but also be able to give the rural communities a chance to demonstrate their own indigenous knowledge and skills toward overcoming the problem of low productivity and improving their wellbeing (EEA, 2005). In general, the impact of the extension program is the function of effective communication, access to services (input and credit) as well as to marketing outlets (EEA/EEPRI, 2006). Each of these factors has influence on success of extension program on technology dissemination to increase income of the beneficiaries. Concerning this, cooperative can provide extension service in partnership with the Ministry and NGOs to deliver education and information in non duplicating manner to its clientele.

2.6.5 Human resource development

Human resource development has been neglected in agriculture in many countries; however human recourse development and technology dissemination are complement each other for effective technology generation, dissemination, and utilization. Here the concern is not only the volume or number, but the effectiveness of professionals, and human capital to change and to develop opportunities for the resource poor farmers. Rolling (1990), revealed that agricultural extension emphasis is usually on technical innovation, but in human resource development the focus is community development, institution build, leadership development, mobilization, and organization. The aim is to make them better leaders, decision makers, and to keep them to organize themselves into effective organization like cooperative. Chamala and Shingi (1997), contended that the entire philosophy of human capacity building is to encourage rural communities to understand their personal and group

styles of managing themselves and to improve their planning, implementation and monitoring skill.

Innovation and human resource development are reinforcing each other for effective extension delivering, credit, input supply, and output marketing system. According to FDRE (2001), which is indicated in the rural development policy and strategy document building human resource development needs work to be done in four major areas: i) it requires guaranteeing preparedness to work and self initiation of human power; ii) we have to continuously improve agricultural skill and profession, and based on this, ensure development of agricultural technology; iii) the health of the workforce should be protected in order to ensure hardworking and effectiveness and iv) it is important to improve the generation, multiplication and dissemination of technology. Further more, to enhance human resource development in frontline extension program the TVET program has started to train middle level manpower. The trainees are high school students and the former development agents who are to be given theoretical and practical training in crop, animal, and natural resource management for three years. Regarding human resource development, the role of cooperative societies is to provide education and training for their members, elected representatives, managers and employees so as to enable them to contribute effectively to the development of their societies (FNG, 1998).

2.6.6 Infrastructures

Poor infrastructure contributes to low productivity and poor marketing system and lowering information status for technology dissemination. The provision of infrastructure most notably improved roads and faster information for the users. Better road lower transaction costs associated with agriculture activities and in so doing have the potential to reduce the costs of acquiring inputs, increase output price. The improvement of quality road and communication increase access to agricultural extension services lead to faster

technology dissemination, utilization and economic growth. Receiving at least one visit from an extension agent raises consumption growth by 7% and reduces poverty incidence by nearly 10% [[http:// www.csae.ox.ac.uk/2007](http://www.csae.ox.ac.uk/2007)].

Areas with relatively good potential for agricultural production are remote, in a sense they are not easily accessible to markets and consumers due to many barriers including high transport costs (EEA, 2005). If there is no effective infrastructure there is no incentive for farmers to produce more and in turn technology dissemination will be affected due to low incidence from the product. In the areas where productivity is high, but infrastructure is poor, the price of products tends to be unusually low due to poor market outlet and low marketing circulation system. This implies technology dissemination would be low due to poor infrastructure. Extension workers can make farmers aware through provision of infrastructure about new technologies and advise them on best farming practices and assist them in dealing with production constraints. Regarding the problem of infrastructure, cooperative society assists community to improve the accessibility of infrastructure like rural road, communication, storage, water supply, electrification, school for children, market information and marketing system, rural financial service, etc.

The key points of this chapter are summarized as follows:

- (i) Cooperative society has long history in the district in introducing improved seed, agro-chemicals, and fertilizer through provision of credit. Cooperatives remain to be passive in changing the livelihood of the most farmers. The cooperatives have passed through different political system to address the need of the farmers. It was not free from political interference. When there is a change in the government it was reorganized to fit the existing ideology. For this reason cooperatives were not able to

change the life of the small scale farmers; the members are less motivated and disintegrated due to low performance.

- (ii) Cooperative societies are established primarily to benefit its members by enabling them to access credit and ensure the availability of new technologies and also purchase farmer produce from the members to reduce the risk that comes due to market fluctuation. Cooperatives do not only insure the availability, they also disseminate information and technologies like seed, fertilizer, agro-chemicals, etc. The new innovation enters the cooperative organization through VEWs, opinion leaders, cooperative leaders and other stakeholders.

- (iii) Cooperatives are highly decentralized organizations, democratically self administered, and run their own business to generate income of the members to benefit all. In doing this, cooperatives have some limitations which make them ineffective. These limitations are inadequate extension service, shortage of credit and credit system, lack of technology, lack of market information and market system, lack of human resource and inadequate infrastructure like road to transport goods and services. A cooperative society is hammered by these factors for along period of time without solution.

- (iv) Due to this, the contribution of cooperative for agricultural development is minimal.

The literature shows that cooperatives have to play the basic and supportive function for effective dissemination of technologies and use of technology. The basic part should be implemented by research staff to generate technologies and supportive part would be facilitated by extension worker. Additionally, cooperative requires mobilization and

training to update their indigenous knowledge, current technologies and information to be effective in technology dissemination and to be competent enough in the existing market.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section describes the study area, research design, study population, sampling procedure and sampling size, instrumentation, pre-testing, data collection methods and statistical procedure used in the analysis of the data collected.

3.2 Description of the study area

The study was conducted in Adea District in Oromia Regional State, the largest region in the country. The region has an area of 353,006.81sq.kms. For administration purpose the region is divided into 17 zones and 255 districts (CACC, 2003a). It constitutes 98.2 % of rural holdings and 1.8% of the area is belong to urban. From the total area temporary crops occupy 70.4%; permanent crops 6.5%, grazing land 12.0%, fallow land 8.3%, and others 2.8 % were utilized for different purposes (CACC, 2003c). About 6.4 million hectares of land were under cultivation, which is covered by different types of crops. Annual production of the region was 12.8 million tones. Agriculture is the back bone of economy in the region and employs the majority of the population. Considering agricultural crops, the highest proportion was covered by cereals, pulses and followed by oil crops which account for 81.1%, 10.2%, and 8.7% respectively. For permanent crops coffee took the largest area which accounts 52.2% and followed by *chat* which covers 20%. The average land holding per individual is estimated to be 1.24 hectares. Most of the land holders own land area from 1.01-2.0 hectares (CACC, 2003c).

According to CACC (2003a), the population of Oromia Regional State is estimated to be 22 137 632 out of this 11 137 632 are males and 10 907 018 are females. From the total population 96.2% are residing in rural areas and the remaining 3.8% are living in urban

areas. The largest population of farmers is practicing mixed farming which consists of crop and livestock and followed by crops. In this regard, the total number of agricultural holders was estimated to be 4.1 million (97.7%) and this is composed of holders producing crop production 18.7%, livestock producers 3.3 %, and holders that are engaged in mixed crop and live stock production is 78%. Furthermore, population is the most important factor that affects production and productivity and output by supplying labor as source for employment. On other hand the size of population is the main factor determining food production and consumption. Regarding this, there should be balance between the two or food production should grow faster than the population growth rate.

Most parts of the region are fertile, except for the eastern and southern part which is lowland; the rainfall pattern is small in amount and unreliable for crops to grow. There are two cropping seasons in the region that is the *Meher* and *Belg*. In the main season *Meher*, crops are planted during the month of July and August. This crops will be harvested between October and February. *Belg* is the second season where the region receives short rains. In highlands in the *Belg* season, they plant short season crops (barley, wheat, pulses, etc) and in low lands they plant long season crops such as sorghum and maize (CACC, 2003c). For short season crops harvesting is done from May to June and long season crops are harvested from October to November.

Adea is one of the districts where the study was done; it is 50 kms away from Addis Ababa in the east direction. The district has an area of 92 751.3 hectares of which 79 501 hectares are under cultivation. From the cultivated land 730 hectares were under different investments like flower production. The area owned by the state and community forestry covers 1159.2 hectares of land. The uncultivated land which is used for grazing, village and unused land is 11 811.2 hectares. The average individual land holding is two hectares. The

altitude ranges from 1600-2430 masl of which 75% is medium altitude and 25% is highland. Annual maximum temperature of the district is reported to be 24°C with the minimum temperature of 18°C. The rainfall of the area is characterized by bi-modal type of pattern in which short rains are usually received from February to April main season takes place from mid June to mid September. The estimated annual average rainfall is 850 mm. The types of soil found in the district are black, clay loam and sandy which accounts for 88%, 3% and 9%, respectively.

The farming system is mixed and contains both crop and livestock. The major crops grown in the district are teff, wheat, chickpea, lentil, etc. There are 69 village extension workers (44 male and 25 female) assigned in 27 PAs to give extension service to 20 362 households, that is 18 450 males and 1873 females. In one FTC three VEWs were giving extension services by dividing PA into three zones in crop, livestock and natural resource management. In average one VEW could give services to 295 households. There are 21 primary cooperative societies with a capital of Birr 5 162 410. They have a membership of 21 093, of which 17 523 are males and 3570 are females.

3.3 Research design

The design of this study is a cross-sectional survey, which involves collecting data at the same point in time (Babbie, 1990). This design is said to be most appropriate and not biased to any member of the population. The design is feasible, economical and data collected could be analyzed to determine relationship between variables.

3.4 Study population

The target population of the study consists of members and non members of primary cooperative societies. The purposive sampling procedure was used to select the six primary cooperatives societies. The selection of six cooperative societies took into consideration the following criteria:

- (i) Management: ability of executive committee of cooperative to lead, organize, coordinate, plan and control to achieve the goal of organization.
- (ii) Input distribution: on time input distribution to address the need of the members.
- (iv) Repayment: total loan that is returned back to lender from the borrowers.
- (v) Recording: keeping data for information on inputs, output marketing, finance, audit, etc.
- (vi) Extension service: linkage with VEWs, PA and high utilization of different inputs by members of cooperative were taken into consideration for selecting cooperatives for this study.

3.5 Sampling procedure and sample size

Random sampling method for member of cooperative societies and purposive sampling method for non members of cooperatives were employed. From each primary cooperative society a total of 20 heads of households from which 15 members of cooperatives were selected from the list to represent the population of primary cooperative societies in the district. The rest non members were selected from the village by consulting VEWs. According to the nature of the study and time availability to carry out the study, a sample size of 120 heads of households was selected for interview.

3.6 Instrumentation

3.6.1 Primary data

Primary data were collected using questionnaires for farmers. The questionnaire was constructed using structured, close and open ended questions. Supplementary data was collected through direct observation, group discussion with cooperatives, and peasant association leaders, key informants and extension workers. Semi-structured questionnaire was designed for districts that is Adea District Agriculture and Rural Development Office and District Cooperative Organizing Office to obtain secondary data, which is considered relevant for the study.

3.6.2 Secondary data

Secondary data which is pertinent to this study and to enrich secondary data information was collected from Regional Cooperative Commission, Federal Cooperative Agency, Ministry of Agriculture and Rural Development (MoARD), Oromiya Regional Bureau of Agriculture, East Shewa Agricultural and Rural Development Bureau, Adea District Agriculture and Rural Development Office, Debere Ziet Research Centre, Sasakawa Global 2000, and National Library Sokoine University of Agriculture.

3.7 Pre-testing

This research instrument both for questionnaire and interview schedule were prepared after consulting supervisor and other professionals. The prepared instruments were commented and corrected too be able to address the objective of the research. The research instrument was given to district extension staff for their comments on whether the instruments fit the local conditions. Thereafter, pre-testing of research instruments was done using a sample of eight farmers who were not part of the sample. The pre- testing was done using three extension experts from Adea District Agriculture and Rural Development Office. The first

draft of the interview schedule was revised based on the pre-test result. Then, the final draft of the questionnaire was prepared for data collection.

3.8 Data collection

The primary data was collected by three enumerators. The enumerators were trained before pre-testing of questionnaire for one day. Each enumerator was fluent speaker with both *Amharic* the national language and *Oromifa* the regional language used by Oromia Regional State. The personal interview was conducted with selected individual households according to the schedule. Each response was carefully recorded in the space provide for the answer.

3.9 Data analysis

The record of each interview was inspected for its accuracy immediately, before proceeding to the next day of the program. Data collection was verified by the researcher after the field data collection in order to make sure that the interview schedule had been filled correctly and completed. The data from interview schedule and questionnaire were organized, coded and analyzed by using the Statistical Package for Social Sciences (SPSS) software program. Descriptive statistics such as frequencies, chi-square, correlation, T-test, percentage, and mean were used to obtain the variability and central tendency and to compare different means to know the proportion and distribution of the data. Chi-square test was used to determine relationship between members of cooperative society in disseminating agricultural technologies. To measure effectiveness of cooperative in disseminating agricultural technologies base on main activities performance indicators were determined. The indictors were loan, repayment, and input distribution.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the survey according to primary and secondary source of information and discusses the findings from the study. The numbers of respondents that provide information were included in each table and secondary data are presented in the form of figures. The data analyzed is based on the response of the individual to the question interviewed. The results are presented below:

4.2 Agricultural potential of the study area

Adea district has high economic potential with reliable rainfall and modern technologies for agricultural production. Relatively, the district has adequate physical and marketing infrastructure. Annual crops like cereals, cool season legumes, vegetables and others are grown. Teff is a dominant cereal crop which occupies about 45 % of cultivated land. It is followed by wheat 43 %, chickpea 5% and others occupy 7%. Annual production of teff in the district is about 83 340 tones (Adea, 2007). Teff is produced mainly for the purpose of local consumption. Production of teff is the lowest of cereals compared to other cereal crops like wheat and barley. The average national yield of teff was 8.95 quintals per hectare. The crop is restricted only to Ethiopia; due to this it does not get international attention for research to improve yield per hectare. Teff has high economic value for the rural and urban people to prepare *injira* which is staple traditional food, porridge and some local alcoholic drinks (Hailu, 1995). The straw is mainly used for animal feed and for plastering the house with mud. Adea district is one of the major producers of quality teff locally known as *manga*, which has high demand in the market.

Wheat (*durum* and bread wheat) is the second important cereal crop grown in the district. Annual production of wheat is about 166 621 tones. *Durum* wheat is originated in Ethiopia. Durum or Macaroni wheat has an important role in the diet of many people both in rural and urban areas in Adea. Traditional product made from grain of durum wheat includes *injira*, *difo-dabbo*, *dabo-kolo*, *ambasha*, *kita*, *kinche* and pasta products (DZARC, 1989). The straw is used to feed animals. Adea district is one of the places where the quality durum and bread wheat is grown. It is main supplier of grain for industries to make flour for preparing bread, making pasta and macaroni from bread and durum wheat.

Chickpea is the third most important food legume grown in the district. Ethiopia is believed to be the origin of centre for small seeded chickpea varieties. Annual production for chickpea is about 15 685 tones. Chickpea has several advantages. It helps to restore and maintain soil fertility through the symbiotic biological nitrogen fixation. It is one of the most important sources of dietary protein for many farmers, which can not afford animal products. It can be processed and used in the form of spilt seed (*kick*), flour (*shiro*), and soaked and roasted have been reported by Geletu, *et al.* (1996). The farmers use to feed chickpea straw to equines like horses, mules and donkeys.

Livestock farming is the second important practice that is carried by farming community. Information from Adea District Agriculture and Rural Development Office shows that there about 166 998 livestock population in the district. According to records cattle constitute 57.2%, equines 18.1%, sheep and goat constitutes 13.8% and 10.9% of livestock population, respectively. In the district cattle's are used for providing drought power, equines are used for transportation, sheep and goat are used for meat and income generating. Nowadays, sheep and goat are playing an important role to secure food security of the poor, because it is easy to manage in small area with less amount of capital.

There is one agricultural research centre which has been undertaking agricultural research in crops and livestock to transfer improved technologies to the farmer to increase production and productivity in the district and for other similar agro-climates in the country. The extension service of the district works with research-extension division to introduce improved technologies by demonstrating on farmers' fields. Those improved technologies which are superior are distributed according to the demand of the farmer. Farmer organizations like cooperative society have active role in disseminating technologies to the members through credit by employing improved seed distribution, fertilizer, agro-chemicals, grain purchasing, and linking farmers to the market.

The findings from the study are divided into seven main sections: Characteristics of respondents, factors that influence technology dissemination, mechanism for technology dissemination, farmers' perceptions, effectiveness of cooperative in disseminating technologies, limitations of cooperative in technology dissemination, and relationship between identified variables and technology dissemination.

4.3 Characteristics of the respondents

This section describes the characteristics of the respondents namely age, sex, education level, family size, farm size, source of income and annual income of the respondent. These factors in most cases have been directly associated with technology dissemination and adoption by small scale farmers.

4.3.1 Age

Table 1 indicate that majority (73.3 %) of the respondent were in the age categories of between 30 and 59 years. The age category of 20-30 which is regarded as youth group is 15%. It was because many young groups do not have land for farming due to land shortage.

The young group in non member of cooperative is more compared to the member, and old age group is almost nil in the non members group. According to (CACC, 2003a) socio-economic report for Oromia the age group under 18 is 57% and the working group who are engaged in agriculture is 43%. The age category above 60 is 14 % which is the lowest of all; this is due to increasing fertility of the population. In addition to this, it was reported that majority of the youth are either migrants to urban areas for wage employment or are engaged in petty trading or farming the land by leasing from those who have the land. In the study the results are not similar to Oromia region population statistical report, because the majority of the farmers involved in this study were heads of the households. The chi-square test results (Chi-square value = 10.667 and P-value = 0.031) also show significant difference of age between respondents. From this result it is possible to conclude that the majority of member of cooperatives are young and that this working group can contribute a lot for the work of cooperative.

Table 1: Distribution of the respondents according to years (N= 120)

Age/ years	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
20-29	4	3.3	14	11.7	18	15.0
30-39	20	16.0	14	11.7	34	28.3
40-49	27	22.5	1	0.8	28	23.3
50-59	25	20.8	1	0.8	26	21.7
>60	14	11.7	0	0.0	14	11.7
Total	90	75.0	30	25.0	120	100.0

Chi-square value= 10. 667 P-value= 0.031**

Note: *, **, ***, Significant at 10%, 5%, and 1% probability level.

4.3.2 Sex

The majority of the respondents which is 76.7% were male and 23.3% were female. It indicates that men are more likely to be members of cooperatives than women. According to CACC (2003a) on Oromia population status report shows that the proportion of the male household heads is significantly higher than female household heads. In the rural area about 21.2 million households are found, out of the total 12.3% were female heads of household.

This reflects the fact that in most societies the major agricultural activities are undertaken by men. The low percentage of women respondents in agricultural holding could be due to cultural barrier in the study area. They would be heads of the household only when they are widowed or legally divorced to own the land, otherwise Ethiopian culture does not allow women to be the head of the household.

4.3.3 Education

The findings from Table 2 show that the majority of the respondents notably 31.7% had no education. However, 18.3% of the respondents in the study area are able to read and write either in their own language or in the national language '*Amharic*'. About 15.8% and 18.3% of the respondents attained primary education and junior high school respectively. This could make primary education coverage in rural area about 34.1%. According to CACC (2003a), in Oromia region the level of primary education in the rural area makes up to 23.3% of the agricultural holdings. The coverage is more than the region, because education coverage in the district is relatively higher, due to availability of facilities for education. On the other hand 15.8 % of the respondents' households have attained education of above junior high school. In general, 68.3% of the respondents were literate. Moreover, the level of education is one of the most important social factors that limit participation of farmers in agricultural production and productivity. Education improves knowledge and use of improved technologies of the farmers in agricultural operation. The chi-square results (Chi-square value = 10.583 and P-value = 0.032) indicate that there is significant difference in educational status among the different levels of education between respondents. The results indicate that a cooperative society has potential of manpower that could lead cooperative.

Table 2: Distribution of respondents according to education level (N = 120)

Level of education	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
No education	32	26.7	6	5.0	38	31.7
Read and write	19	15.8	3	2.5	22	18.3
Primary education	14	11.7	5	4.2	19	15.8
Junior high school	15	12.5	7	5.8	22	18.3
High school	9	7.5	9	7.5	18	15.0
Above high school	1	0.8	0	0.0	1	0.8
Total	90	75.0	30	25.0	120	100.0

Chi-square value =10.583

P-value=0.032**

Note: *, **, *** significant at 10%, 5%, and 1% probability level.

4.3.4 Family size

Families are persons who live together and make provision for food and others which are essential for living. The results of the study show that the majority (33.3 %) of the respondents had a family size of between six to eight persons in a family (Table 3). The average family size of the respondent is five. The maximum family size of the respondent is 13 and the minimum is one. Similarly, the majority of the household distributions in Ormia region have six to nine persons in a family (CACC, 2003a). The chi-square test results show that Chi-square value = 43.770 and P-value = 0.000) there is significant difference of family size between respondents.

Table 3: Distribution of respondents according to family size (N= 120)

Family size	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
≤5	8	6.7	6	5.0	14	11.7

3-5	27	22.5	12	10.0	39	32.5
6-8	34	28.3	5	4.2	39	32.5
9-11	16	13.3	1	0.8	17	14.2
≥12	4	3.3	0	0.0	4	3.3
Not respond	1	0.8	6	5.0	7	5.8
Total	90	75.5	30	25.0	120	100.0

Chi-square value = 43.770

P-value = 0.000***

Note: *, **, ***, Significant at 10%, 5%, and 1% Probability level.

4.3.5 Land size

Land is one of the factors affecting improved technology adoption. Those farmers which have land are most likely utilizing technologies than the landless farmers. Table 4 shows that the majority of respondents own land between 2-3 hectares which is 42.5%. The lowest number of the respondents 5% do not have land, they are landless and not a member of cooperative. They hire it from those who have land. During the *Derg* Regime the land was given to the farmer based on family size. Those who have more family size hold more land than those in small family size. In Oromia Region the land holding is not revised. Due to this policy, the young generation do not have own land except through inheritance from family. Average land holding of the respondents were 1.6 hectares. The maximum and minimum land holding of the respondents is 3 hectares and 0.25 hectares, respectively. Similarly, CACC report for Oromia Region (2003b) on land use indicated that the average land size for the region ranges from 1.01-2.00 hectares. The chi-square test shows significant difference of land size between respondents (Chi-square value = 36.867 and P-value=0.00). One can conclude from these results that population is growing at an increasing rate, but the land is constant. Hence it requires solution for those who are landless to exist.

Table 4: Distribution of respondents according to land size (N=120).

Land size/hectare	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Landless	0	0.0	6	5.0	5	5.0
≤ 1	12	10.0	13	10.8	25	20.8
1.1-2	32	26.7	6	5.0	38	31.7
2.1-3	46	38.3	5	4.2	51	42.5

Total	90	75.0	30	25.0	120	100.0
Chi-square value =36.867			p-value =.000***			
Note: *, **, *** significant at 10%, 5%, and 1% probability level.						

4.3.6 Annual income

The aim of extension is to transfer technology and management that should finally increase the productivity and income of the farmers. Income has direct correlation with adoption of technologies. Farmers who are well off income can afford to buy new technologies than low income farmers (Rogers, 1983). Traditionally, farmers in Ethiopia were not willing to disclose their income. The income of farmers in Adea district is not bad compared to other district, because they have access to market and earn more income from their produce.

According to the Table 5 summary the majority of the respondents which 49.2% had an annual income of *Birr* 5000-10 000, followed by 28.3 %, who had an annual income below *Birr* 5000. The lowest proportion of the respondents is 3. 3% had an annual income *Birr* 17 000-22 000. The average annual income of the respondents were *Birr* 8257, the maximum and minimum were *Birr* 50 000 and *Birr* 600, respectively. The gap of income is very high between the respondents. The chi-square test results indicated also significant difference of annual income between respondents (Chi-square value = 92.530 and P-value = 0.000).

Table 5: Distribution of respondents according to annual income (N= 120)

Annual income/Birr	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
≤5000	23	19.2	11	9.2	34	28.3
5 000-10 000	48	40.0	11	9.2	59	49.2
11 000-16 000	12	10.0	6	5.0	18	15.0
17 000-22 000	3	2.5	1	0.8	4	3.3
≥23 000	4	3.3	1	0.8	5	4.2
Total	90	75.0	30	25.0	120	100.0
Chi-square value = 92.867			P-value = 0.000***			
Note: *, **, ***, significant at 10%, 5%, and 1% probability level.						

4.3.7 Source of income

Farmers in Adea district have different source of income such as from farm, rearing livestock, petty trading, income generating activities such as fattening cattle, poultry and beekeeping, etc. The results (Table 6) show that the majority (71.7 %) of the respondents use crop as their main source of income. About 22.5 % of the respondents have income from crop and livestock. The smallest proportion of the respondents which is 0.8% is engaged in livestock. The remaining 5 % of the respondents are engaged in petty trading for their livelihood.

Table 6: Distribution of respondents according to sources of income (N= 120)

Source of income	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Only from crop	70	58.3	16	13.3	86	71.7
Only from livestock	0	0.0	1	0.8	1	0.8
Crop and livestock	18	15.0	9	7.5	27	22.5
Petty trading	2	1.7	4	3.4	6	5.0
Total	90	75.0	30	25.0	120.0	100.0

Furthermore, to know whether a relationship exists or not between variables, correlation was employed to measure the linear relationship. From the results of correlation analysis presented in Table 7 sex is not correlated with age, family size, land holding, education and income. Income is positively correlated with family and land size it means a household that have more family labor with large farm can earn more income than who has little from technology utilization. Education is negatively correlated with age, family and land size. This means increase in age can reduce technology utilization. This is due to the fact that if one gets old his innovativeness to adopt technologies is reduced. Family size is negatively correlated with education which means increase in family size with limited and scarce resource can increase expenditure and reduce financial capacity of the individual to utilize technologies. Similarly, land size is negatively correlated with education. It means land is constant, where as education fee is increasing from time to time. Hence education would reduce financial capacity of the individual to invest on land to be productive.

Table7: Correlation coefficient of selected variables for technology dissemination (N=120).

VARIABLE	FARMER	AGE	SEX	FAMILY	LAND	EDUCATION	INCOME
FARMER	1	-0.572*** 0.000	0.000 1.000	-0.305** 0.001	-0.492 0.000	0.253** 0.005	-0.082 0.379
AGE		1	0.027 0.766	0.436** 0.000	0.450** 0.000	-0.392** 0.000	0.131 0.161
SEX			1	0.91 0.336	0.110 0.230	-0.162 0.076	0.002 0.986
FAMILY				1	0.427** 0.000	-0.206* 0.028	0.458** 0.000
LAND					1	-0.211* 0.021	0.416** 0.000
EDUCATION						1	0.090 0.333
INCOME							1

Note: *, **, ***, significant at 10%, 5%, and 1% probability level.

To test distribution of the observed population T-test was applied to measure dependent variable by manipulating independent variable. It was parametric test that come from a normal population; sample size is large, assumption about the population parametric like mean, variance, etc. It requires measurement equivalent at least to interval scale (Kothari, 2004). The T-test is used when two experimental conditions is assigned to be different or to be compared.

According to the findings provided in Table 8 family and land size of the household head is negatively associated with technology dissemination. Most of the time landholding in many studies is positively associated, but in this case it is negatively associated because the non cooperative members do not have land. Feder *et al.* (1982), cited by Gerishu (2007), have suggested relatively closer or similar result with this finding stating that farm size can have different effect on the rate of adoption depending on the characteristics of the technologies

and institutional setting of the service delivery system. On the other hand, annual income is positively associated with technology dissemination. In general, this finding indicates that technology dissemination and utilization depend on capacity of the farmers to buy different technologies or exposure for credit to buy inputs.

Additionally, to the test mean difference and relationship associated with technology dissemination from selected variables land and family size were found to be statistically significant indicating that technology dissemination has significant relationship with selected variables. It means the one who has more land and family size can utilize technology than the one who has little or no land. Annual income of the respondent is not significant showing that there is no relationship between annual income and technology dissemination.

Table 8: Summary of mean differences for selected continuous variables to test equality (N=120)

Continuous variables	Mean difference			T-Test	
	Coop. member	Non coop.	Mean difference	T-value	P-value
Family	6.36	6.38	- 0.02	-0.01	0.022**
Land size	1.73	15.80	-14.07	-2.34	0.000***
Annual income	9117.88	6645.46	2472.42	1.25	0.959NS

Note:*, **, ***, significant at 10%, 5%, and 1% probability level.

4.4 Factors influencing technology dissemination

To enhance production and productivity of smallholders need inter related agricultural services such as extension, credit, input supply, output marketing, farmers' income and infrastructure (transportation). Growth of agriculture sector in Ethiopia was hampered by a series of policy and structural constraints which resulted in low out put, due to low levels of investment, low application of technology, and low capacity. The solution needs a structural

change, including a quantum change in human capacity, input supply, technology adoption and provision of infrastructure (MoARD, 2006).

4.4.1 Extension service

4.4.1.1 Frequency of visit

Extension contact by VEWs could make farmers aware of the problems and increase knowledge about improved technologies for implementation. The majority of the respondents (40%) were visited by VEWs once in a week for information (Table 9). 24.2% of the respondents have received messages twice in a month or once in fifteen days. About 19.2% of total respondent met with VEWs by chance, and did not know the program of the visit. In general, about 33.3% of the respondents were visited by VEWs once in 15 to 30 days, which is not frequent and continues to pass relevant message to the users. Rutatora (2005) contended that there are needs for having a competent and dynamic extension cadre that will be able to address the changing roles of the extension service by providing appropriate advice and support for the farmers. Chi-square test results (Chi-square value = 41.500 and P-value = 0.000) show that significant difference of visit by VEWs to pass information and to give advice for the farmers. It means that farmers did not receive extension message regularly and continuously in equitable bases. The program of VEWs is not known clearly to some of the farmers.

Table 9: Farmers' opinions on visit of VEWs (N=120)

Frequency of visit	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Once in a week	36	30.0	12	10.0	48	40.0
Twice a month	24	20.0	5	4.2	29	24.2
Once in a month	6	5.0	5	4.2	11	9.1
Sometimes	18	15.0	5	4.2	23	19.2
Don't know	6	5.0	3	2.5	9	7.5
Total	90	75.0	30	25.0	120	100.0

Chi-square value = 41.500

P-value = .000***

Note: *, **, ***, significant at 10%, 5%, and 5% probability level.

4.4.1.2 Farmers' source of information

Farmers need information on technology, credit and market to improve their farming from different sources. In Ethiopia there are five main major Government institutions which generate agricultural information. They are MAORD at Federal level and Regional Bureaus of Agriculture, research institutions, CACC, Meteorology Commission and Universities. Passing information to the farmers is one of the most important tools of VEWs to create awareness and to make farmers to adopt technologies. VEWs are the main source to facilitate and make access relevant and timely information to the farmers. Similarly, the study results show that about 72.5% of the respondents got information from VEWs. As indicated in the Table 10 the role of research, neighbors, and cooperatives to disseminate technological information was found extremely low. However, nearly 11.7% of all respondents reported that they received information about technologies from all sources and 7.5% of the farmers received information on improved technologies from neighbors. This would encourage farmer to farmer technology dissemination and create more chance for farmers to learn from each other than depending on VEWs.

Table 10: Farmers' opinions on sources of information (N= 120)

Source of information	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
VEWs	67	55.8	20	16.7	87	72.5

Research	8	6.7	1	0.8	9	7.5
Cooperative	1	0.8	0	0.0	1	0.8
Neighbor	5	4.2	4	3.3	9	7.5
From all	9	7.5	5	4.2	14	11.7
Total	90	75.0	30	25.0	120	100.0

4.4.1.3 Relevance of extension message

The results from this study show that 70.0% of the respondents believed that the message passing through VEWs was good. About 21.7% of the respondents reported that the message passing through VEWs was very good. The rest reported that it may not be useful for them or they are not sure to say useful or not (Table 11). The chi-square test from the table indicated also there is a significant difference of opinion between respondents on the relevance of extension message. Moreover, to ensure the benefit of extension messages and new technologies being relevant to farmers needs; this demands more active participation in the validation of new technologies by farmers themselves (Russell, 1986). Furthermore, to serve a large number of farmers effectively it is costly and to pass information requires organization of farmers into groups. Extension messages that are passed into the farmers should be relevant to the farmers need to resolve the problem of farmers socially and economically.

Table 11: Farmers' opinions on the relevance of extension messages (N=120)

Relevance of message	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Very good	22	18.3	4	3.4	26	21.7
Good	61	50.9	23	9.1	84	70.0
Not useful	1	0.8	0	0.0	1	0.8
Not sure	6	5.0	3	2.5	9	7.5
Total	90	75.0	30	25.0	120	100.0

Chi-square value =208. 017

P-value =.000***

Note: *, **, ***, significant at 10%, 5%, and 1% probability level

4.4.1.4 Method for technology introduction and dissemination

The study results show that 66.7%, 17.5%, 15.0%, and 0.8% reported that they were introduced to new technology by demonstrating on farmers' fields, no introduction, visiting farmers fields, and by visiting research centre, respectively. However, the majority of respondents were introduced to new technologies through demonstration and second majority of the respondents are not introduced to new technologies by VEWs or they do not have any exposure to new innovation (Table 12).

Extension is working with farmers and farmers' organization to transmit information, targeted behavioral change and to secure active participation of the community for technology utilization. This includes organizing of farmers' meetings, method and result demonstrations, and interest groups to introduce and disseminate technologies. Clark (1986), revealed that for a group or any organization within a community to function properly, its members must share common objective and have similar economic background. Extension needs to build up capabilities of small groups and organizations within each community to undertake the process of problem identification and problem solving through discussion and analysis of their local situation (Clark, 1986). This needs extension agents who understand institution building and group dynamics for creating confidence of the farmer to solve their own problems using new innovation. The methods

and tools of extension should reflect the situation of the farmers'; otherwise technology introduction and dissemination will never be achieved.

Table 12: Farmers' opinions on methods of technology introduction (N=120)

Technology introduction	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Demonstration	60	50.0	20	16.7	80	66.7
Visiting Research	1	0.8	0	0	1	0.8
Visiting farmers field	15	12.5	3	2.5	18	15.0
No introduction	14	11.7	7	5.8	21	17.5
Total	90	75.0	30	25.0	120	100.0

4.4.1.5 Technology on major crops

The majority of the respondents (67.5%) used improved seed on wheat compared to teff (15%). The cultural practice like using proper fertilizer rate, seeding rate, time of planting, etc which can contribute to high yield with improved seed was 58.5% on wheat and 12.5% on teff. The respondents which used local seed on teff and wheat with cultural practices were 84.1% and 37.5% respectively. These indicate farmers prefer local seed on teff with cultural practices compared to wheat. Similarly, report from the district indicated that most of the farmers prefer local seed than improved seed on teff, because there is no big difference between improved varieties and local seed due to low genetic capacity of the crop and the local seed has better quality compared to improved seed (Adea, 2007). This attributed less utilization of improved varieties of teff by farmers compare to wheat. Improved teff varieties utilized by respondents were DZ-01-196, DZ-01-354, DZ-CR-35, and Quncho and on wheat they were HAR-1685, Qubsa, Paven, HAR-604, Ude and Yerer.

Table 13: Distribution of respondents according to utilization of improved seed on major crops (N=120)

Crop with cultural practice	No	Percent	Chi-square	
			Value	P-value

a)Teff -	Improved seed	18	15.0	6.823	0.033**
	No improved seed	98	81.7		
	Improved seed with cultural practice	15	12.5		
	Local seed with cultural practice	101	84.1		
b) Wheat –	Improved seed	81	67.5	7.180	0.066**
	No improved seed	35	29.2		
	Improved seed with cultural practice	70	58.5		
	Local seed with cultural practice	45	37.5		

Note: Percentage will be more than 100 due to out triple responses.

Local seed: improved seed used by farmers for more than five years.

4.4.1.6 Constraints on technology utilization

As far as improved technology is concerned to increase production of small scale holders appropriate technology utilization play a significant role. However, there was a constraint that hinders farmers not to utilize technologies. It was reported that nearly 80% of the respondents had a problem of high price to use different technologies. About 15.8% of the farmers' believed that low yield of technology discouraged them not to apply new technologies. The lowest proportion of the farmers (1.7%) claimed that the quality of the product was poor (Table 14).

Table 14: Farmers' opinions on what hinders technology utilization (N= 120)

Problem on technology utilization	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
High price	69	57.5	27	22.5	96	80.0
Lack of market	3	2.5	0	0.0	3	2.5
Poor quality	1	0.8	1	0.8	2	1.7
Low Yield	17	14.2	2	1.7	19	15.8
Total	90	75.0	30	25.0	120	100.0

4.4.1.7 Profitability of technology

The majority of the respondents (70.8%) reported that, they had benefited from technology disseminated (Table 15). However, 21.7% of respondents claimed that technology which is disseminated by VEWs was inferior. Hence, they are not influenced by profitability of new innovation for utilization. Profitability of improved technologies is one of the determinants of technology utilization and sustainable use; it is influenced by many factors such as yield, cost of inputs and price of output (EEA, 2005). The chi-square test (Chi-square value = 211.333 and P-value = 0.000) indicated that there is significant difference of profitability from technology among the respondents. One can draw a conclusion from these results that technology was profitable among the majority but a few of them did not get profit. This is due to lack of knowledge in implementing technology in the right time, at the right place and with right recommendation.

Table 15: Farmers' opinions on profitability of technologies (N=120)

Profitability of technology	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Yes, profitable	66	55.0	19	15.8	85	70.8
No, not profitable	19	15.8	7	5.8	26	21.7
Not respond	5	4.2	4	3.3	9	7.5
Total	90	75.0	30	25.0	120	100.0

Chi- square value = 211.333

P-value = .000***

Note: *, **, ***, significant at 10%, 5%, and 1% probability level

4.4.1.8 Farmers training

About 57.5% of the farmers reported that they did not take any training during the last three years. 31.7 % of them attended short seminar for 2-3 days on agriculture, while the remaining 7.5% and 3.3% attended short training on agriculture and cooperative and cooperative respectively (Table 16). Furthermore, training would help cooperative society to improve its technology dissemination and utilization to update their indigenous knowledge and create awareness on new innovation. Training should be given base on the need of cooperatives to reduce risk and uncertainty. Technology dissemination requires adequate information, knowledge, and skill for the beneficiaries for appropriate adoption. According to Rolling (1990), innovation requires local cadres who can play technical role to its utilization. This requires their training under auspices of local groups.

Table 16: Farmers' opinions on training attended (N=120)

Training attended	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Cooperative	3	2.5	1	0.8	4	3.3
Coop. and agriculture	6	5.0	3	2.5	9	7.5
Agriculture	28	23.3	10	8.3	38	31.7
Not attend	53	44.2	16	13.3	69	57.5
Total	90	75.0	30	25.00	120	100.0

4.4.2 Credit

4.4.2.1 Source of credit

About 72.5% of the respondents used the cooperative as source of credit; whereas 2.5% of the respondents got their loan from banks. 25% of the farmers did not give their opinion (Table 17). Most of these respondents are non cooperative members, they rely on their

own finance or they get credit from microfinance. Farmers who have not finance could not easily access to credit for processing, marketing and distribution and as working capital to run agricultural operation. This need basic change in the structure of rural society and particularly in production system to meet the challenge of population increases and the rising level of peoples expectations, require as much better planned coordination and integration of input distribution (Van den Ban and Muntjewerff, 1981). In order to strengthen and to accelerate agricultural growth, rural finance institutions that provide credit to enhance production are crucial. According to Kedir (1999), credit constitutes the method farmers use to acquire funds and the ability to command capital or services for a promise to repay as specified in the promissory note.

Table 17: Distribution of respondents according to sources of credit (N=120)

Source of credit	Coop. member		Non coop		Total	
	No	Percent	No	Percent	No	Percent
Cooperative	85	70.8	2	1.7	87	72.5
Bank	3	2.5	0	0.0	3	2.5
Not respond	2	1.7	28	23.3	30	25.0
Total	90	75.0	30	25.0	120	100.0

4.4.2.2 Preference for credit

The majority (86.7%) of the respondents recognized cooperatives as farmer organizations to get credit. About 12.5% of the respondents showed interest to get credit from banks. Because they believe that the credit system of banks is better than cooperative. The lowest proportion of the farmers which was 0.8%, prefer microfinance to get credit (Table 18). However, the majority (86.7%) of farmers still rely on credit from cooperatives rather than micro-finance due to much higher (twice as much) interest rate compared to that of cooperatives.

Table 18: Distribution of respondents according to preference of credit (N= 120)

Preference for credit	Coop. member		Non coop		Total	
	No	Percent	No	Percent	No	Percent
Cooperative	77	64.2	27	22.5	104	86.7
Banks	12	10.0	3	2.5	15	12.5
Micro-finance	1	0.8	0	0.0	1	0.8
Total	90	75.0	30	25.0	120	100.0

4.4.2.3 Loan approval system and how utilized

From the Fig. 1: the approved loan by Regional Government was fully utilized by cooperative members. This indicates that the loan was not flexible according to the demand and also indicates shortage of money for credit. Shortage of capital to finance agricultural production and marketing activities is one of the major problems the Ethiopian smallholder farmer faces (EEA, 2005). From 2001/02 to 2002/03 the loan increased by 23.2%. It was the lowest increment in the five year period. The highest increment was reported in 2005/06, it was increased by 44.8%. The average loan increment in five years was 30%. The loan approved and utilized was at increasing rate. In general, farmers need credit for short term and long term capital to buy different inputs and for other income generating activities.

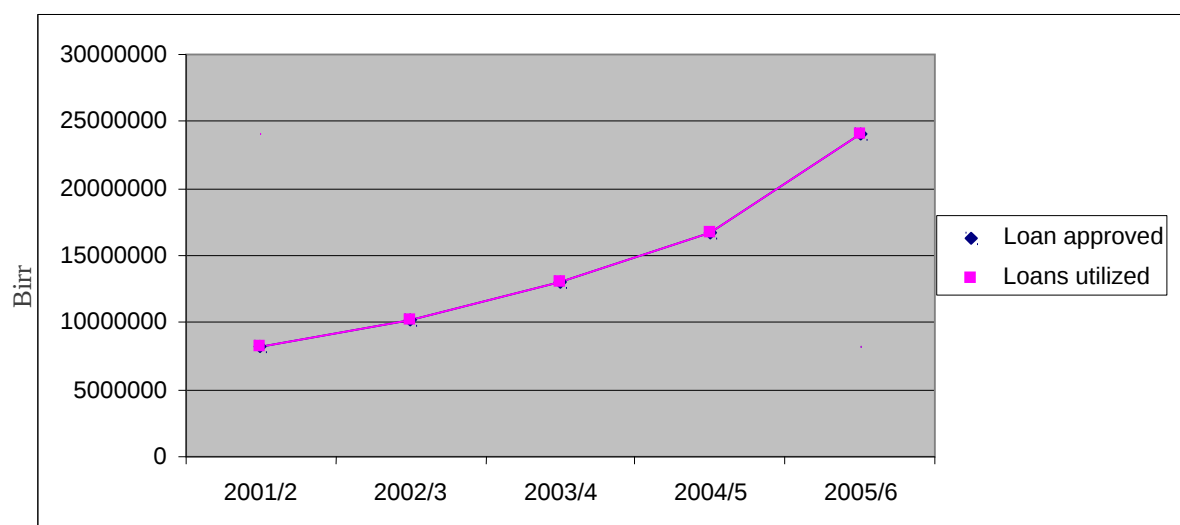


Figure 1: Loan approval and utilization by the member of primary cooperative 2001-06.

Source: Adea district, 2008.

4.4.2.4 Down payment, repayment and remaining loan

In 2001/02 the down payment for fertilizer was 30 % from the total loan agreement, and then from 2002/03 up to 2004/05 the down payment increased each year by 5% for three consecutive years. However, in 2005/06 the down payment increased only 1.6% than the pervious year. It is very difficult for the poor farmers to afford the down payment to get inputs until they design another system which is convenient for them. In 2003/04 the highest loan remained at the hands of the farmers (10.3%) and in 2005/06 the lowest remaining loan was reported (3.8%). In five year loan period, the average amount money which was not returned to cooperative was 6.6%. It is low amount of money which is not returned compared with the amount of loan which has been given to the farmers.

In average, in the last five years about 14 310 farmers have taken credit in the district from 21 362 households. It was estimated that 33.01% of the households they did not take any

credit from cooperatives. However, these farmers might have used their own money to buy necessary inputs or they may have taken credit from other sources like private bank and micro finance.

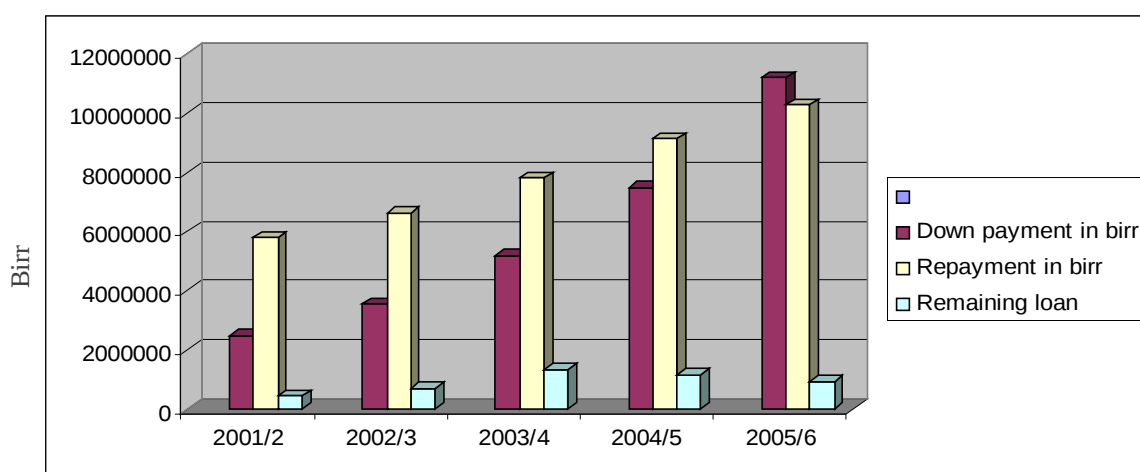


Figure 2: Credit paid for down payment, repayment and remaining loan 2001-06.

Source: Adea District, 2008.

4.4.2.5 Repayment

The majority of the respondents (66.7%) have paid 100% of the loan which they borrowed from cooperative. About 8.9%, 11.1%, and 5.6% of the respondents have paid 75%, 50% and 25% of the loan respectively. The lowest proportion of respondents 2.2 % did not pay at all. The reason was unwillingness of the farmers to pay the loan. Even if they have not paid the loan no serious measure is taken by the concerned authority. The down payment is decided by district council every year. The cooperative society has responsibility to make their members to pay back the repayment according to the agreement. Moreover, discipline in repayment is essential not only to sustain the credit from the supply end but also is important as a revolving fund to engage non adopters in the course of the dissemination process (EDRI, 2004). There is no established loan system which link financial institution (bank) and cooperatives to take credit for their members directly by signing agreement. Due to this, the Regional Government used its budget as collateral and in order to make possible for cooperatives to take credit from bank for purchase of inputs.

Table 19: Distribution of respondents according to its repayment rate (N = 90).

Rate of repayments (%).	No	Percent
25	5	5.6
50	10	11.1
75	8	8.9
100	60	66.7
Not paid at all	2	2.2
Not respond	5	5.5
Total	90	100.0

4.4.3 Input supply

4.4.3.1 Fertilizer

From Fig. 3: the distribution of chemical fertilizer (DAP and Urea) from 2001/02 to 2003/04 were supplied to the farmers according to the need. However, the distribution of Urea increased by 108.6%. More was distributed than the demand. In 2004/05 and 2005/06 cropping season distribution of DAP was 98.6% and 73.6%, while Urea supply was 104.4% and 64.7% respectively from actual demand. The demand of DAP and Urea from 2001/02 to 2002/03 decreased by 3.6% due to shortage of credit, high price, high down payment, and low repayment. However, in 2003/04, 2004/05, and 2005/06 the demand for DAP increased by 23.5%, 4% and 50.3% respectively. Similarly, in 2003/04 and 2005/06 the demand for Urea increased by 37.9%, and 9.2%. In 2004/05 Urea did not show any increment.

Inorganic fertilizers are the major input used for promoting small-scale production for livelihood and generating income. The government has invested huge amounts of foreign currency on chemical fertilizers to meet the demand of the growing population. However, the increasing price of fertilizer is one of the hindrances for small-scale producers to adopt the technology. According to EEA (2005), over the last decade the price of chemical fertilizer has greatly increased. During the past five years, the increment of fertilizer that is distributed to farmers was increased at small rate, but the amount applied per hectare actually decreased due to significant increase in price. According to CACC (2003d) in

Ethiopia fertilizers were applied only on 38.6% of the total cultivated crop area. Furthermore, in the study area price is not the only factor that determines utilization of fertilizer, but the budget allocated for collateral from the Regional Government was another limiting factor due to absence of credit system. To tackle the expense of fertilizer farmers started to shift to compost, green manure and crop rotation to reduce cost of production. To solve this problem the government should allocate revolving fund through independent enterprise to insure credit, however policy to subsidize fertilizer is not supportive. FAO (1984), revealed that the role of fertilizer in increasing food grain production has been very evident, it is recognized that fertilizer have so far accounted for more than 50% of the increase in crop yield. In order to meet food requirement of developing countries, the intensification of agriculture requires a three to four in fertilizer use with the increased used of better seeds, pest control and improved water management. In reality this could not be practical for the poor farmers, because of fertilizer price is increased three to four times.

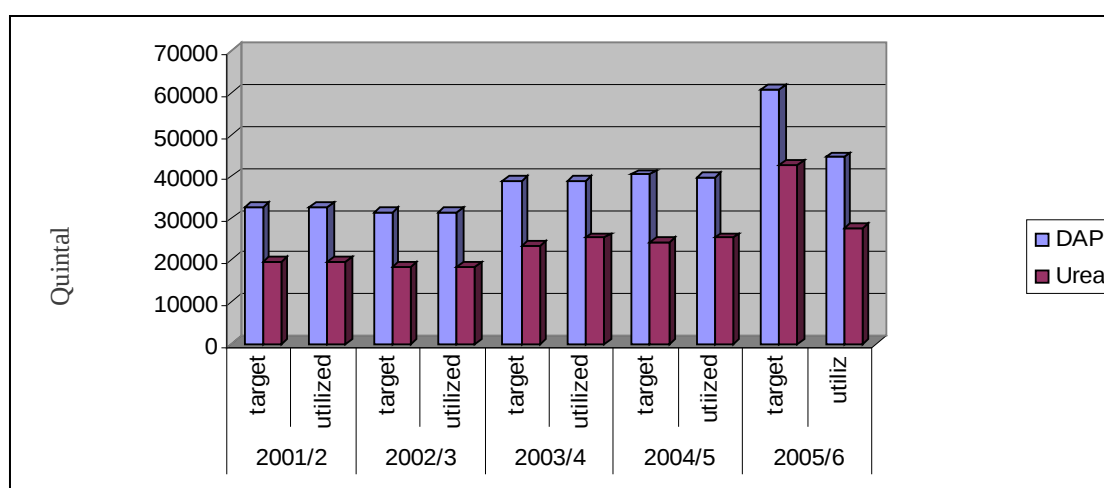


Figure 3: Fertilizer distributed to the farmers in quintals from 2001-06.

Source: Adea district, 2008

Note: 10 quintal = 1 tone.

4.4.3.2 Improved seed

In Fig. 4: despite of improved seed of teff in 2004/05 the highest amount of seed that was distributed to the farmers was 64.3%, while in 2001/02 the lowest amount of seed that

supplied to the farmers was 29.7%. The average amount that was distributed in five cropping seasons was 47.4%. This indicates that the gap between supply and demand was very high. The demand for teff is very low compared to other cereal crops, because there is no big difference in yield between improved and local seed, and the quality of improved seed is less compared to farmers seed due to the nature of seed (very small) that having great chance for mixing with other seed and very difficult for researchers to keep the seed pure. For all these reasons farmers are not courageous to use improved seed of teff. The major improved varieties supplied to the farmers were DZ- 01-196, DZ- Cr- 37, Quncho, etc.

Regarding, improved seed of wheat in 2001/02 the highest volume of seed that was distributed to the farmers was 77.4% from the plan. In 2003/04 the lowest amount of seed was distributed, it was 41.1%. On average, in the five year period 56.4% target was achieved to meet the needs of the farmers. The major improved wheat varieties that were distributed to the farmers were Paven, HAR- 1685, HAR- 604, Qubsa, Buhae, Yerer, and Ude.

Chickpea is the third most important cold season legume among farmers and exported for earning hard currency. In 2002/03, the highest achievement was reported to distribute improved seed to (106.5%) farmers. It was distributed more than demand. In 2004/5 the lowest amount of seed was distributed to the farmers, it was achieved from the target of 24% only. On average, in five year cropping season 63.5% was distributed to the farmers to address their needs. Improved chickpea varieties that was supplied to the farmers were Arerti, Shasho and Filiph. In general, there is high shortage of improved seed in the study area, because the gap between the demand and supply is very high. It needs high attention in the future to fulfill the demand of farmers.

CACC (2003d) revealed that in Ethiopia from the total cultivated land only 2.8 % was sown with improved variety of seed. However, improved varieties are the most important inputs that could increase the production of small scale holders. It is not only the availability, but also the response of variety for high yield and affordability of small scale producers that is critical for sustainable adoption (EEA, 2005). Most of the time the need of the farmers for adopting improved seed was reduced due to shortage of seed, price, and quality. Improved seed of self pollinated crop like teff and wheat can give better yield for four years under good management without yield reduction. To overcome the shortage of seed farmers exchange improved seed between them without demanding for new seeds. In Ethiopia to fulfill the demand improved seeds were multiplied, certified, and distributed by Ethiopian Seed Enterprise (ESE) and Pioneer Hybrids Seeds Ethiopia (PHSE) according to availability of basic seed and demand from the stakeholders. Moreover, to solve the shortage of improved seed primary cooperatives multiplied seed on contract base on individual farm. This local seed multiplication program was monitored by extension workers and evaluated by research centre to insure the viability of the seed. However, the local seed multiplication program has a bottle neck to get basic seeds for multiplication from ESE and research centre. Information sources indicated that agricultural production in Sub-Saharan Africa must grow at 4% to maintain a satisfactory level of economic development, but average growth rates so far has been only 1.2%. The gap can be bridged through increased crop varieties and better management but this benefit will not be realized unless substantial improvements are made in seed production and distribution system.

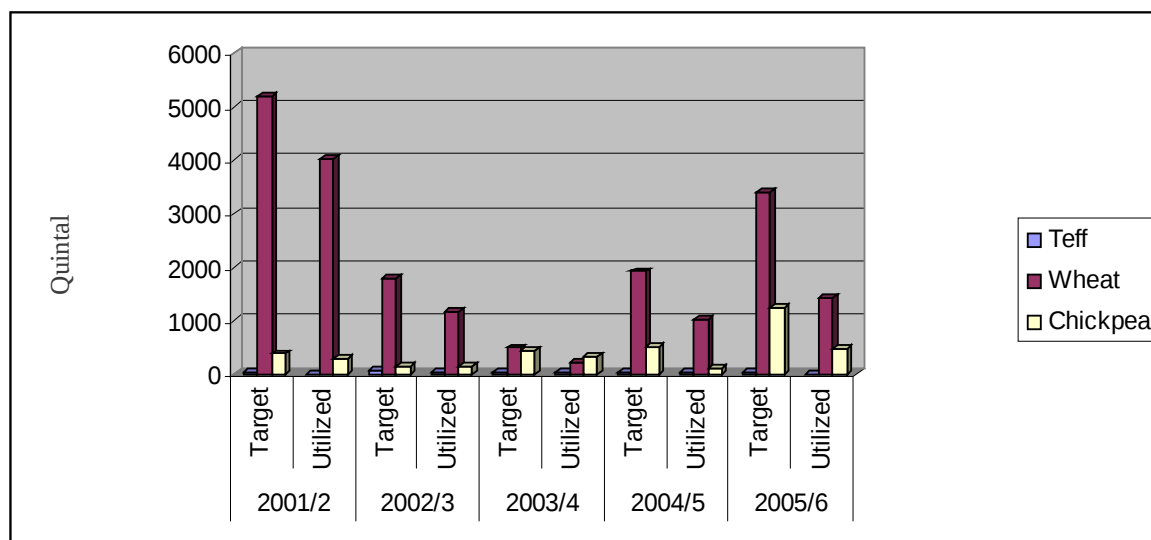


Figure 4: Improved varieties of teff, wheat, and chickpea that distributed to the farmers in quintals 2001-06.

Source: Adea district, 2008.

Note: Improved seed is a crop varieties that give significantly higher yield and better quality compare to the local seed.

4.4.3.3 Input delivery system

Agricultural inputs are required for increasing production and income of the farmer. These include improved seed, fertilizer, agro-chemicals, post harvest technology and farm implements. These inputs should be made available to farmers according to the need, amount, time and place for use. Since, the farmers depend on nature it is very difficult to use them where the rainfall distribution is uneven or sometimes too early or too late.

The results of this study show that 40.9% of the respondents believed that the present input supply system was inadequate. 38.3% of the respondents reported that the current input delivery system is moderate and the remaining 21.8% of the respondent opinion showed that it was adequate (Table 20). The chi-square results (Chi-square value = 8.185 and P-value = 0.017) showed that there is significant difference in the level of input delivery system between respondents. This is an implication for cooperative to improve delivery system in order to address the need of the farmers.

Table 20: Farmers' opinions on adequacy of the input delivery system of cooperative (N = 120).

Farmers' opinions	Coop. member		Non coop		Total	
	No	Percent	No	Percent	No	Percent
Adequate	21	17.5	4	3.3	25	21.8
Moderate	35	29.2	11	9.2	46	38.3
Inadequate	34	28.3	15	12.5	49	40.9
Total	90	75.0	30	25.0	120	100.0

Chi-square value = 8.185

P-value =0.017**

Note: *, **, ***, significant at 10%, 5%, and 1% probability level.

4.4.3.4 Farmers' preference for input

The study results show that 67.6% of the respondents preferred to get inputs through credit. About 18.3% had intention to get inputs using own money in cash. The remaining 13.3% preferred to get inputs half by credit and half in cash (Table 21). The small scale farmers who owed fragmented land have low capital, low saving, low productivity and consequently low income. Hence, they require credit to buy improved technologies and to invest on income generating activities to increase their income.

Table 21: Distribution of respondents according to the preference for input (N=120)

Preference for input	Coop. member		Non Coop		Total	
	No	Percent	No	Percent	No	Percent
In cash	22	18.3	0	0.0	22	18.3
With credit	53	44.2	28	23.4	81	67.6
Both	15	12.5	1	0.8	16	13.3
Not respond	0	0.0	1	0.8	1	0.8
Total	90	75.0	30	25.0	120.00	100.0

4.4.4 Output marketing

4.4.4.1 Marketing

In all market across the district, grain marketing price and the system is the same. Traders are operating in the same way through out the district with similar purchase price which

does not vary within a day across different market (Theresa, 2004). Credit for purchasing grain is not common. The limited access to formal credit is the major bottleneck of the grain marketing as a whole reported by Mesfin *et al.* (2005). The information obtained from cooperative union indicate that five cooperatives in 2007 and seven cooperatives in 2008 got credit service of *Birr* 675 023 and *Birr* 960 000 respectively for purchase of grain. In 2001/02 cooperatives bought 450 tones and 165 tones of teff and wheat respectively. Similarly, in 2002/03 cooperatives purchased and sold to consumer 548 tones of grain. It increased by 21.9% than previous year. In this year the traders started to export teff to international markets illegally. Later on, it was blocked by the government. In 2005/06 the lowest volume of grain was purchased decreasing by 35.5% for teff and 1.9% for wheat (Fig. 5). In marketing output there were many actors in the chain, due to this the price of grain is very high for consumers. The Chain should be from producer to wholesaler, from whole seller to retailer and from retailer to consumer. Market information is one of the critical components of agricultural development; it has not been emphasized by extension program (EEA, 2005). Agricultural extension service in Ethiopia has not been given attention to give information on market; due this output marketing system of cooperatives is very weak and performs low.

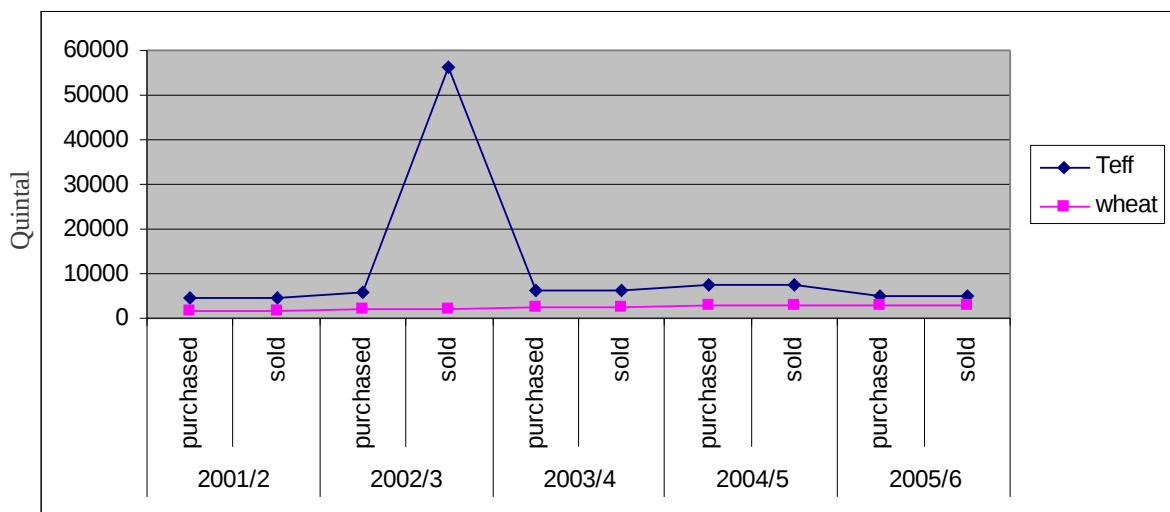


Figure 5: Grain purchased by cooperatives from the farmers in quintals 2001-06.

Source: Adea District, 2008.

4.4.4.2 Market information

The majority that is 83.3%, of the respondents get price information from the market. Nearly, 10.8% of the respondents get information from different sources such as mass media, market, VEWs, and cooperatives. Only 4.2% of the respondents reported that they got information from VEWs (Table 22). Market information helps farmers to know about prices and trends in the market, so that they can bargain with buyers. Market information and improvement in rural infrastructure and access to services could help farmers to earn more (EEA/EERI, 2006). To get market information on grain most of the farmers visit Debre Ziet market. They obtain grain price directly by visiting market place or by asking for such information from friends or relatives. A few of them use cell phones to get grain price. Some traders use brokers by giving incentive *Birr* 3-5 per 100 kg to buy grain in the village. A few traders use regular customers system to buy grain by giving *Birr* 10-15 higher or lower than actual market price. Information has a great impact on decision making. It is closely related to the decision to reduce uncertainty and as the saying goes, “information is power”. Someone who has better information could make good decision than others. Farm recording is the most important in marketing grain which should be introduced to the farmers to make them understand the cost involved in the production. It is based on farm management, and market information to build the ability to negotiate for the price of the product. Information has to be relevant, timely, cost effectiveness, reliable and useable. PASDEP emphasizes on improving the market chain of agricultural produce, increase farm get price, reduce market related transaction costs. Hence, market transparency can increase the volume and quality of supply.

Table 22: Distribution of respondents according to sources of market information (N = 120)

Market information	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Cooperative	0	0.0	1	0.8	1	0.8
VEWs	4	3.3	1	0.8	5	4.2
Market	75	62.5	25	20.8	100	83.3

Mass media	1	0.8	0	0.0	1	0.8
All source	10	8.3	3	2.5	13	10.8
Total	90	75.0	30	25.0	120	100.0

4.4.4.3 Preference for selling produce

The results indicated that 63.3%, 35% and 1.7% of respondents reported that they preferred for selling their produce to market, cooperative and market and cooperative respectively (Table 23). Farmers believed that they did not face any problem to sell their grain in the market; they could bargain and easily sell. In the case of cooperatives the price is fixed and not changes like market within a day or a week, hence it is not easy for bargaining. The person who is assigned to buy grain from cooperatives is not available on time and may finish money allocated. For this reason the majority of the farmers prefer to sell in the market rather than through the cooperative. Therefore, strengthening cooperatives has great meaning in expanding rural financial systems because without these cooperatives, the other institutions cannot perform their jobs at the required level and may seriously weaken the rural financial system (FDRE, 2001). This implies cooperatives should have to serve as link between financial institutions and the market. There is no difference of price between village market and cooperatives. Due to this the majority of the members want to sell their grain to cooperative but the problem is a person who buys grain is not available on time, he could finish money allocated and wait for other decision to continue the marketing process. To attract the business and to benefit members cooperative should employed full time personnel and should be flexible to make decision and to change the price soon according to the market signal.

Table 23: Distribution of respondents according to choice for selling points (N=120)

Choice for selling point	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
Cooperative	1	0.8	1	0.8	2	1.7
Market	59	49.2	17	14.2	76	63.3
Both	30	25.0	12	10.0	42	35.0
Total	90	75.0	30	25.0	120	100.0

4.4.5 Farmers' income

The results of the study showed that the 51.7%, 25%, 14.2% and 9.2% of the respondents recognized that their income increasing moderately, high, low and do not know respectively due to technology utilization (Table 24). The impact of farmers' income is the function of effective extension communication, access to input and credit, as well as to market outlets. Each of these factors has influenced the success of extension program in increasing yield and income (EEA/EEPRI, 2006). Extension program could change farmers' attitude, only if the yield and income of the farmers is increased due to new innovation. Similarly, the chi-square results (Chi-square value =51.800 and P-value = 0.000) indicated that there is significant difference in the level of income between respondents due to different technology utilization in the past years. This implies that cooperative should work more than before to disseminate information and technology for the members to make them utilize technologies in order to increase their income.

Table 24: Farmers' opinions on income increased due to technology utilization (N=120)

Increase of income	Coop. member		Non coop.		Total	
	No	Percent	No	Percent	No	Percent
High	26	21.7	4	3.3	30	25.0
Moderate	49	40.8	13	10.8	62	51.7
Low	11	9.2	6	5.0	17	14.0
Don't know	4	3.3	7	5.9	11	9.3
Total	90	75.0	30	25.0	120	100.0

Chi-square value = 51.800 P-value =.000***

Note: *, **, ***, significant at 10%, 5%, and 1% probability level.

4.4.6 Infrastructures

Road and communication play an instrumental role in rural development. According to EEA/EERI (2006), good infrastructure and rural services reduce cost of inputs, transaction costs and ultimately marketing margins. Mesfin *et al.* (2005), argued that transportation facility is the important marketing function which makes producers in surplus producing

areas gain better market price while consumers in deficit areas get a fairer price than would have been otherwise. Structural adjustment programs in developing countries have significantly reduced government support to the farmer. However, investment in rural infrastructure, marketing schemes and services such as extension and research have improved. In the past, most African countries provided services to the farmers and rural areas through commodity marketing boards and state supported cooperatives. The decline of this institution has hampered economic development as well as farmers' access to local market. Due to poor infrastructure, the majority of the farmers in the district use donkeys, back loading and vehicle to transport their produce to the market. It is a means for the farmers to enter to the market to take in input and to take out produce. In the study area out of 21 primary cooperatives, only 15 have access to all weather roads. Even if they have all weather roads they are not good for transport due to lack of maintenance. All cooperatives have wireless phone for communication, however they are not properly utilized to get the necessary information. It is impossible to think about development, where there is no sufficient rural road, communication and transport services. Rural development and expansion of infrastructure are inseparable and they should go together (FDRE, 2001).



Figure 6: Infrastructure of Ude primary cooperative that shows office, store, and tractor

4.5 Mechanism for technology dissemination

A new technology that is generated by research centers will be demonstrated to Farmers Research Group (FRG) and extension staff on research station. After researchers and extension staff are convinced on the performance of the technology, it is then demonstrated on FRG field. Farmers' day is prepared for farmers, officials and other stakeholders to evaluate the technology and to give feedback. Those farmers, who do not participate on the field day, get information through other farmers and media. Eventually, the innovation will be spread through local channels in the social system over specified period of time. If the technology performs well and is able to solve farmers' problems, it is multiplied for large scale utilization. According to UN/EUE (2002), cited by EEA (2005) certified seed is supplied by ESE, PHSE and Farmer Based Seed Production and Marketing Schemes (FBSPMS) ensure the increase of improved seed production and availability on the national market. The rate of adoption is usually measured by the length of time required for a certain percentage of the members of a system to adopt an innovation, therefore we see the rate of adoption is measured using an innovation or a system, rather than individual (Rogers, 1983). Other technologies like livestock breed and farm implements are multiplied by research centers and private workshops, respectively.

To disseminate technologies two days training is given on needs assessment for executive members of cooperatives by the union to create awareness. Similarly, training is given at cooperative level for PA leaders and group leaders. Technologies that are known and accepted by farmers are discussed between farmers and VEWs for utilization. Through farmer extension groups, the demand for inputs passed to VEWs. The VEWs compile the demands of farmers at the centre level and report to the cooperative. The cooperative will

then approve the requests of PAs according to the capacity of the loan and return to VEWs with comments. The VEWs revise the needs based on cooperative comments and will report to PAs council for final approval. The approved document will be submitted to Adea District and Cooperative Union. Lastly, the inputs will be distributed to farmers according to the needs through the cooperative.

There are numerous institutions, which promote and disseminate technologies; among them are government's extension agents, NGOs and other related agencies (EDRI, 2004). In reality, the system will not work due to shortage of time, loans, shortage of improved technologies, and poor planning. As a result of this input distribution system of cooperatives has not been effective. However, to increase production and productivity of agricultural sector farmers have to have access to improved technologies at the right time, at the right place, and with a reasonable price. Improved technologies like improved seed, fertilizer, agro-chemicals, improved livestock and farm implements that are distributed to the farmers highly depend on availability of technology and credit. Therefore, an input which is distributed to the farmers' through cooperative was supply driven rather than demand driven. Mostly, the need of the farmers' will be jeopardized by scarcity of technology that is livestock breed and farm implements.

4.6 Farmer's perceptions

Farmers were then asked to give their perceptions on the effectiveness of cooperative in distributing agricultural technologies to the members. From the Table 25 the results of the study are summarized on cooperative marketing, linkage, input distribution, and effectiveness. Most of the respondent perception results (agree = 27.5% and disagree = 35.0%) showed that cooperative could not run the business honestly and the price for product is not much less than the actual market price. The perceptions of the farmers

indicate that cooperatives are not honest to run the business; however their price is fair or the same as village market. Similarly, the chi-square test results (Chi-square value =1.950 and P-value = 0.377) showed that cooperatives do not show significant change in running the business through time.

Concerning, the linkage between cooperative and stake holders (PA and VEWs) farmers perceptions results (agree = 48.3% and disagree = 43.3%) indicated that the linkage is smooth. The chi-square test indicated that there is significant difference in linkage. It implies that there is improvement of relationship to serve the members (Table 25). Farmers' perceptions on the progress of cooperative indicated (agree = 29.2% and disagree = 41.5%) negative attitude toward progress of cooperative. It implies cooperative show less progress to serve its members and to develop its organization. The chi-square test results (Chi-square value = 3.750 and P-value = 0.153) similarly indicated that cooperatives do not show significant change on members.

Farmers perceptions on inputs distribution showed that technologies distributed to the farmers was not demand driven (agree = 69.3%, and disagree = 19.2 %). It implies extension program delivered to the farmers was not participatory, because VEWs is not involving farmers in planning inputs for utilization. In a few centers they discuss with farmers' group leaders to know inputs demand. In most cases the plan will not be implemented due to shortage of credit and inputs. On effectiveness of cooperative farmer perception results (agree = 32.5% and disagree = 36.7%) indicated that respondents have a negative attitude. It implies that cooperatives are not effective. Similarly, the chi-square test results (Chi-square value = 30.00 and P-value = 0.723) indicated that there is no significant change on cooperative work, it is the same as before.

Table 25: Distribution of respondents according to perceptions on cooperative societies (N=120)

Variables	Percentage scale			Chi-square	
	Agree	Neutral	Disagree	Value	P-value
-Cooperative carries out their business honestly.	33(27.5)	45(37.7)	42(35.0)	1.950	.377(NS)
-Cooperative business lack clarity.	71(59.2)	23(19.2)	26(21.7)	36.150	.000***
-Cooperative gives good price compared to market.	38(31.7)	30(25.0)	52(43.3)	6.200	.045*
-Input distribution some time is late and I face problem.	58(48.30)	8(6.7)	54(45.0)	38.600	.000***
-Relationships between cooperative and PAs are loose.	58(48.3)	10(8,3)	52(43.3)	43.200	.000***
-Cooperative society is working harder than before.	35(29,2)	35(29.2)	50(41.7)	3.750	.153(NS)
-Technology which is disseminated by cooperative is supply driven.	83(69.3)	14(11.7)	23(19.2)	70.350	.000***
-Cooperative working effectively.	39(32.5)	37(30.8)	44(36.7)	30.00	.723(NS)

Note: *, **, *** significant at 10%, 5%, and 1% probability level.

Note: Value refers in bract is percentage.

4.7 Effectiveness of cooperatives in technology dissemination

Based on the main activity of the cooperative program to measure performance, indicators were determined to indicate success. Indicators are variables used to measure changes in a given situation. Misra (1997) revealed that indicators are the principal means by which a monitoring unit keeps track of extension's capability and effectiveness. These indicators were based on annual target and achievement. To evaluate effectiveness of cooperatives in technology dissemination extension indicators like, loan, repayment, fertilizer and improved seed distribution were selected.

All selected cooperatives in the study area fully utilized loan allocated for them. Regarding repayment, Ude, and Kurkura primary cooperatives were effective in repaying the loans above 90% only for two planting seasons, while Godino repaid only for one season.

Gandagorba cooperative was successful in repaying the loan for three planting seasons; however Denkaka and Hidi were not effective at all. Concerning, fertilizer distribution Gandagorba and Hidi cooperatives were effective in distributing fertilizer, they had distributed above 90% to address the need of the farmers. Ude, Godino and Kurkura cooperatives were effective only for two seasons where as Denkaka was not successful even for one season in distributing fertilizer. All cooperatives had not reached 80% in distributing improved seed to fulfill the demand of the farmers due to shortage of seeds, hence they were not effective.

Table 26: Selected Indicators to measure effectiveness of cooperatives

Cooperatives	Indicators	Unit	2003/2004			2004/2005			2005/2006		
			Target	Achieved	%	Target	Achieved.	%	Target	Achieved	%
1.Ude	Loan	Birr	622 342	622 342	100	642 480	642 480	100	377 112	377 112	100
	Repayment	birr	622 342	622 342	100	642 480	592 480	92	377 112	327 118	86
	Fertilizer	qt	1987	1908	96	2108	1990	94	4140	2926	71
	Improved seed	qt	56	33	58	112	112	100	140	71	51
2 Denkaka	Loan	Birr	442 136	442 136	100	579 727	579 727	100	613 318	613 318	100
	Repayment	birr	442 136	372 180	84	579 727	406 259	70	613 318	476 740	77
	Fertilizer	qt	1520	1319	86	2228	1850	83	2700	2317	86
	Improved seed	qt	47	33	70	288	218	76	119	52	43
3. Hidi	Loan	Birr	458 313	458 313	100	564 459	564 259	100	286 407	286 407	100
	Repayment	birr	458 313	359 290	78	564 459	456 634	80	286 407	250 884	87
	Fertilizer	qt	3 250	3 138	96	3232	3232	100	2886	3334	115
	Improved seed	qt	73	20	27	280	129	46	188	79	42
4. Godino	Loan	Birr	622 342	622 342	100	592 712	592 712	100	377 112	377 112	100
	Repayment	birr	622 342	371 189	60	592 712	542 944	91	377 122	298 110	79
	Fertilizer	qt	1987	1888	95	2108	1990	94	4140	2926	71
	Improved seed	qt	64	46	72	240	219	91	207	126	61
5 .G/gorba	Loan	Birr	290 855	290 855	100	129 907	129 907	100	621 389	621 389	100
	Repayment	birr	290 855	289 597	99	129 907	115 914	90	621 389	614 389	98
	Fertilizer	qt	1550	1490	96	2300	2059	90	2400	2300	95
	Improved seed	qt	5	3	60	242	218	90	147	51	34
6. Kurkura	Loan	Birr	289 582	289 582	100	83 726	83 729	100	476 905	476 905	100
	Repayment	birr	289 582	289 326	99	83728	82 685	98	476 905	377 976	79
	Fertilizer	qt	161	1460	90	2147	1719	80	2080	1877	90
	Improved seed	qt	Nil	Nil	Nil	154	122	84	81	53	65

.Note: To measure effectiveness of cooperative indicators like loan , repayment, and input distribution were estimated at 90%, 90% and 80% respectively.

4.8 Limitation of cooperatives in technology dissemination

The main purpose of cooperative is to satisfy the demand of the members and compete for extension services to increase income. In principle farmer organizations with full empowerment reduce the pressure on routine extension activities which take up lot of the VEWs time (Chamala and Shingi, 1997). Cooperatives are financially weak and ineffective; but they can generate income from the sale of inputs and output. In commodity based organizations like cooperative, extension is integrated into all the other aspects of the organization to maximize the returns on the investment of the collective enterprise (Chamala and Shingi, 1997). Extension should have to work seriously with members of cooperative in disseminating technologies because they derive benefit from it. Extension has to disseminate information and technologies by linking research with farmers need and helping them to change technology package into practice.

In doing this, the study results showed that cooperatives have limitations in the way of technology dissemination. The main limitations were:

- (i) Poor management due to absence of employed personnel.
- (ii) Inadequate information and training on relevant issues.
- (iii) No regular and continuous extension contact.
- (iv) Weak linkage among VEWs, cooperatives and PAs.
- (v) Poor planning system and design for input.
- (vi) Shortage of technology.
- (vii) Lack of credit to address the need of the farmer.
- (viii) Inadequate financial recording and audit system.
- (ix) Inadequate infrastructure to take in input and out output i.e. road.

4.9 Relationships between selected variables and technology dissemination of improved wheat and cultural practices.

4.9.1 Income

For agriculture to be considered as growth sector, a reduction in output price and a raise in farm income should be the ultimate objective of any intervention (EEA/EEPRI, 2006). In general, during field survey observation, group discussion and survey data indicated that the income of the farmers in study area is encouraging after utilization of different technologies. From the Table 27, it is clearly indicated that there was a statistically significant relationship between income and technology dissemination of wheat on improved seed, fertilizer rate and seeding rate. The chi-square test was significant for wheat, improved seed (Chi-square = 8.119, Sig = 0.036), fertilizer rate (Chi-square = 9.289 and Sig = 0.054) and seeding rate (Chi-square = 8.684 and Sig = 0.034). The majority of respondents who utilized wheat improved technologies and fertilizers were those with better annual income in terms of land preparation, planting time and weeding more or less every farmer is working in similar way using his limited recourses i.e. land and labour. Due to this there is no association between income and selected variables. Rogers (1995), is contended that the richer farmers have more access to credit and extension information because they can afford to make a down payment for credit and more likely to take risks and to try out innovation. Capital is one of the major production constraints that affect technology dissemination to utilize them properly by purchasing necessary inputs.

Table 27: Relationships between income and technology dissemination of improved wheat and cultural practices (N=120).

Income Categories	Rate of dissemination for wheat improved technologies											
	Land prepa.		Impr.seed		Planting time		Seeding rate		Fert. rate		Weeding time	
	adopted	Not	adopted	Not	adopted	Not	Adopted	not	adopted	not	adopted	not
<5000	27	2	13	17	26	3	14	15	15	14	27	2
5000-10000	57	0	36	23	56	1	42	15	40	17	54	2
11000-16000	14	1	11	4	14	1	10	5	6	9	15	0
17000- 22000	4	0	4	0	4	0	4	0	2	2	4	0
>23000	5	0	4	1	5	0	5	0	5	0	5	0
Total	107	3	68	45	105	5	75	35	68	42	106	4
chi-square	4.627		8.119		3.855		10.308		9.289		1.770	
Df	4		4		4		4		4		4	
Sig	.328		.087		.426		.036		.054		.778	

Note: *, **, ***, significant at 10%, 5%, and 1% probability level.

4.9.2 Farm size

Land is one of the major production factors which constrain small scale farmers to improve their farming system through utilization of improved practices. Land size is a common variable that limit technology dissemination and utilization and it is an indicator of wealth. This implies that those who have large farm utilize technologies more than those with small farm. The results showed (Table 28) there were statistically significant relationships between farm size and technology dissemination of wheat on land preparation, time of planting and weeding. The chi-square test was significant for wheat, land preparation (Chi-square = 12.514, Sig. = 0.006), time of planting (Chi-square = 8.684, Sig. = 0.034), and weeding (Chi-square = 9.058, Sig. = 0.029). There is no difference observed between farm size and dissemination of wheat technologies for improved seed and fertilizer rate, because almost all farmers used improved seed by keeping seed clean, exchanging with friends, and buying from the market. At present, in the district there is no farmer who uses local seed of wheat. In the case of fertilizer, since the price has been increased three fold compared to the previous years, farmers have used almost similar rate, shifted to crop rotation and compost. As can be seen from Table 28 the majority who utilized wheat technologies were those who owned large farm size. Farmers who have bigger farms than others were more innovative in disseminating agricultural technologies and, they earn better income than those owning small farms.

Table 28: Relationships between farm size and technology dissemination of improved wheat and cultural practices
(N=120).

Farm size categories	Rate of dissemination for wheat improved technologies											
	Land prepa.		Impr. Seed		Planting time		Seeding rate		Fert. rate		Weeding time	
	adopted	not	adopted	Not	adopted	Not	Adopted	not	adopted	not	adopted	not
Landless	2	1	2	1	2	1	2	1	2	1	2	1
<1 ha	21	1	16	6	20	2	12	10	15	7	21	1
1. 1- 2 ha	35	1	26	10	36	0	23	13	25	11	36	0
2.1- 3 ha	51	0	38	13	49	5	40	11	41	10	48	2
Total	109	3	82	30	107	8	77	35	83	29	107	4
Chi-square	12.514		.138		8.684		4.693		1.947		9.058	
DF	3		3		3		3		3		3	
Sig.	.006		.988		.034		.196		.587		.029	

Note: *, **, ***, Significant at 10%, 5%, and 1% percent probability level.

The key findings of this chapter are summarized below:

- (i) Extension service that was given by frontline extension workers is not regular and continuous. The program of extension worker is known only by 40% of the farmers. These farmers were visited only once per week. Therefore, extension service that is provided by District in the study area is not adequate to give service for farm community on equal bases to create awareness and to address the needs of the farmers.
- (ii) The study findings indicate that majority of the farmers use VEWs as main source of information for technology dissemination. In addition to this point VEWs use demonstration as main method for technology introduction and dissemination in order to benefit the farmers.
- (iii) The findings of the study show that price of inputs are the main constraint for technology dissemination and utilization. Even if, the price of improved seed is high the majority of the respondents (70.8%) benefited from technology dissemination in the study area.
- (iv) The provision of credit service to the farmers is crucial to attain technology dissemination and utilization. The study has indicated that the majority of the farmers use cooperative as main source of credit, but the credit that was given to cooperative as collateral (to make available credit from the bank) was very limited to address the needs of the farmers. Mostly, the credit is given only for a short period of time for input purchase like fertilizer and improved seed.

- (v) The crucial limitation of improved seed was found to be the main limitation for technology dissemination and utilization. In the last five years cropping season only about 53.3%, 56.4%, and 63.5% of improved seed of teff, wheat, and chickpea respectively were distributed to the farmers from the actual target. This indicated that the gap between demand and supply is very high for technology dissemination.
- (vi) The findings of the study showed that the majority of respondents prefer to sell their produce to the market rather than cooperative, because it is not easy to bargain and sell in cooperative marketing. Moreover, in cooperative a person who buys grain is not available at all time and besides finishes money allocated and contributes to the discontinuity of marketing process. For all these the main cause is that cooperatives do not have full time employed personnel and not flexible to change the price fast.
- (vii) On the other hand the District has designed a system to disseminate technology to the farmers. In this regard, mechanism for technology dissemination is not implemented practically in the study area due to shortage of time, facilities, lack of commitment, shortage of improved seed and poor planning.
- (viii) Farmer's perceptions on effectiveness of cooperative indicated that cooperative business lack clarity and did not show significant change on farmers' livelihoods, due to this cooperative play passive role and not effective to achieve its goal. Hence it has less motivated the members.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

The overall objective of the study was to determine factors that influence technology dissemination of cooperatives in Adea district. This study investigated and explored extension service, availability of technology and credit, input supply, output marketing and infrastructures that affect the effectiveness of technology dissemination in the study area. Therefore this chapter, basing on the following major findings of the study provides the conclusions and recommendations as follows.

5.2 Conclusions

- (i) The findings of the study proved that extension delivery service which has been given by frontline extension workers is not regular and continuous. In the study area only 40% of the respondents receive adequate extension service, they are visited once in a week. In regard to the relevance of extension message and profitability of technology, the majority i.e. 70.8 % had positive attitude in that they have benefited from extension service and technology utilization. This implies the need to strengthen extension service to benefit all the farmers.
- (ii) The results point out the credit that has been given from cooperative to buy agricultural input to enhance productivity is not sufficient. This is one of the constraints extensionists face in the study area. The priority of credit has been given only for purchase of fertilizer and improved seed. For income generating activities such as fattening cattle, poultry and small ruminants' very small amount of loan has been allocated for poor farmers. Recently, savings and credit associations was

started by cooperatives to support financial need and to enhance saving behavior of the farmers.

- (iii) The study findings showed that the majority of the respondents (63.3%) preferred to sell their product to market. There is small deference of price between cooperative and public market, but it is the same in the village. The study indicates that in the market farmers are bargaining for sell, but during weighing they were cheated. In cooperative there is no bargaining, the problem is the person assigned to buy grain being not available on times and some times he/she could finish the money allocated. Due to this it takes time to continue the normal marketing process. It is not convenient for farmers and they were not courageous enough to sell their product to cooperative.
- (iv) The study result indicated that cooperative work seasonally mainly is focusing on input distribution during planting time and mainly purchasing agricultural products from both members and non members living in respective cooperative societies during harvesting time. These make farmers less motivated to work with organization.
- (v) The study findings pointed out that the linkage between VEWs, cooperatives and PAs is weak to work together. This could limit technical assistance, planning system and design, input distribution, technology dissemination and work relationships of VEWs. It is only; when extension workers, cooperatives and other stakeholders' activity are complementary the farmers and cooperative could benefit from the service.

- (vi) The study results indicated that infrastructure in study area was inadequate to transport input and output. Infrastructure like road is ineffective in the district, farmers' do not easily access markets to get incentive from produce, because transport cost will be high and the cost of produce will be lower. All weather roads which connect cooperatives to district town need maintenance to make it easy for vehicles. The dry season roads give service only when it is dry and no rainfall. These barriers for technology dissemination need to be removed. Road network is one of the indicators for the success of extension and market has to get attention to improve delivery of extension service.

5.3 Recommendations

- (i) The district agricultural extension program that has been implemented for more than four decades has made significant effort to promote improved technologies to increase production and productivity. In order to enhance technology dissemination and adoption more, the extension service have to give priority for farmers need. The farmers should organize into different extension groups and the program of VEWs should known clearly to the farmers on regular basis to advise and to implement extension program.
- (ii) Small scale farmers lack capital to invest on agriculture to increase production and productivity. Credit is one of the most important components of extension which make farmers to buy necessary inputs and farm implements which is required. The credit which has been given by cooperative should overcome the shortage of finance and should have to address the needs of the farmers to diversify investment.

- (iii) Product marketing is one of the main activities of cooperative to buy from members and non members of cooperative. In order to increase income, cooperative should design marketing system which could make them competitive and attractive business to buy farmers products. Marketing information as one part of extension system should be considered to be given by VEWs for farmers.
- (iv) Cooperative as farmer organization should empower the members in bargaining, reducing risk and uncertainties of the farmers. Therefore, cooperatives have to give services for the members throughout the year by identifying the need of members such as different commodities, farm implements, etc.
- (v) Agricultural extension is one of the policy instruments that could increase production of subsistence farming to secure food shortage by stimulating and changing farmers' attitude. Extension linkage is one the most important arena to avoid duplication, get feed back, share experience and to create conducive environment for technology dissemination. Regarding the linkage between cooperatives, PAs and VEWs should strengthen relationship, since they are working for the same goal to benefit the farmer.
- (vi) Infrastructure is the backbone for development by circulating goods and services from producers to consumers. In the district infrastructure like roads are inadequate to transport inputs for the farmers and output to the market. Therefore to facilitate input distribution and output to the market the existing road should be maintained and for those cooperative which are not accessible by road should have roads constructed by Rural Road Authority and community.

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APPENDICES

Appendix 1: Interview schedule for farmers to collect primary data.

A. Introduction

Dear respondent,

First of all, I thank you very much for being selected as representative respondent of the community to give us informations. The aim of the questionnaire is just for research and academic purpose to get your experience and knowledge about your cooperative society. Feel free and be open enough to give answers to the questions without fear.

District: **Adea** Zone: **East Shoa** Region: **Oromia**

Respondent name _____ Cooperative society _____

B. General Information.

Instruction: Put number of the answer in the **box** and give your views for others.

1. Farmer []

- | | |
|--------------------------|------------------------------|
| 1) Member of cooperative | 2) Non member of cooperative |
|--------------------------|------------------------------|

2. What is your age? []

- | | | |
|----------------|------------------|----------------|
| 1)20- 29years | 2) 30-39years | 3)40- 49 years |
| 4) 50-59 years | 5) above 60years | |

3. Sex []

- | | |
|---------|-----------|
| 1) Male | 2) Female |
|---------|-----------|

4. Marital status []

- | | |
|-------------|------------|
| 1) Single | 2) Married |
| 3) Divorced | 4) Widowed |

5. What is your highest level of education? []

- | | | |
|-----------------------|-------------------|----------------------|
| 1) No education | 2) Read and write | 3) Primary education |
| 4) Junior high school | 5) High school | 6) Beyond h. School |

6. What is your family size?

- | | | |
|------------|-------------|--------|
| 1) Below 3 | 2)3-5 | 3) 6-8 |
| 4) 9-11 | 5) above 12 | |

If no what is the reason?

17. Can you tell us services that you get from cooperative? _____

18. Please list service which is not given, but it is important to be delivered by cooperative society in the future?

D. Technology Dissemination

Instruction: Put number for the answer in the **box** and give your views for others?

Extension service

19. How frequently are you visited by VEWs? []

- | | |
|--------------------|---------------------|
| 1) Once in a week | 2) Twice in a month |
| 3) Once in a month | 4) Some times |

20. Are you satisfied with the number of contacts? []

- | | |
|-------------------|--------------|
| 1) Very satisfied | 2) Satisfied |
| 3) Not satisfied | 4) Not sure |

21. How did you receive advice from VEWs most of the time? []

- | | |
|-----------------|--------------|
| 1) Face to face | 2) In groups |
| 3) Training | 4) All |

22. Where did you meet with the VEWs usually? []

- | | | |
|-------------------------|-------------------|------------|
| 1) In the farm field | 2) In the village | |
| 3) In the meeting place | 4) In the market | 5) 1 and 2 |

23. What kind of extension message usually passes from DAs?

24. What kind of extension message you expected to pass?

25. How did you evaluate the relevance of extension message? []

- | | |
|---------------|-------------|
| 1) Very good | 2) Good |
| 3) Not useful | 4) Not sure |

26. From where did you get in formation about technologies? []

- | | | |
|----------------|-------------|--------------|
| 1) VEWs | 2) Research | 5) Neighbors |
| 3) Cooperative | 4) NGOs | |

27. How the VEWs introduce technology to you? []

- | | |
|-------------------------------------------|--------------------------------|
| 1) By demonstrating on the farmers' field | 2) By visiting research centre |
|-------------------------------------------|--------------------------------|

3) By visiting other field

4) They will not introduce

28. Did you get profitable technology according to your need? []

1) Yes

2) No

29. If your answer is no for question No 10 how could you solve the problem?

30. For how long you have been utilized improved varieties on the following major crops

Crop	Variety	Period of years			
		1) 1-3	2) 4-5	3) Above 6	4) Not utilized
Teff					
Wheat					

31. How far you are utilized recommended practices on the major crops?

Recommended practices	Teff		Wheat	
	1. Adopted	2. Not adopted	1. Adopted	2. Not Adopted
-Land preparation				
- Improved seed				
-Time of planting				
- Seeding rate				
- Fertilizer rate				
-Time of weeding				

32. How has your income is increased as the result of adopting new technology? []

1) High

2) Moderate

3) Low

4) Don't now

33. Most of the time what are the problems that hinder you not to utilize agricultural technologies? []

1) High price of input

2) Lack of market

3) Poor quality of the product

4) Low yield of technology

34. What are the limitations of cooperative society in your view in disseminating agricultural technologies?

35. In your view what is appropriate way of technology dissemination?

36. Do you have any comment that could be improved by cooperative society in the future in technology disseminating?

37. Please would you indicate any training that you participate have participated during the last three years? []

- | | |
|----------------|--------------------------------|
| 1) Cooperative | 2) Cooperative and agriculture |
| 3) Agriculture | 4) Don't know |

38. In your opinion which of the following is effective in the delivering agricultural information? []

- | | |
|------------------------|-------------|
| 1) VEWs | 2) Research |
| 3) Cooperative society | 4) NGOs |

Why _____

Technology Supply

Instruction: Put number of the answer in the box below and give your views for others.

39. From where did you get input (seed, fertilizer, herbicide, etc.)? []

- | | |
|----------------|--------------------------------|
| 1) Cooperative | 2) District Agriculture Office |
| 3) Research | 4) Market |

40. Did you prepare plan with DAs for the inputs? []

- | | |
|--------|-------|
| 1) Yes | 2) No |
|--------|-------|

41. If the answer is yes to question No.2 how did you prepare plan with DA for the inputs?

42. Did you face problem on input distribution? []

- | | |
|--------|-------|
| 1) Yes | 2) No |
|--------|-------|

43. What problem did you face mostly in getting inputs? []

- | | |
|--------------------------|---------------------------------------|
| 1) Not available on time | 2) Not available in required quantity |
| 3) Price is high | 4) Low quality 5) No problem |

44. If the answer is not available how did you overcome the shortage of inputs? []

- | | |
|------------------------|--------------------------|
| 1) Buy from market | 2) Exchange from friends |
| 3) Borrow from friends | 3) No problem |

45. How did you evaluate the present input delivery system of cooperative service?

[]

- | | | |
|-------------|---------------|-------------|
| 1) Adequate | 2) Inadequate | 3) Moderate |
|-------------|---------------|-------------|

D. Farmers Perception about Cooperative

Instruction: Please indicate the degree to which each statement are applies to your organization by saying whether **Disagree=1, Neutral = 2, Agree = 3** to show your impression.

- _____ 65. Cooperative is working effectively.
- _____ 66. Cooperative are stable in changing leaders, they are able to do the job.
- _____ 67. Government is interfering with cooperative some time.
- _____ 68. Cooperative societies carry out their business honestly.
- _____ 69. Cooperative gives as good price compared to private buyers.
- _____ 70. Input distribution some time is late and I face problem to use.
- _____ 71. Cooperative society always changes their leaders.
- _____ 72. Technologies is disseminated by cooperative society is supply driven.
- _____ 73. Cooperative has good relationship with peasant association.
- _____ 74. Cooperative price for our product is much less than the market.
- _____ 75. Technologies which is disseminated by cooperative based on our demand.
- _____ 76. The benefit cooperative is unfair to the share holder.
- _____ 77. Now day's government interferences on cooperative are reduced.
- _____ 78. Cooperative society is working ineffectively.
- _____ 79. I got equal benefit from cooperative society according to share.
- _____ 80. Cooperative society show less progress up to now.
- _____ 81. Input distribution is on time and I could apply them properly.
- _____ 82. Relationship between cooperative society and peasant association is loose.
- _____ 83. I am convinced that cooperative society is working hard than it was before.
- _____ 84) Cooperative society business lack clarity.

Thank you very much for your cooperation.

Appendix 2: Questionnaires to be filled by District Ministry of Agriculture and Rural Development Office.

A. Introduction:

I thank you very much for representing your organization to fill this questionnaire for required information. The aim of this questionnaire is just for research and academic purpose to get information about cooperative society in Adea district. The finding of this research may improve the way of technology dissemination through cooperative societies in the future to benefit the members. Hence, your suggestions and in formations about your organization are useful.

B. General information

1. What is your profession? _____
2. How long you have served in your organization? _____
3. Number of service cooperatives _____
4. Member of service cooperative _____ male _____ female _____
5. Non member of cooperative _____ male _____ female _____
6. Total Capital of cooperative _____ birr.
7. Number of peasant association _____
8. Member of Peasant association _____ male _____ female _____
9. Area of district in ha _____, cultivated land in ha _____, uncultivated land in ha _____, average land holding in ha _____, forest land _____ ha.
9. Type of soil, black _____%, clay loam _____%, light soil _____%
10. Average annual rainfall _____mm, temperature highest _____0c and lowest _____°c.
11. Climate, highland _____%, medium altitude _____%, low land _____
12. Major crops grown in the district _____
13. Number of extension supervisor _____ male _____ female _____
14. Number of DAs _____ male _____ female _____
15. Supervisor DAs ratio _____
16. DA farmers' ratio _____

30. Grain purchased from members in selected cooperative societies from 2002-06 in quintals.

Years/	2001/02		2002/03		2003/04		2004/05		2005/06	
Crops	purchased	sold	purchased	sold	purchased	sold	purchased	sold	purchased	sold
Teff										
Wheat										

31. How do cooperative gets market information to buy and to sell the farm products?

32. What is the advantage for the farmers if they sell their product to cooperative?

33. How many cooperatives are accessible by road?

- 1) All weather road _____ cooperatives.
- 2) Seasonal road _____ cooperatives.
- 3) No road _____ cooperatives.

34. What are the mechanisms used by cooperative society in disseminating agricultural technologies? _____

35. What are the limitations of cooperative society in disseminating agricultural technologies _____

36. How could you improve these limitations of cooperative society in the future?

37. What would you suggest for development of cooperative in the future?

Thank you for your cooperation!!