ACIAR ‘TREES FOR FOOD SECURITY’ PROJECT

THE AGRICULTURAL EXTENSION SYSTEM IN ETHIOPIA: A FOCUS ON EAST SHEWA, WEST SHEWA AND EAST WOLLEGA ZONES

Evelyne Kiptot, Ruth Kinuthia, Kaleb Kelemu and Tirhas Mebrahtu Hindeya

OCTOBER 2013
CONTRIBUTORS

Evelyne Kiptot
World Agroforestry Centre
P.0 Box 30677-00100
Nairobi, Kenya

Ruth Kinuthia
World Agroforestry Centre
P.0 Box 30677-00100
Nairobi, Kenya

Kaleb Kelemu
Forestry Research Centre
P.0 Box 30708, Addis Ababa, Ethiopia

Tirhas Mebrahtu Hindeya
Melkassa Agricultural Research Institute,
P.O Box 436, Nazareth, Ethiopia.
EXECUTIVE SUMMARY

As part of the baseline survey for the ACIAR Trees for Food Security Project, a literature review and key informants interviews were undertaken from 29th Jan to 8th Feb 2013 to understand the status of the extension system in Ethiopia. The major areas of focus were:

- Extension technologies disseminated to farmers
- Community engagement
- Capacity and efficiency
- Linkage with other institutions
- Commercialization and marketing
- Local innovation.

The key informant interviews were carried out with government extension staff at the Federal, Regional, Woreda and Kebele level. Staff of three NGOs (Catholic Relief Services, World Vision and International Development Enterprise) were also interviewed.

Ethiopia has invested heavily in extension, and there are plans to improve on infrastructure and strengthen extension personnel. The extension structure in Ethiopia has been developed in such a way that it enables all farmers to access extension services; it flows from the Federal level down to the region, then the zonal level, woreda level and finally the kebele level where farmers are organized into groups of 25-30 households which are subdivided into 1-5 social network groups, where one farmer is in charge of five farmers. Model farmers are in charge of these groups. The 25-30 groups differ in different kebeles depending on the number of farmer households in the kebele.

There are three Development agents (DAs) in each kebele, one DA supervisor for three kebeles and one Veterinary officer for three kebeles. DAs report to their supervisor who reports to Woreda office which reports to the zonal office then to the Region and finally to the Federal government.
The methods of extension used are both individual and group extension; Model farmers, Trainings at Farmer Training Centres (FTCs), Demonstrations at FTCs and on individual farms, individual farm visits, field days and mass media e.g. print outs and brochures. The most common and effective method is the use of model farmers in most areas.

The major challenge common in all areas is lack of resources due to constrained budget, as a result, most FTCs are not equipped and therefore not functional and land set aside for demonstrations at the FTCs lies fallow. There are no transport facilities especially for DAs to visit the farmers. There is also high DA turnover due to low salaries and lack of incentives.

In spite of the challenges, there are areas in which the ACIAR project can build on. The model farmer approach is widely used in Ethiopia and what may be improved upon is the mode of selection of model farmers where the community plays a major role in selection so that farmers feel part and parcel of the extension activities. In addition, the use of peasant associations at the kebele level is also one model that the Trees for Food Security Project can build on. The FTCs are training grounds for farmers. Many FTCs we visited had a hall for training and office space for the DA staff. Most of them had 1.0-2.5 ha of land allocated for demonstrations plots. However, due to lack of resources, most of the land is fallow. The Trees for Food Security Project could use these FTCs to set up rural resource centres where farmers can be trained, access germplasm and other extension services.
# Table of Contents

List of figures ............................................................................................................................................. vi

ACKNOWLEDGEMENTS .......................................................................................................................... vii

ACRONYMS ................................................................................................................................................. viii

1.0 INTRODUCTION ................................................................................................................................. 1

2.0 OVERVIEW OF THE EXTENSION SYSTEM IN ETHIOPIA ................................................................. 6

3.0 DESCRIPTION OF EXTENSION APPROACHES IN ETHIOPIA ......................................................... 17

4.0 METHODS OF THE STUDY .................................................................................................................. 25

5.0 OVERALL EXTENSION PICTURE IN THE COUNTRY FROM THE PERSPECTIVE OF THE FEDERAL GOVERNMENT OFFICIALS .......................................................................................... 33

6.0 EXTENSION IN OROMIA STATE REGION ......................................................................................... 41

7.0 EXTENSION IN EAST SHEWA (MELKASSA SITE) ............................................................................ 45

8.0 EXTENSION ACTIVITIES IN WEST SHEWA AND EAST WOLLEGA (BAKO SITE) ............... 60

9.0 EXTENSION ACTIVITIES BY NON GOVERNMENTAL ORGANIZATIONS ................................. 72

10.0 CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS FOR THE ACIAR TREES FOR FOOD SECURITY PROJECT SCALING UP ACTIVITIES ............................................... 81

11.0 REFERENCES .................................................................................................................................... 84
List of Tables

Table 1: Characterization of Extension Approaches by various scholars.......................................................... 5
Table 2: ACIAR Project sites in West Shewa and East Wollega (Bako site).......................................................... 30
Table 3: ACIAR project sites in East Shewa (Melkassa) ...................................................................................... 30
Table 4: East Shewa zone (Melkassa site) ............................................................................................................. 32
Table 5: West Shewa and East Wollaga zones (Bako site)...................................................................................... 32

List of figures

Figure 1. Overall research framework showing an iterative cycle of refinement driven by structured learning. ............................................................................................................................................. 2
Figure 2: Extension structure .................................................................................................................................. 10
Figure 3. Administrative regions of Ethiopia........................................................................................................... 25
Figure 4: Administrative Map of Oromia State with locations of ACIAR sites ..................................................... 26
ACKNOWLEDGEMENTS
The contributors wish to thank the Trees for Food Security Project for financial support. We are grateful to the ICRAF Country Office in Ethiopia and the Ethiopia Institute of Agricultural Research for logistical support. We also thank all the extension and NGO staff who provided us with information about extension activities in their respective areas.
<table>
<thead>
<tr>
<th>ACRONYMS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADLI</td>
<td>Agricultural Development-Led Industrialization</td>
</tr>
<tr>
<td>AKIS/RD</td>
<td>Agricultural Knowledge and Information Systems for Rural Development</td>
</tr>
<tr>
<td>AKS</td>
<td>Agricultural Knowledge System</td>
</tr>
<tr>
<td>BOARD</td>
<td>Bureau of Agriculture and Rural Development</td>
</tr>
<tr>
<td>CADU</td>
<td>Chilalo Agricultural Development Unit</td>
</tr>
<tr>
<td>CIPP</td>
<td>Comprehensive Integrated Package Project</td>
</tr>
<tr>
<td>CSA</td>
<td>Central Statistical Agency</td>
</tr>
<tr>
<td>CSP</td>
<td>Centre for Social Protection</td>
</tr>
<tr>
<td>DA</td>
<td>Development Agent</td>
</tr>
<tr>
<td>EEA/EEPRI</td>
<td>Ethiopian Economic Association/ Ethiopian Economic Policy Research institute</td>
</tr>
<tr>
<td>EPRDF</td>
<td>Ethiopian People’s Revolutionary Democratic Front</td>
</tr>
<tr>
<td>ESE</td>
<td>Ethiopian Seed Enterprise</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FFS</td>
<td>Farmer Field Schools</td>
</tr>
<tr>
<td>FTC</td>
<td>Farmers Training Centers</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GOE</td>
<td>Government of Ethiopia</td>
</tr>
<tr>
<td>IECAMA</td>
<td>Imperial Ethiopian College of Agriculture and Mechanical Arts</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
</tr>
<tr>
<td>IPMS</td>
<td>Improving Productivity and Market Success</td>
</tr>
<tr>
<td>IRIN</td>
<td>Integrated Regional Information Networks</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>MOARD</td>
<td>Ministry of Agriculture and Rural Development</td>
</tr>
<tr>
<td>MPP</td>
<td>Minimum Package Program</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PAPI</td>
<td>Participatory Action Planning and Implementation</td>
</tr>
<tr>
<td>PASDEP</td>
<td>Plan for Accelerated and Sustained Development to End Poverty</td>
</tr>
<tr>
<td>PADETES</td>
<td>Participatory Demonstration and Training Extension System</td>
</tr>
<tr>
<td>PLUPI</td>
<td>Participatory Land Use Planning and Implementation</td>
</tr>
<tr>
<td>REAC</td>
<td>Research-Extension Advisory Councils</td>
</tr>
<tr>
<td>SAA</td>
<td>Sasakawa Africa Association</td>
</tr>
<tr>
<td>SG-2000</td>
<td>Sasakawa Global 2000</td>
</tr>
<tr>
<td>SIDA</td>
<td>Swedish International Development Authority</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>SNNPR</td>
<td>Southern Nations Nationalities and People's Region</td>
</tr>
<tr>
<td>TOT</td>
<td>Transfer of Technology</td>
</tr>
<tr>
<td>T&amp;V</td>
<td>Training and visit</td>
</tr>
<tr>
<td>WADU</td>
<td>Wolayita Agricultural Development Unit</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION
The ‘Trees for Food Security’ project led by the World Agroforestry Centre (ICRAF) and working with national partners in Ethiopia, Rwanda, Burundi and Uganda began its operations in 2012. The aim of the project is to enhance food security for resource-poor rural people in Eastern Africa through research that underpins national programmes to scale up the use of trees within farming systems in Ethiopia and Rwanda and then scale out successes to relevant agro-ecological zones in Uganda and Burundi.

The specific objectives are:

1. To characterise target farming landscapes and systems, and develop tools for matching species and management options to sites and circumstances.
2. To generalize predictions of impacts of tree species and management on crop productivity, water resources and nutrients at field, farm and landscape scales to inform scaling up to improve food security and reduce climate risk.
3. To develop effective methods and enabling environments for scaling up and out the adoption of trees on farms.
4. To develop databases and tools for monitoring and evaluation of the impact of scaling up and out the adoption of trees on farms, and
5. To enhance capacity and connectivity of national partner institutions (including farmer groups) in developing and promoting locally appropriate options for adoption of farm trees.

There are four research work packages tied together in a major effort to strengthen national capacities in the four target countries (Figure 1). Together they comprise an iterative cycle of co-learning and refinement that address key barriers to adoption of trees on farms, followed by immediate promotion of best-bet agroforestry options across a range of conditions. This is coupled with extensive assessment of the performance of species and management options in the initial scaling up trials (including farmer feedback and analysis of their adaptations) and intensive measurement and modelling of impacts of trees on water, soil health, crop yield and overall system performance, in more controlled experiments. The results from these assessments feed back into the development of tools to match options to sites and circumstances and predict
impact of investments in scaling up and out. The emphasis of the research on methods to take adoption to scale focuses, on the one hand, on developing appropriate seed and seedling supply and extension methods for different contexts, and on the other, on policies and institutions that address barriers to adoption.

Figure 1. Overall research framework showing an iterative cycle of refinement driven by structured learning.

The objective of work package 3 is to develop effective methods and enabling environments for scaling up and out adoption of trees on farms. Under this objective we focus on extension methods (including seed and seedling supply systems) required to deliver germplasm and information to farmers as well as the institutional and policy environment required to overcome barriers to adoption. Together these constitute the scaling approaches that will be developed, tested and promoted. In order to identify the best fit extension approaches for scaling out the adoption of trees on farms, it is important to first understand the extension systems in the
respective national countries, hence this study. This report, therefore, presents the findings of the state of extension in Ethiopia based on a review of literature and key informant interviews which are described in detail in the methods section. The report begins with a general introduction of the challenges facing Ethiopia as a country and the role of extension; this is followed by an overview of extension and evolution of approaches in the country. Methods of the study and findings of the key informant’s interview are presented. Finally, we discuss the implications to the ‘Trees for Food Security’ project scaling up activities.

**Challenges facing Ethiopia and the role of extension**

Ethiopia, with an area of 1.1 million square kilometers and a population of more than 75 million, is a country of great geographical diversity. It has high and rugged mountains, flat-topped plateau, deep gorges, incised river valleys and vast rolling plains. Its altitude ranges from the highest peak at Ras Dashen (4,542 meters above sea level) down to the Danakil depression, which is about 170 meters below sea level (IFPRI/ CSA, 2006).

On the whole, Ethiopia has ample resources for agriculture. The country has 111.5 million hectares of land, and although 74 million hectares are arable, only 13 million hectares are being used for agricultural activities. Water resources are also plentiful in much of the country. There are about 12 million farmer households providing human resources. Ethiopia’s livestock resources are among the top in the world, at least in terms of quantity. The country also has a high level of biodiversity, with several different economically important crops indigenous to the country (such as teff) (Davis et al., 2010).

In spite of these resources, many challenges confront policy makers and other agents of change. These include the growing demand for food and agricultural products to feed nearly 80 million people, the growing income gap between urban and rural areas, dwindling natural resources, and poverty and food insecurity (it is estimated that some 6.4 million people required emergency assistance in late 2008 (IRIN 2008) and 7.5 million people are chronically food insecure and must receive assistance through a social welfare scheme (IRIN 2009).
Ethiopian agriculture is virtually small-scale, subsistence-oriented and crucially dependent on rainfall. A closer look at the performance of the Ethiopian agriculture reveals that over the last three decades it has been unable to produce sufficient quantities to feed the country’s rapidly growing population (FDRE, 1999; Belay, 2004; Ashworth, 2005; Berhanu et al., 2006; Quinones, 2007). The agricultural sector and institutions that support it, such as extension is thus key to poverty reduction in Ethiopia.

Extension service has meant different things to different people. Moris (1991) defined extension as the mechanism for information and technology delivery to farmers. This conceptualization of the extension service has been the basis for the Transfer of Technology (TOT) extension model. A more comprehensive definition of extension service is given by the World Bank as ‘A process that helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare’ (Purcell and Anderson, 1997).

Agricultural extension can be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being (Birner et al., 2006). This can include different governmental agencies (formerly the main actors in extension), non-governmental organizations (NGOs), producer organizations and other farmer organizations, and private sector actors including input suppliers, purchasers of agricultural products, training organizations, and media groups (Neuchâtel Group, 1999).

In the broadest interpretation, agricultural extension provides non formal agriculturally related continuing adult education for multiple audiences: Farmers, spouses, youth, community, urban horticulturalists (continuing agricultural education and community development) and for various purposes (including agricultural development, community resource development, group promotion and cooperative organizational development) (Rivera, 2001).

Agricultural extension operates within a broader knowledge system that includes research and agricultural education. FAO and the World Bank refer to this larger system as AKIS/RD (Agricultural Knowledge and Information Systems for Rural Development). The OECD countries refer to it simply as the Agricultural Knowledge System (AKS). Others describe the
three pillars of this system—research, extension and agricultural higher education—as “The agricultural knowledge triangle” and suggest that since the three pillars involve complementary investments they should be planned and sequenced as a system rather than as separate entities (Eicher, 2001). There are many models and types of extension activities around the world, and several authors have given typologies of extension, shown here for this illustrative review (Table 1). Many extension systems in SSA today are combinations of these broad categories:

**Table 1:** Characterization of Extension Approaches by various scholars

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conventional</td>
<td>1) General agriculture</td>
<td>1 Public</td>
<td></td>
</tr>
<tr>
<td>2. Training and visit (T&amp;V)</td>
<td>2) Commodity</td>
<td>2 Commodity</td>
<td></td>
</tr>
<tr>
<td>3. University</td>
<td>3) T&amp;V</td>
<td>3 T&amp;V</td>
<td></td>
</tr>
<tr>
<td>4. Technical innovation</td>
<td>4) Agriculture participatory approach</td>
<td>4 NGO</td>
<td></td>
</tr>
<tr>
<td>5. Integrated agricultural development program</td>
<td>5) Project approach</td>
<td>5 Private sector</td>
<td></td>
</tr>
<tr>
<td>Participatory</td>
<td>1. Farmer information dissemination system</td>
<td>6) Farming systems research and extension (FSR/E)</td>
<td>6 Farmer field schools (FFS)</td>
</tr>
<tr>
<td>2. Farming system research extension</td>
<td>7) Cost-sharing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract farming</td>
<td>1. Commodity development</td>
<td>8) Educational institute approach</td>
<td></td>
</tr>
<tr>
<td>2. Commodity focused</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural development</td>
<td>1. Commodity development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Integrated rural development programs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.0 OVERVIEW OF THE EXTENSION SYSTEM IN ETHIOPIA

Agricultural extension service in Ethiopia is said to have started in 1953 with the establishment of the then Imperial Ethiopian College of Agriculture and Mechanical Arts (IECAMA), currently known as Haramaya University. IECAMA was established following the concept of the land grant system of the United States of America (USA) and was mandated to have three responsibilities: teaching, research and extension. The extension mandate of the college included transferring local research outputs and technologies to farmers, and importing technologies and improved practices from abroad and introducing them to farmers (Ibrahim, 2004). The college was using graduates of the then Jimma and Ambo agricultural high schools as development agents (DAs), and was concentrating its efforts around the areas where it had agricultural experimental stations. The college started with only 2 extension agents; this number later increased to 132 agents operating in 77 extension posts. Extension in Ethiopia has gone through radical policy shift in the past 50 years, from feudalism to Marxism to a free market system (Kassa, 2005).

Currently, extension is mostly provided by the public sector, operating in a decentralized manner where extension is implemented at the woreda (district) level. The public sector is the single most important player, especially in terms of inputs, at the local level for smallholders. The private sector and NGOs (known to have many innovative and participatory approaches), while becoming increasingly important, are often left out of extension initiatives. In Ethiopia, limited extension is conducted by NGOs and the private sector, usually working through the woreda-level BOARDs (Davis et al., 2009).

2.1 National extension system

In most countries, nearly all agricultural extension systems were organized as departments within the ministry of agriculture. Therefore, most of these extension organizations are government agencies with a hierarchical management structure. In addition, a primary national agricultural development goal in most countries following independence was to achieve national food security. As a result, most extension programs focused primarily on technology transfer activities
that would improve the production of basic food crops, with far less attention and fewer resources being given to other extension programs and activities, including livestock, horticulture, fisheries, and natural resource management (Swanson and Rajalahti, 2010).

In 1963, the Ministry of Agriculture in Ethiopia was established, and the mandate of extension provision was transferred to this institution. The Ministry of Agriculture established extension departments at the headquarters and provincial levels (Abate, 2007). During this time, several national development plans were devised, the last of which supported small-scale farmers through comprehensive package programs (Comprehensive Integrated Package Projects, or CIPPs), the most prominent of which were the Chilalo and Wolayita Agricultural Development Units (CADU and WADU). CADU was established in Arsi to improve living standards through increased production and infrastructure. The WADU program, based in Wolayita, although still focused on improving living standards, based its approach on agroecological zones (Abate, 2007).

A minimum package (Minimum Package Program-MPP1 and MPP2) approach then followed these programs, to help to scale up the CIPPs. MPP1 lasted from about 1971 to 1975. The country then moved into a socialist period. During this time the government implemented “quasi-participatory extension approaches” and continued with the MPP2 program until 1985. Much of the focus during this time was on land reform. The MPP2 program ended around 1985 (Abate 2007). In the mid-1980s, various new programs were implemented, such as the National Program for Food Self Sufficiency (1986–1989), the Modified Training and Visit (T&V) Approach, and the Peasant Agriculture Development Extension Projects (1986–1995) (Abate, 2007).

Over the years the Ministry has implemented different extension approaches, such as the comprehensive package programme, the minimum package programme, the peasant agriculture development extension programme, and since 1995, the Participatory Demonstration and Training Extension System. A closer scrutiny of the different extension approaches reveals that they have been planned and implemented without the participation of the very people for whom they have been designed. Apart from being biased against the livestock sub-sector, these approaches have captured farmers located only few kilometres from both sides of all-weather roads (Belay, 2003).
Beginning in 1992 with the Maputo Declaration, the Government of Ethiopia (GOE) began an unprecedented public investment in the agricultural sector. At a time when many governments in Africa were curtailing support for the agricultural sector, the GOE instituted a policy of Agricultural Development-Led Industrialization (ADLI). In 2008, 16 percent of the government budget was committed to the agricultural sector. In recent years, high rates of economic growth have been linked to increases in the area cultivated and in agricultural productivity (Byerlee et al., 2007; Diao et al., 2007).

As part of the current five-year (2006–2011) Plan for Accelerated and Sustained Development to End Poverty (PASDEP), the government is continuing to invest heavily in agriculture. To enable this, the Ministry of Agriculture and Rural Development (MOARD) has developed a document outlining rural development policies, strategies, and instruments (Ethiopia, MOARD 2001). The basic directions of agricultural development include the utilization of human labor, proper use of agricultural land, the combining of endogenous and exogenous knowledge (a “foot on land”), a focus on innovations adapted to agroecological zones, and an integrated development approach. The MOARD has aligned donor support with plans to scale activities in the sector and to meet the resource gaps identified. A core part of the government’s investment in agriculture is the public agricultural extension system.

The decentralized extension system comprises the MOARD as key institution responsible for developing and refining the overall national agricultural and rural development strategies and policies for the country; major government ministries concerned with or affecting agricultural and rural development; several agencies beneath the MOARD; and regional, woreda (district level), and kebele (lowest administrative level) institutions. The MOARD is responsible for developing and refining the overall national agricultural and rural development strategies and policies for the country, with input from the regions and other stakeholders. Within this strategy, the MOARD establishes the overall national extension policy, providing financial support for the extension system and supporting the regions with training and other capacity-strengthening activities. There are three sectors within MOARD as illustrated in Figure 2.

The regions fall beneath MOARD. Each region has a Bureau of Agriculture and Rural Development (BOARD). The regions and their BOARDs are responsible for agricultural and
rural development policy implementation, coordination, and evaluation. Each BOARD has a head and a number of technical and administrative staff, including department heads. These personnel provide technical and administrative support, as well as supervision and monitoring for the woreda- and kebele-level extension offices. Each region’s agricultural advisory support is internally divided according to major agroecological zones, providing more detailed technical and administrative support, especially for the large regions (http://www.worldwide-extension.org/africa/ethiopia).

Beneath Regional administrative level, are the woredas. The woreda (district level) Offices of Agriculture and Rural Development (OOARDs) are the main frontline administrative structures implementing agricultural extension. The OOARDs are composed of five main sectors: agricultural development, natural resources, environmental protection and land administration, water supply and rural roads, and input supply and cooperative promotion (Gebremedhin et al., 2006). The largest sector, agricultural development, is responsible for extension services and is usually divided into crop production, livestock production, natural resource management, and extension teams (Gebremedhin et al., 2006).

Kebele is the lowest administrative level institution. It is estimated that 8,500 Farmers Training Centers (FTCs) have been established at the kebele level with roughly 2,500 of them reported fully functional (MOARD 2009a). In 2009 there were about 45,000 DAs at the kebele level, of whom about 12 to 22 percent are women, depending on the region (Ethiopia, MOARD 2009a). The number of frontline extension personnel is expected to increase to roughly 60,000 when all FTCs have been established and are fully functional. About 62,764 DAs have graduated from the ATVETs as of 2008, with 12 percent of them being female (Ethiopia, MOARD 2009b).
The extension system has federal and regional dimensions. Core institutions are the Agricultural Technical and Vocational Education and Training (ATVET) centres and the Farmer Training Centres (FTCs). These institutions are currently functioning to produce, as well as use, the
human capital that is embodied in Development Agents (DAs). ATVETs train DAs and the DAs in turn use FTCs to train farmers. At present the extension system deploys four DAs at each kebele: with responsibility for crop production, livestock production, natural resource management, and home economics. In addition, there is one animal health assistant per three kebeles, and one cooperative expert serving five kebeles. Furthermore, as part of the system, Research-Extension-Farmer Linkage Councils have been established to oversee technology generation, packaging and dissemination (Chanyalew et al., 2010).

2.2 Non-governmental organizations
Ethiopia has a long tradition of informal community-based organizations that operate at the local level and offer mutual socio-economic support to their members. Formal civil society that is, organizations with legal personality did not exist until the 1973-1974 and 1984-1985 famines when many more non-governmental organizations (NGOs) emerged with a focus on relief and humanitarian services. The number of NGOs increased substantially after the downfall of the Derg regime in 1991, and most recently the Government adopted the Proclamation to Provide for the Registration and Regulation of Charities and Societies (CSP), the country’s first comprehensive law governing the registration and regulation of NGOs. NGOs are becoming an important feature of Ethiopia’s agricultural innovation system, and many are now investing heavily in sustained agriculture and rural development. They operate at all levels: national, regional, zonal, woreda, and kebele. In many rural areas, they collaborate with agricultural bureaus or agricultural offices at the woreda level. (http://www.worldwide-extension.org/africa/ethiopia/s-ethiopia).

In addition to the public extension, NGOs have also been involved in providing extension services to farmers, mostly in more drought prone and food insecure areas. Some of the extension services provided by the NGOs use innovative extension approaches. SOS Sahel, Farm Africa, and Save the Children are few examples (Ashworth, 2005). Several participatory approaches under different names have been used, including Participatory Action Planning and Implementation (PAPI), Participatory Land Use Planning and Implementation (PLUPI), and Farmer Field Schools (FFS) (Ashworth, 2005). However, many of these programs suffer from
the fact that even though they use woreda level government staff, they are not well integrated into the public system.

In 1993, NGO Sasakawa Global 2000 (SG-2000) promoted the use of productivity-enhancing technologies and access to inputs and credit, coupled with training using 1/4 to 1/2 ha demonstration plots that were closely supervised by research and extension. SG-2000’s goal was to increase food production and stimulate links between research and extension. Via their on-farm demonstration plots, SG-2000 showed that with sufficient inputs and supervision and management farmers could double or triple their cereal yields of maize and wheat (Davis et al., 2010).

The SG 2000 extension activities started by assessing available agricultural technologies in the country with the support of the national research and extension bodies. On the basis of the availability of improved varieties and recommendations of the research and extension experts, in 1993 technology packages for maize and wheat production were defined and demonstrated to 160 farmers residing in seven districts of the Oromia National Regional State and the Southern Nations, Nationalities and Peoples Regional State (Habtemariam, 1997).

In 1994 the SG 2000 extension program expanded its extension activities both in terms of area coverage and technology packages. More specifically, sorghum and teff technology packages were included in the program, the number of participating farmers rose to 1600 and the program was expanded to some districts of the Amhara National Regional State and the Tigray National Regional State. In 1995, good weather conditions, coupled with the material and technical support that participating farmers received from SG 2000, resulted in substantial yield increments. In general, the SG 2000 extension program has successfully demonstrated that the correct use of improved technology packages can result in substantial increases in crop output (maize, sorghum, teff, wheat) in the appropriate agro-ecological environment. The impressive yield increments obtained by the participating farmers persuaded the Ethiopian government that self-sufficiency in food production could be achieved by adopting the SG 2000 extension approach. Consequently, in 1995 the government took the initiative to run the program on its own and launched the Participatory Demonstration and Training Extension System (PADETES)
as the national agricultural extension system (Habtemariam, 1997; Takele, 1997; Ashworth, 2005).

The PADETES program has been an aggressive extension intervention that has involved 4.2 million participants from a total of about 10 million small-scale farmers in the country (Kelemework and Kassa 2006). Several reviews have been conducted of Ethiopia’s Participatory Demonstration and Training Extension System (PADETES), based on Sasakawa Global 2000’s (SG-2000) approach to extension that uses demonstration plots and links technologies to inputs through a package deal. Although 55% of respondents used the package, a good number of farmers later abandoned package components such as fertilizer or improved seed (Bekele, et al., 2006). Extension workers saw their role mostly as distributors of fertilizer and credit rather than technical advisors. Other researchers found that agricultural extension, as well as other rural services, contributed significantly to agricultural productivity in Ethiopia (Ayele et al., 2005).

In SG 2000 intervention sites, farmers participating in the SG 2000 technology popularization programs, have been able to increase their farm incomes and improve their livelihoods (Abera, 2006; SAA, 2006b; Quinones, 2007; SAA, 2008). A closer view at the SG 2000 project-based interventions in Ethiopia over the past fifteen years shows that SG 2000 has been very successful in bringing about perceptible changes in agricultural productivity levels, improving farmers’ livelihoods, enhancing the technical skills and management capacity of smallholder farmers and promoting more sustainable and nature-friendly farming practices (Takele, 1997; Belay, 2003; SAA, 2006a; Quinones, 2007).

### 2.3 Private extension

Private extension schemes involve fee-for-service extension provided by private firms with no public support, and are clearly private. Considering both the market failures of private extension systems in which privatization reduces social welfare provision, and the public extension failures in which privatization increases social welfare provision, Hanson and Just (2001) argue that “A universal movement towards paid extension is not in the public interest”. They conclude that
“Optimality calls for a mix of public, private, and paid extension including policy support of private extension”.

In a partnership, equal authority is vested in the parties to it. In some countries (South Korea, Taiwan), farmers’ associations are equal partners with decentralized government authorities. In other countries (e.g. Israel) farmers may ‘contract-in’ certain services to establish an equal partnership, since decisions regarding the provision of field services are made by the farmers’ associations. More recently, other forms of public sector partnership involving government funding have emerged (e.g. Chile, Hungary, and Venezuela). Where government funds private field services providers, however, there remains the same question that arises in relation to pluralism regarding the equality of the partnership when government pays (Rivera et al., 2001).

Various cost recovery strategies exist. There are systems in which government and private organizations charge for extension information, and arrangements in which extension technicians work with farmers on a fee-based contract. Repartition of costs is seen as an important development by committing the stakeholders to share the burden of funding extension, which encourages them to acknowledge and appreciate the value of information (Rivera et al., 2001).

Several public and private sector extension cost recovery schemes exist. Hanson and Just (2001) cite such public schemes as:

(a) Fee-for-service extension provided by a public extension system

(b) Partially public-funded private extension schemes, under which extension services are provided by private firms under contract or their fees are paid from public extension budgets with a contribution paid by the user of the services, and

(c) Policy-supported private extension schemes, under which fee-for-service extension provided by private firms is made viable by government requirements or subsidies are provided for or taxes levied on specific production practices.

The private sector is known to contribute to agricultural production through organized markets and channels for seed, fertilizers and other farm inputs to farmers. In Ethiopia, the overwhelming presence of the government in all areas of agriculture has limited private sector expansion in
previous years. The limited supply of farm inputs underscores the need for an increased participation of other companies to alleviate this constraint. The government has put in place policies favorable to private sector development, and domestic and foreign firms, small-scale rural entrepreneur, traders, transporters, and industry associations are emerging as a potentially important force in the country. However, there are still a number of barriers that limit private sector involvement. For example, it is difficult for new market entrants to build a distribution network that can compete with that of the Ethiopian Seed Enterprise (ESE). (http://www.worldwide-extension.org/africa/ethiopia/s-ethiopia).

In the private sector, domestic and foreign firms, small-scale rural entrepreneurs, traders, transporters, and industry associations are emerging as a potentially important force in the country. Private investment as a percentage of GDP in Ethiopia has risen significantly, as has domestic lending to the private sector. Between 1992 and 2004, 614 domestic firms and 23 foreign firms invested approximately US$310 million in the agricultural sector (Spielman et al., 2006).

Cooperatives and unions provide a wide variety of services, including input supply management, grain marketing, and the supply of consumer goods to members at prices that compete with local traders (Spielman et al., 2006). Some cooperatives are also involved in seed multiplication and distribution schemes, grain milling, distribution of veterinary medicines, and training of members in fields such as Para-veterinary services for cooperatives and veterinary clinics (Rahmato, 2002).

Cooperatives are becoming an increasingly important agricultural institution in Ethiopia, with the recent strong attention paid by the government to cooperatives as a key vehicle for advancing the government’s agricultural and rural development agenda. Cooperatives have both the function of rural “user organizations” and of service providers (Mogues et al., 2009). They have the common characteristics of user organizations in that their members and often their leadership, is comprised of local residents who directly use the services and resources that cooperatives facilitate. Also, they take the form of user organizations in that they are not strictly public agencies but rather are voluntary local organizations of individuals interested in cooperating to achieve individual and mutual goals of increasing productivity and accessing markets. At the
same time, agricultural cooperatives in Ethiopia can also be characterized as “service providers,” as it is, for example, predominantly through cooperatives that farmers obtain agricultural inputs and in some cases agricultural equipment (Spielman et al., 2008).

Bernard et al., (2007) found that a greater percent of households in the Tigray region participate in cooperatives than is the case in the three other leading regions (Amhara, Oromia and SNNPR). The cooperative union is engaged in projects such as dairy farms and beehive production in order to encourage its member cooperatives and individual farmers to engage in such activities. This has demonstration effects on farmers’ adoption of agricultural practices. A cooperative union leader reported that these projects are successful in having such demonstration effects (Mogues et al., 2009).
3.0 DESCRIPTION OF EXTENSION APPROACHES IN ETHIOPIA

3.1 Chillalo agricultural development unit (CADU)
The first comprehensive package project, the (CADU) was established in September 1967 and was financially backed by the Swedish International Development Authority (SIDA). CADU aimed at a general socioeconomic development. Towards this end it integrated planning, credit and marketing facilities, price stabilization, mechanization, research into inputs and intermediate technologies and training local project employees. The method CADU adopted in reaching the peasants was basically that of demonstration. The project region was divided into extension areas where agricultural extension agents and model farmers demonstrated the effects of new agricultural techniques (Belay, 2003).

It was soon realized that the comprehensive package projects failed to serve the very people for whom they were destined the tenants and small-scale farmers. Most importantly, the principal beneficiaries were landlords and commercial farmers who reaped almost all the services rendered. In evaluating the experience from CADU, Schulz (1981), underlined the fact that the distribution of CADU loans between tenants and landowners has always been biased in favour of owners and so proportionately, there have been roughly only half as many tenants on the credit list as there are in the target population. Other authors have shown that, by encouraging the process of mechanization in larger commercial farms, the package projects accelerated the eviction of tenants (Betru, 1975; EPID, 1970; Mengisteab, 1990; Task Force on Agricultural Extension, 1994a; Tesfai, 1975).

3.2 Minimum package project (MPP-I/ MPP II)
It became apparent that the comprehensive package projects were too expensive, both financially and in terms of trained manpower requirements, to warrant replication in other areas of the country. As a result, in 1971 the government, in co-operation with SIDA designed an alternative strategy envisaged to be compatible with the availability of resources called the Minimum Package Project I (MPP-I). MPP-I was prepared for the 1971-1974 period and was designed to provide small scale farmers with services considered to be the minimum essential elements for agricultural development (Mengisteab 1990, Schulz 1981).
The objective of the MPP-I was to provide smallholders with extension and input supply services. As an implementing structure, the then MOA established a department known as Extension and Project Implementation Department (EPID). MPP-I used similar extension approaches as the comprehensive package approach, which was using demonstration plots and model farmers (Gebremedhin 2006). It was also in 1971 that the government established the Extension and Project Implementation Department (EPID) in the Ministry of Agriculture. EPID was commissioned to administer the minimum package projects and supervise the activities of comprehensive package projects. MPP-I was supposed to reach a large number of farmers by making use of the technologies generated and tested by the comprehensive package projects (Belay, 2003).

MPP-I failed to have a significant impact on the agricultural sector because the government was reluctant to put in place the necessary reform measures in the areas of land tenure, tenant landlord relationships and the organizational and administrative systems of the different institutions entrusted with agricultural development of the country (Harbeson, 1990; Mengisteab, 1990; Schulz, 1981).

The major drawbacks of the MMP-I also included minimal attention given to the livestock sector, not benefiting smallholders, and not being able to reach the vast majority of the farmers. The Derg regime, which toppled the Imperial regime in 1974, continued with the MPP-I for four years, although the implementation of the project was constrained by political instability and changes in the government structure. In 1980, the Minimum Package Project II (MPP-II) was developed with funding from The World Bank, International Fund for Agricultural Development (IFAD) and SIDA. The MPP-II aimed to improve crop and livestock productivity, increase the production of agricultural raw materials for domestic use and for export, enhance soil and water conservation activities, establish various farmer organizations, and construct rural roads, grain stores and agricultural offices (Gebremedhin 2006).

During its implementation (1981-1985), the MPP-II did not attain its stated objectives because the very limited number of extension agents available in the country were made to cover as wide an area as possible without adequate facilities and logistical support. The same agents were overloaded with different assignments, such as collecting taxes, promoting producers’ co-
operatives, collecting loan repayments and mobilizing labour and resources on the part of public authorities, which were, at times, not in their domain of responsibility (Task Force on Agricultural Extension 1994a). The development centres that were established under MPP-I were closed and extension personnel were re-assigned to the woreda level. MPP-II was phased out in 1985 and was replaced by a new program called Peasant Agricultural Development Program (PADEP) (Gebremedhin 2006).

3.3 Peasant agricultural development program (PADEP)
PADEP was designed to bring perceptible changes in peasant agriculture through concerted and co-ordinated efforts in the areas of agricultural research and extension. The strategy was based on a critical evaluation of past extension strategies and underscored the importance of stratifying the country into relatively homogeneous zones, decentralizing the planning and execution of agricultural development activities and empowering and giving considerable attention to zones which were to be the centres of development efforts (Belay, 2003). PADEP classified the country into eight development zones: Northwestern Ethiopia, Western Ethiopia, Southern Ethiopia, Southeastern Ethiopia, Eastern and Southeastern Ethiopia, Central Ethiopia, Northeastern Ethiopia and Tigray. However, only the programs for Northwestern Ethiopia, Eastern and Southeastern Ethiopia. Hence, PADEP focused on the high potential areas of the country (Gebremedhin 2006).

The principal objectives of the PADEP programme were: increasing food production at least to the level of self-sufficiency; developing the production of cash crops for export and raw materials for domestic industries; increasing rural sector employment opportunities; supporting and encouraging the development of rural co-operatives; preventing further soil depletion and introducing suitable farming system in erosion prone areas of the country (Belay, 2003).

PADEP used the Training and Visit (T&V) extension approach, which was pilot-tested in six woredas three years prior to its implementation. The PADEP witnessed the formation of the research extension liaison committees in 1986, the first of its kind in the country by then. Because of the ideological basis of the Marxist military regime, most of the extension services
and input supply went to the producer’s co-operatives, and smallholders were again left out of the development process (Ibrahim 2004). The PADEP program continued for four more years under the Ethiopian People’s Revolutionary Democratic Front (EPRDF) regime which overthrew the Derg in 1991. The PADEP was then replaced by a new extension program called Participatory Demonstration and Training Extension System (PADETES) in 1995. PADETES became the first extension program to be developed without foreign assistance and fully funded by the government budget (Ibrahim, 2004).

3.4 Participatory demonstration and training extension system (PADETES)
PDETES was formulated in 1994/1995 primarily based on the experience and much touted success story of Sasakawa Global 2000 program (Gebrekidan et al., 2004). The strategy was a technology-based, supply-driven intensification which consisted of enhanced supply and promotion of improved seeds, fertilizers, on-farm demonstrations of improved farm practices and technologies, improved credit supply for the purchase of inputs and close follow up of farmers’ extension plots (Kassa, 2005).

PADETES was developed after a critical evaluation of the past extension approaches and the experience of SG 2000. Its major objectives included increasing production and productivity of small-scale farmers through research-generated information and technologies; empowering farmers to participate actively in the development process; increasing the level of food self-sufficiency; increasing the supply of industrial and export crops and ensuring the rehabilitation and conservation of the natural resource base of the country (Task Force on Agricultural Extension, 1994b).

PADETES system that now reaches some 35 to 40 percent of farm households in rural areas provides a small amount of inputs through packages provided directly to farm households, and functions with a low number of visits by public DAs (Davis et al., 2010). Several reviews of the PADETES program have been performed. The major one, conducted by the EEA/EEPRI, evaluated PADETES in 2005 (EEA/EEPRI 2006). According to the results of the study, Ethiopia’s current PADETES model has shown the following significant achievements:
• Reached many farmers equitably
• Increased productivity in some cases
• Increased production of grains
• Increased use of fertilizer and improved seed
• Increased numbers of participating households in extension packages

Weaknesses
• Majority of extension packages are on crop production
• Extension is supply-driven
• Extension packages are formulated at the federal level and there is a lack of regional strategies
• Narrow focus on cereal crops
• Limited focus on cash crops and animals
• Incomplete use of packages by farmers, with 75 percent dis adoption (started but not continued)
• Limitations in infrastructure, marketing, and inputs affected implementation
• Limited participation by women farmers
• Limited training for extension workers

The PADETES program has been an aggressive extension intervention that has involved 4.2 million participants from a total of about 10 million small-scale farmers in the country (Kelemework and Kassa, 2006).
3.5 Farmer Field schools (FFS)
Farmer Field Schools are a participatory method of learning, technology development, and dissemination based on adult-learning principles such as experiential learning. Groups of 20-25 farmers typically meet weekly in an informal setting in their own environment. Farmers are facilitated to conduct their own research, diagnose and test problems, and come up with solutions. Both to ensure sustainability and to enhance the sense of ownership and responsibility, FFS programs are encouraging cost sharing (Davis, 2009).

Farmer field schools (FFS) have been a recent topic of debate as to their impact in SSA and elsewhere (Davis, 2006). Although many positive reports exist on the benefits of the FFS approach, some studies have called into question their overall impact and financial sustainability. FFS have shown remarkable impact in terms of pesticide reduction, increases in productivity, knowledge gain among farmers, and empowerment. However, these effects have been generally confined to the most directly-engaged farmers, rather than demonstrating adequate capacity for scaling up for greater impact. The FFS themselves are undergoing reforms to address these issues, such as becoming self-financed (Khisa, 2007).

3.6 Farmer training centers (FTCS)
Since 2002, more than 8,489 FTCs have been built at the kebele (the lowest administrative division) level. The centers are staffed by DAs and are responsible for providing extension activities in rural areas. Core activities concern livestock, crop production, and NRM (Davis et al., 2010). FTCs at the kebele level were also identified as a critical resource needed to enable extension delivery. The FTCs were designed as local-level focal points for farmers to receive information, training, demonstrations, and advice, and included both classrooms and demonstration fields. The FTCs are expected to form an important node between extension and farmers in the agricultural sector. FTCs are managed at the kebele level, but funding for capital, operational, and salary costs come from the woreda level (Davis et al., 2009).

Each FTC is staffed by three DAs (one each in the areas of crops, livestock, and NRM) and supported by an itinerant DA covering three FTCs and trained in cooperatives management or a related field (Spielman et al., 2006). Each DA is expected to train 120 farmers per year in his or
her field of specialization. He or she is also expected to provide modular training to 60 farmers every six months in his or her field of specialization (Ethiopia MOFED, 2007). Researchers agree that the FTCs should be the focal point for all the actors within the innovation system (Abate, 2007). However, the FTCs need monitoring and support (Aberra and Teshome, 2009). This is in addition to having a clear business or operational strategy and knowledgeable DAs who are capable of running them.

### 3.7 Agricultural technical and vocational education (ATVET)

ATVETs train development agents (DAs) to work in Farmer Training Centers (FTCs) to enhance the knowledge base and skills of farmers and thereby provide the institutional framework for increasing the efficacy of agricultural extension services. Before the ATVETs, the universities were the only institutions offering training at degree and diploma levels in general agriculture. In 2000, the government invested in ATVET centers to train DAs charged with carrying out agricultural extension activities with farm households. By the close of 2008, the program had trained 62,764 DAs at the diploma level (Davis et al., 2010).

Agricultural education and training institutes such as the ATVETs are conventionally viewed as a means for building human and scientific capital, but it is important to recognize that this training also has a vital role in building the capacity of organizations and individuals to transmit and adapt to new applications of existing information, new products and processes, and new organizational cultures and behaviors. It is thus important to improve training systems by strengthening the innovative capabilities of organizations and professionals; changing organizational cultures, behaviors, and incentives; and building innovation networks and linkages (Davis et al., 2007; Spielman, Davis et al., 2008).

The ATVETs work closely with farmers to provide technical information in crop production, livestock production and natural resource management. NGOs like FAO, Farm Africa, Red Cross, and Bio-Safe have been implementing very innovative extension systems (Aberra and Teshome, 2009).
In addition to their training role, the ATVET colleges have expanded their mission to include provision of non-formal specialized short-term training, skill gap training, entrepreneurial training, applied technology transfer, and services for farmers, agriculture businesses, and the public sector (Kreuchauf, 2008).

Demands of the GOE’s latest extension program have strained the capacity of the ATVETs to provide appropriate and effective training (Davis et al., 2007). Resources allocated to many ATVETs are insufficient to conduct practical education (including training on tractors, combine harvesters, or other machinery, and experimentation with plant and animal breeding materials); to assist students in undertaking practical attachments (by covering their travel and living expenses during long-term attachments in the private sector or with public extension services); and to appoint qualified B.Sc.-level instructors with sufficient experience and practical training.

Moreover, ATVETs continue to depend on very traditional educational approaches and learning philosophies that revolve around conventional modalities of instruction, make limited use of modern educational infrastructure or equipment, and provide professionals and graduates with a relative small set of technical skills and abilities. Lectures and materials are often in English, although students’ command of the language is usually quite limited and curriculum content tends to overlook the importance of creating opportunities for students to build practical skills in decision making, creative thinking, problem solving, and independent thought (Davis et al., 2007).
4.0 METHODS OF THE STUDY

4.1 Study sites
The ACIAR project works in two sites of Ethiopia, Melkassa and Bako. The two sites are spread in several woredas in East Shewa, West Shewa and East Wallega zones of Oromia state and represent the semi-arid and sub humid agro ecologies.

Figure 3. Administrative regions of Ethiopia
Figure 4: Administrative Map of Oromia State with locations of ACIAR sites
Oromia/Oromiya Regional State

Oromia is one of the nine National regional states ethnic divisions of Ethiopia. Stretching from the western border in an arc to the southwestern corner of the country, the region accounts for 34.3% of a total area of the country. The state’s population is over thirty million people, making it the largest state in terms of population in the country. Out of the total population in the region about 12.2% is estimated to dwell in urban towns, whereas the remaining 87.8 % resides in rural areas.

Oromia is a region of great physiographic diversity. Its landscape includes high and rugged mountain ranges, undulating plateaus, panoramic gorges and deep incised river valleys, and rolling plains. The region can be categorized into three distinct geographical areas. These include: the western highlands and associated low lands, the eastern highlands and associated lowlands and the rift valley. Generally the elevation of the region varies from less than 500 meters to 4377 meters above sea level. About 49% of the regions land surface is above 1500m above sea level. The lowlands and the rift valley system accounts for the remaining 51% of the regions land surface.

The climatic types prevailing in the region may be grouped into 3 major categories: arid climate, tropical rainy climate and temperate rainy climate. In general, about 30 percent of the lowlands of eastern sub-region have arid climate. Over 35 percent of the intermediate highlands of central and western Oromia have hot tropical rainy climate, while the highlands have warm temperate rainy, tropical and arid climate. The mean annual temperature of Oromia is about 19.3ºC with a range of mean maximum over 30.0 ºC in lowlands areas. The rainfall pattern of the region is bimodal, receiving the greatest share of rainfall in summer and the smallest portion in spring. The distribution of mean annual rainfall varies from place to place and from year to year, decreasing in all directions from the western highlands (1600-2400 mm) towards the eastern and south eastern arid lowlands (less than 400 mm).
West Shewa

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 1,101,129, of whom 556,194 are men and 544,935 women. 149,878 or 13.61% of population are urban inhabitants. A total of 233,916 households were counted in this Zone, which results in an average of 4.71 persons to a household, and 227,102 housing units. The three largest ethnic groups reported were the Oromo (87.08%), the Amhara (6.16%) and the Gurage (5.06%); all other ethnic groups made up 1.7% of the population. Oromiffa was spoken as a first language by 84.85%, 8.41% spoke Amharic and 5.57% spoke Guragiegn; the remaining 1.17% spoke all other primary languages reported. The majority of the inhabitants professed Ethiopian Orthodox Christianity, with 77.82% of the population having reported they practiced that belief, while 11.11% of the population were Muslim, 8.81% of the population professed Protestantism and 2.04% said they held traditional beliefs.

With its capital city 120 km west of Addis Ababa and consisting of 13 districts, the West Shewa Zone is one of the administrative zones of the Oromiya Regional State. The zone has a variable agro-ecology and farming system. The West Shewa Zone encompasses low land, mid altitude and high land environments with respective shares of 25%, 30% and 45% . Districts dominated by low land environment are Ginderberet, Nonno, Bako-tibe, Meta-Robi and Adeberga, while districts such as Ejere, Ambo, Cheliya, Danno, Dendi and Welmera are dominated by mid altitude. Districts representing typical highland environments are Jeldu and Tikureenchini. The project works in Bako Tibe (Table 2).

With a population of almost 2 million, the West Shewa Zone accounts for 9% of the total population in the regional state. The rural population accounts for about 96% of the total population in the zone, while the urban population accounts for 4%. The total population density of the zone is estimated at 127 persons km-2 and population density varied considerably among the districts. The most densely populated districts were Bakotibie, Welmera, Ambo, Metarobi, Dendi, Ejere and Jeldu with a population density of > 130 persons km-2 each. Sparsely populated districts include Gindeberet, Nano and Adeberga with a population density of < 103
persons km-2 each. The west Shewa zone has a total land area of 1.5 million ha. Cultivated land and grazing areas account for 49% and 22% of the total area of the zone, respectively.

**East Shewa Zone**

East Shewa Zone is one of the administrative zones of Oromia. It has 13 Woreda (District)s. Most of the Woredas in East Shewa Zone fall in the lowlands of the Central Rift Valley. The altitude is more or less 1500 m, whereas it rises up to 2300 m at the northwestern and western mountain fringes of the Rift on one hand, and it falls to 900-1000 m northeastwards on the other hand. The climate of lowland is dominantly sub-tropical/semi-arid (kola), whereas that of mid-highland is slightly moderate (woinadega) and that of areas below 1000m is tropical/arid (gambarj/kolla).

Across the East Shewa Zone, grain crop and livestock farming are dominant, whereas in areas adjacent to rift valley lakes and rivers, irrigated vegetable farming and horticulture are practiced. Pastoralism becomes more common towards northeastern arid areas. Within the grain-livestock areas, the further diversity is observed in terms of the combination and management of crop/tree systems; tef-wheat plus *Faidherbia albida* to maize-beans-sorghum plus *Acacia tortilis* across the north-south transect, and tef-wheat plus *Faidherbia albida* to tef-maize-sorghum plus *Acacia tortilis* and *Ziziphus mauritania* across the west-east transects, while the livestock system is commonly communal/free grazing of cattle. The selection protocols of the socio-economic baseline survey sites were decided in order to well characterize the diversity in terms of crop/tree management systems in the semi-arid agro-ecology of Central Rift Valley. Woredas where the Trees for Food Security Project works are Adami Tulu Jido, Dugda, Bora, Lumme and Boset (Table 3)
### Table 2: ACIAR Project sites in West Shewa and East Wollega (Bako site)

<table>
<thead>
<tr>
<th>no.</th>
<th>Zone</th>
<th>Woreda</th>
<th>Kebele</th>
<th>Zone</th>
<th>no. of HH</th>
<th>Total HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E Wollega</td>
<td>Jima Arjo</td>
<td>Wayu Kumba</td>
<td>Zone 1</td>
<td>345</td>
<td>345</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 2</td>
<td>176</td>
<td>521</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 3</td>
<td>218</td>
<td>739</td>
</tr>
<tr>
<td>2</td>
<td>W Shewa</td>
<td>Bako Tibe</td>
<td>Oda Haro</td>
<td>Zone 1</td>
<td>351</td>
<td>351</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 2</td>
<td>234</td>
<td>585</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 3</td>
<td>134</td>
<td>719</td>
</tr>
<tr>
<td>3</td>
<td>E Wollega</td>
<td>Godu Sayo</td>
<td>Ongobo Bakanisa</td>
<td>Zone 1</td>
<td>389</td>
<td>389</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 2</td>
<td>310</td>
<td>699</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 3</td>
<td>306</td>
<td>1005</td>
</tr>
<tr>
<td>4</td>
<td>E Wollega</td>
<td>Gito Gidu</td>
<td>Uukee Badiya</td>
<td>Zone 1</td>
<td>295</td>
<td>295</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 2</td>
<td>289</td>
<td>584</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zone 3</td>
<td>323</td>
<td>907</td>
</tr>
</tbody>
</table>

### Table 3: ACIAR project sites in East Shewa (Melkassa)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Zewai-Bulbula</th>
<th>Meki</th>
<th>Bora</th>
<th>Mojo</th>
<th>Bofa/ Welenchiti</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woreda capital</td>
<td>Zewai</td>
<td>Meki</td>
<td>Alem Tena</td>
<td>Mojo</td>
<td>Welenchiti</td>
</tr>
<tr>
<td>Woreda (district)</td>
<td>Adami Tulu Jido Kombolcha</td>
<td>Dugda</td>
<td>Bora</td>
<td>Lumme</td>
<td>Boset</td>
</tr>
</tbody>
</table>

| Woreda population 2011 | 164,234 | 169,552 | 68,461 | 137,717 | 180,710 |
| Estimated no. of HHs | 32,847 | 33,910 | 13,692 | 27,543 | 36,142 |

<table>
<thead>
<tr>
<th>Crop-diversity</th>
<th>maize-bean-wheat</th>
<th>maize-tef-wheat, veges</th>
<th>tef-wheat-maize</th>
<th>tef-wheat</th>
<th>tef-maize-sorghum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees diversity</td>
<td>F. Albida, Acacia tortilis</td>
<td>F albida, Ficus spp. irrigated fruit orchards</td>
<td>transition between Meki &amp; Mojo</td>
<td>Faidherbia dominant scattered Acacia spp</td>
<td>Ziziphus spp, Acacia tortilis, Faidherbia albida;</td>
</tr>
</tbody>
</table>
4.2 Methods
A literature review, key informants interviews, field visits to various kebeles were undertaken to understand the extension systems in Ethiopia. The major areas of focus were:

- Extension technologies disseminated to farmers
- Community engagement
- Capacity and efficiency
- Linkage with other institutions
- Commercialization and marketing
- Local innovation.

The Key informant Survey was conducted from 29th January to 8th February 2013. Key informants interviewed were government extension staff at the Federal, Regional, Woreda and Kebele level. Staff representatives of three NGOs (Catholic Relief Services, World Vision and International Development Enterprise) were also interviewed. The number of the respondents is as indicated below:

**Federal Government-2**
- Extension Programme Coordinator
- Development partners linkage expert

**Regional level- (Oromia State)-3**
- Regional extension coordinator
- Regional extension specialist- Adequate rainfall areas
- Extension expert

In Bako and Melkassa sites, the respondents interviewed are shown in Tables 4 and 5.
Table 4: East Shewa zone (Melkassa site)

<table>
<thead>
<tr>
<th>Woredas- East Shewa</th>
<th>Zewai</th>
<th>Bora</th>
<th>Meki</th>
<th>Boset</th>
<th>Lume</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of respondents- woreda level</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No. at Kebele level</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No. of NGO officers</td>
<td>2 (International Development Enterprise-IDE)</td>
<td>0</td>
<td>1 (Catholic relief Services)</td>
<td>1 (World vision)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5: West Shewa and East Wollaga zones (Bako site)

<table>
<thead>
<tr>
<th>Woredas- West Shewa</th>
<th>Guto Gidda(Nekemte)</th>
<th>Gobu saayo(Anno)</th>
<th>Arjo</th>
<th>Bako</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of respondents- woreda level</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>No. at Kebele level</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
5.0 OVERALL EXTENSION PICTURE IN THE COUNTRY FROM THE PERSPECTIVE OF THE FEDERAL GOVERNMENT OFFICIALS

Extension under the Federal government is under different directorates/case teams

- Livestock department case team
- Crop production and protection case team
- Natural resource conservation case team
- Extension technique and transfer case team
- Development partners linkage case team
- Soil fertility case team (this is an incoming case team aimed at solving soil acidity problem in the country which is emerging as a challenge)
- Special support case team (directed towards vast pastoralism and agro pastoralism areas)

There are 9 regional states at the federal government and 2 administrative councils at Addis Ababa and Dredowa.

At the Regional level there is the Bureau of Agriculture which has different directorates under it. The Oromia region’s capital is in Addis Ababa and its directorates include:

- Crop production-Surplus/ high produce potential areas extension directorate
- Pastoralism/ moisture deficit areas extension directorate
- Livestock production extension directorate
- Natural resource conservation extension directorate

Extension systems at the regional level have a Bureau head and Extension heads.

Agriculture information is disseminated in extension packages the major ones being:

- Crop production package
- Livestock production package
- Natural resource conservation extension package
Curriculum and Package modules to train farmers are developed by Ministry of Agriculture (MOA) officers and regional experts.

**Structure of Extension**

Extension services in the country are delivered under the MOA. The highest extension level is the Federal Government. Under this level there are extension directorates/extension case systems. There are 3 major case teams/directorates and these include; Crop production, livestock production and Natural resource conservation. Under the Federal Government there is the Bureau of Agriculture at the regional level.

The region focused here is the Oromia region whose capital is Addis Ababa. Just like in the Federal level, there are 3 main extension directorates; crop production, livestock production and natural resource conservation. These three directorates are also operational at zonal, woreda and kebele levels. There are farmers’ cooperatives and unions that enhance extension work at all levels. The zonal level is the next lower level from the regional level. There are several kebeles or Peasant Associations (PAs) in each woreda. The number of PAs is different according to the size of the woreda. There are different extension specialists in the woreda whose duties are to oversee the extension process and progress in the woreda. These specialists are in charge of crop production, livestock production and natural resource conservation.

The kebele level is the lowest level in extension services delivery. In each kebele, there are 3 DAs. One is in charge of Crop production, the other Livestock production and the third Natural resource conservation. In each kebele, there are development groups which have 20-30 Households. These development groups are further sub divided into 1-5 social network groups where 1 farmer (lead /model farmer) is in charge of five farmers. The lead farmers report to the DA. The DA reports to the DA supervisor. 1 DA supervisor is in charge of 3 kebeles meaning that 9 DAs report to one supervisor. The DA supervisors report to the Woreda level extension coordinators who then report to the zonal level leaders. These report to the region level then finally to the federal government.

Model farmers are selected based on best practices and results, their interest and innovativeness.
Model farmers practice technologies on their farms and share it with/to others during group meetings. They discuss these technologies with other members and evaluate the technology usually based on performance and results then give their feedback to higher authority levels.

**Technologies**

There is a development program for each region. Types of technologies/skills to be delivered depend on the area’s agro ecology and climate. Technologies are also determined by the type of farming systems which include crop production, pastoralism, agro pastoralism, mixed farming and irrigation. Technologies/skills also depend on development potential of the area like food production through irrigation or industrialization.

**Target community**

The target community is selected based on National development interests/ Government interests and farmers’ interests. Market demand of a product also influences the technology to be disseminated. The government determines the target community sometimes especially where it has to intervene for soil and water conservation technologies in areas that are degraded. Community interests are assessed by the extension officers then such needs are met. There are usually campaigns that influence local people to adopt the technologies.

The government officials make forums for farmers to create awareness on the available technologies. The interested farmers register, they are trained on the technologies and the technologies are then delivered to the farmers. The officials may use influential people like village heads and administrative authorities to help in spreading the technologies to farmers. Technologies are open to the wider community not only the target group.

**Information to be disseminated**

Decision on this is made by the experts in agriculture, extension officers, researchers and government officials. In some cases the target community is divided according to gender, age and level of education depending on the technology that is being disseminated. In most cases training is done to all participants together.
Extension methods used

Training in FTCs, Demonstrations on FTCs and individual farms, major areas of demonstrations include poultry, livestock, crop production, forestry, irrigation and business development. Farmers field days, Mass media for example TV, radio, print outs/brochures, individual visits and training. There is a plan to develop industrialization in future.

Policies

Policies considered include;

Rural development policies

Agricultural development policies

Agriculture scaling up strategy

Curriculum

This is prepared by agricultural experts at the federal and regional level in conjunction with Ministry of Education. This curriculum is taken down to zone, woreda and kebele level depending on the kind of training being conducted. The DAs use the manuals to train farmers. DAs at kebele level are first then they will be training farmers. All DAs must have a Certificate of Competence (COC).

At the Federal level, training depends on education and type of training. Usually training is given to more qualified experts first who take it down the technologies to officers at the lower levels. Uptake of a technology depends on the success of the technology, if results are positive, more people will take up the technology.
Demonstration plots

These plots are in the FTCs and on farmers’ lands. Management of these plots differ from area to area, in some areas farmers manage the plots in others laborers are hired to manage the plots. In most FTCs however farmers are assigned by DAs to manage the plots. In most cases demonstrations are established on model farmers’ lands since they are willing and ready to take up a technology and spread it to other farmers, also because they are risk takers. For communal grazing lands, the community committees and water shed management committees manage the lands.

Capacity/Efficiency

3 DAs in each kebele

I DA supervisor for 3 kebeles- 1DA supervisor supervises 9 DAs

1 veterinary officer for 3 kebeles

1 cooperative expert for 3 kebeles

The government allocates 16% of its resources for Agriculture in Ethiopia. Funding for agricultural extension services is usually from the government, Donors e.g. Bill and Melinda Gates foundation, World Bank, European Union (EU), United Nations Development Programme (UNDP) and German Technical Cooperation (GTZ).

Linkages

Linkages are generally weak especially between the MOA and other stakeholders since they may have other interests. There was initially a forum for linkage guidelines but it stopped. Linkage with the lower administration levels is inevitable since they receive funds and resources from the federal government.
MOA works on some programmes with NGOs like Oxfarm America, GTZ, World Vision, it also links with private sector for veterinary services provision, animal husbandry, individual investors, seeds suppliers among others.

**Incentives**

National awards by the prime minister to outstanding performers in agriculture annually, examples of prizes given, water pumps, TVs, radios and farm equipment.

**Commercialization**

Development directorate supports private farmers in exports. Targeted areas of commercialization are in crops such as coffee, wheat, teff and horticultural products. The federal government promotes commercialization by awareness creation among farmers on market prices and potential marketable commodities. The farmers are linked with cooperatives to market their products especially coffee farmers, these are also linked to the export markets.

**Local Innovation**

Local innovation is promoted by sharing such practices with other farmers through training and demonstrations in the innovators farms. Examples of innovative cases include:

- Broad bed making- Used for soil and water conservation, a ploughing method in which excess water is removed from the land.
- Seeding teff in rows/furrows from the previous broadcast method.

Innovative farmers are recognized and awarded. The innovated practices are then disseminated to other farmers during trainings, demonstrations and on field days.

**Strengths**

- The extension structure in the country is designed in such a way that most farmers are reached during technologies dissemination.
• The government is committed to upscale extension services and therefore it has planned to establish 1 FTC in each kebele, a total of 18,000. Currently it has established 10,391 FTCs. There is also government commitment to assign more than 47650 graduate DAs. 3 in each kebele, 1 DA supervisor for 3 kebeles, 1 veterinary for 3 kebeles and 1 cooperative union expert for 3 kebeles.

• There is intensive monitoring and follow-ups done by the government through its officials at the different levels.

• Uptake of information is good and farmers are generally willing to be engaged in extension activities. In Oromia, uptake could be estimated at 70%.

• Campaigns by the local administration on issues relating to agriculture or natural resource conservation has helped in uptake of some technologies, however this happens when the campaigns are in line with extension objectives.

• Generally success in the farm is attributed to proper inputs, early land preparation, proper farm management, proper feeds to livestock and uptake of soil and water conservation techniques.

Weaknesses

• Inadequate financial resources, as a result the FTCs are not adequately equipped in terms of furniture, computers and other resources.

• Lack of awareness about importance of extension services among local leaders who may have an influence on farmers’ decisions.

• High turnover of DAs due to low salaries and lack of incentives

• Lack of modern technologies e.g. farm implements, cure for diseases, improved seeds and breeds.

• Poor linkages with the stakeholders such as researchers, NGOs and private investors

• Some campaigns by local administration may contradict extension objectives
• Some farmers lack capacity to take up some technologies due to lack of financial capacity for example they may be unable to purchase farm equipment due to inadequate finances.

A farmer training Centre (FTC) in West Shewa

Future of extension

Extension will be successful if all persons take up their roles effectively. Campaigns can be a great lead to successful extension but only if they are also geared towards extension objectives. Private investors can help in extension promotion if they work in line with public extension.
6.0 EXTENSION IN OROMIA STATE REGION

Structure/organization of Extension

The region is the second top management unit from the federal government. There are various units at the regional level:

- The Agriculture sector management unit is the body that strategizes, develops guidelines and policies on crop and livestock production.
- The Farmers organization unit that looks into all farmers’ needs.
- Pastoral areas unit that concentrates on pastoralism areas and these areas are mostly moisture stressed.

The region develops strategies, technology package and curriculum development together with experts from the federal government. The zonal level is next lower level from the region. It channels information from the region to woreda and gives feedback to the region. Funds are allocated to the woreda office by the government to run activities at both woreda and kebele levels. Below the Woreda are the kebeles which are the lowest level in extension structure.

The major NGOs and funded projects in the region include, Agricultural Gross Programme (AGP), Rural capacity development program, Oxfarm America, Sustainable Land Management (SLM), among others.

Agro ecologies

There are 3 major agro ecologies in the country highland, lowland, mid latitude. The major agro ecologies in the region are the highlands which usually experience adequate rainfall and lowlands with inadequate and mostly unreliable rainfall.

Extension activities

Extension in Oromia is same as in other regions. The system is referred to as PADETES-Participatory Demonstration and Training Extension System. It is participatory in that farmers, researchers and extension experts are all involved in the processes. They demonstrate technologies to farmers and advise farmers on how to implement them. Every technology is first demonstrated on FTC plots if the farmers are interested, it will be implemented on their land.
Model farmers’ lands are used for demonstration. Other farmers can therefore see it during field days or during visits to these farmers where they see the progress and results. The technology is then scaled up. Inputs for the technology are supplied.

Training
Farmers are organized and trained on FTCs and on their land. Modular training may take 3-6 months. Farmers are selected for this type of training and are given certificates on completion. The subject of training is based on the agro ecologies and the technological needs of the area. Farmers may also be trained during workshops and seminars. Usually this form of training takes a shorter time and more farmers are invited.

Technologies delivered
Extension services involve promoting output enhancing technologies for example fertilizers, improved livestock breeds and seeds, improved agricultural practices. Improved seeds are distributed to farmers by the government or through cooperative unions. Primary cooperatives obtain the seeds from government enterprises. There is high demand for seeds therefore these enterprises are not able to meet the total demand; farmers are therefore trained on multiplication of seeds. Private sectors also help in distributing seeds. There is a challenge in supply of fertilizer since the cost is too high for the farmers. To improve livestock production, technologies such as Artificial insemination are practiced; improved breeds are also supplied to farmers. The major challenge encountered is in obtaining improved livestock feeds.

Soil and water conservation techniques are also emphasized due to increased land degradation. There are several cases of mass mobilizations to encourage community members conserve the natural resources. Efforts have been made to plant trees in such degraded areas and establish more nurseries to produce and multiply trees seedlings. These nurseries are both government owned and private nurseries owned by the farmers and organizations.
**Linkages with other stakeholders**

The Government has established an approach to link NGOs to government structures. If the NGOs apply for a license, they have to identify their government partners whom they will work with at the various levels of extension. Many NGOs are working with the government, some provide financial support and others may engage the government staff in some of their activities. The NGOs submit their budget and proposed activities and together with the government, they prepare objectives. In such a case both the NGOs and the government authorities will work towards the same objectives. Other NGOs may have independent objectives and financial system but these also have to work with the woreda office.

**Commercialization**

Market linkage procedures have been outlined and strategized but have not been implemented. Issues to do with post-harvest processes and linkages to markets are all in the strategy but implementation has emerged as a challenge. An example where market linkage failed was a situation where there were women groups from the rural areas who were organized to produce and sell milk products. There was a challenge in bringing such products to the urban market since they were in rural areas and there were no resources to transport to the urban markets hence it failed. Another example was the effort to link wheat producers with industries but the farmers could not match up with the required quality hence their wheat was not acceptable.

The authorities however take market information to farmers. They encourage them to produce surplus for market especially for products in high demand. There is visible effort from the farmers’ side to understand market conditions than in the past. The farmers are advised to use improved inputs in order to increase productivity this is still not taken up completely due to financial constraints that limits many farmers from uptake of the technologies.

**Agroforestry**

Concerns were raised regarding Agroforestry techniques in the region where the experts are of the opinion that there are gaps in this area. Emphasis on Agroforestry techniques was started recently and people are not well trained in the field. The top management units at both federal
and Regional levels lack adequate information on agroforestry. Little attention is paid to Agroforestry techniques since most people- extension experts, researchers, policy makers, agricultural experts are mainly concentrating on crop production, livestock production and conservation of natural resources.

There are no experts to evaluate agroforestry as a technology. The farmers also have no in depth knowledge of agroforestry and its importance, this can be seen from high level of on farm tree cutting.

Challenges

- Limited financial resources, this leads to in-equipped facilities at grass root level/FTC level.
- The modular training by the government to farmers for 3-6 months, where farmers are then given certificates sometimes fails due to lack of adequate resources.
- Inadequate budget to cater for DAs on job training, capacity building and mobility. These DAs are also dissatisfied with the low salaries and lack of incentives hence resulting to high turnover.
- Inputs such as improved seeds, fertilizers and farm implements are less than the demand. The Government is trying to decentralize seed enterprises to the woredas but not yet adequate.

Recommendations

- More studies to be undertaken on Agroforestry
- Policy makers to be trained/oriented to Agroforestry techniques intensively
- Knowledge on Agroforestry to be disseminated to farmers.
- All agro ecologies should have assessment of Agroforestry
7.0 EXTENSION IN EAST SHEWA (MELKASSA SITE)

7.1 Extension activities in Adamit Tilu Combolicha

Agro ecology

The woreda is in a dry lowland area. About 3 kebeles are located in the mid latitude area. The rainfall is erratic and inadequate. Water scarcity is the main challenge here.

Agriculture technologies disseminated

Technologies to be disseminated to farmers are determined by the farmers’ needs. DAs determine the various needs in the kebele and establish how such needs will be met. For example if farmers are involved in farming activities, improved seeds will be supplied to them. Research also determines technologies that can be introduced to farmers in the area which could help them increase productivity. In most cases they start with model farmers while introducing technologies and later to the wider community.

Technologies disseminated include: Supply of fertilizers and improved seeds of crops such as maize wheat and teff, irrigation technologies, seed multiplication- multiply and distribute seeds of trees mostly exotic e.g. Acacia species, Eucalyptus, Cordia Africana, Grevillea robusta, fruit trees like mango, pawpaw avocado, etc. Seeds are supplied by the government through the woredas and also by the Farmer cooperative unions.

Artificial insemination techniques are promoted and improved breeds supplied to farmers. Farmers are trained on application of these technologies every 7-10 days before such activities begin. DAs train the farmers involved, usually these trainings help farmers to have the right form of implementation.

Methods of extension used

Group extension system where many farmers are trained together. In such forums, extension officers bring experiences of successful farmers in areas where the proposed technologies have succeeded and demonstrate them to farmers through video presentations. Many farmers are reached through this method.
Use of Lead/Model farmers is the other major method used; this is useful in training and spreading the skills to other farmers. Radio Programs- sometimes farmers get information from radios even before the extension officers. There are also individual visits where the DAs sometimes visit farmers and check on their progress. Demonstrations plots and field days are also used

**Target community**

Every farmer in every kebele is targeted for extension services. This however depends on the technology disseminated. All farmers are targeted regardless of gender or age. The extension system is always participatory in that all farmers are involved. There are more than 1000 groups in the woreda each with 25-30 farmers who are all potential beneficiaries of extension.

**Technology uptake**

Technology uptake on crops is 100%. The organization is efficient and there are follow ups and monitoring by DAs. There is low level technology uptake on natural resources conservation especially on water harvesting techniques due to low level of awareness. Uptake of livestock and poultry keeping technologies is generally low since these technologies are labor intensive. Each kebele has 3 DAs who make follow ups all the time since they are always in the village. Farmers’ awareness is also increased through model farmers.

**Decision and feedback**

DAs and extension experts assess what farmers’ needs are; they then organize for trainings and technology dissemination. Feedback from communities is obtained during trainings. 1-5 group leaders collect feedback from the group members and give it to DAs who present it to their supervisor; the supervisor gives it to the woreda experts who determine the actions to be taken on the various issues presented. There are quarterly visits by woreda experts to the kebeles; they also get feedback during such visits.
Gender

No specific gender roles but in activities like ploughing and natural resource conservation men participate more. Women are continually encouraged to participate more in agricultural activities.

Demonstrations

Managed by DAs and some farmers assigned by the DA

Linkages with other stakeholders

Good linkage with research institutes and MOA. The woreda also has linkages with NGOs like SIDA, International Development Enterprise (IDE). These NGOs have their activities but they work jointly on capacity development, seed supply credit facilities and technology development. The woreda has no direct contact with regional government but receives directives from the zonal level. NGOs submit quarterly reports on their activities to the woreda office which sends them to the zonal office. The major NGO working in the area is the IDE.

Incentives

No incentives for the farmers at the woreda level. There is the national award scheme by the prime minister to outstanding farmers. Farmers are however recognized. There is the standard A-B-C-D rank which divides farmers as per achievements, hence farmers work towards being ranked in high standard-A. This woreda was the best in East Shewa the previous season.

Commercialization

Over some time now, farmers are producing surplus for market e.g. maize and teff. Other market commodities produced include, tomatoes, onions, haricot bean, wheat. Improved technology has helped in improved productivity hence produce for market purpose. There is regular market assessment by the marketing agency which provides market information to farmers. The woreda links farmers to markets through cooperatives which give better prices for farmers’ products.
Innovations

The woreda identifies, tests disseminates and documents cases of innovations. Farmers’ innovation is mainly based on technology that farmers receive for example use of wood to make water pump instead of metal which is more costly, use of tree branches to construct gabions instead of mesh wire which is more expensive.

Strengths

- Extension structure is well developed such that it reaches all farmers and has also existed for a long time.

- In every Kebele there is a demonstration plot where farmers can see progress and results of the technologies introduced, farmers become more convinced after observation especially during field days

- Model/lead farmers convince other farmers to take up technologies disseminated to them.

- Group method reaches many people, no information distortion because many people are reached at the same time with the same information.

Weaknesses

- Different understanding capacities by farmers in the group, sometimes a lot of time is taken during training.

- Difficult to attend to all individual needs due to the large numbers of farmers.

- Radio method- Not all farmers have radios and also some farmers may be unavailable hence may miss out on some Programs.

- Individual visits are time consuming.

- Preparing field days is costly.
Challenges

Droughts, water shortage, shortage of seeds/ inputs, high turnover of DAs, financial capacity is low to purchase seedlings and inputs, increased cost of inputs, irrigation equipment not available and sometimes water reduces in dry periods hence posing a challenge. Funding is from the government and 90% of the budget is for salaries. This leaves less funds for other activities like maintenance of FTCs. There is little external financial assistance.

7.2 Extension Activities in Bora

Technologies disseminated

Natural resources conservation, input supply, irrigation, poultry and livestock production, pre and post harvesting management, soil and water conservation, tree planting and nursery management.

Extension mobilizes farmers to be in groups share labor and manage the farms. The major farming system is mixed farming. Major crops produced are cereals such as maize, wheat and teff. Irrigation is also practiced in 5 kebeles. They use river (Awash) water for irrigation of crops such as onions, tomatoes, carrots.

Extension methods

They include training in FTCs; (farmers are given printed notes during training), animal husbandry and natural resource conservation. Each FTC has approximately 3 ha of land where there are also some demonstration plots are established. Model farmers are used to transfer technologies to other farmers. Individual farmer visits, field days- woreda organizes one field day per year for all the kebeles.

Technologies delivered by the forestry department include Seedling preparation, distribution, management of trees, nursery management. Tree species delivered to farmers- Acacia albida, Neem tree, Jacaranda, Sesbania, Leucaena, fruit trees-Mango, pawpaw, Guava, oranges. There is
1 nursery for the woreda; some households have individual nurseries especially those with adequate water supply.

**Adoption**

Farmers accept to produce commodities especially those for commercial purpose. They are at times resistant to take up the soil and water conservation techniques since these are tedious, take more time and the benefits are not immediate. Farmers want to be paid for construction of the soil and water conservation structures. Farmers prefer technologies with faster benefits unlike soil & water conservation.

**Strengths**

Model farmers help in reaching many farmers, model farmers are opinion leaders and they help in convincing other farmers to adopt the technologies.

**Curriculum**

It is determined by MOA. Training modules prepared at the region level and taken down to the zone and woreda level. Some NGOs give training directly to farmers in workshops that they organize. Both males and females are trained together. Farmers give their feedback to group leaders who forward it to the DAs then to the DA Supervisor. The supervisor takes it to the woreda office and such feedback is taken up to higher offices.

**Linkage**

The woreda office works with NGOs like, SIDA, JICA, Catholic Relief Services (CRS), Agricultural Sector Support Project (ASSP) which mainly deals in water harvesting and capacity building, Melkassa research institute- purpose of linkage is for seeds supply, multiplication, training and capacity building to farmers and government staff.
Commercialization
Products produced mainly for commercial purposes include: Haricot beans, onions and tomatoes. There is no specific linkage strategy to the markets. Some farmers produce eucalyptus and fruit trees for sale. The woreda has half hectare plantation of paw paws for commercial purpose. Most local farmers sell their products to local markets. Generally the community is willing to be engaged.

Opportunity for fruit trees
High demand for fruit trees and adequate market, location of the woreda- it is on main trade route, 5 kebeles have irrigation technologies practiced hence high potential for fruit trees.

Challenges
- Low literacy levels hence a challenge during training especially where the farmers have to be trained using printed notes.
- Rising cost of inputs-seeds and fertilizers
- DAs high turnover, limited commitment by DAs due to low salaries, DAs also fail to cooperate fully with the administration.
- FTC are not well equipped, some are not functional due to inadequate budget. The FTCs cannot demonstrate irrigation technologies due to lack of funds for equipment.
- Model farmers tend to spend much time on their farms not in training other farmers.
- Transport problem due to poor roads.
- Different tree species preference among farmers, some farmers fail to plant tree seedlings supplied to them.
- No water in most kebeles
- Seed shortage, demand of seeds by farmers is more than the supply
- Unreliable rainfall
Many farmers are unable to attend some field activities organized by the Woreda since mostly these are organized during peak times when there is a lot of work on farms.

7.3 Agricultural extension activities in Meki

Technologies
Improved crop seeds such as maize and teff, training on land preparation before sowing. Acacia is the main tree species grown; fruit trees include mango, avocado and pawpaw. Livestock production technologies include artificial insemination and fattening, promotion of bee keeping.

Extension methods used
The methods used include model farmers, they conduct field days every year, farmers get registered based on their technological needs then their interests are then taken to the woreda office by the DA supervisor. DAs visit the groups and also individual farmers. Adoption is high for technologies which give faster returns for example livestock and improved seeds. It is very low for longer returns technologies such as soil and water conservation. Demand for fruit trees is high but water scarcity is a problem. The DA faces challenges when the woreda office does not provide enough inputs after he has assured farmers of inputs provision. This creates a conflict. DAs receive low salaries and no motivation

Innovation
Some farmers modify and improve their technology. They organize field days for such farmers and others for example poultry incubators constructed from wood and wheat/teff straw.

7.4 Extension Activities in Boset-Wolenchiti
The woreda has 33 kebeles and all farmers are targeted in the extension activities. Model farmers are usually used for technology transfer. They are trained in the FTCs. Field days are conducted every year in FTCs and individual farms; all farmers participate in the field days.
Technologies

Irrigation, soil and water conservation, improved seeds of maize, teff, haricot beans, fertilizers. Livestock- improved breeds, artificial insemination and poultry keeping. Promotion of fruits trees such as mango avocado, paw paws and other non-fruit trees especially Acacia.

Farmers’ interests

Farmers needs determine the kind of technology to be disseminated to them. Farmers register their needs, and give them to group leaders who submit them to the DAs. These needs are assessed and taken to the woreda office which determines how the technologies will be taken to the farmers. Adoption of technologies is very high. Improved seeds are obtained from Melkassa research Centre. They also get fruit trees seeds like mango, oranges, lemons and paw paws. Farmers are willing to take up the technologies especially irrigation and water pumping technologies due to high demand for water. Soil and water conservation efforts started recently and the officers and farmers are working towards improving them. The officers visit the farmers at least once in 2 weeks or upon request. Follow up is done by DAs on a daily basis who give feedback and report on their findings in case of any challenge, they visit the farms and give the necessary assistance.

Curriculum

They use the curriculum developed at the region. Melkassa Research Centre also prepares its own curriculum for training farmers, NGOs also use their own curriculum depending on the technologies being disseminated. Experts train DAs who train model farmers who then train other farmers. Training is done to all farmers together regardless of their age and gender, education information is given to all.

Demonstration plots

They are located at FTCs, farmers’ lands, research farms-Melkassa, community land for natural resource conservation; farmers around the land manage the land as organized by DAs. The
youths are targeted in managing the plots on communal lands and are paid daily wages, this helps curb the high unemployment rate.

**Linkage with other stakeholders**

Links with research institutions especially for input supply and for technical information. Links also farmers’ cooperative unions, private input suppliers and NGOs for example the World Vision which helps in promoting water harvesting techniques. Water conservation requires high capital; the NGO provides assistance to farmers to construct the structures. Farmers construct ponds for water storage. They give incentives to farmers who construct these structures to encourage them and others to construct.

**Commercialization**

Commodities produced for commercial purposes include haricot beans, onions, cabbages, wheat and tomatoes. Limited effort for fruit trees commercialization due to water stress which discourages farmers from producing them.

**Local Innovation**

One farmer designed teff row planter, this technique is currently being tested, and he also introduced teff varieties through selection from teff plants through vegetative propagation. He has been recognized and travels to different countries to give seminars and talks.

**Strengths**

- Research improves quality of extension
- Practical demonstrations improve farmers understanding and enhances adoption
- Many farmers in FTC learn at the same time hence there is no distortion of information

**Challenges**

- Model farmers may take up a technology which may not be preferred by other farmers.
• The farmers only want fruit trees and not other forest trees, they claim not to see their direct benefits for trees like acacias, however they prefer eucalyptus since they generate income after sale
Some farmers want free inputs which becomes a challenge since these inputs are not enough

7.5 Extension activities at Lume-Mojo

Methods

Methods used for extension are field days, group trainings, individual visits, FTC training and training on individual farms, use of model farmers. Field days are mainly conducted before planting and harvesting. Periods for these activities are decided at the woreda level. Demonstration plots are also used. Some are on FTC but most are on individual farms. Training is done to groups of model farmers whereby they are trained to later disseminate the technologies to other farmers. Model farmers are chosen on the basis of their performance and progress. Groups meet once in two weeks on different days and the DA joins them in their meetings.

Individual dissemination is more successful; groups may sometimes fail especially if farmers have conflicting needs. Individual farmers are visited by the DA who goes around and may visit about 10 individuals per day; however it takes more time to disseminate information to individuals. Adoption rate is high but could be higher with more capacity. Activities that have changed with time include farmers now using compost and growing crops using irrigation. Initially there was 1 DA but now there are 3 which make delivery of extension activities more efficient.

Technologies

Improved seeds, fertilizer, irrigation, animal husbandry and preparation of compost to help increase productivity are some of the technologies. They promote planting of fruit trees like paw paws, mango and avocados. Research is done then disseminated to farmers through scaling up. Best practices are taken to other farmers. Farmers are trained on how to use inputs and the appropriate time to apply them, also on other crop production technologies where wheat and teff
are planted in rows. Poultry keeping, livestock production, preparing livestock feeds from local materials like teff, beef fattening, improved dairy feeds, and increased milk production from the improved breeds. Improved breeds are like jersey which has high milk productivity, Borana cow for improved milk production and disease resistance, milk production is also increased when the local breeds- Arsi and Bale are cross bred with the exotic breeds through artificial insemination.

Challenges encountered in livestock keeping include: High cost of animal feeds, water scarcity and limited veterinary services since 1 veterinary officer is in charge of 3 kebeles. Forage plantations are not enough. Usually livestock keeping is preferred because crop production is challenging due to inadequate rainfall. Farmers usually use their land for grazing where they plant fodder, cut and carry to feed their animals from the closures at home. Fodder is not enough hence need for more forage plantations.

Model farmers and innovative farmers are first targeted, since these can easily transfer technologies introduced to them to other farmers. Extension methods used include field days, model farmers, training and demonstrations at the FTC. There are 35 PAs in the woreda. The woreda is in lowland area. Technologies delivered include. Adoption of the technologies is high. The DA works with the farmer groups where he disseminates information/skills through the model farmers. The group leaders give feedback to the DA. There is the ABC standard ranking used which motivates farmers to have best performance in order to be ranked in category A.

Technologies in natural resource conservation are organized into afforestation and soil and water conservation. Soil is greatly eroded hence need to conserve, erosion challenge due to tree cutting stone and sand mining. They have strategies in conserving the soil by mobilizing the communities. These campaigns started last year and awareness was created. They have watershed management programs started but only a small group of PAs have been able to adopt now they are extending to other PAs. They first identify level of degradation and this will determine the treatment of the area either check dams, gabions or terraces. The area has moisture stress therefore more micro basins are being constructed.
There are area closures on degraded lands due to human and animal interference. Trees are being planted in such areas. The main purpose of this is soil conservation. It is in the strategic plan of the woreda to enhance afforestation, almost 14 million multipurpose tree seedlings will be established in the nurseries to be planted in different areas, these trees are for construction, forage, fruits and soil conservation. Tree plantations will be established in area closures, degraded lands, homesteads home compounds these trees include Sesbania sesban, Leucaena sp, Acacias, Grevillea robusta, Cordia africana fruit trees e.g. avocados, mangoes, guava, bananas.

**Linkages with other stakeholders**

Major linkages are with the researchers who provide them with information from their findings, seed enterprises (Ethiopia Seed Enterprise) for supply of seeds, Projects like the Sustainable Land Management (SLM), Agricultural Sustainable Project (ASP), Natural resource integrated watershed management- a project under GTZ where they train on water conservation and provide technical assistance.

**Incentives**

In technologies to enhance natural resource conservation, farmers are given equipment to construct the structures; farmers may be given some money to work on farmland especially if the soil and water conservation structures are being constructed on communal lands, Livelihood programs provides farmers with seeds.

**Commercialization**

Commercialized products include Eucalyptus, *Rhamnus prinloioides* (Gesho)a shrub for fruits fruit trees, horticultural crops-onions, tomatoes, chickpeas, haricot beans, lentils, wheat and teff. Extension provides market information like prices of commodities and the most marketable crops. A challenge arises where most farmers end up producing the same commodities hence supply exceeds demand resulting to low prices. The woreda office would recommend construction of storage facilities especially cereals where farmers can keep them when supply is in plenty and sell later when prices are higher.
**Gender**

Women are not active in the work packages. They are trying to empower women to engage more in agriculture activities. They try and work on water and soil conservation activities. Women have development armies of 1-5 people and they mainly engage in keeping improved breeds of livestock, energy saving stoves and improved crops.

Generally farmers are willing to take up the technologies. There is a nursery in the kebele on communal land where the ‘Mashav project’ has established it and produces coffee and mango seedlings. There is a laborer who is hired by the project to manage the nursery. Local innovation cases have been identified where in one instance a farmer made beehives from mud which is cheaper. For fattening livestock, one farmer used sweet potatoes; this was a cheaper and more convenient method. They promote local innovation by spreading such technology to other farmers.

**Market linkages**

Products commercialized include maize, sorghum, soya beans, haricot beans, fattened livestock. Some farmers raise and sell seedlings. There is no market linkage, farmers find markets on their own. They link with Mashav project and Agriculture Gross program (AGP), a recent program that started last year, Mashav project produces and sells fruit trees seedlings to farmers.

**Strengths**

- Most model farmers have capacity and they can easily bear risks
- Some farmers do not appreciate if the same model farmers are used- to solve this, they dialogue with the farmers
- There is a high level of adoption of the technologies and high demand for them.
- Field days are appropriate since farmers tend to adopt after seeing the results.
- The use of model farmers enables many farmers to be reached
- They have a feedback mechanism to improve on the process
- They get feedback during field days
Challenges

- FTCs are not adequately equipped with inputs and technology. Financial constraints hinder proper FTC operation
- Size of the demonstration plots is small, this limits the number of demonstrations
- Seedlings provided by the government are not enough. They satisfy about 20% of farmers’ needs.
- There is a challenge in management of community lands since sometimes it is not clear whose responsibility it is.
- Extensive cutting of trees for charcoal.
- Management and ownership problems especially on the free grazing lands, this affects tree seedlings survival.
- Field days are conducted once every year and not all farmers make it to attend
- Free grazing areas affects tree seedlings survival
- Some farmers don’t see the need for trees, instead they prefer crops since they will get food and income after sale
- Inadequate finances limits adoption of some technologies
- Poor infrastructure limits transport of products to the market
- There is no on job training for the DAs,
- No incentives for DAs, this demotivates them and results to high turnover.
- Some organizations come in and provide incentives to farmers to encourage them to adopt and implement the technologies
- There is no nursery for the woreda since there is no budget for nurseries at kebeles farmers prefer to have seedlings not seeds but these are not available.
- Transport within the kebeles is a challenge since there are no facilities
- Water scarcity is a challenge encountered in production of horticultural crops.
8.0 EXTENSION ACTIVITIES IN WEST SHEWA AND EAST WOLLEGA (BAKO SITE)

8.1 Extension Activities in Gito Gida
There are 21 kebeles in the woreda. 10 kebeles are in the lowland areas (Elevation-1300m) mostly fruit trees are grown in these areas. 11 kebeles are in the highland areas where coffee is the main crop grown. There are more than 4000ha of coffee coverage. Crop technologies include production of maize, millet, teff, sorghum, sesame, groundnuts, animal husbandry, natural resource conservation, promoting understanding of agriculture technologies through training, Inputs supply by farmers unions and cooperatives, supply of maize and wheat seeds. Livestock breeds kept include borana, jersey, improved forage- elephant grass, improved livestock feeds, bee production and poultry keeping. Natural resource conservation, they mobilize communities on tree planting and planting of fruit trees-mango, avocado, paw paws.

Trees mainly grown in highlands include- Cordia africana and Juniperous procera. In lowlands fruit trees are common. The woreda has a tree nursery in Ukay town for trees seedlings production and provision to farmers which is irrigated. There is a focal person at the woreda who helps in management. Trees are also planted in coffee plantations on farm boundaries around roads. Terraces are dug to help prevent soil erosion.

Farming systems are diversified and include alley intercropping, mono cropping and mixed farming. 2-3 kebeles produce pure coffee. Small scale irrigation is practiced in all kebeles e.g. maize, vegetables, tomato, carrots, beet roots, onions. No pure pastoralists in the woreda, it is usually mixed farming- zero grazing in paddocks.

Extension methods
They include individual and group, model farmers, training and demonstrations in FTCs, field days. At FTCs they give modular training for 3-6 months, farmers are given certificates after completion of the training. Few farmers attend since educated farmers are selected, these trained farmers help in training others.
Technology demonstration plot at the FTCs covers 1-3ha. There is 1 plot in each kebele. Running costs of the kebeles are high, there are also demonstration plots on farmers’ lands, in most cases model farmers’ are lands are used. There are no demonstration plots on community land.

Management at FTCs is by DAs and farmers, there is usually a challenge in management since farmers may not be available to manage. In most cases management at demos coincides with planting and working seasons on farmers lands hence labor may not available.

Model farmers are chosen on the basis of education, indigenous knowledge, interest and innovativeness. DAs select the model farmers. Curriculum development and modular packaging is at the regional level. Monitoring of activities by the woreda officers is done quarterly; visits are made to farmers every one to two weeks by the woreda officers.

Factors that determine success of extension are trained manpower- 3 DAs per kebele, the supervisor, veterinary officers woreda experts and other experts from other organizations.

Feedback from farmers is obtained through issue of questionnaires after a technology is introduced, DAs and farmers both do evaluations- farmers also evaluate DAs. Males and females are trained together; all community members are targeted depending on the type of technology to be delivered.

**Linkages with other stakeholders**

They do not work with any NGO but there are projects that have been funded and have the same objectives as the woreda extension objectives these are; Agriculture Development Programme (ADP) and Sustainable Land Management (SLM) project. The woreda also links with Bako research institute. In meeting the project objectives, extension technologies are improved and extension enhanced.

Commercial products include; sesame, coffee, teff, maize, horticulture products. There is a nursery site for coffee seedlings where woreda distributes seeds. Market linkage is by use of market sheds for exhibitions and promotion of marketable commodities during field days.
Farmers also get knowledge on potential buyers of their products. Transport access is a challenge due to poor roads.

No incentives provided to farmers, the woreda awards outstanding farmers during field days by providing them with farm tools or certificates.

**Strengths**

- Model farmers are easier to make follow ups
- Adoption is high hence increased productivity
- Market potential after the road is complete

**Challenges**

- Model farmers are different and some do not properly train others
- DA salaries are low hence DAs are not motivated
- Land units are small hence a challenge to plant trees and crops on the same land. This undermines agroforestry techniques farmers do not understand importance of agroforestry. Farmers concentrate more on livestock and crop production for food security they have limited understanding in tree intercropping.
- Field days are expensive to organize and involve a lot of work
- Running costs of FTC are high
- No transport facilities for DAs who walk long distances to the kebeles
- High DA turnover
- Poor roads in the area which limit transportation of commodities to the market
8.2 Extension activities in Gobu Sayo

Technologies delivered include; water shed management in all kebeles, livestock production where farmers are provided with improved dairy breeds like fresian and jersey. They get the breeds from the university with the help of AGP project, poultry keeping, modern bee keeping, forage production; pigeon peas, cowpeas, elephant grass, oats. Improved seeds such as maize and coffee, fruits, vegetables like cabbages, beetroots and carrots. Livestock technologies including artificial insemination, improved breeds for example holastine, fresian, modern beehives, improved poultry breeds. Forage production- pigeon peas, elephant grass, rhodes, vetch grass, alfalfa, modern irrigation techniques for vegetables. Production of crops such as maize, teff, wheat and coffee. Fruit trees include mango, avocado, banana, planting trees such as Acacias and Cordia africana. Mixed farming is most common in the area. Farmers are trained to make compost/ organic fertilizer, this helps improve productivity.

Methods of extension include training farmers’ groups, individual team visits, model farmers, field days and demonstration plots at FTC and individual farms. DAs and volunteer farmers manage demos at the FTCs. DAs may assign farmer groups to take care of the demos at the FTC. Training is done to selected farmers; they train about 60 farmers for a period of 3 months (Modular training). There are 960 lead farmers at woreda level. Farmers who can read and write are given priority. Farmers are given certificates after the training. Sometimes they train all the available farmers during introduction of a new technology. Field days are conducted 3 times in a year- before planting, before harvesting and at maturity stage. Most demonstration plots are on farmers’ lands. Farmers are involved in constructing structures for soil conservation like terraces, micro basins stone bunds and soil bunds.

Nursery activities like preparing nursery in the kebeles on government land and private nurseries on farmers land. About 25 private nurseries are in the process of being prepared. Tree species grown include Grevillea robusta, Acacias, Leucaena sp, Juniperous procera, Jacaranda, Sesbania sesban and eucalyptus. Eucalyptus and fruit trees are mainly produced on private nurseries.
Adoption level is high especially on crop technologies; challenge arises due to untimely supply of inputs. Demand for fruit trees is high. Less adoption of non-fruit trees since farmers see no direct benefits. Trees are intercropped with coffee so this helps in planting and maintaining trees on farm; trees intercropped with coffee include Acacia albida and Croton macrostachyus. Technology dissemination is more beneficial to groups than individuals because in groups more farmers are reached. Activities that have changed due to extension include: Introducing modern beehives which are bigger hence farmers obtain more yields. Some households used to depend on food aid, now they can produce their own. More products for market due to improved seeds, new livestock varieties including Friesian for more milk production, improved poultry breeds for eggs. Irrigation has increased farmers’ incomes especially the modern methods. Canals and storage reservoirs are used for modern irrigation. Success of extension can be visible due to factors such as increase in income, increased crop yields; many farmers are able to educate their children and construct of modern/improved houses. Many farmers can afford to buy motorcycles for transport and water pumps to irrigate their products.

Feedback

Feedback is obtained from farmers through their group leaders. They evaluate them in their groups per individuals, visit them and organize meetings for evaluation. They link with the Bako research institute who sell seeds to them and sometimes distribute the seeds freely to farmers during demonstration. Private seed industries are also involved in seedling supply like the Anno agro industry which provides teff seeds and improved maize seeds.

Linkages with other stakeholders

Partners include Bako research centre which does experiments on farmers’ lands. The woreda office and the research institute conduct some field days jointly. They link with Oromia seed supply and cooperative unions for seed supply. SLM projects organize farmers into groups and bring inputs. SLM provides modern beehives, sheep, fruit trees like mango, avocado, bananas, SLM also has coffee nursery and nursery for fruit trees. There are no NGOs operating in the area. Private seed enterprises sell seeds to farmers.
Commercialization

Coffee is mainly produced for market purpose; other products include tomatoes, onions, potatoes, sweet potatoes and fruits- mango, bananas. Cooperatives societies sometimes purchase products from farmers. They have a cooperative union where farmers take their products for sale, farmers are given price information of commodities and market condition.

Strengths

- Message conveyed to farmers is uniform in group extension; many farmers are reached and it is faster to transfer technologies.
- Easy to transmit technology because they are using farmers from the community who are familiar with each other.
- Field days are conducted at the woreda level once in a year, before harvesting, at village level, at flowering and before harvesting, farmers adopt more after seeing the positive results during field days.
- Strong follow ups, monitoring and evaluation of technologies.
- Farmers have big lands hence potential opportunity to adopt agroforestry technologies
- High demand and willingness to farmers to plant fruit trees
- Technologies are in high demand and this helps improve adoption
- Farmers learn uniformly during group trainings and field days.
- Group method is more beneficial than individual method; it is inconveniencing to move from individual farmer to farmer.
- Vegetables were not grown in the past but are now grown due to extension

Challenges

- Zonal supply of inputs is not timely to the woredas this may delay farmers’ activities.
• Some model farmers are unwilling to disseminate information to other farmers.

• Costly methods especially field days most costs are incurred for farmers food and transport, especially where farmers are traveling to different kebeles where they have to use vehicles

• Information may not be conveyed on time
• Some farmers are reluctant to adopt, they need more explanation which is time consuming.
• Most farmers are poor are unable to purchase improved inputs hence low adoption
• Lack of transport for the DAs who have to walk long distances
• Inadequate finances.
• Preparations of field days is demanding and costly

8.3 Extension activities in Jimma Arjo

Mixed farming is the most common farming system. The woreda has nurseries where they have established Acacia species, Sesbania sesban and coffee seedlings in small quantities. Farmers get fruit seedlings from other sources since these are not available at the woreda nursery. Some farmers have their own nurseries. There are 20 kebeles in the woreda. Extension activities focus on production of food crops like maize, teff, barley and provision of inputs like fertilizers and improved seeds. There is the provision of improved breeds and artificial insemination. In most kebeles traditional methods of irrigation are used for crops such as potatoes, maize, tomatoes, pepper and onions.

Coffee is produced especially for commercial purposes. Coffee is usually grown in rows under trees and this promotes growing trees on farm.

Other extension activities include supply of improved wheat seeds- HAR 604, maize seeds-BH 666, Construction of modern beehives, improved poultry keeping, forage production- vetiver grass, Rhodes and elephant grass, Sesabania sesban. Soil and water conservation structures including terraces and soil bunds, planting trees like eucalyptus, Ficus spp, Cordia africana, Croton macrostachyus among others. Promote Irrigation of vegetables like onions, tomatoes,
cabbages, carrots mainly for commercial purposes. Promotion of fruit trees like mango, pawpaw, banana and avocado.

**Methods of extension**

Technologies are disseminated through social network groups led by model farmers, individual farm visits by the DAs, field days which are conducted at germination time and before harvesting. There is also demonstration of irrigation technologies. Trainings are conducted at the FTC. Some demonstration plots are on FTC especially for forage and crops others are on farmers land especially the research demonstrations. Modular form of training is conducted at the FTC which takes 3-6 months. This form of training has been started recently at the woreda. Framers who can read and write are targeted for this type of training. Certificates are issued to them after completion of the training. Many farmers in the area cannot read and write hence becomes a challenge. The trained farmers then disseminate the information to other farmers. The DAs make follow ups for the trained farmers to give information to others. About 60 farmers are trained in one module.

**Factors of success**

The DA may visit up to 4 groups per day. Each group has a meeting after 2 weeks. There are approximately 27 groups in the kebele and he is in charge of about 13 groups. He visits up to 20 farmers per day since the group members are normally from the same area. There are gender related campaigns to encourage women to participate in the agriculture activities especially production of vegetables since males dominate in most activities. The Agro ecology is suitable for farming since there is sufficient and reliable rainfall. The extension structure is well designed and as such most farmers can have access to the extension services since each kebele has 3 DAs. Each DA has his own sub village which he must visit at least 1 group per day. The most efficient extension method is the use of model farmers who make it easier to transfer technologies to other farmers. Strong monitoring and evaluation is conducted by the DAs assisted by the model farmers.
Adoption
Generally adoption is low for fertilizer technologies. Farmers use fewer inputs especially in lowlands where they apply fewer fertilizers since they claim that the soil is fertile. In highlands less use of fertilizers is due to financial constraints. There is a high adoption for artificial insemination technologies. High demand for cash crops especially coffee and horticultural products has led to more farmers producing these crops. Farmers earn more income due to the increased crop yields. Initially farmers required about 45kg of coffee seeds each, now they need up to 71kg due to increased demand.

Linkages with other stakeholders
The major partner in extension is the Bako Research center. The office also links with the Farmers’ Cooperatives which supply inputs to farmers and also purchase products from farmers. The woreda office does not link farmers to the markets.

Local innovations
Farmers constructed beehives from bamboo which can accommodate a larger colony hence increased productivity. This is still being tested

Strengths
• Model farmers are mostly used since they are efficient in transferring the technologies
• Farmers are ready and willing to take up the technologies
• Farmers are able to see practically during field days hence improving adoption rate if the results are positive

Challenges
• Farmers may be unavailable especially during peak periods
• Natural conditions like rain may affect the work for example field days
• The DAs may not reach all farmers on time especially in cases of short term activities
• Sometimes DAs walks long distances consuming much time hence reducing efficiency
• Farmers may not be able to adopt all technologies disseminated to them due to lack of finances
• Some farmers drop out of the three months training before completion due to other activities on their farms.
• Poor productivity due to diseases for example Bako hybrid (BH 660) is a maize breed that was introduced but is now being rejected by farmers since its productivity is continually declining.
• The area is a bit forested but for the past 3 years there has been a problem of tree cutting which has resulted to increased cases of soil loss due to erosion. Emphasis has been laid on soil bunds, terraces and micro brains this year. Some areas have been closed up for rehabilitation.

8.4 Extension activities in Bako Tibe
Agriculture technologies
The woreda has 28 kebeles. Technologies disseminated include natural resource conservation whereby soil bunds are constructed to control erosion. They have a plan to construct the structures a distance of 8km, have constructed 40% of it. Selected farmers are trained on natural resource conservation methods including waterways, cutoff drains, hillside terraces and micro basins.

Distributing tree seeds to farmers, Grevillea robusta is the main exotic tree in the area. It has been established in the nurseries. Indigenous tree seeds are also established at the nursery and also collected by the farmers. There are 2 nurseries at the woreda level located about 16km from town. At the kebeles 511 farmers have nurseries. Tree species available at the nurseries include Grevillea robusta, Cordia africana, Olea africana, Casuarina spp and Sesbania sesban.

Trainings are conducted by the woreda experts. They prepare handouts and sometimes power point presentations. DAs are first trained, and then DAs select model farmers to train. At each kebele there are more than 200 model farmers. The trained model farmers then go to train other farmers in groups 25-30 and 1-5 groups. At a sitting, about 150-200 farmers are trained. This is
in most cases the modular type of training which takes about 3-6 months; farmers are given certificates on completion. All farmers are called in workshop type of training; such training may take one day or a few days.

As a result of extension, crop production methods have been improved for example row sowing instead of broadcasting. Many farmers are now experienced unlike time in the past. Wheat planting in row results to higher produce. Modern beehives have been introduced; farmers have been introduced to animal feeds such as Sesbania sesban and Rhodes grass and have been encouraged to minimize cattle quantity for better quality. More training is given on animal husbandry especially on artificial insemination. Modern breeds of livestock have been introduced like holestian and fresian which provide more milk and also a better quality chicken breed Rhode Island. Farmers have improved coffee farming and management; they can now produce their seedlings given the seeds. They also prune and weed their coffee to increase productivity. Farmers are now selling more coffee of higher quality and are getting better prices. They distribute booklets to farmers explaining more on aspects of improved coffee farming.

**Adoption**

Adoption is at approximately 80-90%, community is willing to be engaged. All farmers are targeted. Technologies are first introduced to the model farmers before being disseminated to others. No specific roles for gender. All people are trained together and perform the various activities together. Sometimes it is a challenge when technologies introduced to farmers are not taken up due to lack of capacity. Feedback is received during training and visits. It is given to DAs by the group leaders.

**Demonstration plots**

Some are on farmers’ lands and some on FTCs. They demonstrate seedling preparation, horticulture farming for example growing cabbages, onions and tomatoes, fertilizer application and weeding.

Soil conservation demos are mostly on community land. Farmer groups are assigned by the DAs to manage these demo plots
**Linkage with other stakeholders**
They link with Bako research centre whereby experts from the research station train farmers, they carry out experiments on farmers’ lands and advise on the best seeds to use. The Agriculture College supports in materials, training of farmers, farm mechanization and farm implements. Private investors are involved in supply of seeds to the farmers.

**Incentives**- The best farmers are picked annually from the 28 Peasant Associations. These farmers are awarded points based on best practices. Those that score highest are given farm implements, fertilizers and certificates.

**Commercialized products** include coffee, maize wheat, teff, eggs, poultry, pepper, sugarcane, barley, tomatoes, onions, cabbage, sheep, goats, oxen. In some cases the cooperative purchases products from farmers at better prices. Woreda officers provide market information to farmers and create awareness on market conditions.

**Local Innovation**
Coffee production where a farmer used irrigation to produce coffee and was able to obtain 2 harvests in a year. Farmers are willing to be engaged but there is low expertise on various technologies, the experts are few and financial constraints hamper adoption of many technologies by the farmers.
9.0 EXTENSION ACTIVITIES BY NON GOVERNMENTAL ORGANIZATIONS

9.1 International Development Enterprise (IDE)
The NGO has been in Ethiopia for 6-7 years. The NGO has 2 major projects:

a) Rural prosperity initiative aimed at increasing income for small holder farmers by promoting production of commodities such as vegetables, fruit trees and use of irrigation technologies.

b) Smallholder Market and Agriculture Resilience (SMART) project funded by European Union. The project focuses on food security, agriculture inputs, integration of livestock in the farming system, crop production, forestry department, agroforestry ruminant fattening, liaising with micro finance for credit facilities to farmers. They also engage women economy groups, which ultimately become self-dependent.

Extension activities

- They supply improved seeds, fertilizers and other inputs to farmers to help in increasing productivity.
- Introduce modern agriculture practices for example from broadcast sowing to row planting
- Determining the most appropriate cropping patterns and determining products in demand, they advise farmers to follow the patterns and produce the demanded products.
- Providing market information to farmers after analyzing the market conditions
- They introduce new irrigation technologies to farmers
- Establish tree plantations and root crops
- Invite agriculture experts to train farmers.
- Monitoring all activities

They first demonstrate the technologies to farmers and the expected results, they then supply inputs to farmers who implement the technologies. They also help women organize themselves into women economy groups where women can obtain funds/loans and engage in income generating activities. The NGO operates in 8 PAs. They work with Community Marketing
Agents-these are farmers who are trained on marketing linkages, cropping technologies and then transfer the knowledge to other farmers.

**Extension Methods/ Approaches**

- Individual and group based approach- Field officers visit both individual farmers and groups where they advise farmers and find out their weaknesses. They conduct on farm training while they visit the farms.
- Customized training-they invite experts from research centers, Ministry of Agriculture and other organizations to educate farmers
- They use Demonstration plots which are on individual farms.
- They have set up a kebele cabinet which makes decisions; mainly the key influential people in the kebele are engaged. These may include village elders, religious leaders and lead farmers.
- Training/ discussions with farmers is done by IDE on all technologies introduced, feedback is obtained during such forums and also during Farmer to farmer visits by the field officers.
- The targeted group for extension is less than that targeted by government projects and institutions. However adoption rate is high.

**Linkage with other stakeholders**

The NGO signed with regional level offices to be permitted to operate in the region. It submits reports to the zonal government about its activities; it also works with the woreda office. It gives funds to microfinance institutions which advances funds to farmers. They also supply seeds approved by the government.

**Challenges**

- Poor crop growth due to soil infertility and poor seed type
- Insufficient and costly inputs, they are unable to meet all the farmers’ demands
• There should be dividends shared from the farmers unions at least once a year. This requires time and logistic preparations which is difficult
• Innovation among farmers is not strong
• Sometimes there is conflict between scientific versus traditional methods of agricultural methods.
• Inadequate/erratic rainfall causes poor crop production. Many crops dry up before maturity.
• Water scarcity in the area
• No proper established water harvesting techniques

Opportunities
• Farmers are interested in fruit trees to enhance food security
• Land availability, farmers have big lands

Recommendations
• Show the results, farmers learn better by seeing the actual results e.g. training on farmers land
• Involve the community members in all activities, not only government officials
• Community to be empowered to manage themselves and give feedback
• Both Top-down and Bottom-up approach in information dissemination

9.2 Catholic Relief Services (CRS)
In East Shewa, the NGO works in Arsi, Bora, Dugda and Zeway.

Extension technologies and methods used

CRS mainly focuses on social and development activities including; education, health, crop production, poultry keeping, rabbit keeping, bee keeping, natural resource conservation and ecological sanitation (use of pit latrines and after pit fills to plant fruit trees). Improved seeds, seed multiplication, storage of farm produce, promotion of farmers cooperatives, capacity
building among farmers, works with microfinances to advance farmers credit facilities by allocating to them financial capital, promote commodities for market purposes especially haricot bean. The NGO works with Melkassa research institute to obtain expertise advice on better seed varieties. Natural resource conservation- in the last 3 years it has concentrated on area closures, planting of trees, constructing soil conservation structures like terraces to prevent soil erosion, providing farm equipment to farmers, water harvesting in schools, planting of trees, provide fruit trees e.g. mango- Kent- they have established a tree nursery for the seedlings. They are also involved in compost preparation. They train farmers on how to prepare it and farmers can now produce it in large amounts.

Demonstration plots are located on the NGO’s land; farmers are trained from the plots. Their staff members manage the demonstration plots. The NGO has its trained DAs referred to as ‘animators’ who work in the kebeles. The NGO also engages in natural resource conservation technologies, these are more costly and it may take several years before the benefits are realized. The NGO also encourages silk groups- these are women groups in which members save money and can get loans from the groups. Such members also engage in agricultural activities. They use group extension method where they train farmer s in a group and during field days. Model farmers are first trained before engaging other farmers.

**Sourcing for funds**
The NGO develops concept papers, submits to donors, after project is accepted they identify the area of implementation, they liaise with the woreda office then start their activities. Before delivering a technology they sometimes get baseline information from Melkassa Research Institute. Few farmers are first selected then the technologies are scaled out to other kebeles. Target community depends on the project, for food security projects, poor households are selected first, ecological sanitation projects targets all households. It may take a long time before the project is approved for funding; this becomes a challenge in introducing technologies to farmers. Many farmers are active in the group and using group approach of extension and model farmers is efficient since many people are reached.
Adoption

Farmers are at times hesitant to apply the new technologies, for example farmers were reluctant to adopt Awash Melkassa- a new maize seed instead they preferred Awash 1- the seed they were used to planting. The NGO had to organize a workshop to train farmers on the benefits of the technologies introduced to them. Ecological sanitation project involves construction of pit latrines, this poses a challenge due to culture where the old people are hesitant to use the same latrines that the younger people are using.

Adoption of fruits production is higher in areas where water is available. Farmers still ask for more technologies, improved seeds and tree seedlings. The NGO operates near the main road which is a major trade route hence easy transport of products for market purposes. This helps
increase demand for commercial products. There are increased cases of small scale irrigation and fruit production due to intensive training and capacity building on the different technologies. The NGO at times works with existing farmer unions like the Meki Batu Union.

**Credit systems**
The NGO works with farmers cooperatives to advance loans to farmers. They should be well organized; there should be guarantees to sign for loans allocated to the farmers. Credit facilities are also advanced to individual saving groups. They also encourage saving within the ‘Silk’ groups, the group members are provided with a ‘Silk’ box to put their savings. 3 people are given keys for the box and can only open when they are all together with the consent if the group.

**Linkages with stakeholders**
It links with micro finance institutions, money is given to the micro finance which advances credit facilities to clients. It links with the government, the project document is submitted to the Oromia regional offices either to the finance and credit institution bureau, water bureau- this depends on the project type. Project document then delivered to the zonal and woreda level. This bureaus conduct an intensive evaluation on completion of the activities.

**Incentives**
Some outstanding farmers are recognized for example they are given the slab freely for promotion of ecological sanitation, they are also given tree seedlings freely, tools and equipment and new seed varieties. The NGO also works with village elders who help in restricting community members against cutting trees. Due to the high rate of early marriages of young girls, they have established empowering girls project which builds capacity among community members on importance of girls’ education. They have 1 demonstration at their compound, 2 at the village- government community land. Every year there is a field day conducted on individuals’ farms on crop production, there is also a field day on soil conservation structures in area closures. To enhance efficiency, 1 DA is given a motorcycle for movement since one DA is in charge of 3 kebeles.
9.3 World Vision
World vision mainly focuses on food security and agriculture. They are working in 13 kebeles. Irrigation is in Doni and Siferberte kebeles. Technologies delivered are on crop production, animal husbandry, food security where they train farmers and equip them with improved production techniques and agriculture training. They train woreda and zonal officers/extension officers, they take farmers to research centres for demonstration and help them in technology adoption. Provision of improved inputs-seeds, fertilizers to model farmers for example grafted fruits, improved livestock- dairy cows, goats by organizing farmers into interest groups then such inputs benefit members as a group, improved farm implements. They also organize for provision of veterinary services and irrigation.

They have 2ha of nursery site on government land where they provide training on nursery management and inputs for the nursery where seedlings are produced and distributed to farmers. Some of the tree seedlings produced are planted in area closures on government land. Tree seedlings produced include Acacias, Grevillea robusta and casuarina.
Extension methods

In most cases they train model farmers on a technology then they train others. They use demonstration plots. Government DAs are called in sometimes to be trained in order to also help in training. Trainings are conducted at the World Vision Centre not in the FTCs; they invite resource persons/experts from Ministry of Agriculture to do the training.

Adoption

Demand and marketability of the products measures the adoption rate and success of adoption. Generally adoption for technologies where farmers are provided with inputs is high. It is more successful to provide extension services in groups since many farmers are reached at the same time. Farmers organized in groups also have set up rules that must be adhered to, to ensure success of their activities.

Water scarcity is a major obstacle in the area, another obstacle is the high number of masses who are targeted in most cases they shift their focus on quantity of population reached rather than quality of services delivered as a result they may not be in a position to support innovativeness.

Monitoring

The 3 experts in charge of the food security project do the monitoring. Farmers have committees which have leaders normally the model farmers. Other farmers give their feedback to such committees who report to the office. Training is given to the community members together regardless of gender and age since those present for the training are all farmers with similar objectives.

Linkages with other organizations

Linkage with other organizations is not as strong but they work with Melkassa Research Centre, office of agriculture and cooperative unions. These organizations help in providing inputs and
farm equipment like water pumps. Fruit seeds are bought from Meki Awash industry. They motivate farmers by providing outstanding farmers with additional farm equipment and inputs.

**Market**

World Vision purchases products from farmers and sells them. This motivates farmers to produce more since they are assured of ready market. Location of the woreda makes it favorable for market since it is on a major trade route. Products commercialized are mainly vegetables and fruits.

**Recommendations**

- Get feedback information from other organizations and other farmers especially those who failed to determine how such failures can be avoided.

- Focus on community needs so that the farmers can be willing to participate since they will feel that their needs are being addressed

- Livestock production in the area is a very feasible activity; they can have more development on livestock technologies

- Approaches introduced should integrate the traditional systems to avoid resistance by some farmers

- Construction of water harvesting and conservation structures should be up scaled to curb the challenge of water scarcity and also because there is usually a lot of water during the rainy season which is washed away.
10.0 CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS FOR THE ACIAR TREES FOR FOOD SECURITY PROJECT SCALING UP ACTIVITIES

Agricultural extension has a key role to play in achieving rural transformation. Yet access to extension services and lack of resources are the main challenges facing Ethiopia. Extension agents in Ethiopia use both group and individual methods of extension in communicating new ideas to farmers. The specific methods used to introduce new technologies/practices include: arranging public meetings at a specified day and time through local leaders (religious leaders, leaders of local organizations & elders); through model farmers, contacting farmers individually and through Peasant Association officials. As there is a shortage of extension professionals in the country, extension agents prefer to introduce new technologies/practices through community leaders (peasant association officials and local leaders) and by arranging public meetings.

Critics also claim that the agricultural education system is too isolated to contribute effectively to Ethiopia’s changing rural economy. Kassa (2004a) argues that the agricultural education system suffers from weak linkages with research institutes, and extension services to meet the nation’s development objectives. Gebremedhin et al., (2006) argue that the relationships between research, extension, and education at the woreda level are largely top-down, supply-driven, and unimodal, thus impeding the capacity of farmers to innovate and engage in the growing commercial economy.

Agricultural extension operates within a broad knowledge system that includes various stakeholders such as agricultural research and the end user clients (farmers). In most of the cases, poor linkages between extension, research and farmers have been singled out as the major reason for lower performance of the extension and research organizations in Ethiopia. The absence of effective linkage between research-extension-farmer has been identified time and again as one of the major problems. There had also been various attempts both by the extension and research organizations in devising linkages. However in most of the cases the arrangements failed to work satisfactorily due to various reasons such as frequent restructuring of organizations, poor farmers’ representation, high staff turnover, budgetary limitations, lack of commitment, and in
some cases rivalry of institutions as if they were competing each other rather than complementing to attain a common development goal (Kalemework and Kassa 2006).

This was recognized even during the formulation of PADETES and due attention was given to establish pragmatic relationship between agricultural research, extension and education (Belay Ejigu, 1997). Similarly, the Ethiopian Agricultural Research System has also recognized the importance of having strong research-extension-farmer linkage for successful technology development. A linkage strategy was developed by a task force comprising of staff from the then Ethiopian Agricultural Research Organization (now called Ethiopian Institute of Agricultural Research) and the then Ministry of Agriculture (now MOARD). A workshop was organized whose outcome was a draft strategy on Research-Extension-Farmer Linkages. Consequently, institutional linkage problems were supposed to have been addressed through establishments of Research-Extension Advisory Councils (REACs) at three levels: National/Federal, Regional and Zonal/Research Center levels. This was meant to bring together researchers, extension workers, farmers and other relevant development practitioners and discussed on how to integrate their resources and realize agricultural developments in a sustainable ways (EARO, 2000). However as REACs were not institutionalized well, linkage problems persisted and implementation problems became apparent.

**Implications for the ACIAR Trees for Food Security project**

The Ethiopian Government has invested heavily in infrastructure and extension personnel required for farmers to access extension services. It is committed to further increasing the number of DAs and having an FTC in each Kebele. The extension system in Ethiopia has several strengths which the ACIAR project can build on. These include the use of model farmers, demonstrations and the FTCs. The model farmer approach is widely used in Ethiopia and what may be improved upon is the mode of selection of model farmers where the community plays a major role in selection so that farmers feel part and parcel of the extension activities. In addition, the use of peasant associations at the kebele level is also one model that the Trees and Food Security Project can build on. The FTCs are training grounds for farmers. Many FTCs we visited
had a hall for training and office space for the DA staff. Most of them had 1.0-2.5 ha of land allocated for demonstrations plots. However, due to lack of resources, most of the land is fallow. The Trees for Food Security Project could use these FTCs to set up rural resource centres where farmers can be trained, access germplasm and other extension services.

Conclusion

Addressing new challenges requires extension to play an expanded role with a diversity of objectives, which include: linking farmers more effectively and responsively to domestic and international markets; enhancing crop diversification; coupling technology transfer with other services relating to input and output markets; poverty reduction and environmental conservation; viewing agriculture as part of a wider set of rural development process that includes enterprise development and non-farm employment; and capacity development in terms of strengthening innovation process, building linkages between farmers and other agencies, and institutional development to support the bargaining position of farmers (Sulaiman et al, 2006).

Whenever possible, performance measurement should be included and carefully assessed. Besides, as a system the costs and benefits of any extension program must be properly assessed and documented to inform decision making. To this end, well thought monitoring and evaluation system has to be put in place, and information must be collected and reports collected analyzed at different levels to inform extension planning. Extension service is one factor to accelerate agricultural development. There are series of economic, policy, environmental and social factors that have compounding effects. Besides, the impact of extension often is not immediate. These needs to be taken into account when attempting to assess impact of agricultural extension. Farmers require information regarding various aspects of farming, including marketing, prices, etc. to increase their productivity and income. All these cannot be provided by the government extension program alone. There is a need to enhance the roles of NGOs, private sectors, farmers’ cooperatives in extension service provisions. There should be a well-defined agricultural extension policy. This clarifies what extension can and should do and, accordingly, the tasks of extension workers (Kelemework and Kassa 2006).
11.0 REFERENCES


Berhanu Gebremedhin, Hoekstra D and Azage Tegegne. 2006. Commercialization of Ethiopian agriculture: Extension service from input supplier to knowledge broker and facilitator.


Ministry of Agriculture and Rural Development (MOARD), Department of Agricultural Technical and Vocational Training and Education. 2009a. Data on ATVET Colleges Graduates. Addis Ababa, Ethiopia: MOARD.


Task Force on Agricultural Extension. 1994b. Ethiopian Agricultural Extension System (in Amharic), Addis Ababa


Agricultural and Rural Extension and Advisory Services in Ethiopia-IFPRI

http://www.worldwide-extension.org/africa/ethiopia
## APPENDIX 1: KEY INFORMANTS INTERVIEWED

### 1.0 FEDERAL LEVEL

<table>
<thead>
<tr>
<th>Name</th>
<th>Bernahu Gezahegh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Institution</td>
<td>MOA</td>
</tr>
<tr>
<td>Position</td>
<td>Extension Program Coordinator</td>
</tr>
<tr>
<td>Tel</td>
<td>0911 43 74 51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Fisseha Teshome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Institution</td>
<td>MOA</td>
</tr>
<tr>
<td>Position</td>
<td>Development Partners Linkage Expert</td>
</tr>
<tr>
<td>Tel</td>
<td>0912 07 68 26</td>
</tr>
</tbody>
</table>

### 3. OROMIA STATE REGION

<table>
<thead>
<tr>
<th>Name</th>
<th>Abebe Diriba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Institution</td>
<td>Oromia Region</td>
</tr>
<tr>
<td>Position</td>
<td>Regional Extension Coordinator</td>
</tr>
<tr>
<td>Tel</td>
<td>0911 48 76 69</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:Abebe@roktmail.com">Abebe@roktmail.com</a></td>
</tr>
<tr>
<td>Name</td>
<td>Gender</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Garishu Abati</td>
<td>Male</td>
</tr>
<tr>
<td>Tekley Tibeso</td>
<td>Male</td>
</tr>
<tr>
<td>Jamal Gamada</td>
<td>Male</td>
</tr>
<tr>
<td>Bone Melkato</td>
<td>Male</td>
</tr>
</tbody>
</table>

**4.0 ADAMIT TILU COMBOLICHA**

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Institution</th>
<th>Position</th>
<th>Tel</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamal Gamada</td>
<td>Male</td>
<td>Agriculture</td>
<td>Assistant Extension Officer</td>
<td>0916 34 09 16</td>
<td></td>
</tr>
<tr>
<td>Bone Melkato</td>
<td>Male</td>
<td>Agriculture Office</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Position: Extension Coordinator
Tel: 0912 05 68 04

Name: Tahir Hedeto
Gender: Male
Institution: Agriculture Office
Position: Natural Resource Process Owner
Tel: 0913 17 16 16

5.0 BORA

Name: Santiayo Sheferaw
Gender: Male
Woreda: Bora
Institution: Agriculture Office
Position: Extension Coordinator
TEL: 0913 47 83 07

NAME: Kalkiden Fikire
Gender: Male
Woreda: Bora
Institution: Agriculture Office
Position: Forestry Expert
Tel: 0912 75 85 80
6.0 MEKI

Date 31/01/2013
Woreda Meki
Name Belay Yadesa
Gender Male
Institution Agriculture Office
Position DA
Tel 0922 64 67 65

7.0 BOSET-WOLENCHITI

Date 01/02/2013
Woreda Boset-Wolenchiti
Name Bashir Ali
Gender Male
Institution Agriculture Office
Position Natural Resource Team Leader
Tel 0913 29 67 49

Date 01/02/2013
Woreda Boset-Wolenchiti
Name Kasahun Getahun
Gender Male
Institution Agriculture Office
Position Crop Protection Expert
8.0 LUME-MOJO

Date 01/02/2013
Woreda Lume-Mojo
Name Katama Getacho
Gender Male
Institution Agriculture Office
Position Extension Coordinator
Tel 0912 29 66 81

Date 01/02/2013
Woreda Lume-Mojo
Name Makonen Abarbar
Gender Male
Institution Agriculture Office
Position Natural Resource Team Leader
Tel 0913 28 97 69

Date 02/02/2013
Woreda Lume-Mojo
Kebele Tededilima Kebele
Name Amare Bekele
Gender Male
Institution
Agriculture Office
Position
DA- Animal Science Specialist
Tel
0911 92 34 87

Date
04/02/2013
Woreda
Lume-Mojo
Kebele
Uukke
Name
Solome Kebede
Gender
Male
Institution
Agriculture Office
Position
DA- Natural Resources Conservation
Tel
0917 83 65 53

9.0 GITO GIDA
Date
04/02/2013
Woreda
Guto Gida
Name
Girma Namomsa
Gender
Male
Institution
Agriculture Office
Position
Extension Coordinator
Tel
0911 07 13 21

10.0 GOBU SAYO
Date
05/02/2013
Woreda Gobu Sayo
Name Tolera Urgesa
Gender Male
Institution Agriculture Office
Position Extension Officer
Tel 0921 17 32 38

Date 05/02/2013
Woreda Gobu Sayo
Kebele Ongobo Bakanisa
Name Getahun Fekadu
Gender Male
Institution Agriculture Office
Position DA- Plant Science
Tel 0931 02 51 09

11.0 JIMMA ARJO
Date 06/02/2013
Woreda Ardjo
Name Makonnen Abebe
Gender Male
Institution Agriculture Office
Position Head of Agriculture Department
Tel 0917 03 83 85
Date          06/02/2013
Woreda        Ardjo
Kebele        Wayu Kumba
Name          Tememesgen Orkeh
Gender        Male
Institution   Agriculture Office
Position      DA- Animal Science
Tel           0913 89 34 69

12.0  BAKO

Date          07/02/2013
Woreda        Bako
Name          Shiffah Yesuf
Gender        Male
Institution   Agriculture Office
Position      Head of Natural Resource Management
Tel           0911 07 96 14

Date          07/02/2013
Woreda        Bako
Name          Hudensa Kumsa
Gender        Male
Institution   Agriculture Office
Position      Irrigation Management Department Head
Tel           0920 42 19 21
Date 07/02/2013
Woreda Bako
Name Deranje Deresa
Gender Male
Institution Agriculture Office
Position Coffee and Spice Department Head
Tel 0917 85 11 72

14.0 Non-Governmental Organizations

14.1 International Development Enterprise (IDE)
Date 30/01/2013
Name Wordsan Tamara
Gender Male
Institution International Development Enterprise (IDE)
Position Project Team Leader
Tel 0911 64 82 66

Name Wogeya Tesfaye
Gender Male
Institution International Development Enterprise (IDE)
Position Project Field Officer

14.2 CATHOLIC RELIEF SERVICES (CRS)
Date 31/01/2013
<table>
<thead>
<tr>
<th>Name</th>
<th>Solomon Kebede</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Institution</td>
<td>Catholic Relief Services (CRS)</td>
</tr>
<tr>
<td>Position</td>
<td>Development Coordinator</td>
</tr>
<tr>
<td>Tel</td>
<td>0913 72 89 85</td>
</tr>
</tbody>
</table>

### 14.3 WORLD VISION

<table>
<thead>
<tr>
<th>Date</th>
<th>1/02/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woreda</td>
<td>Wolenchiti</td>
</tr>
<tr>
<td>Name</td>
<td>Gulumatre Tekeste</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Institution</td>
<td>World Vision</td>
</tr>
<tr>
<td>Position</td>
<td>Area Development Program Manager</td>
</tr>
<tr>
<td>Tel</td>
<td>0911 30 46 04</td>
</tr>
</tbody>
</table>