

**EFFECTIVENESS OF MODULAR TRAINING AT FARMERS'
TRAINING CENTER: THE CASE OF FOGERA DISTRICT, AMHARA
NATIONAL REGIONAL STATE, ETHIOPIA.**

M.Sc. Thesis

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June 2010

Haramaya University

**EFFECTIVENESS OF MODULAR TRAINING AT FARMERS'
TRAINING CENTER: THE CASE OF FOGERA DISTRICT, SOUTH
GONDAR, ETHIOPIA.**

**A Thesis Submitted to the Department of
Rural Development and Agricultural Extension, School of Graduate Studies
HARAMAYA UNIVERSITY**

**In Partial Fulfillment of the Requirement of for the Degree of
MASTER OF SCIENCE IN RURAL DEVELOPMENT AND AGRICULTURAL
EXTENSION (RURAL DEVELOPMENT)**

By

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June 2010

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I dedicate this Thesis manuscript to
my family for their love and affection

STATEMENT OF AUTHOR

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ABBREVIATIONS

ADLI	Agricultural Development Led Industry
AESP	Agricultural Extension Service Process
ANRS	Amhara National Regional State
ATVET	Agricultural, Technical, Vocational, Education and Training
BoARD	Bureau of Agriculture and Rural Development
BoFED	Bureau of Finance and Economic Development
DA	Development Agent
DoARD	Department of Agriculture and Rural Development
FDRE	Federal Democratic Republic of Ethiopia
EPLAUA	Environmental Protection, Land Administration and Use Authority
FFS	Farmer Field School
FTC	Farmer Training Center
GDP	Growth Domestic Product
GO	Governmental Organization
HHs	Households
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IECAMA	Imperial Ethiopia College of Agriculture and Mechanical Arts
ILRI	International Livestock Research Institute
IPMS	Improving Productivity and Market Success
M.a.s.l	Meter above sea level
MoA	Ministry of Agriculture
MoFED	Ministry of Finance and Economic Development
NGO	Non Governmental Organization
ORDA	Organization for Rehabilitation and Development in Amhara
PA	Peasant Association
PADETES	Participatory Demonstration Training and Extension System
PD	positive deviance
PLS	Pilot Learning Site

ABBREVIATIONS (*Continued*)

RAAKS	Rapid Appraisal of Agricultural Knowledge System
SG	Sasakawa Global
SWHISA	Sustainable Water Harvesting and Institutional Strengthening in Amhara
TIER	Training, Innovation and Effectiveness Research
ToT	Training of Trainers
TTI	Teachers Training Institute
T and V	Training and Visiting

BIOGRAPHICAL SKETH

The author was born on November 5, 1972 in Debre Sina, South Gondar, and Amhara National Regional State. He completed his primary and secondary school at Maynet and Theodros II Elementary and Senior Secondary School respectively.

After passing the Ethiopian School Leaving Certificate Examination (ESLCE), he joined in Jimma College of Agriculture in 1990 with General Agriculture and completed his diploma in August, 1992. Then he was employed by Ministry of Agriculture and served with different disciplines and job responsibilities in Districts of South Gondar Zone. He, then, joined at Haramaya University in 2003 in summer program with Rural Development and Agricultural Extension Department and graduated in September 2007.

After his graduation of B.Sc degree he has served in South Gondar Zone Department of Agriculture and Rural Development as planning expert and communication expert from January 2008 until he joined the School of Graduate Studies at Haramaya University in 2008, as IPMS sponsored candidate to pursue his post graduate studies in Rural Development and Agricultural Extension Department.

ACKNOWLEDGMENT

First and foremost let me praise and honor the Almighty God for the opportunity and capacity given to me to realize my hope. This study is the result of the contributions and supports of many individuals and institutions. I would like to express my deepest grateful thanks to my research advisor Professor Ranjan S. Karippai for his encouragement, field support, intellectual stimulation as well as constructive comments all along. Without his guidance and advice, the completion of this study would have hardly been possible.

I would like to extend my gratitude to Dr. Ranjitha Puskur and Dr. Tesfaye Lemma for their helpful comments and practical insights for the study. My sincere appreciation goes to ILRI-IPMS project for granting me learning and research funds. Grateful thanks also given to Berkie Enyew and Tilahun Gebey (Fogera IPMS Development Research Officer) for their encouragement and facilitation of financial matters to accomplish this study.

It is worth to mention here many individuals' contributions; especially, I am indebted to my senior graduate Tesfaye Alemu who has supported me starting from my entry till my research work is completed. My appreciation extends to W/ro Birke Aycheh who was concerned for my children in every aspect. Special thanks also go to Adebabay Mengist, Anteneh Girma, Dessalegn Alemu, Tefera Mekonen, Aklog Yimer, Berihun Yigzaw, Getnet Beyene, Endalkachew Fekadu and my office colleagues for their moral support. Respondent farmers, DAs, supervisors and Woreda experts were also encouraged me at the time of my study.

I am particularly indebted to my wife, Wubit Tialhun, for unreserved moral support, encouragement and responsibility to take care of our children during my leave of absence. Finally, yet importantly, I would like to thank my parents who pray for my health and wellbeing.

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**EFFECTIVENESS OF MODULAR TRAINING AT FARMERS’
TRAINING CENTER: THE CASE OF FOGERA DISTRICT, SOUTH
GONDAR, ETHIOPIA.**

ABSTRACT

Subsistence farming, climatic change, environmental degradation and low adult literacy ratio are problems of livelihoods. To increase productivity and alleviate poverty in rural areas, farmers need to have training to improve knowledge, attitudes and skills on better farming practices. Attending modular training might lead farmers to produce market oriented commodities. Such trainings are offered in the Farmers’ Training Centers, which are being functional at Peasant Association level throughout Ethiopia. The objectives of the study were to analyze whether modular training addresses the knowledge gap of the farmers and enable them to use the acquired knowledge; institutional linkages and positive deviances of FTCs in performance and their contributions. A total of 120 respondents were selected. Interview schedules, focused group discussions, key informant interviews, personal observations and case studies were conducted for quantitative and qualitative data collection. RAAKS tools, SWOT analysis, Likert scale and teacher-made-test tools were also employed. The data were analyzed using descriptive statistical tools like, percentage, frequencies, chi-square and t-test. The result of the study revealed that, in the study area, Fogera, 7 PAs had delivered modular trainings. Even though, the training time and season was sufficient and convenient, less participation of females and being more theoretical and lecture type of methodology of the training were the major deficiencies. But trained farmers acquired better knowledge, skill, and attitude significantly than untrained farmers. Actors have been identified with different intensity of linkages. Many development actors assessed as strong, medium, weak and no linkage among and between them. The study indicated that, it requires enhancing the linkage of actors and their roles involved in training system. There are actors missed to support and integrate FTCs such as, Fogera Wet-land project, GTZ, CARE, private investors, research centers and ORDA. Positive deviances of FTCs were assessed, and found that there were no as such significant deviations documented at FTC level. Case studies and key informants revealed that, there are individual smallholder farmers who could perform and emerge better than the others as positive deviants and raised their level of living that could be scaled-up.

1. INTRODUCTION

1.1. Background of the Study

Ethiopia is one of the largest countries in Africa both in terms of land area of 1.2 million square km and with a population of 73.9 million; and it is predominantly an agrarian country with the vast majority of its population directly or indirectly being involved in crop and livestock production. More than 83.8% of population is living at rural areas engaging in agriculture for its livelihoods (MoFED, 2009). Hence, agriculture plays a vital role in Ethiopian economy which accounts for about 47% GDP and 80% of export earnings (MoARD, 2009).

Available evidences indicate that peasant agriculture in Ethiopia is characterized by subsistence farming system using backward traditional farm tools and farming practices, with low productivity that unable to produce sufficient amount of food for the country's rapidly growing population. Various factors can be cited for slow growth of agriculture such as the trend of conventional farming system as a result of poor extension service coupled with climatic change, reduced soil fertility, recurrent and prolonged drought periods, weak agricultural research base, inadequate financial service, poor infrastructure and market service, environmental degradation (population growth, deforestation, pollution, depletion of ozone layer, destruction of biodiversity, decline of water resources, inappropriate chemical utilization),and fragmentation of land holdings (EPLAUA,2008). Furthermore, lack of improved technologies, low adult literacy ratio and inappropriate training system had been contributed for slow growth of agriculture (BoARD and SWHISA, 2006; Taddesse, 2007).

Ethiopian development policy and strategy document had given credence to different economical, social, political and institutional arrangements including building capacity program to strengthen local institutions and organizations so as to reduce the bottleneck of development. Government plan shows that, 25 Technical Vocational and Education Training Colleges had been established at the beginning of 2000 with the main objective of creating and developing human resource and institutional capacity that will have beneficial impact on medium and long term objectives of the country (Habtemariam,2007). About 18 thousand

FTCs were planned to be established throughout the country (Habtemariam, 2007); one FTC at each PA which serves as, center of information, extension, demonstration, place where modular trainings are given, source of advice for the transfer of improved technologies, knowledge acquisition, area of linkage between research, extension and technology users, and other institutional support services (FDRE, 2001; Berhanu, 2006).

Adult literacy rate of Ethiopian population who can read and write and Human Development Index were 36.3 % and 0.406 respectively (MoFED, 2009). Human Development Index is an index measuring national socio-economic development based on measures of life expectancy at birth, educational attainment and adjusted real per capita income. From primary to tertiary level accounts only 12.3 million (16.0%) of the total population of the country (St.Mary, 2006). Literacy rate is a key indicator of development next to life expectancy at birth and followed by infant or child mortality rate, per capita income, unemployment and security (Mesfin, 2009).

Farmers are more likely to adopt new technologies and become more productive with the help of basic education and extension services. They will be better equipped to make more informed decisions for their lives and to be active participants in improving economic, social and political dimension of development. Hence, rural youth are the farmers of the future and most of them start farming at a very early age. In rural areas, especially poor farmers, access to education is still much lower and the quality of non formal education is poorer and often irrelevant to their lives.

Among eight Millennium Development Goals, eradication of illiteracy can be achieved through training. Training is an essential strategy by which skill and knowledge can be acquired, attitudes changed, motivation and aspiration also could be accomplished. Several trainings, especially modular and other non modular trainings have been given to farmers in rural communities. At this time, Ethiopian government has been launched strategies and implementing directions to initiate modular training at FTC level as a means to meet the required level of knowledge. Hence, modular training is the main option within which the solution is found. For the main purpose of modular training many FTCs have been established

since 2004 in Ethiopia. Farmers were supposed to be trained through certain selection criteria. Hence, three development agents have been employed for each PAs, and modules have been printed and distributed to regions (MoARD, 2008).

Effective modular trainings can be delivered and successful achievements can be gained when linkage of different organizations and stakeholders realized at different level of institutions. Local institutions are the main instruments of human resource development through training for sustainable development. In recent years, more attention has been given to use newly established FTCs where modular trainings can be delivered for youth groups to increase production and productivity by enabling them more skillful and knowledgeable producers. It could also take an additional responsibility to undertake farmer based research in the area of agricultural technologies. The research and extension department is charged with the responsibility to support those needs through effective farmers' training (TSION, 2008).

In Fogera, out of 27 rural PAs, 15 PAs had already established FTCs within which 7 PAs had been delivered modular training at FTC level (DoARD, 2008). However, the effectiveness of modular training and its continuity as a result of this intervention has not been assessed and evaluated in the study area. In line with such context, the idea of this research was needed.

This study was aimed at analyzing the effectiveness of modular trainings in the study area and exploring options to enhance their utility. As a result, therefore; it is possible to generate information for policy makers and executive officials for an intervention that can facilitate the modular trainings through materials and facilities provision, training need assessment, continual monitoring and evaluation starting from targeting until the certification of trainees

1.2. Statement of the Problem

Capacity building is an essential dimension of development in general and of rural development in particular for developing as well as developed nations. Level of living can be raised through quality of life. Quality of life is a component of the quality and quantity of the basic physical, social and cultural needs of human beings including ability to do something

(Mesfin, 2009). Ability can be acquired by learning. Learning is the base of knowledge gained, skill performed, attitude changed, and experience shared.

To increase production and productivity, farmers need to have trainings. Formal, non-formal and informal trainings are equally important. But, farmers have opportunity to learn non-formal trainings at their farming community through different training programs. Aiming this fact, the government has been made potential development instruments including modular trainings at FTC level. Extension agents were trained at ATVET Colleges, Farmer Training Centers were established, training modules and texts have been prepared and some other progresses were achieved (BoARD, 2007).

Although government and NGOs made restless efforts to bring change in living standard of farmers, there are a number of problems encountered on the effectiveness of modular trainings. Some of the major challenges that were facing modular trainings: Cross cutting issues were not incorporated (HIV/AIDS, gender, home science, communication skills, group development, marketing, policies), lack of facilities, inappropriate time of training (Kristin *et al.*, 2009), lack of demonstration areas, training of trainers (ToT) has not been conducted, tasks and duties of modules were not easily understandable for development agents and farmers, lack of training aids, less involvement of female farmers and low follow up of training programs were some of the constraints that can be mentioned (Berhanu, 2006; TSION, 2008).

There was no study conducted in the context of personal, psychological, socio-cultural, institutional, and organizational aspects that hinder the effectiveness of modular trainings. As a result, no information was available in line with such issues. This holds true to Amhara Region, Fogera District where modular trainings were introduced to the farmers. In Amhara Region, including the study area, there was no well documented research finding which can reveal the effectiveness of modular trainings.

Research on effectiveness of training, especially in terms of relevance, curriculum design, training methodology, materials and aids, training evaluation and assessments were not

undertaken. If institutions focused on training need assessment and follow standard training procedures, it might help to avoid some of the most common mistakes in training (TSION, 2008).

FTCs were started to deliver modular trainings four years back in Ethiopia. However, assessments elsewhere in the country indicated that modular training was a problematic issue due to less functioning of FTCs and some other reasons (Anteneh, 2008; MoE, 2008; Fisseha, 2009). The situation may be similar or different in Fogera.

The interest of this study was therefore to investigate the effectiveness of modular trainings, understanding of linkage system and come up with recommendations at FTC level. It is useful for advancement of rural communities and design of policies and strategies, which can foster effective trainings. The study can also fill the current knowledge gaps; so that innovation, communication, skill, knowledge and attitude can be enhanced; and as a result productivity can be increased.

1.3. Objectives of the Study

In the view of the above statements, the objectives of the study are stated as follows:

General objective of the study

The overall objective of this study is to assess the effectiveness of modular training in Fogera district.

The Specific objectives of the study were:

- to analyze whether the training address the knowledge gap of the farmers and requirements effectively and enable them to use the acquired knowledge;
- to identify linkages of FTCs with other public and private institutions and
- to identify positive deviance of FTCs in their performance and contributions for rural communities

1.4. Research Questions

An attempt to promote modular training intervention to those of specific and selected farmers was relatively recent phenomenon. Therefore, it is the right time to deal with such issues so as to take timely measures. Accordingly, the rationale behind this study revolves around the following questions.

1. Does the training address the farmers’ knowledge gaps and requirements effectively to use the acquired knowledge?
2. Are there linkages between FTCs and other institutions that would enable them to provide effective knowledge and information sharing service?
3. Is there any positive deviance in performance of FTCs and farmers contribution at FTC level?

1.5. Significance of the Study

Agriculture is the most important sector of Ethiopian economy, and is mainly dependent on traditional farming. Doing all possible efforts to alienate the ever increasing agricultural problem is therefore, not an assignment to be left for tomorrow. To use modern technologies capacity building has been taken as one important strategy to improve productivity. There are ample potentials to acquire knowledge. Extension service, skill training, modular training,

panel discussion, conference, experience sharing, advising and counseling are among the possible alternatives. However, choosing promising intervention demands conscious research. In the endeavor of introducing and promoting new ideas for targeted farmers, basic information about technologies, socio-cultural, personal, institutional as well as the knowledge acquired for them in relation to modular trainings is too important for the success of different stakeholders who are working for the well being of the farmers.

Therefore, this study is expected to be useful for policy makers and executive officials. Secondly, it is to be useful to give insights for researchers and designers interested for further investigation and to formulate appropriate delivery system of trainings that can better fit farmers and their trainers. Thirdly, the result can help as a channel for further macro-level studies.

1.6. Scope of the Study

The main concern of this study was to investigate technical, institutional, organizational and demographic facts that significantly influence the effectiveness of modular trainings. The study was delimited in Fogera District, Amhara National Regional state. Due to Pilot Learning Site of ILRI-IPMS; it is the area at which the study had conducted. Besides the scope of the area, the study was focused only on modular trainings that delivered at FTC level. As such, the research does not claim to provide conclusive findings on modular trainings in Ethiopia. However, the research findings could be used to raise awareness among different stakeholders and also serve as background information for others who seek to do further related researches and would serve in formulating and revising agricultural extension strategies in the region as well as other places with similar socio-economic situations.

1.7. Structure of the Thesis

The thesis is organized in five main chapters. The introduction part describes about the background of the study including statement of the problem, objectives, significance and scope of the study.

Subsequent to the introduction, relevant literature is reviewed in chapter two. Basic concepts and theories of trainings are described. Chapter three deals with the description of the study area and also it discusses the methodology employed for data collection, analysis and conceptual framework of the study are presented in this chapter.

Main findings of the study are presented and discussed in chapter four. The first section of the chapter is devoted to describing the profile of farmers; the second section of the chapter is dedicated to effectiveness of modular training in terms of knowledge, attitude and skill; the third section deals with linkage of FTCs with other institutions; the fourth section concerned about knowledge and information sharing; the fifth item treated positive deviance and the final section of the chapter talked about challenges and opportunities of training related issues at FTC level. Finally, chapter five presents the summary, conclusions and recommendations based on the results of the study.

2. LITERATURE REVIEW

In this chapter, relevant literature to the theme of the study has been reviewed. It divided into different sections. The first section presents concepts, theories, definitions and typology of trainings in agricultural sector. The remaining sections deal with a review of theoretical and empirical literature related to the main concern of this thesis.

2.1. Concepts and Theories of Training

2.1.1. Concepts of training

Education is the main and supportive instrument for development and knowledge acquisition for a given country's citizen. To increase positive thinking of people, that fasten the creativity and job creation as the same time social, economical, and political participation, improvement of basic education is needed. Therefore, learning is important for growth and development of a given nation to increase production and productivity as well as it is needed to learn to reach at a higher stage of science and technology. Developed countries have been achieved their development and prosperity through the best competition of education. They understood the use of learning earlier through expanding schools for their population. Ethiopia did not expand modern education, as other developing countries, properly so that people did not learn as it was expected. With having and using backward technology, subsistence farming system made low income and little capital from its production.

Challenges of extension can be tackled through diverse objectives using capacity development including trainings with appropriate innovation processes. FTCs are expected to become multi-functional service providers in the future. Emphasis in such centers had been given for demand driven knowledge sharing system rather than supply driven approaches. Capacity building was also linked to the newly established ATVET colleges; since these colleges have been producing the future generation of extension workers that assigned for FTCs. Three main initiatives are undertaking by the government of Ethiopia through capacity building:

i) Reorient and strengthen the extension system to increase the capabilities of extension staff;

- ii) Introducing FTC-based extension system; and
- iii) Strengthening the agricultural knowledge management system.

Moreover, capacity building has some additional objectives including developing a national strategic plan for ATVET colleges in the country so as to build up their own long term strategic plans, provision of institutional strengthening grants and transforming them into training institutions with new mandates and long term sustainability plans (Mekonnen, 2008).

Training has to start with the identification of training needs through need assessment approaches. There are different need assessment techniques: Job and task analysis, competency and strategic need assessment, knowledge and skill assessment and organization analysis. Need is the gap between the current condition and a desired condition (Wiley and Inc., 2007). Once the training needs of farmers have been identified, then the next step is organizing of training programs follows. Modular trainings were designed to be given at FTC level for selected farmers on identified contents using training guidelines. Hence, modular trainings were offered at FTC level using different modules for selected duties and commodities.

2.1.2. Effectiveness of training and theories of adult learning

Assessment of training is a process to determine the effectiveness of activities in light of their objectives. To evaluate training effectiveness one needs to consider that most important training activities exist in the system. There are different adult learning theories and models towards training.

TIER model

This model indicates that the training activity includes four essential steps such as formative; process, out come and impact assessments indicated in the following figure.

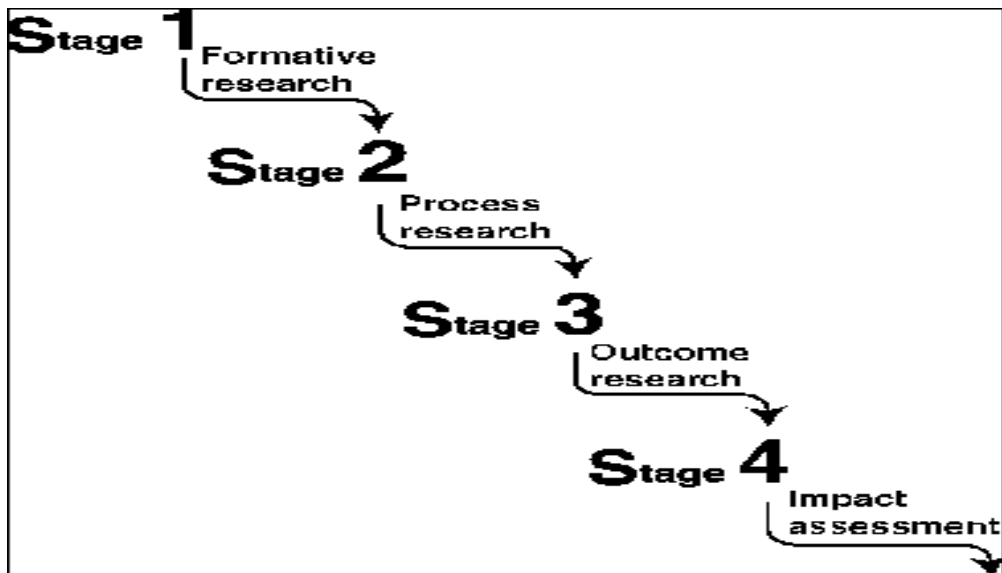


Figure 1. Four Stages of the TIER Model

Source: Loos *et al.*, 1999.

Stage 1: Formative stage: Training efforts are conceived, reviewed, and structured. Typically, this stage involves the following research questions:

What are the needs and how are they determined? What are the target populations served by the training? How do the goals and objectives of the training relate to identified needs? How will the attainment of these goals be assessed? What instructional approach should be taken?

Assessment instruments and training materials are also drafted in this stage. During formative research, TIER model users collaborate with (1) end users to ascertain preferred communication channels, learning styles, and instructional mediums; (2) content experts to provide technical and policy reviews; and (3) training professionals to perform pedagogic and instructional reviews.

Stage 2: Process stage: Training materials, instructional approaches, and research instruments are drafted, proposed and tested in pilot sites. Several typical questions for this stage are: What modifications are needed? Are the materials educationally and pedagogically

sound? Are the assessment instruments valid? Is there enough confidence in the approach to warrant higher-cost enhancements (e.g., video, multimedia) and wider distribution of materials?

Stage 3: Outcome stage: Involves a controlled evaluation study. This stage is primarily concerned with the following questions: Does the approach produce intended outcomes such as increased knowledge, appropriately shaped attitudes, and positive behavioral intent? Are targeted behaviors modified? What are the critical elements of the instructional approach that contribute to desired results?

Stage 4: Impact Assessment: This final stage emphasizes on these questions: Do the approaches under study met the educational needs identified in Stage1? What are the intended and unintended impacts of the training on the learners and their environment? What are the direct effects on the learner? What are the indirect effects on others whom the trainees influence? Why are the approaches studied effective or not? Stage 4 also examines the impact of study-related materials as they are applied to practice. The products of Stage 4 assessments are similar to those of Stage 3 except that the former emphasizes on longer-term impacts while the later on immediate outcomes.

Uses of the TIER model refine and focus the efforts of training evaluation studies. The model also provides researchers with practical knowledge of training research design and consistency, and with a reliable reference point for launching other investigations. Such benefits complement the primary goals of identifying the critical elements of effective training and creating validated templates.

Donald Kirkpatrick model

One of the most popular methodologies for measuring training effectiveness was developed by Donald Kirkpatrick. This model articulates a four-step process (Loos *et al.*, 1999).

Level 1: Reactions: At this level, it indicates what they thought and felt about the training. It measures the participants' reaction to the program. This is measured through the use of feedback forms termed as "happy-sheets". It throws light on the level of learner satisfaction. Here "happy sheet", feedback and verbal reaction tools can be used.

Level 2: Participant learning: It measures changes pertaining to knowledge, skill and attitude. The result increases in knowledge and capability. Pre-test and post-test measures can be taken. An assessment or test of before and after measurement can be used.

Level 3: Transfer of learning: It is the extent of behavioral change and capability improvement and implementation. It measures the application of the learning in the work context. It makes sense to obtain feedback from the participants on the application of learning on the job. Observation and interview are the best tools for this level.

Level 4: Results: This measures effectiveness of the program in terms of business objectives. At this level productivity increases and defects decreases. Reporting the measured results is needed at this level. For a long time, many generation of farming communities have been evolved different farming technologies that can provide a basis of intervention that enable human resources more capable.

In the context of modular training effectiveness of program conducted has to be measured in terms of knowledge, skill, attitude and behavioral change of the participants depending on the type of the training and its objectives. It is a common practice in many countries including Ethiopia for most of households who exercise training in general and non-formal training in particular. Farmer trainings often focus on imparting knowledge along with changing attitude in favor of modern farming system. Skill development enables the farmers to reduce poverty and hunger so that self sufficient society can be possible.

Kefyalew (2006) pointed out some points about adult education in Ethiopia. In the Derg regime, functional adult learning programs were initiated in 1974 through community skill training centers, though the need to provide focal points for adult education programs to meet

skill training needs had been recognized much easier, which was designed to reach rural people all over the country. These centers were established to: Raise level of indigenous skill and introduce new knowledge, acquire skills for the development of rural communities, help self employed and community development work, and Introduce basic technologies

Training enables to make conscious and consecutive contributions to the development process through the acquisition of knowledge, skill and positive attitude for individuals and society. In line with this, the government has already adopted a new comprehensive education and training policy which is expected to contribute a lot of improvements for the performance of agricultural sector (BoARD, 2007).

2.2. Evolution of Education and Extension in Ethiopia

Informal education was the only means for people in the primitive society. Religion and culture were carried to people through special program of non-formal education around temples, and churches through secular methods like folk media, music, proverbs, tales and songs. As societies grow more complex and modernized, the present formal education system came in but non-formal education system did not disappear merely because formal education appeared on the scene. Extension education had become a powerful instrument of change for bringing about socio-economic transformation of rural people in utilizing the latest scientific and technological innovations and technical knowhow (Pitchai, 2005).

Extension has an important role to play both in improving production efficiency and in promoting technologies to change circumstances and disseminate information on impact evaluation (Madhur, 2000). In Ethiopia, formal extension system was started at the time when the agricultural and technical school at Ambo, Jimma and college of Agricultural and Mechanical Arts of Alemaya that opened in 1947, 1952 and 1953 respectively. The first extension agent was Minilik II in 1889 due to sever cattle disease and famine was occurred throughout the country. He also introduced rubber tree to Ethiopia in 1897 (YICDOL, 2006).

In 1963, agricultural extension was transferred from Alemaya College of Agriculture to MoA. It became the department of agricultural extension which was then organized into three units namely, field service unit, youth club unit and training unit. In 1966, the Institute of Agricultural Research was established and it was the first nationally coordinated agricultural research system in Ethiopia to carry out agricultural research policy, research on crops, livestock, and natural resource and related disciplines (Tsion, 2008). Formal extension service has been started with in establishment of agricultural higher learner institution in 1950s. The Ethiopian government was initiated various comprehensive package development projects focused on the defined geographical areas financed by Swedish International Development Authority (SIDA) (Ebrahim, 2005).

In 1986, the then MoA launched the Peasant Agricultural Development Program (PADEP) and implemented T and V based extension system funded by different donor agencies. SG-2000 programs were started in 1993 with the main aim of increasing agricultural food production at the level of small scale farmers. The major policy framework for economic development of Ethiopia is currently known as Agricultural Development Led Industrialization (ADLI), which was formulated in 1993. Since, 1995 PADETES is the main extension program to be mentioned (Berhanu, 2006; Kaleb, 2008).

2.3. Phases of Training

Training is a circular process that begins with needs identification and after a number of steps ends with evaluation of the training activity. Training cycle is the process of need assessment on training to set objectives and design training curriculum so as to implement training through a serious of monitoring and evaluation processes.

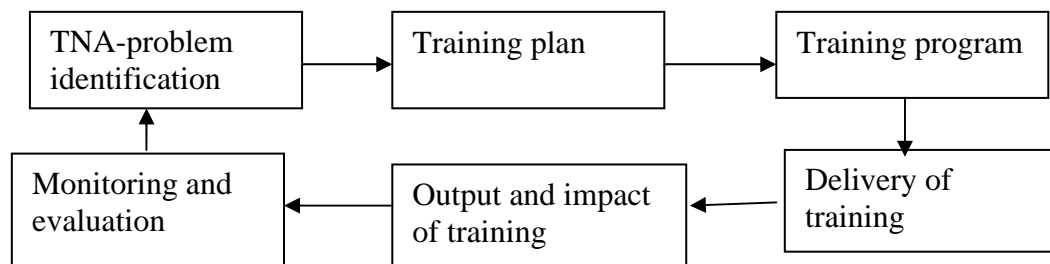


Figure 2: Training Cycle

Source: Panjabi (2008), modified

2.3.1. Planning phase.

The planning phase contains several activities. Training need assessment and curriculum development are very important steps of this phase. Training need is a condition where there is a gap between “What is” and “What should be” in terms of incumbents’ knowledge, skill, attitude and behavior for a particular situation at one point in time. Training need identification is possible through different analytical procedures. The possible methods for individual analysis include performance appraisal, interviews, and questionnaires, analysis of behavior, informal talks, checklists, counseling, recording, surveys and observations. Curriculum development is also the most important part in a training program after a need for training has been identified. The curriculum specifies what and how it should be taught (Swanson *et al.*, 1998).

2.3.2. Implementation phase

It is the actual conduct on delivery of training based on physical facilities, sequence of training and choosing effective training methods and techniques to deliver it. Once the planning phase of the training program is completed, then it is time to implement the course. Implementation is a point where a trainer activates the training plan or it is the process of putting a training program into operation. Once the training center and concerned organizations agree to implement training, the next step is to deliver effective training using arranged available resources. All these resources need to be well managed and coordinated to run the program smoothly (Swanson *et al.*, 1998).

2.3.3. Monitoring and evaluation phase

Monitoring is an internal activity designed to provide constant feedback on the problem it is facing, and the efficiency within which it is being implemented. It is continuous assessment of gathering information on all the aspects of a given duty. Evaluation is a periodic assessment of the relevance, performance, effectiveness and impact of a given activity in the context of its

stated objectives which involves comparisons requiring information from outside the project in time, area and population (St Mary, 2006).

2.4. Definitions and Typology of Trainings

In spite of the fact that many authors have been defined training in different ways, their meaning was more or less similar. But different scholars had different definitions about the training. Although professionals had given some short and precise definitions on trainings, there are consequently a dozen of different definitions of training. As written by Dahama (1979; cited in Kefyalew, 2006) described as, training helps people to become qualified and proficient in doing some job. Van Dorsal (1962) also defined as, training is a process of teaching, informing or educating people so that they become as well qualified as possible to do their job.

Training is concerned with increasing general knowledge and understanding of the total environment. It is usually short term, intensive, narrowly focused, specific, designed to meet specific needs and has immediate benefits. Training also can be seen as complementary to broader education (Sunnane, 1994). Training varies with its scope, duration and typology. It also can be short, medium and long periods in terms of its duration.

Formal training: It has learning objectives and learning materials and then applying some sort of evaluation activities at the end of the training. It is applied in schools, colleges, polytechnics and universities for preparatory of latter applications with fixed compartmentalized content and selective entry. It is organized and accredited with licensed teachers having characteristics of standard curricula. Mostly it is long cycle, rigidly structured, full time, terminal, examination oriented, self assessing with regular academic years and recognized certification.

Non-formal training: It is non-school based program that provides basic skills to individuals. It is personal oriented for all age groups, especially for adults for their immediate application to change and integrate contents with an open entry and any location. It is short cycle,

environmental base, flexibly structured, learner centered, part time, practical, non-terminal and so on. Extension service, modular training, package training, skill training, adult-learning, on the-job-training and other agricultural related extension services are examples of non-formal trainings (YICDOL, 2006). Usually formal and non-formal trainings overlap. There is no clear cut boundary to say formal and non-formal for instance 'extension'.

Informal training: It is a casual and incidental type of training having no special goals and has no curriculum. Learning from experience on the job, listening a group of people, talking about a new idea, discussion, brain storming and reading a book are examples of informal trainings (YICDOL, 2006).

2.5. Experiences of Modular Training

Farmer training was provided at local level through vocational agricultural school and field demonstrations in organic agriculture of sustainable farming systems such as composting, integrated pest management and sericulture in India. These training classes were conducted on specific or vast topics. The new information that farmers gain through training sessions make their daily farming activities much easier. Moreover, the training was supported by field trial, agricultural exhibitions, field visit, group discussion, experience sharing, video film and practical sessions for three months duration (Frontier Natural Products Coop., 2008).

Dairy farming training center was established and the training was delivered using different techniques in China. Training in farming technologies and professional skill training. The central government was invested US \$ 75 million for farmer training. In China out of 1.3 billion people 800 million are farmers. Training boosts income for land less farmers. Tourism, catering, mechanical and electrical maintenance and clothes making were the focus of the training (Davis, 2006; iNet Solutions Group, 2009).

In Asian countries (Ceylon, Philippines and Indonesia) project based trainings had been taken two hrs per week courses for one year duration. In Ceylon 16 to 25 age group youth individuals were trained farm project at home. Two-third time of trainers spent time on

trainees' farm cooperation and coordination to make successful programs. In Philippines two years farmer training was delivered for 12 to 25 age groups of males and females. In Indonesia also young farmers' course was given two hours of lecture per week for matured farm youth who engaged in the project. One terminal agricultural education offered to young farmers training center to future farmers of 17 to 25 age groups (Eric, 2001).

In Africa, two hundred fifty farmers were also participated in agricultural apprenticeship training in Indonesia, Kenya, Uganda, Zambia and Mozambique. Two hundred farmers were trained in Gambia, Guinea Bissau, Mali, Senegal and Sierra Leone since 1997. The training was concentrated on agribusiness and entrepreneurs (Eric, 2001).

In Ethiopia, Farmer Training Centers have been established at the center of a given PA in which farmers trained in different commodities of the production system (Habtemariam, 2007).

Table 1: Estimated number of FTCs and DAs in Ethiopia

Region	Farmer Training Center			Development Agents (DAs)		
	Required FTCs	Established FTCs	Functional FTCs	Male	Female	Total
Tigray	602	588	55	1879	188	2067
Oromia	6420	2459	1147	19	6	25
Amhara	3150	1725	318	7532	2664	10196
SNNP	3681	1610	857	9707	1266	10973
Afar	558	3	3	-	-	748
Somali	2	2	2	1176	102	1278
Harari	17	5	3	47	5	52
Dire Dawa	25	7	7	73	15	88
Benshangul	54	54	54	-	-	677
Total	14509	6543	2446	20433	4246	26104

Source: Kristin *et al.*, 2009

The guidelines of modular training were prepared at national level and reorganized at the regional level based on the local language of the people. Schedule of modular training has been designed to take full or partial content of the module. One training intake covers 3 to 6 months, 2 days per week, 6 hrs per day or 48 hrs per month so that trainees can “get green certificate”. Each Development Agent supposed to train 20 farmers per one intake at each PA. Four hrs (80%) per day of the training supposed to be given practically and two hrs (20%) theoretically at FTC level (BoARD, 2007).

In Fogera, modular training started in 2006. In the district, 15 FTCs have been established till 2009. Among those established institutions 7 FTCs had delivered training for targeted farmers. These are Aember (apiculture), Woreta Zuria (Dairy), Avua Tihua (crop), Quaher Michael (nursery), Quaher Abo (crop), and Shina (fattening). These PAs were delivered training in 2006 while Woji Awuranba (apiculture) was offered training in 2008.

According to the guideline of modular training the total area of one FTC ranges from 2.5 to 3 ha. Preferably this land should be located at the center of PA administration adjacent to FTCs. Different activities and interventions can be put into practice at FTC level. Therefore, more than 12,000 training materials have been distributed to South Gondar Zone in which more than 2000 modules, texts and manuals were offered to Fogera.

2.6. Benefits and Purposes of Modular Trainings

In Ethiopian situation, FTCs have many duties and responsibilities at a given community. Awareness creation of farmers can be created through agricultural package training at FTCs level. Orientation about a given technologies, theoretical explanations, skill trainings and other types of meetings can be delivered in FTCs. Agricultural extension services, modular training that enable farmers to get “Green Certificate”, market price information, knowledge sharing, counseling, advising services, permanent exhibition center, socio economy data and demonstrating different improved agricultural technologies are the major functions that were supposed to organize in each FTC (BoARD, 2007; Adebabay *et al.*, 2008).

Modular training was supposed to be given for those farmers who are grade four and above. This is because the trainees can understand the content of the text. After the training, farmers are expected to run their own enterprise on their field so that not only knowledge and skill acquired by trainees but also different income generating schemes can be raised through different commodities of animal, crop and natural resource as a means of profits (BoARD and SWHISA, 2006).

Training is used to improve the performance of individuals and social purposes in addition to get the job done effectively and for the improvement of productions (Spring, 2002; Pitchai, 2005). Adebey, *et al.* (2008) pointed out that FTCs assist farmers to make good decisions, leading to optimal use of their resources and efficient use of water and other resources. Furthermore, training has additional benefits for moral building, individual motivation, financial gain, capacity to develop new technologies and methods, leads to higher productivity or profit, increase the quality of output and customer satisfaction and foster dynamic and forward looking. Training helps a business run better, adds flexibility and efficiencies in processes. Training is essential for knowledge transfer, gives seasonal work and an investment in a company. It can also give a better service to clients (Pitchai, 2005; YICDOL, 2008).

2.7. Institutional Linkage

Institutions are, whether organizations or not, complex of norms, rules of conduct and behaviors that persist over time by serving collectively valued purposes. Institutions mediate the rural poor access to knowledge service, market, employment, strategy and livelihood assets. For instance, *Debo*, *Wonfel*, *Senbete*, *Mahber*, *Idir* (funeral groups), *Jigie* (work or labor saving groups), *Iquob* (saving and loan type of groups), water user associations and other traditional and cultural institutions and informal organizations that help to disseminate and gathering information (Dejene, 1999; Ellis, 1999).

2.7.1. Types of linkage mechanisms

Joint planning and review process, collaborative of professional activities, resource allocation procedures and communication device are types of linkage mechanisms. Innovation developed without the involvement of farmer has little chance to achieve the actual needs of farmers. Since, 1980s onwards rural development program, farmers participatory research, participatory learning action, participatory technology development, participatory rural appraisal, rapid rural appraisal and recently client oriented research, farmer research groups, farmer field school and farmer extension group are used (BoARD and SWHISA, 2006).

Institutional linkage between FTCs, farmers or groups and different institutions in agricultural sector including rural micro-finance credit institutions, cooperatives, research centers, health clinics, schools, private traders, and entrepreneurs can contribute to give technical, financial and institutional assistances. Institutions have important roles for farming communities. They deliver rules and regulations that can understand the cultural set up of people and strengthen community-based organizations. Institutions can have roles in quality control, pollution regulation, influence human behavior, reduce risk and uncertainty by establishing stable structure and build resilience to shocks that minimize transaction costs and addressing externalities (Ellis, 1999).

2.7.2. Roles of actors and stakeholders

Actor is a role that a system in the environment plays during an interaction with in our system (David, 2002). Actors are all those people who have a stake or share in a particular issue or system. Actors can be at any level or position in a society from the international to the national, regional, household or intra-household level. Actors include all those who affect and are affected by policies, decisions or actions within a particular system (Eshetu, 2008).

Stakeholder is a person, group, organization, or a system that affects or can be affected by an organizational action (Cameron *et al.*, 2003). Stakeholder is a person who holds the stake or stakes in a bet. It is any group or individual, who can affect, or it is affected by, the

achievement of a corporation purpose (Ramirez, 2001). Stakeholders are persons or groups who are directly or indirectly affected by a project as well as those who may have interests in a project and/or the ability to influence its outcome either positively or negatively. These may include individuals, communities, formal and informal representatives, authorities, politicians, religious leaders, civil society organizations and others.

2.7.3. Knowledge and information sharing

Knowledge is defined as the combination of data and information to which is added expert opinion, skills and experiences (Ermias, 2006). Knowledge sharing is the process of an activity through which knowledge (i.e. information, skill or experience) is exchanged among people, friends or members of a family, a community or an organization. Knowledge sharing activities are supported by knowledge management systems. If knowledge is not shared, negative consequences such as isolation and resistance to ideas occur (Gruber, 1993). There are four knowledge types:

Embrained knowledge: It is Conceptual skills and cognitive abilities. It is also practical and high level type of knowledge. The second type of knowledge is Embodied knowledge. It is an action oriented and consists of contextual practices, social acquisitions and non explicit type of knowledge. The third type of knowledge is Encultured knowledge. It is the process of achieving shared understandings through socialization and acculturation. The fourth knowledge type is Encoded knowledge. Information is conveyed in signs and symbols and de-contextualized into codes of practice. It deals more with transmission, storage and integration of knowledge. Knowledge can be transfer from one part to another part(s) of an individual or organization.

Information sharing: information is fact or understood data while knowledge is flexible and adaptable skills, a person's unique ability to apply it. Knowledge is tacit and personal, the knowledge one person has difficulty to quantify, store, and retrieve for someone else to use. Specifically, for knowledge to be made explicit, it must be translated into information. Hence, information sharing referred to one-to-one exchange of data between a sender and

receiver. There are four information sharing design patterns, one-to-one, one-to-many, many-to-many and many-to-one. Formal sources of information are extension workers, NGOs, communications (meeting, interpersonal discussions), radio and the like (Gruber, 1993).

2.8. Positive Deviance

Positive deviance means departure from the norm which results in a positive outcome (Anandajayasekeram *et al.*, 2008). Deviance is a one that differ from a norm, especially a person whose behavior and attitudes differ from accepted social standards (PDI, 2010).

Positive deviance is an approach to personal, organizational and cultural changes based on the idea that every community or a group of people performing a similar function have certain individuals (“the positive deviants”) whose special attitudes, practices, behaviors; enable them to function more effectively than with the exact same resources and conditions. Un-common behaviors and strategies enable them to find better solutions to problems than their neighbors or peers, while having access to the same resources and facing similar or worse challenges. It is asset based, problem solving, and community driven approach that enables the communities to discover successful behaviors and strategies and develop a plan of action to promote their adoption by all concerned (Sternin, 1990).

Sustainable ways of life is possible and desirable by taking positive solution-oriented approach. Important perspectives of positive deviance are be clear the cause of unsustainable development and urgency and scale of the challenges. Consider the reasons for challenges and outline new ways of thinking for the proper designing. It is a strategy for change. A growing number of people are practicing positive deviance (Sara, 2010). This approach has two assumptions: What solution to the community problem already exists within the community of interest, and that is possible to find successful solution to problems right now before all the underlying causes are addressed. Positive deviance has the following steps: The first step is defining the problem. It analyzes what people want to achieve and what are the current practices (need and its objectives). The second step is determining if positive deviances exist. Here farmers’ profile, identity, pool of good performances (possible positive deviances) can

be examined, defined and described by the characteristics of the community. The third step discovers un-common behavior. Un-common behaviors and practices enable to find better solutions to problems and identify poor performers or agents in the poor performance group and their common practice in use of resources. It scrutinizes the good performance group by contrasting with poor performers. The fourth step is designing opportunities to practices. It is the system of monitoring poor performance progress. Here the burning issue is how to make motivation to become positive deviants and if successful, how to scale up. This is a new problem solving approach (Sternin, 2009).

2.9. Challenges and Opportunities of Modular Training at FTC Level

2.9.1. Challenges of modular training at FTC level

Some documents tried to point out about constraints of training. There are also evidences that practically observed limitations on delivery and implementation of the trainings such as one way of training, lack of need assessment, lack of participation, lack of motivation; lack of clear selection criteria of trainers and trainees, over loading ,lack of cost benefit analysis, absence of feedback and inadequate support media. Transport and housing facilities are not available for DAs, inadequate knowledge on training techniques, the premises of most FTCs are not fenced, and the security guards were not in placed.

Pitchai, (2005) said that without proper scheduling from top level, first line supervisors had difficulty in production norm of employees for attending training programs. Much emphasizes was not given on the use of variety of methods, locally available materials and training aids that facilitate effective maximum learning through observation, interaction and practice. The training was not based on supportive and / or corrective feedback, in which learners take time and reflect back up on the experiences gained and draw conclusions (Ousman, 2007).

No comprehensive studies and reports available on the effectiveness of the training programs that were being conducted by the centers at different levels starting from farmers up to professionals in agricultural science and technology. Relevance, curriculum development,

training methodology, material aids were not well designed. More of theoretical aspects of the trainings were outweighed than practical sessions. In addition to unfair and urgent selection of participants in training, time and place were not convenience to farmers (TSION, 2008). Assessments on the experience of model FTCs shows that, there was lack of farm plan for different demonstrations, there was no lesson plan on daily and weekly basis and lack of handouts for trainees were some of the challenges that should be mentioned (Adebabay *et al.*, 2009).

At ATVETs level, some courses were not offered for DAs related to HIV/AIDS, home science and others. There was no clear training strategy that guides the involved actors towards modular training. Gender insensitivity and top down approaches are another weakness of the program that can be mentioned. Reliable data might not be available, different educational level of farmers were trained together. These were some of the challenges that researchers pointed out and different reports documented (AESp, 2009).

2.9.2. Opportunities of modular trainings at FTC level

There are different opportunities which can be available for proper functioning of FTCs. Such prospects are: Access of information and technology dissemination (seed, fertilizer, pumps, ploughs, beehives, etc) can be easily undertaken. FTCs can also be serve as research center, demonstration area, participation on planning, center of DAs, place of development village for infrastructures (telephone, road, water, electricity, schools, clinic, cooperatives etc), center of adaptation trials for plant and animal species. FTCs could be also serve as a permanent exhibition center, farmers' field school, and new intervention area, area of meeting for stakeholders and site of recreation and nursery plots. Improved technologies and indigenous knowledge can be compared at FTCs, contrasted and integrated at FTCs. Livelihood asset creation and coping mechanisms for instance; apiculture, fattening, dairy cows, poultry production, fish-pond farming, fruit and vegetable production, sericulture, conservation techniques, post harvest structures, organic fertilizer or compost, intercropping, row plantation, and other technologies can be implemented at FTCs (BoARD, 2007).

FTCs are expected to play active roles in linking farmers with the other institutions for different purpose. FTCs also can be used for Participatory Technology Development (PTD) where farmers could select technology options and choose the best that suited to their own condition based on their own criteria. Farmers can adapt and develop technologies together with researchers and extension agents. The platforms can be used for participatory innovation development (PID) where promising local innovations, local practices or indigenous knowledge would be scaled- up or scale out (Habtemariam, 2007).

Three DAs have been employed for each PAs. Upgrading of DAs from certificate to degree level is the most important opportunity (AESP, 2009). DAs must possess competencies of skill, attitude, ability, knowledge and behavioral cluster. They should have an area of expertise to design, deliver, measure, evaluate, facilitate, manage, coach and plan the training utilities. They motivate, initiate and deliver trainings for farmers being involved in experimentation, discussion and decision making. DAs strengthen the role of farmers in the research-extension-farmer linkage. They improve the sense of ownership of rural communities in technological packages and new knowledge sharing practices.

2.10. Empirical Studies

Researchers explained about the advantages of farmer trainings in different style of programs in different times. In order to introduce development interventions and adopt technologies farmers' training is paramount important part of capacity building. As Tesfaye (2006) explained in his thesis research, education was very important for the farmers to understand and interpret the information coming from any direction to them. Farmers' education was also an essential element for the effective efforts of extension personnel because farmers have capability to understand and interpret easily the information transferred from development agents. He was also reported the significant and positive association between training and adopting technologies but they need intensive training for proper and effective utilization of those technologies.

According to Tadesse (2007) the greatest enemy for women was illiteracy. In Amhara 49% of women married below the age of 15 years and 83% below the age of 18 years (EPLAUA, 2008). Hence, education is determinant factor for empowerment of women.

In the Derg regime, agricultural education was given as one discipline together with other subjects since the elementary level up to grade ten. Asres (2005) in her thesis explained that, literacy campaign launched by previous government had made significant gains in increasing the national literacy rate, but it has been declined due to the collapse of the main supporting structure.

Melaku (2005) also had given details in his thesis, beekeeping was a potential farm where bush and indigenous forest land exists. Honey is used for consumption, wax production, sale, pollination, medicine and social gift in our country, Ethiopia. Average production of traditional beehives was 5 kg per hive per year at national level and 6.11 kg in Wollo (Ambasel Woreda). Currently, modern beehives give up to 50 kg per hive per year while improved traditional beehives not exceeding 15 kg per hive per year.

Kefyalew (2006) explained in his research thesis, FTCs were delayed to start the intended activity. He also said that, evaluation of the past and the present helps to prepare curriculum of FTCs and revised in light of such findings. Belete (2006) explained that, farmers were fattened oxen for the short duration of three months. Hence, producers of milk and meat were facing with marketing problems and traditional management systems. According to Belete, there was a high potential of dairy cows and meat production in Fogera. Using traditional management of cows farmers were producing 2.5 lit of milk per day per cow for consumption, producing and marketing.

Findings of Adebabay *et al.*, (2009) an assessment report on DAs' capacity in planning and delivering of modular training to farmers in FTC setting was indicated that some districts were claimed that they had not yet received those training modules and texts either from zones or bureau. Training was delivered without providing guidelines and training modules to FTCs. The training was not organized as per the guidelines of BoARD. DAs were also

deficient in training skills, especially on training techniques. The qualities of FTCs were several times raised by DAs but no attention was given for its improvements.

2.11. Conceptual Framework of the Study

Effectiveness of trainings can be influenced by institutional, demographic, socio-cultural and psychological as well as communication aspects. It can also be influenced by the way in which the whole process has been carried out. Hence, this conceptual frame work presented in the figure below shows the given environment that expected to influence the effectiveness of modular training in the study area.

Internal environment is an institutional environment where effective modular trainings can be carried out based on identified gaps of training process. Training aids, materials, facilities, content, trainees and trainers (DAs and farmers) are elements of effective trainings. In doing so, multiple effects of training, i.e. knowledge, skills and positive thinking can be achieved through proper training cycle and effective training situations. It refers to internal situations that influence the direction of the organization and the energy displayed in its activities such as incentive, reward, linkage system, organizational work culture, leadership and management style, organizational structure, organizational missions and goals (Anteneh, 2008).

External environment refers to an environment in which organizations carry out their activities with the help of other supporting structures. Such environment includes policies, strategies, social and cultural settings, availability of technologies and economical status (Anteneh, 2008). It is where other supportive institutions and socializations take place. Institutional linkages and social participations can be realized towards farmers' training depending on the roles of different actors, stakeholders, institutions, and community based organizations.

Institutions and organizations are NGOs, public and private institutions and /or organizations that help to arrange, communicate, support and share knowledge, information and materials to the internal system of trainings through appropriate policy and strategies.

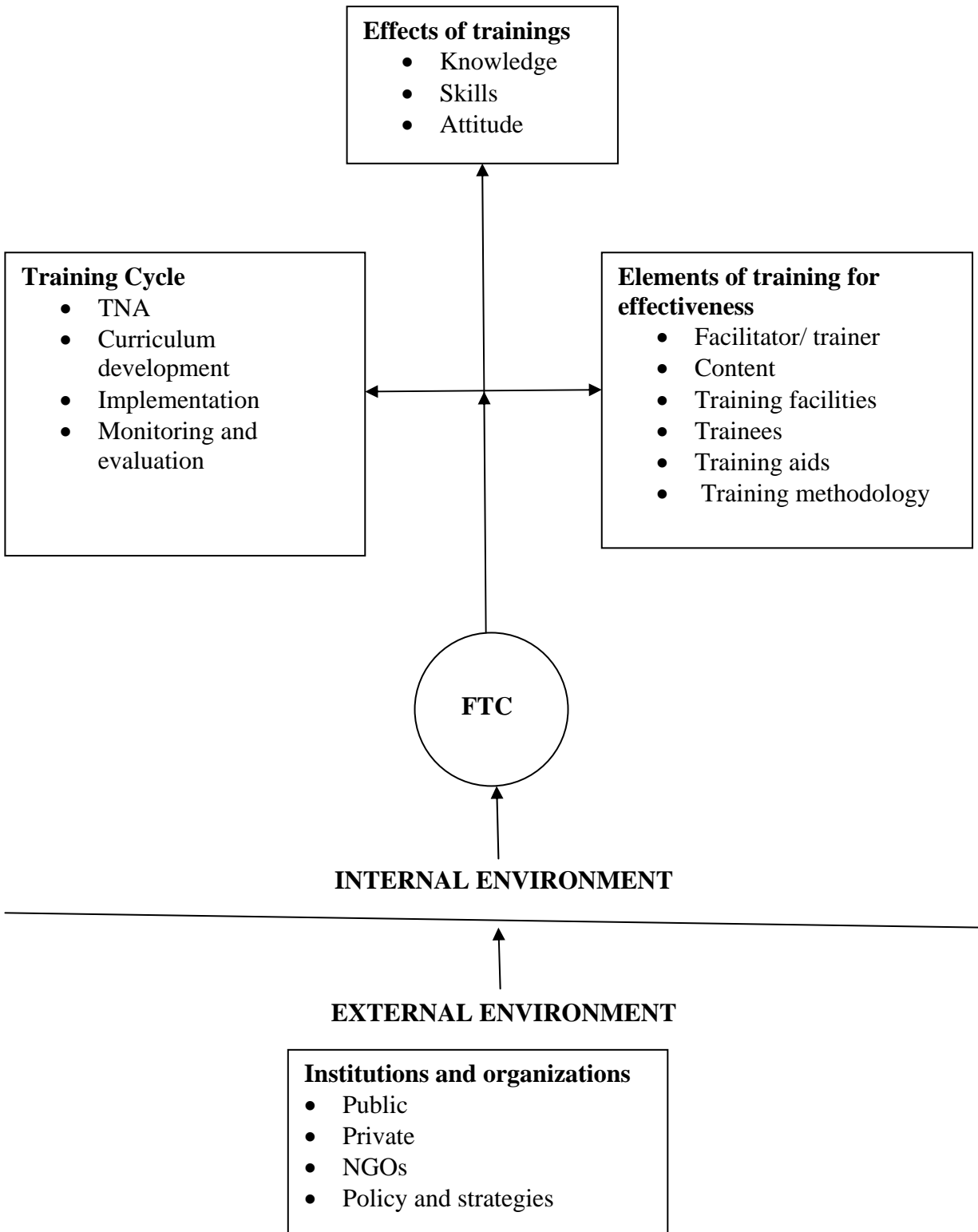


Figure3. Conceptual framework of the study

Source: Own figure

3. RESEARCH METHODOLOGY

In this chapter, a brief description of the study area, research methodology and definition of terms are presented in detail.

3.1. Selection and Description of the Study Area

Description of the study area is one of the essential elements of any scientific report. Hence, socio-economic, demographic and bio physical features of Amhara National Regional State, South Gondar Zone and Fogera district are briefly described in this section.

3.1.1. Amhara National Regional State (ANRS)

Amhara National Regional State is the second largest region of the Federal Democratic Republic of Ethiopia next to Oromia. It covers about 15% of the country with its area coverage. The Region extends from 9° N to 14° N latitude and from 36° E to 40° E longitude. The area of the region covers 161828 Sq. Km. Agriculture provides employment for about 8 million (46.8%) of the active labor force (Mesfin, 2009).

Topographically, Amhara is characterized by extensive range of mountains, plateaus, hills, undulating and rolling plains, deep gorges, and rivers (BoARD, 2007). It has a population of 17.2 million, of which 15 million (87%) population lives at rural areas engaging in agriculture (Mesfin, 2009). Average land holding of the region is 1.04 ha (BoRD, 2003). The crude population density of the region has been increased from 108.15 to 124.9 persons per Sq. km. An arable, pasture and forest land of Amhara is 36.3%, 17.1% and 4.8 % respectively. The region has 37 million livestock population (10.48 million cattle, 13.37 million goat and sheep, 0.28 million horses, 1.53 million donkey, 0.09 million mules, 0.01 million camel, 10.36 million hens and 0.85 million bees) accounting for about 30-33 % of the total cattle population of the country. Major drainage basins such as *Abay*, *Tekeze*, *Gumara*, *Rib*, and *Beshilo* are found in Amhara.

3.1.2. South Gondar administrative Zone

South Gondar is located 667 km away from the country's capital city of Addis Ababa and 97 km from regional capital city, Bahir Dar. It has 10 rural and 2 urban districts with an area of 14298.73 Sq. km which covers from river *Abay* in the West up to river *Beshilo* in the East; and with a population of 2.05 million (1,038,913 men and 1,008,293 women). Population density of South Gondar is 143.17 (Mesfin, 2009). About 90% of the population lives in rural areas engaging in agriculture. It has 334 kebeles (305 rural and 29 urban). Topographically South Gondar is characterized by extensive range of *Guna* mountain hills (20.65%), undulating (33.73%) and rolling plains (42.14%), rivers (3.08%) and 0.37% is swampy area. It lays at an altitude between 1500m and 4231 m.a.s.l. Average temperature of the Zone ranges from 10°C to 30°C. Agro ecology of south Gondar is 58.48 % *W/Dega*, 27.35% *Dega*, 13.02% *Kola*, and 1.15% frost. Livestock population reached about 2.37 million (cattle 721698, equine 262260, sheep and goat 664264, poultry 516496 and bee hive 206710) (DoARD, 2008).

3.1.3. Fogera District

One of the twelve districts of South Gondar Administrative Zone is Fogera where the study was conducted. Although the delivery system of training is almost similar in districts of the region, Fogera had chosen because of relatively potential crops, livestock commodities and marketing facilities belongs to there and it was better opportunities for undertaking innovative interventions as it is a Pilot Learning Site of IPMS project.

3.1.3.1. Location and topography of the study area

The study area, Fogera district is located 625 km east from the country's capital Addis Ababa and 55 km from regional city *Bahir Dar* to North and 42 km South of *Debre Tabor*. The district is comprised of 27 rural peasant administrative and 2 urban settings, and its center is *Woreta* town. *Woreta* is located geographically 11° 58'N latitude and 37° 34'E longitude. Average altitude of Fogera ranges from 1800 to 2500 m a.s.l. The study area covers 76% plain, 13% gentle and 11% of mountainous slopes.

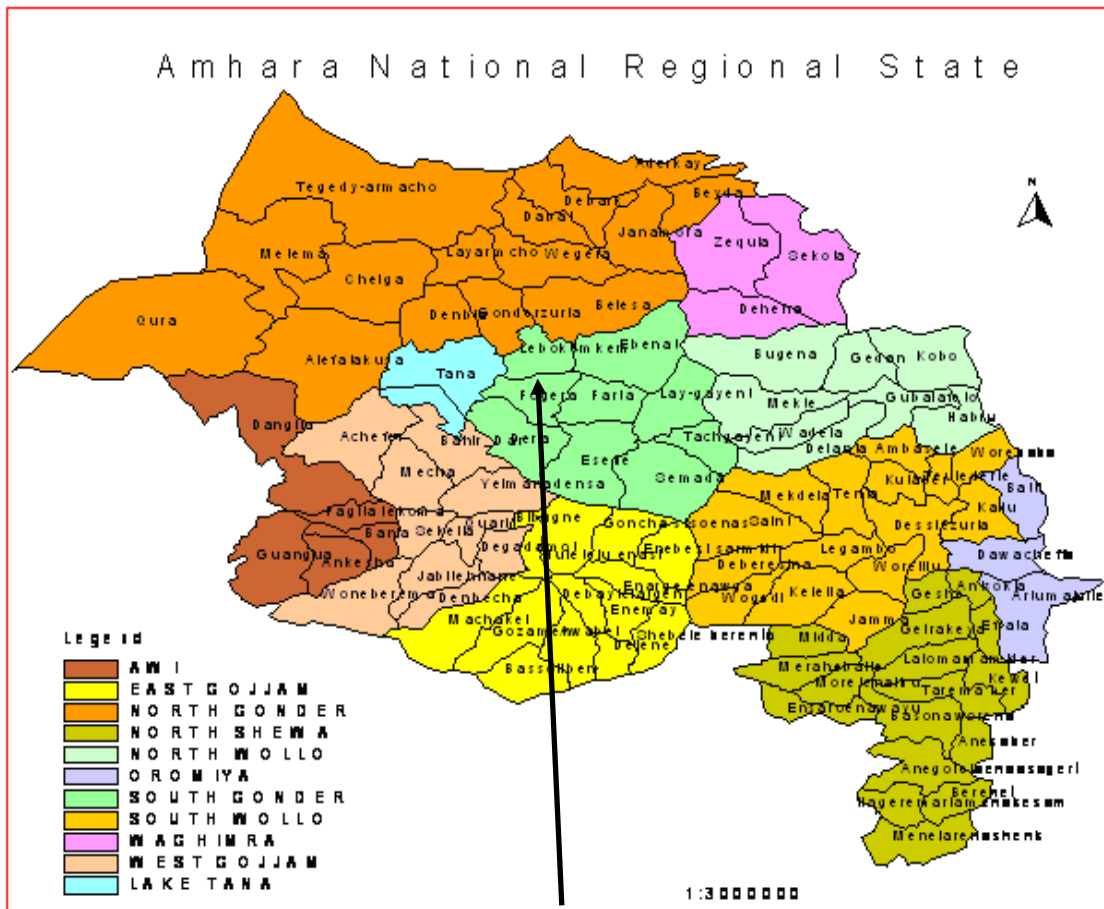


Figure 4. Map of the study Area (Fogera Woreda) Source: ANRS, BoRD, 2003

3.1.3.2. Population

The total number of households in rural areas of 27 PAs in the district is 40566 out of these 36488 (90%) are men and 4078 (10%) are women headed. Population of rural areas is 201411 out of these 103354 (51.3%) are males and 98057(48.7%) are females (Mesfin, 2009).

3.1.3.3. Agro- ecology and farming system

Agricultural practice of Fogera is mixed farming system i, e crop and livestock production are the major engagement of the people with 92% mixed farming, 5% daily laborers, 2% only crop Production, 0.5% handicrafts and 0.5% trading. Most of crops are grown with rain fed farming system. Growing crops in the study area are rice, maize, sorghum, *tef*, wheat, field

pea, barley, bean and others. The climate of Fogera with its temperature ranges 10 °C -27 °C and its rain fall in an average 1284 mm. Soil type by its color is red, brown, black and grey at 12%, 20%, 65%, and 3% respectively. Land use of the district is cultivated 51472 ha, grazing land 26999 ha, forest and bush 2190 ha, water bodies 23354 ha, settlement and infrastructure 7075 ha, and swampy area is 1698 ha (DoARD, 2008).

3.1.3.4. Socio-economy of Fogera

Now-a-days, Fogera is said to be the growth corridor and market accessible area of the region. Surface and ground water potential of Fogera enables to produce irrigable crops and vegetables (Abay, 2007). This pilot district is well-known by its local cattle breeds for dairy, and rice production (Belete, 2006; Tesfaye, 2009).

3.2. Research Design

Design of the study was non-experimental method based on different data collection techniques. With respect to the objectives and nature of research questions of the study, combination of both qualitative and quantitative data collection techniques have been employed. The overall framework of the study enabled the researcher leading to meaningful results. Hence in this section, techniques and procedures of sampling and sample size determination, sources and types of data, principles of data collection, definition of terms and methods of analysis are discussed in detail below.

3.2.1. Sampling Techniques

For the qualitative study, theoretical sampling procedures i.e. sampling on the basis of emerging issues and concepts have been achieved through opportunities presented during observation, discussion, and interviews. These investigational inquiries are aimed at discovering the relationship and interaction. Therefore, in this study, the quantitative and qualitative research techniques were used aiming at analyzing the effectiveness of modular training at FTC level.

3.2.2. Sample size and sampling procedure

Since training effectiveness study through measurement before and after training session was impossible due to time availability. Hence, untrained farmers were used as control. Purposive sampling system was used to select four peasant associations; namely, Alemeber, Woji, Woreta Zuria and Shina Teklehaimanot. The rationale of taking four PAs purposively as the unit of analysis was: (1) Four FTCs had conducted training on market oriented, recently promoted and promising commodities such as apiculture, fattening and dairy that were identified as potential commodities by IPMS project before delivery of the trainings. (2)The study was not considered the remaining three PAs because those FTCs carried out the training contents on cross cutting issues such as field crops and nursery management practices.

Next, from the population of the study PAs, sampling frame has been taken as 687 farmers (94 trained and 593 untrained) who had been exercising those commodities. Further, 60 trained and 60 untrained farmers were selected randomly in probability proportionate size to the sampling frame of each category.

Table 2. Sample respondents in the study area

List of PAs	Sampling Frame			Sample Size		
	Trained	Untrained	Total	Trained	Untrained	Total
Almeber	16	90	106	11	10	21
Woji	20	227	247	13	23	36
W.Zuria	23	206	229	14	20	34
Shina	35	70	105	22	7	29
Total	94	593	687	60	60	120

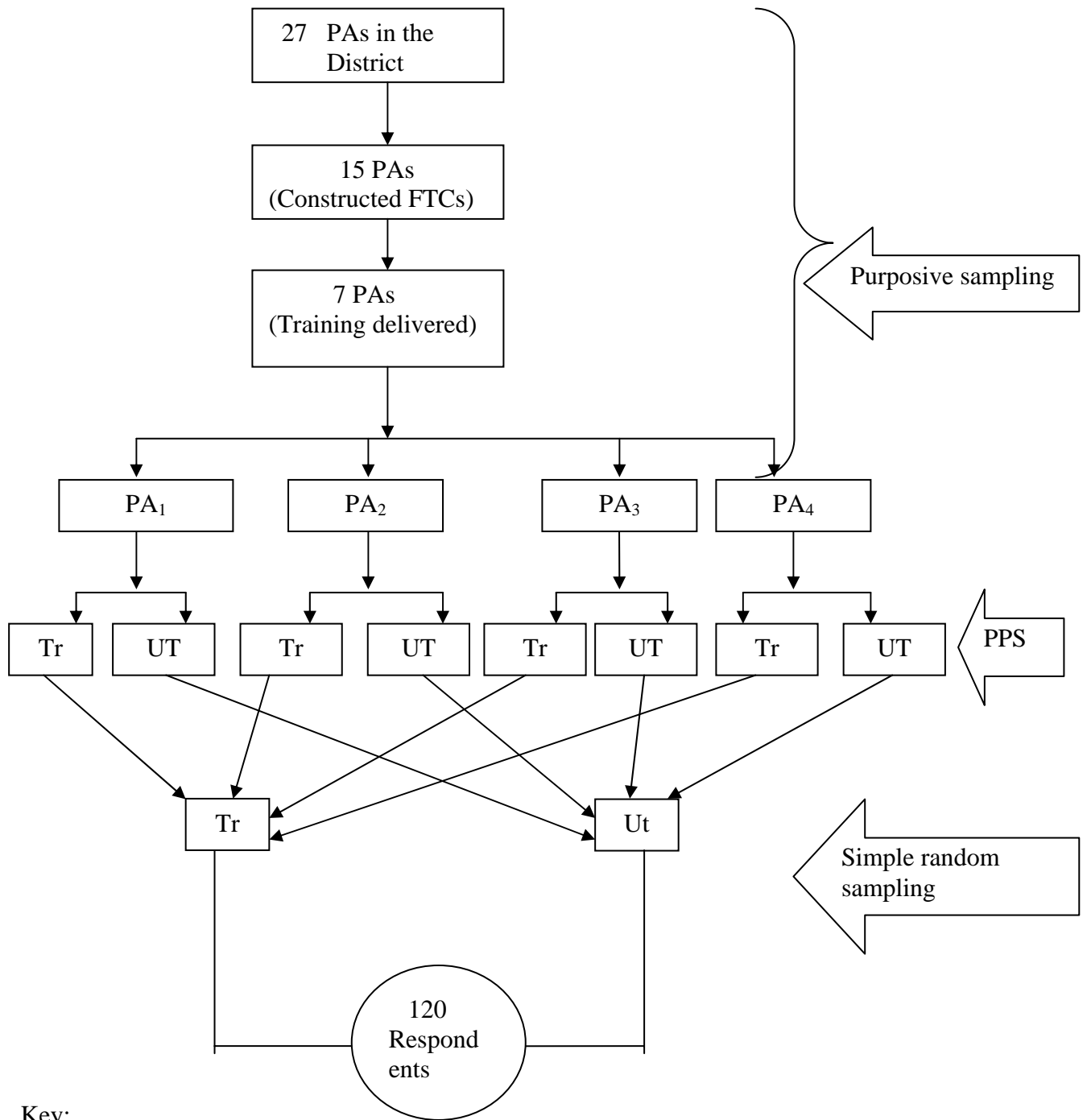


Figure: Sampling procedure

Source: Own presentation

3.2.3. Types and sources of data

To draw out the necessary information for a given research, it has been decided the types of data that need to be collected and the source from where the data are to be gathered. Both primary and secondary data were gathered. Primary data were collected from sampled respondents and key informants on different aspects assumed to affect the effectiveness of modular training at FTC level using semi-structured interview and check lists. In order to draw the right conclusion from the survey work, qualitative information was also gathered through group discussions, observations, key informant interviews and indirect participation. Secondary data were also searched and collected from books, journals, reports, magazines, proceedings, documents, and different communication media.

3.2.4. Methods of data collection

Based on both primary and secondary data sources, qualitative and quantitative data were collected using different methods. For primary data, semi-structured and structured interviews, five focused group discussions, fifteen key informants were interviewed, and direct observation using checklists have been used depending on the context of specific objectives of the study. Secondary data were gathered from different documents. Eight enumerators were selected from the study area and they had taken training in Dec, 2009 for administering structured and semi-structured interview schedules. Pre-test was done and essential amendments were made based on such comments. After formulating the interview schedules, necessary editing has been done for its validity, consistency and clarity, based on a pre-test on selected non-sample respondents.

To supplement the quantitative data gathered through respondent farmers, qualitative data were also collected through key informant interviews, observations, focused group discussions and check lists. Efforts had been made to explain to respondents about the purpose of survey. In addition to the above, some appropriate tools such as RAAKS windows and tools have been employed. Moreover, knowledge test, practice assessments and Likert scale has been used for trained and untrained farmers on beekeeping, dairy and fattening

commodities. Attitude scale is the most frequently used scaling technique to measure levels of attitudes. For this purpose Summated Likert scale was used, because it doesn't need series of statements. Six statements affecting the phenomenon were listed and total values were given for each respondent based on the responses of agreement or disagreement with each item on a five point continuum. Based on the responses, total attitude score was calculated for each respondent (the score value was from 6 to 30).

RAAKS methodology was used. For the purpose of this study, four windows have been employed among three phases, sixteen windows, relevant tools and analytical questions in order to see the second objective of the study.

Table 3: RAAKS windows, tools and analytical questions

Phase	Window	Tools	Analytical questions
A Problem identification phase	A2 Identifying relevant actors	Actor identification exercise	Who are actors? Which actors play significant roles? What are the contributions of key actors?
B Constraints and opportunity analysis	B2 Actor analysis	Actor analysis check list	What activities carried out? What resources controlled by each actors? What is the knowledge base of each actor? What type of innovation favored by each actor?
	B5 Task/Linkage matrix	Task analysis sheet	What are the type, frequency, and intensity of contact? Who initiated? Is there one or two way contact?
C Policy articulation	Actor potential analysis C2	Actor potential check list	Who can do what? Who has the mandate or interest to cooperate in making changes for successful performance of the system?

Source: Adapted from Salomon *et al.*, 1997.

3.2.5. Method of data analysis

Based on the objectives of the given study and nature of the data available, different data analysis methods are required using different approaches. Descriptive and inferential statistics were employed for the given objectives such as mean, percentage, frequencies, standard deviation and ranking were used in a descriptive manner to summarize and categorize the data. For the purpose of knowledge, attitude and practice gap measurements between trained and untrained groups independent sample t-test was applied and chi-square test was used to compare between categories.

4. RESULTS AND DISCUSSION

The main objective of this part is to present the results and discussion findings of the study on the effectiveness of modular training at FTC level in Fogera district. The study has been analyzed the knowledge gap of the farmers, linkage of FTCs and its positive deviances. The study has evaluated the effectiveness of modular training in improving farmers' attitude and practice to perform farm commodities. Both trained and untrained farmers were used as a sample groups.

4.1. Respondents' Profile, Selection Process and Modular Training at FTC Level

4.1.1. Respondents' profile

Taking the profile of respondents may give insights about the study and for further assessments of relevant issues. Age, educational background, family members and gender participation were considered here as indicated on Table 4.

Table 4: Profiles of respondents

No	Characteristics	Category	Trained		Untrained		Total	
			F	%	F	%	F	%
1	Sex	Male	59	98.3	56	93.3	115	95.8
		Female	1	1.7	4	6.7	5	4.2
2	Age	18-45 yrs	45	75.0	36	60.0	81	67.5
		46-65 yrs	15	25.0	21	35.0	36	30.0
		> 65 yrs			3	5.0	3	2.5
3	Family members	Male	165	51.2	182	57.4	347	54.3
		Female	157	48.8	135	42.6	292	45.7
4	Educational level	Unable to read and write	3	5.0	15	25.0	18	15.0
		< Grade 1	16	26.7	21	35.0	37	30.8
		Grade 1-4	12	20.0	13	21.7	25	20.9
		Grade 5-8	22	36.7	9	15.0	31	25.8
		Above grade 8	7	11.6	2	3.3	9	7.5

Source: Own survey, 2010

Out of 687 of the total sampling frame, 13.7% (n=94) were trained and 86.3% (n=593) were untrained farmers. Only 2.1% (n=2) and 5.7% (n=34) were trained and untrained females respectively that participated for activities of market oriented commodities (apiculture, dairy and fattening). From the total of 120 respondent farmers 1.7% (n=1) and 6.7% (n=4) trained and untrained females were interviewed respectively. Nearly 97.5% of the total interviewed individuals have ages in between 18 to 65.

Of the total respondents surveyed, about 85% of the household heads have different level of education while the remaining 15% are cannot read and write. Educational data of farmers in Fogera varies for different sources. For instance, BoRD (2003) indicated that 77.26% of household heads were illiterate while Abay (2007) explained that, they were about 27.5%. The differences may be due to the purposes of the study, the ways of taking samples and methods of assessments. According to this survey, females were not participated in modular training as it was expected. This result agreed with the idea of Swanson *et al.* (1998) who has stated that females were not in a position of participating in educational institutions due to marriage, abduction, workload, and cultural settings of communities. In Fogera, as indicated on Table 4, very few numbers of females were trained. The guideline of modular training was stated that educational level of trainees should be grade 4 and above. As a matter-of-fact, trained farmers vary in its educational level. About 31.7% of trained respondents were below grade 4; and as result it may create difficulty to deliver modular trainings for trainees and trainers.

4.1.2. Trained farmers' responses on trainees selection

Table 5 shows the responses of sample respondents on the selection processes of trainees by the training institutions for modular training through different actors.

Table 5: Responses on selection processes of trained farmers

Selection of trainees	Trained farmers (N= 60)	
	Frequency	Percent
By Development Agents	55	91.7
By PA leaders	2	3.3
By cabinet members	3	5.0

Source: Own survey, 2010

The data in the Table reveal that there are different actors who were involved in farmers' modular training. About 91.7%, 3.3% and 5.0% of the trainees were selected by development agents, PA leaders and administrative staff respectively.

The criteria used to select the farmers that are underlined by the guideline of modular training were: Innovative, creative, interested and voluntary youth who have been withdrawn from schools and involved in agricultural activities, those who engaged in agricultural activities, model and exemplary farmers, age of 18 and above, both male and female farmers, grade four and above and ability to share knowledge obtained to their colleagues (Adebabay *et al.*, 2008). As a matter-of-fact, the selections made so far show that both male and female farmers have not participated equally in modular trainings. The criteria of educational background were violated in selection processes because illiterate farmers and those without schooling were included and trained in modular training. It shows that the care taken for the selection was made in a hurry.

4.1.3. Training cycle

4.1.3.1. Training Need Assessment (TNA)

As per the evidence obtained from focused group discussions of development agents, there was an attempt made by development agents and Woreda experts to conduct training need assessment, but it lacks participation of different stakeholders and direct beneficiaries or trainees before organizing farmers' training. Emphasis was not given for the needs of farmers before the delivery of the training. What they did was, selecting farmers who are presumed to be or was progressive farmers or team leaders of development activities and training was conducted based on the issues what they have in the texts obtained from top levels.

Training need assessment can be conducted through direct observation, questionnaire, consultation, focused group discussion, review of documents on the locality, tests, records, and work samples. On contrary, modular training has got deficiency in almost all of these mentioned techniques. Hence, this result agreed with the findings of Kefyalew (2006) who

stated that, there was no made to ask farmers’ needs before, during and after the training. Tsion (2008) also explained that there was no as such organized need assessment even in research centers, but it was organized based on the needs of DAs and experts.

4.1.3.2. Content of the training

Content of the training is one of the important aspect to be considered in the process of human resource development. Training content should connect with training needs of the farmers. Training plan or curriculum and training programs should correspond with the content of the training.

Table 6: Trained farmers’ response on the content of the training

Contents of the training	Trained Farmers	
	Frequency	percent
Relevant	55	91.7
Non relevant	5	8.3
Total	60	

Source: Own survey, 2010

Based on the data gathered from interview schedules, 91.7 % respondents explained that the training content was relevant in terms of the training contents towards farming communities; where as 8.3 % respondents explained that the training content was not relevant. The training what they had conducted was curriculum based and relevant to the farming system, but it doesn’t mean that only training contents can achieve the stated objectives for successful training results. The guideline was developed at Federal level by experts of the Ministry of Agriculture and Rural Development and interpreted to the local language at regional level as indicated by Fisseha (2009). Training texts were prepared to train farmers based on tasks and duties presented in the modules. Farmers were not deemed and involved while the contents of modules were produced.

4.1.3.3. Delivery of modular training

Duration, proportion, seasons, techniques and styles of the training are very important training methodological aspects that can affect the effectiveness of modular training.

Table 7: Training delivery dimensions

Items	Trained farmers (n= 60)	
	Frequency	Percent
Length of trainings		
• Sufficient	50	83.3
• Not sufficient	10	16.7
Preferred style of training		
• With interval	53	88.3
• Continuous	7	11.7
Training mix		
• More theoretical	54	90.0
• More practical	3	5.0
• Balanced	3	5.0
Training methods		
• Class lecture	46	76.6
• Mixed type	9	15.0
• Group discussion	3	5.0
• Demonstration	1	1.7
• Field visit	1	1.7

Source: Own survey data, 2010

According to the data gathered from respondent farmers through interview schedules the time allowed to take modular courses was sufficient as 83.3% of sample respondents' responses and was not sufficient according to 16.7% of respondents. Approaches or styles of the training

are also essential aspects towards farmers' day-to-day activities and continuous practices in rural areas. Hence, 88.3% of respondents were preferred with-interval style of the training while 11.7% of the responses indicated continuous ways of training. With-interval was preferred due to farming practices need continuous follow up. About 90.0% of the trainees indicated that trainings were carried out more on theoretical parts of the training content. Practical and balanced techniques were 5.0% for both proportions. As far as training methodology is concerned, 76.6% of the respondents replied that the training system was class lecture. The remaining records of the training methodologies were 15%, 5%, 1.7% and 1.7% for mixed type, group discussions, demonstrations, and field visits respectively.

As per the data gathered from sample respondents of four PAs, training sessions were conducted for different durations as short as 30 days to 90 days. For instance, Aember FTC has conducted training from April to June, Woji FTC has conducted for one month of training in February, W.Zuria FTC has delivered from April to May and Shina has trained in April. Most of the trainings were delivered two days per week and for 2 to 4 hrs daily. This training duration was designed by DAs and Office of Agriculture and Rural Development of the district considering cropping seasons and other technical and other agro ecological situations.

According to the training guideline training was allowed to be conducted two times per year as per the preferences of trainees for months. The slack periods of production system in Fogera are around October and February. Length and styles of the trainings were done in line with the interest of majority of the farmers. Here the most challenging issues were training methods and the proportions of methodology of the training. The syllabus has been designed to be 80% practical and 20% theory (Adebaby *et al.*, 2007). Training materials, skills of trainees, interest of trainees and trainers, demonstration sites, etc were supposed to be convenient for the delivery of the training but practically it did not happen.

According to key informants and focused group discussions, limitations of training delivery systems were observed. Some of the challenges of effective training were: poor time management, more class lecture, low participatory method of training, poorly organized delivery of the training without lesson plan are the major limitations of the program. Trainees

also have not participated with full commitment and interest; rather they were recruited as if some benefit or incentive is being paid by the trainers. Aember and Woji FTCs used somehow practical teaching aids such as framed, transitional and traditional beehives to compare and contrast traditional with modern techniques of practice and its application in terms of production and productivity. They had taken practical training on bee splitting, transferring, wax making, honey harvesting techniques and some other important tasks to increase the productivity of honey. The remaining two PAs (W. Zuria and Shina) had selected and trained farmers on dairy and sheep fattening practices.

In totality, in the absence of facilities and training materials, demonstration areas, inputs, training of trainers and appropriate training methodologies, the trainings couldn't achieve its objectives to address the required level of knowledge sharing experiences.

4.1.3.4. Monitoring and evaluation

Monitoring and evaluation are used to improve performance of modular trainings that make decisions and choices, give lessons and increase accountability in progress, establishment and implementation processes. Ex-ante, ongoing, terminal and ex-post evaluations types are needed. Before, during and after modular training, monitoring and evaluation help to improve the performance of trainees and their institutions. However, results of group discussions revealed that number of trainees and training contents were usual measurements for achievement of the trainings and follow up of activities rarely and spontaneously undertaken. There was no proper monitoring and evaluation system used by trainers and training organizations.

There was no follow up, feedback and continuous assessment at the time of training. Moreover, researcher's observation also indicated that there was difficulty in getting organized, disaggregated, reliable, timely and accurate data on related issues of modular training due to many reasons such as DAs' turnover, low level of data compiling techniques, low management skills, lack of stationeries and lack of commitment at all levels.

4.2. Effectiveness of Modular Training in terms of Knowledge, Skill and Attitude

Effectiveness of modular training can be evaluated by taking various parameters. For these purposes, efforts of actors and their linkage intensity, the output (knowledge) and outcome (practice) of the training for trained farmers and performance of FTCs were taken as measurement indicators. To assess the effectiveness of modular training in improving farmers' knowledge, attitude and practice of apiculture, dairy and sheep fattening practices, 60 trained and 60 untrained farmers were used in the study. In this study, assessment in knowledge, attitude and practice in promoting those commodities was performed using descriptive statistics such as frequency, percentage and statistical tests. The difference between trained and untrained farmers was compared by using independent sample t-test. The frequencies and percentages of respondents were ranged as low, medium and high categories in order to understand distributions of each group of farmers.

Training is prerequisite to decrease the complexity of the technology. Moreover, field visit, tour and demonstration upgrade farmers' knowledge and skill (Tesfaye, 2006). In the same analogy, Tesfaye (2009) indicated that, training is an approach used to disseminate knowledge and skill to the farming community.

4.2.1. Knowledge

A 'Teacher-made-test' was constructed and administered to look at the knowledge level of farmers with 10 questions having 25 obtainable scores for trained and untrained farmers on apiculture, dairy and fattening. Independent sample t-test was applied to compare the mean difference of trained and untrained farmers' knowledge and results are presented below in Table 10. The answers of respondents were evaluated and categorized into low (0-8), medium (9-17) and high (18-25) based on the score ranges. This distribution shows the frequency, percentage and chi-square with 1% level significant ($p=0.006$) of trained and untrained respondents that explained in Appendix Table 1.

Table 8: Knowledge test of sample households

Respondents	N	Mean	SD	t- value	p-value
Trained	60	17.38	3.11	2.952***	0.004
Untrained	60	15.82	2.69		

Source: Own survey data (2010) ***Significant at 1 % probability level

The t-test shows that there was high significant ($p < 0.01$) difference between mean scores of trained and untrained farmers (probability $p = 0.004$). Knowledge test indicates that the trained farmers had better level of knowledge than untrained farmers. The data reported in Table 8, clearly indicated that there was high significant difference between mean scores of knowledge of two groups of farmers with respect to modular training on selected practices. The trained farmers gained more knowledge as compared to untrained farmers. About 41.7% and 56.7% of the trained respondents had acquired medium to high level of knowledge respectively, while 70.0% and 30.0% of the untrained farmers had acquired medium to high level of knowledge of the same practices (see Appendix Table 1).

However, untrained farmers also know something about apiculture, dairy and fattening practices due to knowledge and information sharing, different extension activities conducted in the locality, informal discussion with trained farmers and from their life experience. But from the result obtained, it could be seen that modular training kept the farmers more knowledgeable in promoting those commodities, especially with reference to beekeeping and dairy. The results of the study are in line with the findings of Babur (2009), who reported that knowledge of coffee management practices of members of Farmer Field School was higher than the non members. Although the training content differs, these findings can agree with the findings of Kefyalew (2006) and Tsion (2008) that trainings kept the trained farmers more informed and acquired knowledge.



Case Study

Fiseha Binega(Trained farmer) in Aember PA, Fogera woreda

This case study has focused on the knowledge from modular training on beekeeping practices. The effectiveness of modular training in promoting apiculture practices was best illustrated by one of trained farmer who lives in Aember peasant association, Fogera Woreda. Fiseha Binega is a beekeeper aged 35 years, married and living with his family told about the effectiveness of modular training in the beehives management and other related beekeeping practices.

He said, “Five years back, I was selected as one of the training participants in the bee hive management in the community. Beekeeping is challenging, but it is an interesting enterprise because it needs serious follow-up, skill of management and experience. I have actively participated in farmers’ training through group discussion; practical demonstration and group exercise because more than 15 beehives are belonging to me. Through group learning with the help of the facilitator (Amare Genetu), I have already acquired knowledge about the bee splitting, honey harvesting systems, transitional beehives making, dearth period management, housing, transferring of bees, wax making, and other bee-enemies management practices. In this aspect, traditional bee hives were not able to give honey production more than 5 kg per hive per year. Currently, honey production has been raised to 25 kg per improved hive per year. This change would never have happened, if I would not have participated in modular training. I have performed practically what I have learned in the Farmers’ Training Center.”

He explained further as “Now-a-days, I use improved traditional, transitional and framed beehives. In the near future, I want to increase the number of beehives with proper management practices. As you see, in addition to appropriate management, there is a big natural forest in close proximity to my home that gives additional potential for honey production. In general, this is the outcome of training from which knowledge and better practices were acquired.”

4.2.2. Practice

Practice was operationalized as the application of knowledge acquired from the training. It is the transfer of learning. Practices of farmers were evaluated based on their responses on the application of recommended technologies of bee keeping, dairy and fattening. In order to know practices used by trained farmers, an assessment was administered with questions having seven scores on trained and untrained farmers for apiculture, dairy and fattening. The means of practices of trained and untrained farmers were analyzed using independent sample t-test and results are presented below in Table 9.

Table 9: Practice difference of sample households

Respondents	N	Mean	SD	t- value	p-value
Trained	60	4.45	1.53	1.981**	0.05
Untrained	60	3.82	1.94		

Source: Own survey data (2010)

** Significant at 5% probability level

The practice comparison of trained and untrained farmers showed that the mean scores of practices of trained respondents were significantly higher than that of untrained respondents. This may be due to the fact that trained farmers might have attended farming practices of beekeeping, dairy and fattening with ‘learning by doing’ programs and the training offered by FTCs has improved the level of application of the scientific recommendations in those practices thereby comparing the traditional and improved management technologies resulting in better practices of those commodities as compared to untrained farmers.

Trained farmers had low, medium and high categories in 13.3%, 60.0%, and 26.7% level of practice respectively regarding improved beekeeping, dairy and fattening practices with reference to its management systems. However, almost 38.3%, 36.7% and 25.0% of untrained farmers were found in low, medium and high level of practice categories of the same

technologies respectively. The responses of farmers were categorized into low (0-2), medium (3-5) and high (6-7) based on the score ranges. The difference between trained and untrained farmers' practices was compared using frequency, percentage and chi-square was calculated at significant value of 1% ($p=0.005$) as indicated in Appendix Table 2. Trained farmers had frequent contacts with facilitators during the training periods that result in to higher knowledge in promoting diverse commodities practices in their locality. This was in agreement with the findings of Babur (2009) who stated that the management practices of coffee by FFS member farmers were significantly higher than those of non-FFS member farmers.

4.2.3. Attitude

Attitude of 60 trained and 60 untrained respondent farmers was measured using Likert scale using 6 statements. The scale allows measurement of degree of positive or negative attitude towards beekeeping, dairy and fattening in four PAs. The mean scores of trained and untrained farmers' attitude was analyzed using independent sample t-test. The results are presented below in Table 12.

Table 10: Attitude difference of sample respondents

Respondents	N	Mean	SD	t- value	p-value
Trained	60	23.30	2.417	3.621***	0.000
Untrained	60	21.71	2.373		

Source: Own survey data (2010)

*** Significant at <1% of probability level

The mean score of attitude of trained farmers was significant at 1% ($p<0.01$) of improvement due to the training in Farmers' Training Center on agricultural practices, especially with reference to the beekeeping, dairy and fattening of small ruminants. This shows that trained farmers had more favorable attitude towards those market oriented commodities as compared to untrained farmers.

The responses of farmers were categorized into low (0-10), medium (11-20) and high (21-30) based on the score ranges. From Appendix Table 3 one can perceive that, 10% of trained respondents were from moderate attitude followed by 90.0% with more favorable attitude about improved beekeeping, dairy and fattening management practice; whereas, 28.3% of the untrained respondents were found to have moderate attitude followed by 71.7% with more favorable attitude about improved commodities. The value of chi-square indicated that trained farmers were more significantly favorable at 5% ($p= 0.011$) than untrained farmers. The evidence of such a strong positive attitude by the trained farmers may be due to participatory and group learning that geared the farmers towards a more favorable attitude as compared to untrained farmers. It is suggested that trained farmers have acquired better knowledge through modular training about commercial commodities so as to make their attitude highly favorable than untrained farmers.

This was in line with the findings of Kefyalew (2006), Tsion (2008) and Babur (2009), who stated that undergoing training by formal and informal institutions such as community skill training centers, research centers, farmer field schools, NGOs and exposing ones to scientific information help individuals to think rationally and logically in all aspects of the life.

4.3. Linkages of FTCs with different actors

Linkage mechanism is the concept, procedures, arrangements, devices or channels that bridges the gap between components of the system and allows communication between them (Anandajayasekeram *et al.*, 2008).

In the study area, Fogera, FTCs have served for different purposes such as modular training, skill training, conferences, meetings, extension services, and various community development affairs. Discussion results with experts in the field of agriculture explained that, strengthening FTCs result in positive consequences that might have capacities to carry out farmer based researches, practical attachment, senior research projects, and linkages with different actors.

4.3.1. Actor linkage

In undertaking any intervention, the first step is to identify the key actors who bring about or prevent change in an innovation system (Anandajayasekera, *et al.* 2008). The purpose of this section is to list actors, who were involved for modular trainings, and looking in to the roles of actors, knowledge and information sharing and how the linkage system is functioning. Farmers, development agents, supervisors, experts, officials, researchers and relevant institutions were consulted and discussed through focused group discussions, key informant interviews, own observations, case studies and indirect participatory techniques.

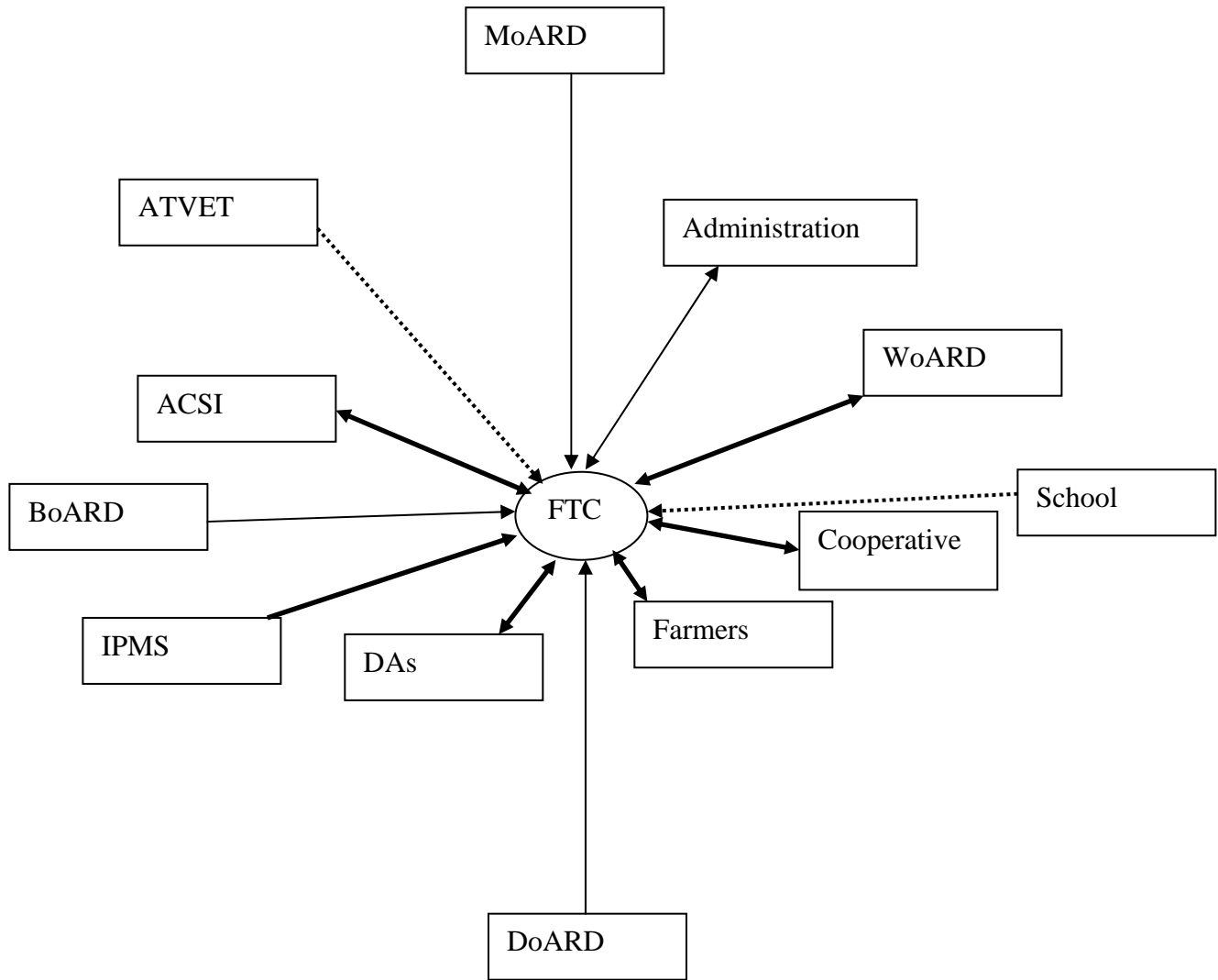
A number of actors were involved in modular training. Key actors that were categorized in to public sectors include: DAs, administrators, cooperatives, primary schools, Amhara Credit and Saving Institute (ACSI), Bureau of Agriculture and Rural Development (BoARD), Department of Agriculture and Rural development (DoARD), Woreda of Agriculture and Rural Development Office (WoARD), ATVETs and Ministry of Agriculture and Rural Development (MoARD). Private sectors and NGOs were also identified as key actors with regard to modular training system. These actors were farmers themselves and IPMS project. Thus, a total of 12 actors were identified who are involved in modular training at Farmer Training Center in study area.

4.3.2. Actor linkage map

Linkage has many advantages. It develops trust and confidence among partners of development, it enables sharing of roles and responsibilities foster an interdisciplinary and holistic approach, and linkage also avoids duplication of work and enables communication between farmers, researchers, and NGOs as they work together. Five Focused Group Discussions were undertaken with DAs, farmers and supervisor and group of Woreda experts; and fifteen Key Informant Interviews revealed that the following actors had linkages with FTCs. Actors' role and interest were analyzed using checklists and respondent farmers. Interaction of actors was made using actor linkage map. Actor linkage map was produced by placing FTC at the center and connecting other actors based on their contribution to the

system. Actors' interactions can be shown by septa-grams. These prime movers in the diagram are also called as drivers of the change. Prime movers are internal and external actors who take the decisions that are most important to the system.

The common tool used to analyze actors' linkage is actor linkage map in Figure 6. The map shows the intensity of each actor's linkage. Respondents and key informants tried to put and categorized actors as primary, secondary, and tertiary levels according to their roles. Hence, the primary identified actors are farmers, DAs, WoARD, cooperatives, ACSI and IPMS project. Administrators, DoARD, BoARD and MoARD identified under medium category, and ATVETs and primary schools are classified as tertiary levels of actors.



Keys of linkage strength

- ↔ Strong linkage
- Medium linkage
- ⋯ Weak linkage

Figure 6: Actor linkage map Source: Own qualitative data (2010)

Strong linkage: DAs, WoARD, farmers, cooperatives, and ACSI have strong linkage with FTCs. These actors have identified with their linkage intensity and mutual benefits between FTCs and those mentioned actors for different purposes. The probable reason for strong and two way linkages may be those institutions are exist in the locality so that information sharing and daily communication is possible. IPMS project has strong but unidirectional linkage with

FTCs and this project supports only four FTCs in the Woreda. Detailed roles of actors explained in Appendix Table 4.

Medium linkage: Actors such as DoARD, BoARD and MoARD have medium and unidirectional linkage types. These actors have their own roles for FTCs, but they do not get direct services and benefits from FTCs where as Administration have medium and mutual linkages and get services from FTCs. Types of linkages and roles of actors indicated in Appendix Table 4 that gathered from key informants and group discussions.

Weak linkage: Two actors (schools and Woreta ATVET College) were identified. Both actors have weak and unidirectional linkage and their roles were insignificant based on its relationship. Weak linkage disrupts the knowledge flow processes, lowers adoption rate, increase time lag between developments, reduce efficiency in the use of resources, unnecessary completion and duplication of efforts, and make confusion among farmers regarding which institutions to approach. Such type of linkages explained in Appendix Table4

4.3.3. Roles of private actors in relation to modular training

Farmers are the first primary stakeholders who have been contributed many resources towards FTCs. Most of the respondent farmers indicated that, farmers were participated for labor and construction materials at the time of FTCs establishment. Moreover, they are the beneficiaries of functioning of FTCs.

IPMS project: Improving Productivity and Market Success Project is a project that has supported the activities for four FTCs (Quahir, Woji, Aember and Meneguzer). In the study area, two PAs (Aember and Woji) were supported by the project for different materials such as computer with printer, Television, VCDs, chairs and tables. The project was also facilitating seed supply, training and experience sharing of farmers, development agents and Woredra experts.

4.3.4. Missed actors

There are actors, which could have contributed for FTCs related to modular trainings. Some of missed actors that identified based on key informant interviews and focused group discussions are explained as follows:

Wetland project: In Fogera, this project was involved in water conservation activities. If the project were to be integrated with FTCs, it would have been possible to accomplish demonstration of soil and water conservation activities and experience sharing based on related duties for farmers, development agents and experts of the Woreda.

Investors: They do have their own share for proper functioning of FTCs and for better accomplishment of modular trainings. Investors can empower farming communities at FTC level in doing some farming enterprises such as poultry, fattening, beekeeping, rice promotion and other related activities. Each of 15 established FTCs in Fogera district could have an average land of 2.5 ha per FTC. It implies that more than 30 ha of land can be available for instance for such activities, but it couldn't happen due to lack of coordination and joint planning systems between actors.

Adet Research Center: This institution promotes rice and other commercialized commodities in the study area (Tesfaye, 2009). Demonstrations, training of farmers and development agents were some of the possibilities that could be played by research centers.

NGOs: There are various nongovernmental organizations in Fogera that have been implementing rural development activities. For instance, GTZ, CARE, and ORDA were involved in potable water supply, forage development, improved seed provision, latrine construction, fruit and vegetable promotion, and some other interventions. If institutional innovation and linkage mechanisms improved, FTCs can have better performances. Focused group discussions with DAs and supervisors indicated that, FTCs have water supply problems. Without water demonstration and adoption of improved technologies are hardly possible.

4.3.5. Actor linkage matrix

Actor linkage matrix format is more useful than actor linkage map. Advantage of using this format is not only for clarification of existence and type of linkage but also it tells the frequency and intensity of contact among actors themselves. This format displayed tasks or functions of actors in the enhancement of FTCs. Farmers have played the leading role or share for their institutions, being as a primary stakeholder. There are also secondary and tertiary stakeholders that have been contributed and showed efforts throughout the delivery of modular training at FTC level.

Thus a total of 13 actors have been identified with respondents and key informants who have been involved in training process and establishment of FTCs. Especially, four actors were involved to serve farmers for different purposes of farming practices. Types of linkage, relative strengths and ranks of key actors were identified and explained in detail according to the data gathered through group discussions and respondents' responses in Appendix Table 5.

FTC		Training, extension service	Training office service	Area of Technology Adoption	Teaching aids and support	Module and text support	Guideline preparation	Supply of DAs	Source of data	Source of data	Teaching aids	Training and technical support	Center and source of information for administration
Farmer			Training	Material provision	Technical support	Module provision	Nil	Problem identification	Financing Credit	Input supply Marketing	Education	Technical support	Administration
DAs				Technical support	Technical support	Training	Policy and Strategy	Training knowledge sharing	Source of data, organizing farmers	Source of data, organizing farmers	Material support	Experience share	Farmers' selection Community development
WoARD					Technical support	Module provision	Module provision	Apprenticeship	Credit facilitation	Input facilitation And allocation	Nil	Funding and material	Information sharing
DoARD						Technical support	Technical cooperation	Supervision	Credit facilitation	Input facilitation	Nil	Material support	Information
BoARD							Module Provision	Training of DAS	Loan facilitation	Input supply	Nil	Funding activities	Information
MoARD								Nil	Nil	Nil	Nil	Technical cooperation	Nil
ATVET									Nil	Nil	Nil	Nil	Nil
ACSI										Information sharing	Nil	Nil	Credit facilitation
Co-ops											Nil	Nil	Input facilitation
Schools												Nil	Education matters
IPMS													Capacity building
Administrators													

Source: Own survey, 2010

According to actor linkage matrix; strong, medium and weak linkages were identified. From the above Table, 'Nil' indicates there is no institutional linkage between actors. Non shaded boxes indicate that there is weak linkage between those actors. The dark shaded parts are designated for medium linkage types and all the remaining matrix boxes indicate that strong linkages represented by light-dark shading patterns.

Table 11 indicates the type of functions performed by different actors. The extent and relative strength of key actors in relation to rural communities' development notified that the major activities have been accomplished by them. Linkage matrix reveals various activities such as training, material provision, module preparation and distribution, funding, input and credit supply, technical advice, communication, information sharing, management, supervision, apprenticeship programs etc.

4.4. Knowledge and Information Sharing

Linkage mechanisms for communication enable to generate transfer, share, and use knowledge and information that available when it is required. There are different ways of knowledge and information sharing techniques. The focus of this part is to assess knowledge and information sharing services. According to focused group discussions of farmers and their interview responses, the figure represents different actors that enable farmers to share knowledge and information (Figure 7).

Knowledge can be transferred and shared through delivery of various sources such as training, field days, demonstrations, experience sharing, market, mass media, formal and informal meetings and discussions. Actors can be categorized into four, based on the frequency of contact and sources of information. In Figure 7, farmers are the center of knowledge flow diagram. Information and knowledge sharing were involved in trainings and related activities. Information that accessed by farmers was from trainings, advice, motivation, technical support, experience share, market prices, inputs and consultancy services.

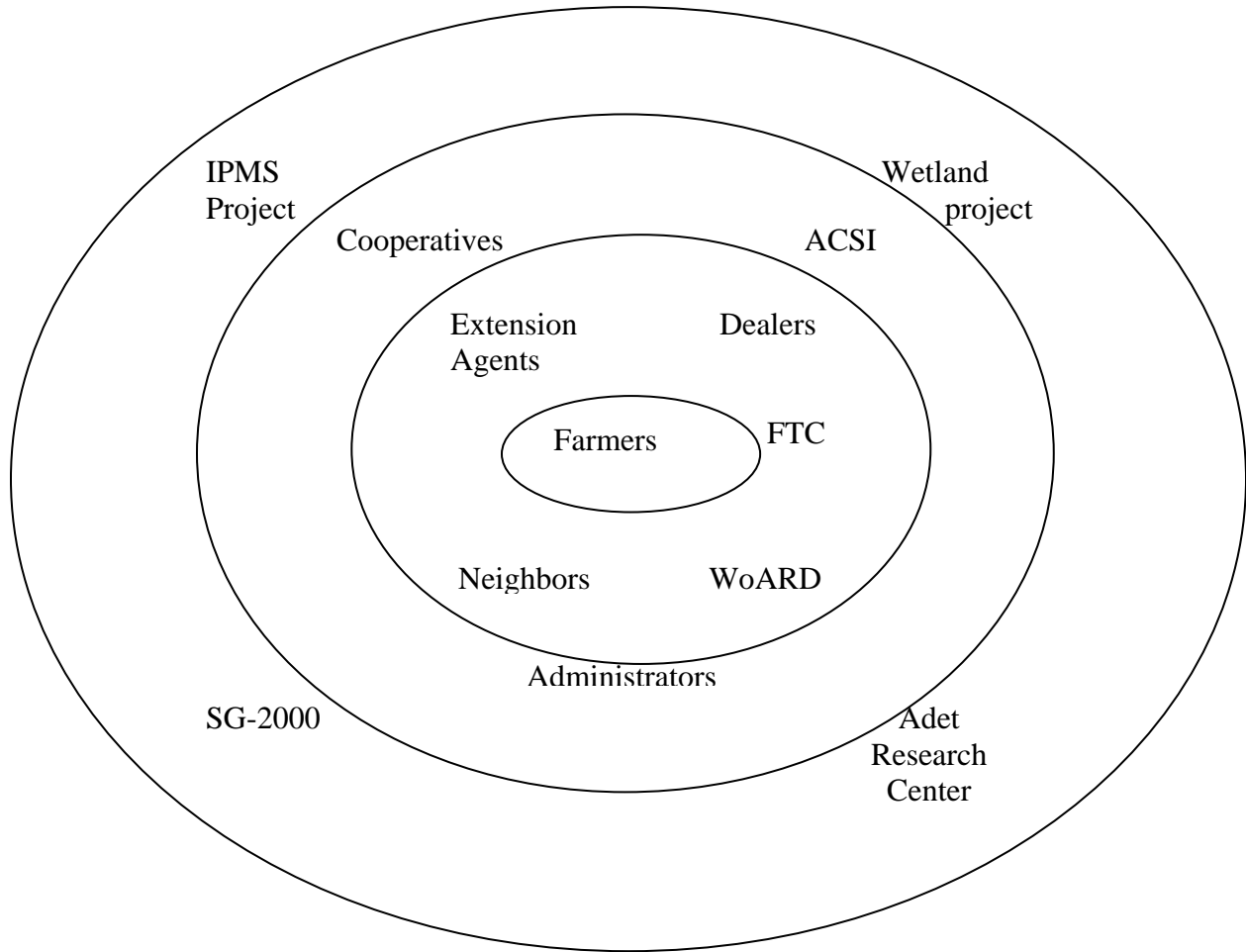


Figure 7: Knowledge flow among actors

Source: Own presentation

The second circle indicates the primary sources of knowledge and information such as Extension Agents (DAs, health extension agents, cooperative agents, animal health technicians and supervisors), market dealers, neighbors, FTCs and WoARD. These actors are the primary sources of information and knowledge sharing. Farmers have accessed in daily, weekly or monthly basis for information from different actors for their own purposes. The probable reason may be those actors living with farmers had more close contact than other development partners.

The third circle explained that actors that have less frequency of contact with farmers. Thus, ACSI, administrators, and cooperatives are secondary sources of information for farmers

followed by projects, NGOs and research institutions. These actors are said to be secondary because they may not have daily or weekly contacts with farmers. The last circle of the Figure indicates that the possibility of getting knowledge by farmers from NGOs and projects is very low. Because projects, NGOs and research institutions target farmers at minimum scope for specific period of time and limited amount of resources. Therefore, IPMS project, SG-2000, and Adet research center identified as tertiary sources of knowledge and information to farmers. Hence, this explanation has the same opinion with the findings of Deribe (2007). According to Deribe, neighbors, DAs, relatives and religious organizations were the major and most important sources of information for farmers. The types of roles and linkages of key actors are explained well in Appendix Table 4.

4.5. Positive Deviance

Positive deviance is organizational, institutional, personal and cultural changes based on the idea that individuals performed better achievements whose special attitude, knowledge and skill enabled them to function more effectively than the other within a given same resources and conditions.

Focused group discussions, key informant interviews and observations were conducted to obtain reliable data to identify positive deviance in performance of FTCs and farmers contribution at FTC level. Farmers have contributed for establishment of FTCs and training programs as mentioned earlier in actor linkage analysis part of the study (section 4.3.3).

4.5.1. Functions of FTCs

FTCs have been established since 2004 in Fogera. Two FTCs (Alember and Woji) were established with participation of farmers. The remaining two FTCs (Shina and W.Zura) were not established as per the required standard level of FTCs. Even though, the training was conducted in Shina and W.Zuria, FTCs were not constructed based on the requirements of the design of FTCs. In both PAs, only two classes of buildings have been constructed that serve

for multipurpose functions, i.e., office for DAs, place of meetings, and other functions in such small houses.

Table 12: Farmers' participation in functioning of FTCs

Participation in FTC functioning	Trained farmers (N=60)		Untrained farmers (N=60)		Total (N=60)		X ²
	F	%	F	%	F	%	
	Yes	37	61.7	4	6.7	41	
No	23	38.3	56	93.3	79	65.8	(p=0.000)
Nature of participation							
No participation	23	38.3	56	93.3	79	65.8	40.728***
FTC construction	29	48.3	3	5.0	32	26.7	(p=0.000)
Committee	1	1.7			1	0.8	
Mixed types	7	11.7	1	1.7	8	6.7	

Source: Own survey, 2010

*** Significant at <1% probability level

Respondents' indicated that, about 61.7% and 6.7% of trained and untrained farmers were participated while 38.3% and 93.3% of trained and untrained farmers were not participated in functioning of FTCs respectively. Activities involved in establishment of FTCs were construction, committee mobilization, and other related actions. Majority (48.3%) of trained farmers have contributed their labor and materials for construction purposes where as only 5% of untrained farmers were involved at the time of construction.

FTCs were launched with the participation of farmers. Participation was in terms of labor, fencing, land preparation, material provision or awareness creation. Most of activities were achieved through passive participation that means people have participated by being told what is going to happen announced by administrators or development agents. Anyway, in this regard, participation of trained farmers was better than untrained farmers. The possible reason might be that trained farmers had close relation to development agents and administrators, or

may have access for information about the roles of FTCs due to most of trained farmers were involved in different committee activities that made them more committed and think positively towards the roles FTCs.

4.5.2. Positive deviance of FTCs in performance and their contributions

Positive deviance focus on new application approaches to address issues and promote new ways of doing. This approach enable communities to solve intractable problems, which require behavioral and social change by offering workshops, trainings, technical support, and on line resources (Sternin, 2009).

In Fogera 15 FTCs have been established but this study was focused on four FTCs. Based on personal observations, key informant interviews and focused group discussions, aspects of positive deviance were assessed and findings of results are explained here.

Activities carried out at FTCs in the study area

Conducting training (modular and/or non modular), motivating people for functions of FTCs, provision of local sitting materials, selection of trainees, knowledge and information flow, deliver extension services, socialization (arbitration, discussions, appointments, and the like), storage services for farm implements, serve as office for development agents, trial and demonstration of improved practices and other related activities.

Other researchers' results indicated that, Fogera is a growth corridor of rice, dairy and vegetable production practices. Moreover, apiculture, fattening and fish management practices are promising enterprises now. So far, FTCs were not taking part much in performance and contributions to serve farmers in full competences. However, there are activities that should be considered, cherished and sustained. Knowing positive deviant FTCs help to take further actions and corrective measures in both sides of its strength and weakness.

Box 1. Alember FTC

Alember is small town located about 80 km far from Bahir Dar to North. Household number of Alember is about 1462 (1316 males and 146 females). It is accessible to asphalt road, multipurpose and dairy cooperatives services, credit and saving institutions for credit and input supply purposes, private and public health clinics, market, public phone, both primary and junior schools, and it is the center of supervision sites.

Modular training was delivered for 14 male and 2 female farmers in 2006 for consecutive three months (April to May). The subject of the training was apiculture. Apiculture was selected due to high potential of honey production in this locality. The training was delivered on different tasks and duties of beekeeping such as bee splitting, transitional and improved traditional hives making, bee hunting, wax making and other honey production systems. Training methodology was more of practical. The trainees have done those activities at their home and discussed in groups at FTC. This method of training enabled them to continue beekeeping management practices. At the end of the course, trainees got certificates prepared by WoARD.

Keeping other things similar, the main deviations from other FTCs are, two guards were recruited at PA level for the safety of FTC, and their salary was being paid from the people's contribution. More of practical aspect of training was conducted using trainees' resources at their village. Moreover, group discussions were made in FTC. Recruitment of trained farmers was also better than other three FTCs. Most of (81%) trained farmers were literate (grade four and above).

Having these, there was problem of water, training was delivered without lesson plan, turnover of DAs, lack of demonstration areas, non functional management committee that formed at the time of FTC establishment are some of the deficiencies that should be considered and reinforced by concerned bodies to take corrective measures.

Source: Key informant interviews, 2010

4.5.3. Lessons learned from better performed FTCs in Amhara region

There was an experience sharing undertaken by the team of Regional, Zonal, Woreda and Kebele extension workers. The team has visited best performed FTCs in Amhara Region, Mekdela and other Woredas in February, 2009. The purpose of tour was to disseminate promising ideas and understand how to put into practice and carry out modular training at FTC level. The team had prepared feedback what the team members had observed at the time of experience sharing and delivered the document to all concerned bodies. The premises of the content of the report are: Roles of civil service and its implementation, overall structures and functions of FTCS, commitment of farmers and development practitioners, roles and responsibilities of FTC management committee, and joint planning, organizing, leading, controlling and monitoring systems

Table 13: Roles and Responsibilities of Committee

No	Responsibilities	At PA level	At Woreda level
1	Chairman	PA leader	Administrator
2	Secretary and member	Development Agent	Head of WoARD
3	Member	Police	Police
4	Member	Administration and security	Administration and security
5	Member	Local elders	Justice
6	Member	Land administration and Environmental protection	Land administration and Environmental protection

Source: Field report, 2009

Roles of the committee at PA level: FTC management committee deals with establishment, construction and functions of FTCs. The committee also looks for and assesses the sources of land for FTCs construction. If the selected site of the land tenure belongs to the farmer(s), the committee set alternative solutions and put priorities. The one who evicted the land has to be replaced or compensated. There are alternative solutions to access the land for FTCs:

Deceased households, social institutions (schools, churches, clinics, etc) that possess excess farm size, employed civil servants or workers who have accessed for land at the time of redistribution, committee members who might have owned land in extra amount during land redistribution and the committee also resolves the land shortage discussing with people so that the community gives alternative solutions for FTCs.

Roles of the committee at district level: Site selection, committee formation, strengthening how income generating schemes are implemented, inventory and budget allocation systems and searching alternative solutions how to access land are the major roles and functions of committee at district level.

FTCs management committee has been collaborated with development agents for demonstrating different income generating activities. Activities have been practiced not only for the purpose of demonstrating but also for income generating objectives. FTCs have served for different purposes. Modular training, non modular training, advisory services and planning of development interventions are the common tasks of those visited areas. Field report (2009) explained that, the major income generating activities that observed by the team were:

Poultry production, apiary (for modern, transitional and traditional bee hives), fodder and forage development, hide and skin demonstration equipments, dairy, fattening of small ruminants, grazing strategies and breeding (bull services), Vegetable and fruit production, irrigation and water management systems, post harvest and storage structures, organic farming (compost making), seed multiplication and intensive farming systems, soil and water conservation practices, waste land management, bund stabilization and gully rehabilitation, water harvesting structures, land reclamation with forestry and agro forestry activities.

4.6. Challenges and Opportunities of Modular Training at FTC Level

For the last five years, there were challenges recognized and identified by key informant interviews, focused group discussions, documents, and personal observations. There are also opportunities that can be tailored for effective training processes and functioning of FTCs.

SWOT Analysis

Strength, Weakness, Opportunities and Threats (SWOT) analysis summarizes the contributions of actors in stimulating training performance and linkage mechanisms. It enhances knowledge and skills for future achievements and the improvements of innovations of practiced commodities. The strength, weakness, opportunities and threats explained below are according to the findings of key informant interviews and group discussions.

Table 14: SWOT analysis of farmers' training in Fogera Woreda

Strength	Weakness
<p>Training perspective</p> <ul style="list-style-type: none"> • Establishment of FTCs in 15 PAs • Delivery of modules for 7 FTCs • Contribution of IPMS for training materials. For instance, Computer, TV, VCDs • A few farmers have better devotions and commitments towards training, so that they could scale up best practices 	<ul style="list-style-type: none"> • Partition of rooms are narrow for training, office of three DAs, and exhibition purposes • TNA has not been conducted • DAs have not used lesson plans • Modules are difficult to understand • Lack of manuals for trained farmers • Shortage of teaching aids (chalk, stationery, charts) • The training was mostly theoretical • Gender, HIV/AIDS, home science, and other contemporary issues were not incorporated in modules • There was problem of handling system of farm equipments and offered teaching aids • There was no monitoring, evaluation, follow up and feedback • Modules do not focus on location specific farming issues

<p>FTCs perspective</p> <ul style="list-style-type: none"> • Established at the center of the PAs • There was community participation at the time of construction in two PAs (Alember and Woji) • Modules were distributed to PAs except its shortage • Recruitment of guards in two PAs (Alember and Woji) 	<ul style="list-style-type: none"> • Less quality construction of FTCs • Shortage of water supply • FTCs were not fenced • Lack of demonstration areas for FTCs and the lands were not substituted for owners of the tenures • Lack of enough budget • Lack of inputs (seeds) • Income generating enterprises and duties were not established
<p>Trainees perspective</p> <p>Some good performed farmers emerged as positive deviants</p>	<ul style="list-style-type: none"> • Selection of trainees in haste • Some trainees were not at required level of educational status • Trainees demanded and anticipated incentive • Seasonal work load at both farmers’ and DAs’ side • Drop out and absenteeism problems • Interruption of trainings
<p>DAs perspective</p> <ul style="list-style-type: none"> • DAs have tried to identify training contents in consultation and help of modules, potentials of localities and Woreda experts although it lacks participation of farmers 	<ul style="list-style-type: none"> • Practical training was not well organized during their apprenticeship programs • ToT was not conducted for DAs • Inadequate skills and knowledge of facilitators at Woreda and PA level how to train and operate computers • There is no well organized socio-economic data at Woreda and PA level • Lack of transport and home services for DAs • There is no clear training policy documents at hand how to integrate stakeholders towards training.
<p>All over potency of the program</p> <ul style="list-style-type: none"> • Access to information • Policy and strategy • Other Infrastructures (road, market, telephone, electricity) • Few projects’ and rural institutions’ effort 	<ul style="list-style-type: none"> • Lack of political commitment • Low participation of development partners • Lacks community ownership to the sustainable use of facilities and resources

Opportunities	Threats
<ul style="list-style-type: none"> • Participatory planning, panel discussion, radio program, articles, magazines, TV station, internet café, telecommunication, and ecotourism that enhances awareness of farmers • Upgrading of DAs in their professional career. This opportunity can be addressed to farmers in advising, close extension service and it enables to share knowledge and information • Micro enterprises will be enhanced in the Woreda • Research-Farmer-Extension linkage strengthening in the Woreda • Actors collaboration to implement non formal education • Employment and job creation upon graduation • Scaling up and scaling out of best Practices 	<ul style="list-style-type: none"> • Conflict may occur unless the areas of FTCs are compensated to farmers to make healthful coexistence between owner of the land and FTCs • Lack of continuity modular trainings • Turnover of DAs, since many of them are learning at degree level in other subjects • Roles and responsibilities of DAs and supervisors are not clearly defined towards training. Unless Business Process Reengineering is not in position to redefine tasks, duties, activities. There might be claims in chains of command • FTCs' buildings may not serve for intended purposes, and may also deteriorate due to less quality of construction • High illiteracy level in rural areas

Source: Own data, 2010

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

This study was conducted in Fogera district, South Gondar, Amhara Region, Ethiopia. Fogera was selected for this study because it is the pilot learning site of the sponsor of the project, IPMS. Despite many research studies conducted, there was no assessment and survey carried out about modular training at FTC level. This limits the effectiveness of the training and functions of FTCs and their managerial activities of the whole system.

Hence, this study was designed with the objectives of analyzing whether modular trainings address the knowledge gap of farmers, and requirements effectively and enables them to use the acquired knowledge, identifying linkage of FTCs with other institutions that would enable them to provide effective knowledge and information sharing services and assessing positive deviances of FTCs in performance and their contributions.

Primary and secondary data were collected from relevant sources through interview schedule from sampled respondents. Moreover, key informant interviews, focused group discussions and personal observations were conducted using check lists. Four PAs were selected, and for the purpose of the study, a total 120 sample respondents were taken from sampling lists of the population. In addition, 5 focused group discussions were held and 15 key informants were interviewed. The data collected were analyzed using descriptive and inferential statistics using SPSS version 12. RAAKS methodology and SWOT analysis were also employed for analysis of qualitative data.

The effectiveness of modular training in the study area was evaluated using descriptive statistics knowledge of trained and untrained farmers using teacher made test, t-test and chi-square. Hence the result of t-test indicated that there was significance difference between trained and untrained farmers ($P=0.004$) at 1% probability level.

Practice was assessed based on trained and untrained farmers using practice assessment and t-test. The mean difference of practice of trained farmers were significantly higher than untrained farmers at 5% probability level ($p= 0.05$). Attitude scale was also administered and the result showed that trained farmers have more favorable attitude towards the given technologies and commodities than untrained farmers ($P=0.000$) at $<1\%$ probability level.

Twelve actors were identified as public, private and NGOs that were involved for various types of roles in modular training activities and functioning of FTCs. Resource allocation, information sharing, communication, and professional linkages were the major linkage types, which were identified. Strong linkages were identified between FTCs and IPMS, farmers themselves, cooperatives, DAs, WoARD, and ACSI. The linkage of MoARD, DoARD, BoARD, and administrators identified as medium linkages where as the linkages of schools and ATVET were identified as weak linkages. There were actors such as Wet land project, investors, research center, local organizations, and NGOs such as GTZ, CARE, and ORDA were identified as missed actors that believed to contribute a lot for modular trainings.

Positive deviance also has been assessed. There were no as such measurable results recorded on the deviation of FTCs positively when they compare each other, key informants and in-depth analysis of a case study indicated that there are good performer farmers after attending training in rural communities of the study area. Those farmers are positive deviants that they could define their problems, determined their alternative solutions, they could select promising practices and designed activities so as to adopt and scale up market oriented enterprises as best practices.

Although, trained farmers acquired knowledge, skill and attitude and few FTCs that could act upon in modular training and other functions, there were no enough scenarios identified towards training under taken at the study area, Fogera. The guideline states that continuous intake of farmers training (120 farmers per year per one FTC) has to be conducted. But the overall objectives of the trainings were not achieved because only very few numbers of farmers were addressed within five years. Till the data were gathered in Fogera, twenty PAs have not conducted modular trainings. Area delineation, material supervision, demonstration,

and practical training remain silent at those PAs. Monitoring, evaluation and feedback were not undertaken by FTCs. There was no clear linkage modalities designed by policy makers how development partners could integrate with FTCs.

5.2. Conclusion and Recommendations

The study has revealed that modular training is potential growth indicator in the study area. It is the training that farmers could perform better enterprises having knowledge gained, skill acquired and attitude changed. Although, restless efforts have been made by government and relevant stakeholders effectiveness of the training couldn't result in at required level, due to multiple challenges. Based on this fact the following recommendations have been made:

- Training Need Assessment should be prepared with full participation of farmers so that farmers can properly learn. Learning helps to acquire knowledge and changes in attitude.
- ToT is required for DAs and supervisors on the module of the training content and methodologies so that delivery systems, training techniques and teaching aids will be at ease for them.
- Asset creation and income generating schemes can be possible at FTCs level that the trainees can have images on alternatives to specialize in their own farm and to have off farm activities for their employment and livelihood opportunities.
- The role of agricultural extension in knowledge and skill transformation should strongly be reviewed and continued until the farmers are acquainted with best practices. There has to be alternative information and knowledge sharing techniques such as farmers' club, audio and video cassettes, magazines, radio, telephone, television, internet, and demonstration plots. These all, are required in addition to experience sharing, workshop, panel discussion, tour, visit, and similar facilities that can be designed to be undertaken by FTCs. Knowledge centers at Woreda level are very valuable that should accommodate

with communication media, articles, TVs, projectors, internets, books, VCDs, DVDs, news letter, etc that can be served as libraries of an educational institutions.

- Private and public sector should be reconfigured into training policy analysis so as to participate and make integration. For instance, FTCs can be run by state universities, colleges, bilateral and multilateral NGOs, and industries. FTCs also should be conceived as rural vocational training centers to impart knowledge and skills to farmers so that they could increase their productivity and efficiency.
- Potential and missed actors should collaborate and get rid of constraints and take advantages of opportunities to improve institutional linkages and innovative performances by encouraging their commitment and better interactions.
- ATVETs, Colleges and Universities should develop linkages with their closest FTCs to offer training programs and to work together adaptive researches with farmers.
- Entrepreneurs and private investors should contribute for training and proper functioning of FTCs by demonstrating various technologies and disseminating information for farming communities.

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7. APPENDIX

Appendix Table 1. Category of trained and untrained farmers towards Knowledge

Knowledge scale	Trained		Untrained		Total		X ²	p-value
	F	%	F	%	F	%		
Low	1	1.6	0	0	1	0.9	10.24***	(0.006)
Medium	25	41.7	42	70.0	67	55.8		
High	34	56.7	18	30.0	52	43.3		

Source: Own survey data (2010) *** Significant at 1% probability level

Appendix Table 2: Practice of trained and untrained farmers

Practice scale	Trained farmers (N=60)		Untrained farmers (N=60)		Total (N=120)		X ²	p-value
	F	%	F	%	F	%		
Low	8	13.3	23	38.3	31	25.8	10.67***	(0.005)
Medium	36	60.0	22	36.7	58	48.3		
High	16	26.7	15	25.0	31	25.8		

Source Own survey data (2010) *** Significant at 1% probability level

Appendix Table 3: Attitude of trained and untrained farmers in terms of its difference

Attitude scale	Trained farmers (N=60)		Untrained farmers (N=60)		Total (N=120)		X ²	p-value
	F	%	F	%	F	%		
Low	-	-	-	-	-	-	6.50**	(0.011)
Medium	6	10.0	17	28.3	23	19.1		
High	54	90.0	43	71.7	97	80.9		

**Significant at 5% probability level

Appendix table 4. Roles of actors in relation to modular training at FTCs level in the study area.

Institutions	List of actors	Type of linkage mechanisms	Roles of actors
Public institutions	Development agents	Planning, communication, and professional collaboration	Selection of trainees, training, technical support, counseling and advice, motivating farmers, farm visit
	Cooperatives	Resource allocation	Credit and input supply facilitation, provision of industrial commodities, storage facilities, marketing services
	ACSI	Resource allocation	Credit and input supply and saving
	WoARD	Planning, professional collaboration, resource allocation, communication,	Site selection and construction of FTCs, technical support, recruiting of DAs, provision and distribution of training materials and equipments.
	Administrators	Joint planning, resource allocation, communication	FTC construction, safety of FTCs and its equipments , recruiting guards
	ATVETS	Professional collaborative activities	Training of DAs, problem identification of farming practices
	School	Resource allocation	Provision of chalk and black board for modular training, class arrangements (Woji PA)
	DoARD	Communication, joint planning and review	technical support, distribution of modules, texts and manuals; supervision and training of DAs
	BoARD	Professional collaborative activities, resource allocation	Interpretation of module and preparation of texts and manuals; supporting of ATVET, technical support and supervision of FTCs, strengthening and assessment of DAs and FTCs.
	MoARD	Resource allocation, professional collaborative activities	Preparation of training guideline or modules, formulating strategies and working directions
Private	Farmers	Joint planning, resource allocation, communication	Site selection, construction, and participation in training
NGOs	IPMS	Professional collaborative activities, resource allocation	Technical support, training of DAs, materials support, experience share, provision of inputs

Source: Focused Group Discussions and Key Informant Interviews, 2010

Appendix Table 5: Extent of linkage of key actors in the study area

No	key actors	Relative strength	Relative importance rate (Rank)
1	WoARD	<p>Trained respondents</p> <ul style="list-style-type: none"> • Technical advice • Technology dissemination • Training • Credit supply <p>Untrained farmers</p> <ul style="list-style-type: none"> • Technology dissemination • Technical advice • Credit supply • Training 	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p>
2	Cooperatives	<p>Trained respondents</p> <ul style="list-style-type: none"> • Credit provision • Input supply • Marketing <p>Untrained respondents</p> <ul style="list-style-type: none"> • Credit provision • Input supply • Marketing 	<p>1</p> <p>2</p> <p>3</p> <p>1</p> <p>2</p> <p>3</p>
3	ACSI	<p>Trained respondents</p> <ul style="list-style-type: none"> • Credit supply • Input supply <p>Untrained respondents</p> <ul style="list-style-type: none"> • Credit supply • Input supply 	<p>1</p> <p>2</p> <p>1</p> <p>2</p>
4	IPMS	<p>Trained respondents</p> <ul style="list-style-type: none"> • Training • Material provision • Technical advice <p>Untrained respondents</p> <ul style="list-style-type: none"> • Training • Technical advice • Technology dissemination 	<p>1</p> <p>2</p> <p>3</p> <p>1</p> <p>2</p> <p>3</p>

Source: Focused Group Discussions and Key Informant Interviews, 2010

Interview schedule

I.General instruction to enumerators:

- Make brief introduction to each farmers about the purpose of this study
- Attempt all items and questions
- Please write / fill only respondents’ feeling and reply

II.Objectives of the study are:

- to analyze whether the trainings address the knowledge gaps of the farmers and requirements effectively and enable them to use the acquired knowledge;
- to identify linkages of FTCs with other public and private institutions that would enable them to provide effective knowledge and information sharing services; and
- to identify positive deviances of FTCs in performance and their contributions

General information

Code No..... Kebele Date of interview.....
 Name of interviewer Signature

1. personal profile of respondent farmers

- 1.1 Name of respondent
- 1.2 Sex M F
- 1.3 Age
- 1.4 Trained untrained
- 1.5 Educational status A) Illiterate B) Read and Write C) Grade 1-4
 D) Grade 5-8 E) above grade 8
- 1.6 Number of family members in 15-64 age group (M_____ F_____ T_____)

2. Linkage related questions 2.1 If you have an access to the following, who does what and how in the system? (**Task matrix**)

No	Tasks Actors	List of tasks							
		No access	Input supply	Technical advice	Credit	Marketing	Training	Research	Technology dissemination
1	Cooperatives								
2	ILRI/ IPMS								
3	SG-2000								
4	Adet research institution								
5	Agricultural office								
6	Woreta ATVET								
7	Credit institutions (ACSI and others)								
6	other (specify)								

3. Training related questions (For trained farmers)

3.1. When and how long do you trained (at FTC)? Year....month/s.....Number of days.....

- 3.2. What do you think about the time allowed for modular training duration?
 A) Sufficient B) Insufficient C) Too much
- 3.3. If it is insufficient, what do you suggest for future appropriate duration? Days
- 3.4. Is the time period (season) selected is convenient for you? A) Yes B) No
- 2.5. If it is not convenient, which month(s) is convenient for you?
- 3.6. Who selected / recruited you for training? A) DA(s) B) Supervisor C) Woreda expert(s) D) NGO D) PA leader E) PA manager F) Others (Specify).....
- 3.7. Does the training's content have relevance to your need and farming practice? A) Yes B) No
- 3.8. What is the proportion/mix of practical to theoretical modular training?
 A) Equal B) More theoretical C) More practical
- 3.9. Which training methodology was used? A) Demonstration B) Class lecture
 C) Group discussion D) Field visit and experience share E) mixed
- 3.10. Which style of training you prefer? A) Continuous B) With interval

4. Knowledge, attitude and practice between and among trained and untrained farmers

4.1. Knowledge test for modular training on beekeeping

- 4.1.1. Mention three types of honey bee- beehives _____
- 4.1.2. Mention three bee enemies _____
- 4.1.3. Mention three advantages of removing old combs before coming of brood rearing ____
- 4.1.4. Which types of bees are active and more duties performed? _____
- 4.1.5. List two protection mechanisms from bee enemies' _____
- 4.1.6. How can you differentiate the three types of brood cell? _____
- 4.1.7. Mention three beekeeping equipments _____
- 4.1.8. Mention four accessory names of modern beehives _____
- 4.1.9. Mention three reasons for migration of bees' _____
- 4.1.10. List the two major advantages of beekeeping _____

4.2. Knowledge test for modular training on dairy

- 4.2.1. Mention three types of milk products _____
- 4.2.2. What is the age of heifer to take the first pregnancy? _____
- 4.2.3. What are the criteria for identification of dairy cows? (Mention only two) _____
- 4.2.4. What are the three signs of a cow at the time of its estrous? _____
- 4.2.5. What are the three delivery equipments of a cow? _____
- 4.2.6. What are the three grazing strategies? _____
- 4.2.7. Mention three reasons for low productivity of cows' milk _____
- 4.2.8. Mention four criteria for site selection of dairy barn _____
- 4.2.9. Mention two types of insemination systems _____
- 4.2.10. Name one disease that can damage dairy cows. _____

4.3. Knowledge test for modular training on fattening

- 4.3.1. What are the three gazing strategies _____
- 4.3.2. Mention three types of fodder/ forage species for fattening of animals _____
- 4.3.3. Name the three diseases that can harm for fattening sheep _____
- 4.3.4. Name the two external parasites that can decrease productivity of fattening sheep _____
- 4.3.5. List the three types of domestic animals that can be fatten in your locality _____

- 4.3.6. Mention three forage development strategies _____
- 4.3.7. What are the two methods of weighing of animals _____
- 4.3.8. Name three important seasons that fattened animals can be sold with more profit _____
- 4.3.9. Mention two methods of castration of male sheep _____
- 4.3.10. How many months are enough for fattening of sheep? _____

4.4. Attitude test (attitude is the degree of positive or favorable and negative or unfavorable affect towards

4.4.1. Attitude test for beekeepers

No	Statements	Measurement scale				
		Strongly agree(5)	Agree(4)	Un decided(3)	Disagree (2)	Strongly disagree(1)
1	Traditional beehive is better than modern beehives for high yield of honey production					
2	Following scientific recommendation can increase honey production					
3	Splitting of bee colonies is a waste of time					
4	Apiculture can bring about substantial improvement in economic return of a farmer					
5	Modern beekeeping is possible at any agro ecological area of a given country					
6	Modern bee hive can give high honey production than traditional hives					

4.4.2. Attitude test for dairy

No	Statements	Measurement scale				
		Strongly agree(5)	Agree(4)	Un decided(3)	Disagree (2)	Strongly disagree(1)
1	Whether there is good management or not improved breed of cows can give more milk than local breed					
2	Following scientific recommendation can increase milk production					
3	Open grazing is more suitable for dairy cows than zero grazing					
4	Accessibility matter for dairy package					
5	Vaccination is one of a good management of dairy cows					
6	Using female animal is not good for fattening					

4.4.3. Attitude test for fattening

No	Statements	Measurement scale				
		Strongly agree(5)	Agree(4)	Un decided(3)	Disagree (2)	Strongly disagree(1)
1	Following scientific fattening can increase the yield of meat					
2	Open grazing can also be used for fattening					
3	Castration may adversely affect the health of fattening animals					
4	Vaccination is important for preventing disease transmission					
5	Using female animals for fattening is not good					
6	Using female animals is not good for fattening					

4.5 Practice (Indicate whether you do the following or not)

4.5.1 for beekeeping

No	Practice	Yes	No
1	Hunting colonies of honey bees		
2	Transferring of bees from traditional to modern bee hives		
3	Wax printing		
4	Method of harvest honey from modern bee hives		
5	Splitting of bee colony		
6	Suppering and de-supering in modern bee hives		
7	Making of beekeeping tools and materials		

4.5.2 for dairy

No	Practice	Yes	No
1	Construction of house for dairy cows as recommended		
2	Artificial insemination		
3	Testing of pregnant cow		
4	Straw treatment using urea		
5	Making water trough		
6	Separation of butter from milk		
7	Attending delivery of dairy cows in recommended way		

4.5.3 for fattening

No	Practice	Yes	No
1	House construction of fattening sheep as recommended		
2	Crash construction for vaccination and insemination purpose		
3	Castration of male sheep		
4	Dehorning		
5	Making a feed trough		
6	Making skin frame		
7	Making of water trough		

5. Participation

5.1 Have you participated and consulted by training organizations while fixing the training?

A) Yes B) No,

5.2 If you participated, at what stage do you participate? A) TNA B) Curriculum development C) Deciding duration D) Training days E) Length of the training F) different stages

5.3 Did you participate for FTC functioning? A) Yes B) No

5.4 If yes, in which activity did you participate? A) FTC construction B) Committee Participation C) Fencing D) plough E) Demonstration activities F) others (Specify)

Check lists

FGD, KII, Case study for possible deviance has been done by the researcher

1. Woreda experts, Supervisors, DAs, and other extension personnel, farmers, mgt committee

☞ **FTCs**

- Components (demonstration areas, class room, exhibition room)
- Facilities and materials (received, quantity, quality and inventory)
- Functions
- Management methods
- Budget and its sources(income generating scheme, farmers ‘ contribution)
- Good and poor performers(FTC, DAs, and creative farmers)

☞ **Design of modular training**

- TNA(was there, farmers’ participation, method of conduct, frequency)
- Contents (local adaptation, policy issues, gender, home science, HIV/ AIDS, marketing, entrepreneurs, participant parities)
- Time (day, after noon, at noon, at night, season, duration)
- Methodology (practical, theoretical, facilities, ITK, lesson plan, application of attitude, knowledge and practice)
- Trainees criteria for recruitment (who, age, gender, educational back ground, social status, size of group, incentives)
- Input availability (fertilizer, seed, others)
- Follow up, (report, supervision, support, any other)
- Monitoring and evaluation, feedback,

☞ **Participation of stakeholders**

☞ **SWOT analysis**

2. ATVETs and Woreda experts

- ☞ Educational curriculum
- ☞ Training situation
- ☞ Apprenticeship (Result of assessment)
- ☞ DAs at work place
- ☞ Other training or field activities of the college with farmers
- ☞ Institutional linkage

3. Development agents

- ☞ ToT on modular training
- ☞ Problems, Salary, Promotion, Long and short term training, Incentive
- ☞ Opinions on modular curriculum
- ☞ Challenges of modular training
- ☞ How to make effective modular trainings

4. Case studies at farmers level

- Apiculture /Fattening
- Dairy production and management