

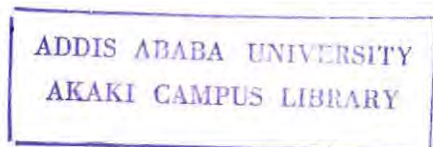
**ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
INSTITUTE OF REGIONAL AND LOCAL DEVELOPMENT
STUDIES(IRLDS)**

**Community Participation and Sustainable Natural Resource Management:
The Case of Lenche Dima watershed, Gubalafto Woreda, North East
Ethiopia.**

**A Thesis submitted to the Institute of Regional and Local Development Studies
of Addis Ababa University in partial Fulfilment of the requirement for the
Degree of Master of Arts in Regional and Local Development Studies**

By

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Institute of Regional and Local Development Studies

(IRLDS)

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Acronyms and Abbreviations

ACSI.....	Amhara Credit and Saving Institute
ANRS.....	Amhara National Regional State
CBNRM.....	Community Based Natural Resource Management
CNRM.....	Community Natural Resource Management
CBOs.....	Community Based Organizations
CBMO.....	Community Based Management Organization
CPR.....	Common Property Resource
DA	Development Agents
F.....	Variation between Mean Test
FAO.....	Food and Agricultural Organizations
GEF.....	Global Environmental Facility
GOs.....	Government Organizations
GWARDO.....	Gubalafto Woreda Agricultural Rural Development Office
IFAD.....	International Food and Agricultural Development
KA.....	Kebele Administration
M.....	Mean
MoARD.....	Ministry of Agricultural and Rural Development
NGOs.....	Non Governmental Organizations
NRM.....	Natural Resource Management
p.....	Probability level/level of significance/
PASDEP.....	a Plan for Accelerated and Sustainable Development to End Poverty
r.....	Correlation Coefficient
RDCC.....	Rural Development Coordinating Committee
SD.....	Standard Deviation
SLM	Sustainable Land Management
SNRM.....	Sustainable Natural Resource Management
SWC.....	Soil and Water Conservation
t.....	Mean Test
TLU.....	Total Livestock Unit
USAID.....	United States Agency for International Development
WMP.....	Watershed Management Project
X ²	Chi-Square

Abstract

This thesis attempted to examine “community participation on existing participatory natural resource management approaches with a due emphasis on land conservation and rehabilitation practices in Lenche Dima water shed, North East Ethiopia.” Out of the total 865 households found in the research site, 120 households were randomly selected and taken as representative sample size of the target population. Similarly, a mixture of both qualitative and quantitative research methods was used to analyze the data obtained thorough the data collecting instruments (such as household survey, key informant interview, focus group discussion, and field observation) used in the study. That is, in order to see the relationship between dependent and independent variables, the qualitative data gathered from the research respondents were described and explained in the study. Whereas, the quantitative data obtained in the study were analyzed by different statistical methods. The major findings of the study were: first, before the watershed management project intervention, farmers were very well aware of land degradation problems in the area. As the result of this, farmers’ participation at the initial stage of the project implementation was positively significant for the management practices in the watershed. Second, from the statistical analysis of community participation, the socio-economic and demographic characteristics of households such as sex, age, family size, crop production and livestock ownership were found to be significant and highly associated with the participation of households. Relying on the results of the analysis community participation at various planning processes, participation at the implementation stage of the watershed project was found to be relatively very high 381 or (83.3%). However, farmers’ continuous participation (at the maintenance stage) was declined by 127 or (39.1%) due to the discontinuity of incentives from the project. That is, sustainable community participation was hampered by lack of support, benefit from conservation practices, and continuous stakeholder’s coordination. Similarly, women’s participation in conservation work was found not to be significant in the statistical analysis some observable challenges. In addition, the finding showed that participatory sustainable resource conservation was influenced by lack of maintenance, quality of conservation practices, the prevalence of drought, policy support and tenure security as well as lack of stakeholders’ involvement. More importantly, following the withdrawal of the watershed donor project, the remaining stakeholders’ role for assuring sustainable management approach was found to be negligible. Generally, it could be concluded that conservation practices undertaken in the area by the project was so encouraging. Thus, the incentive-based approach of the project was found to be essential for implementing the project conservation activities. However, that approach created dependency than self-reliance on community participation and identified as the major challenge for sustainable watershed management. Therefore, there is a need for sustainable involvement of the existing stakeholders’, including local CBOs as well as vertical and horizontal linkage the existing stakeholders in order to promote sound watershed management with effective community participation.

CHAPTER ONE

1. Introduction

1.1 Background of the Study

Community participation on natural resource management has been popular since the 1980s in name at least. Donors, developing governments in African countries, and non- government organizations, have supported this policy and continued it to be popular, though repeated failures to deliver benefits (Communicating International Development Research, 2007).

In this regard, the major causes for the failure of the policy are lack of comprehensive evaluation of resource management programmes, a complex needs to cover environmental issues such as poverty reduction and institutional changes. Moreover, inadequacy of skills to mainstream environmental sustainability in socio- economic initiatives, lack of impact assessment survey, the only dependence of managing resources on donor based funds, lack of people and stakeholders participation on resource conservation as well as the dominant reflections of the interests of policy makers than the community (ibid).

In the past, a common feature of land conservation and rehabilitation in developing countries is a heavy involvement of the state. In Ethiopia, it was also true where resource management particularly land conservation, rehabilitation efforts during the late 1960s and at the beginning of 1970s had been top-down approach, and that was the failure and it has not shown demonstrable change in the day-to-day lives of farmers in terms of improving food security and livelihood needs (Dessalegn, 2001).

Among multinational donors (such as the World Bank, Food Agricultural Organizations, as well as bilateral donors), the new orthodoxy of the environmental deterioration can best be reversed through involving local people either directly or through the involvement of Non-Government Organizations (NGOs) in partnerships with the state, transforming the common experience of conflict into co-operation (Dube and Swatuk, 2002). Recently, decentralized development approaches have promoted to realize the goal of poverty reduction and natural resource management. Countries in east Africa including Ethiopia had taken in to a measure to bring an end of the problem with the help of external donors like NGOs for the effective development of the management approaches. Nevertheless, it came up with short of demonstrable outcomes.

On the one hand, watershed management has practiced through participatory approach by local farmers to a better management of natural resources. Moreover, this management approach also used as a means to improve agricultural productivity, and to conserve natural resources and reduce poverty in the semi-arid tropical regions in South Asia and Sub-Saharan Africa, which are characterized by low agricultural productivity, severe natural resource degradation, and high level of poverty (Kerr, 2002). In India, for instance, the national policy on watershed management has recently characterized by a concern that decisions on rehabilitation and subsequent rights and responsibilities had taken in way that supports the livelihood of the poor, especially women and are to be institutionally sustainable (ibid).

The current government of Ethiopia in its rural development strategy identifies major activities in the area of management of natural resources including sustainable land use, forests development, soil and water conservation, and water management for irrigation development with participatory approach at the watershed development projects (Alemneh, 2003). Besides, different studies conducted on the area show that the success or failure of resource management with community participation is influenced by not only participation of the community but also other factors like partnership with the State and other sectors, characteristics of the community (Jones, 2002). To put it in a nut shell, in sub Saharan African countries, participation of the community in management activities is expected to be a solution to address the gap of natural resource conservation problems in the past; however, the effective involvement of the community in grass root development projects is still uncertain (Kerr, 2002).

Thus, this research is an attempt to deal with examining watershed management intervention of participatory natural resource management with its dimensions of sustainability, assessing the link between participatory land resource management and their livelihoods, assessing the role of gender on the scenario. In addition, identifying the major challenges/factors of community participation in watershed management programme and then suggesting the possible or alternative approaches for sustainable resource management practices in the study area, particularly in Lenche Dima Water Shed, Gubalafto Woreda in North East Ethiopia.

1.2. Statement of the Problem

In the predominantly agrarian society of Africa, one of the most ominous threats to food supply is environmental degradation, the deterioration of croplands, grasslands and forests. Furthermore,

extreme poverty, intensive cultivation, overgrazing, deforestation, overpopulation, climatic variations and the political and economic forces that relate to peasant agriculture have exerted enormous pressure on the ecosystem are some of the major contributors to these problems (Yeraswork, 2000).

In Ethiopia, natural resource degradation has become the most serious environmental problem. The North East part of country in particular is a region in which its land degradation caused by soil erosion. This has been and the major threat to the livelihoods of the rural communities (Almena, 2003). This degradation in turn becomes the underlying root of poverty. Thus, the challenges of breaking the poverty-environment trap and initiating sustainable intensification requires policy incentives and technologies that confer short-term benefits to the poor while conserving the resource base. Only by improving the natural resource base can one increase food production and lessen the need for external food supplies (Shiferaw and Holden, 1998).

North East part of the country is characterized by high level of land degradation that results food insecurities and famine also exacerbated to the ever exploitation of the remaining resources by the rural poor community of the area. As the Gubalafto woreda is well known by its drought prone and soil erosion, shortage of rainfall and poor soil fertility; and poor grazing land are the current observable agricultural problems the need to seriously consider environmental degradation in the area is vital (Solomon, 1999). Moreover, because of ever-increasing human population and demand for more cultivable land and grazing has been restricted to the fragile erosion-prone hillsides. The two extreme sides of the problem and the intervention of participatory approaches with the local communities need revitalize of the effects in the area (ibid).

Currently, in Ethiopia, the transfer of resource management systems from government to the community had implemented. This shift reduces the role of the government and increases the role of the community and therefore the participation of the community in management activities has expected to address the weaknesses of the state when it plays their role in conservation activities. However, not all participatory management systems are able to be successful and well functioning as needed, constraints and practices of local people have not always considered in watershed development programmes around the world, and this often accounts for the poor performance of such projects. Different people also use the term 'people's participation' discordantly. For instance according to Mirghani and Savenije (1995), people's participation in a watershed management projects should refer to the stakeholders, inside as well as outside the project area. The institutional

framework within the management of natural resources have an important effect on the sustainability of natural resource use and the livelihoods of the communities that depend on those natural resources.

In line with this, Watershed management is an important focus of environmental protection efforts in many countries in the world, particularly in developing countries. Still, approaches of external donor projects like incentive based or not to involve the community and the contribution of their participation in sustainable watershed development remains conditional and controversial. Though participatory watershed management were undertaken in different areas of the country as a solution to the problems including Lenche Dima, however, little was investigated on peoples important role in watershed management project particularly in north east parts of the country. Moreover, prior to the study some researches has undertaken in the study area including Adissalem, (2010). However, their major focus was the objective or physical aspects like land use and land cover change rather than the subjective or human aspect as the community based resource management with its participatory approaches of the intervention of watershed management project.

Thus, this study tries to explore how the prevailed experience on sustainable participatory watershed management activities perceive and done in lenche dima watershed. Moreover, it devoted to assess how the proper way to involve the community in resource conservation development on top of constraints and prospects of community participation in the watershed. The study also strives for observing the existing natural resource management practices and approaches in the watershed, and the role of gender particularly women and the contribution of multiple stakeholders in the watershed management project. Besides, it attempts to identify the challenges and opportunities for the development of resource conservation on the area. Lenche Dima watershed has selected for the study site since the area where donor funded/externally induced participatory natural resource management had been undertaken. The study conducted at a particular time based on a household survey at a basis of case study in the watershed community.

1.3. Objectives of the Study

The general objective of this research is to examine the nature of community participation on sustainable natural resource management approaches with a due emphasis on land conservation and rehabilitation practices in Lenche Dima Watershed, North East part of Ethiopia.

Thus, the specific objectives of the study are to:

- Explore the participation of the community in the planning process of watershed management project.
- Examine the role of gender in participatory resource conservation practices.
- Identify the contribution of multiple stakeholders' and other organizations in promoting sustainable resource conservation in the watershed.
- Describe the existing land conservation and rehabilitation approaches and its practices in the area.
- Identify the factors affecting community participation and sustainable natural resource management practices.
- Suggest alternative approaches or possible solutions for the resource development approaches in the area.

1.4. Research questions

The study attempts to answer the following research questions:

1. How is the community organized and participates in the watershed management intervention?
2. What is the role of gender and its contribution on resource conservation?
3. What are the major factors that hinder community participation on the watershed?
4. What are the land conservation and rehabilitation approaches and practices used in the area?
5. What factors affect sustainable natural resource management in the area?
6. Who are the multiple stakeholders and their roles in sustainable natural resource management in the area?
7. What are the alternative approaches or possible solutions for the sustainable resource development constraints in the watershed?

1.5. Significance of the study

A variety of development strategies have developed and practiced by development agencies or NGOs, Agricultural or environmental policy makers and governments to manage natural resources with community participation. However, maintaining effective and sustainable resource management was a challenge particularly in local areas of rural communities. Thus, the purpose of this research is to assess and identify the major challenges and potential opportunities that exist on the participation of local communities towards the management of natural resources. Moreover, it tries to raise awareness to policy makers, relevant actors, and natural resource management initiatives about resource management approaches of the area for further scaling up or development of the management approach, to recommend and suggest possible alternatives ways of community

centered conservation approaches for practitioners. Besides, this research was also important for academic purpose and documentation in the development of knowledge on the area of participatory watershed management. Finally, to recommend possible solutions and innervations of the study area for those of regional and Gubalafto Woreda Agricultural and Rural development Office and concerned practitioners of the area.

1.6. Limitation of the Study

While conducting this research certain constraints had encountered. One of the major limitations was lack of reliable data and reports on the status and activities undertaken by the AMAREW project due to the withdrawals of USAID funded project that have leading role in the participatory approach of the watershed. Moreover, as the survey was conducted on the remote area of Gubalafto Woreda, inaccessibility of the transportation to the field was also challenged the researcher in the day-to-field visits. Lack of reliable data within appropriate documentation of files on some local organizations had limited the possible comfort to take and accessed it. Moreover, financial constraints were also the threat to conducting this research.

1.7. Scope of the Research

Participation has a broad meaning, which may cover various components. The discussion in this research would benefit from a deeper exploration into all its aspects, its nature and participation level in order to provide more understandings about farmers' perceptions and assessments. However, this had beyond the scope of this study. Only genuine participation with a certain planning process with the project in activities regarding natural resource management particularly land conservation and rehabilitation as well the role of the farmer for sustainability of NRM was explored. Concretely, this research just works on the fields of how the community is organized and how they manage in conservation systems, what activities they participate in, frequency of participation, what force or motivate participation. factors influencing the participation like imitation, their interest or incentives may be broad to considered but narrowly included in this research. It is also a limitation of this research to consider all natural resource management activities in the water shed level, as water shed is an integrated and broader systems. It is also limited to employed and analyze with certain analytical model to this thesis.

1.8. Organization of the Thesis

This thesis organized into five chapters. The first chapter provides the introduction in which background of the study; statement of the problem; objectives; research questions; significance of the study; scope and limitation of the study. The second chapter of the thesis deals with, the literature review of different studies that include definitions of key concepts; conceptual framework of the research; theoretical and empirical literatures, which is pertinent to the study. The third chapter presents and explored with the methodological approach in which description of the study area, the research design, methods of data collection, sampling design, sampling frame and methods of data analysis. Chapter fourth presents results and discussions, which is the foundation of the study. The final chapter provides the summary, conclusion and recommendation of the thesis. The next chapter presents the theoretical and empirical literatures and conceptual framework of the study.

CHAPTER TWO

2. LITERATURE REVIEW

This chapter presents the theoretical literature reviews and conceptual framework relevant and central to the research topic. The chapter aims at discussing the basic concepts and principles that the study results were fund. It deals with the concepts of community participation; community participation on resource management, concepts and managing watershed, meaning and indicators of participation in the study is discuss and reviewed. Moreover, issues on causes of resource degradation, approaches of natural resource management in Ethiopia and its past experiences and current attempts, land tenure, common resources and policy issues, gender particularly women participation, contributions and stakeholders to resource management challenges of community resource management, concept of sustainability in land management and conceptual framework of the study are also discussed. Finally, an empirical literature related to the topics has reviewed.

2.1 Definition of Concepts

Many literatures define different terms according to their view and context. But the following are taken as definitions which lie and appropriately related context to this study.

Community: refers to a heterogeneous group of people who share residence in the same geographic area and access to a set of local natural resources. The degree of social cohesion and differentiation, strength of common beliefs and institutions, cultural diversity and other factors vary widely within and among communities Marianne (1999). Kelly (2005) also defines community as “people that live in a geographically bounded area who are involved in social interaction and have one or more psychological with each other with the place in which they live”. By having these two definitions therefore this study taken as a community with the combination of definition of both Marianne (1999) and Kelly (2005) in which the combination assumed to be a full definition of community. Therefore, a community is a heterogeneous (i.e. interest, economic e.t.c) groups of people which serves in a common institutions, shares common societal interest with their instruction within a certain bounded geographical area.

Gender: refers to socially constructed differences and relations between men and women that vary by situation and context. Gender analysis requires going beyond statements about “women” and “men” to understand how historical, demographic, institutional, cultural, socioeconomic and

ecological factors affect relations between women and men of different groups, which partly determine forms of natural resource management. Gender analysis focuses on the interaction of gender with other socially important variables, such as age, marital status, economic roles, ethnicity, and migratory status (Marianne, 1999). The definition of gender by Marianne (1999), which this thesis more relies that the socially structured differences between both sexes and a certain possessions for occupying a certain resources or activities, in which the differences were created by a certain groups in a society or a society as a whole.

Land degradation: it has defined as the loss of utility or potential utility through the reduction of or damage of physical, socio, cultural or economic feature, and/or reduction of ecosystem diversity. There may be a single cause or a complex mix of causes FAO (1994) land degradation is the temporary or permanent lowering of productive capacity of the land. This thesis directly adopted this definition of land degradation as the definition of this study.

Participation: can range from simply being informed, to receiving material benefits, to empowerment through full involvement in project decision-making and management (Marianne, 1999). This definition of participation is the foundation of this study as participation ranges from information giving up to its empowerment that the community has a say about what affects them. Moreover, participation also defined in terms of the involvement of the community through the overall planning process.

Property rights – ownership, use and access: often influence decisions on investment in land management and conservation. Such rights may be customary or legally entrenched, communal, private/individual, seasonal or permanent. The rights may also link to use of specific resources such as firewood and building materials, water or grazing (Azene and Kimaru, 2006). What Azene and Kimaru (2006), defined property rights ownerships, use and access were this study agreed and adopted, that the rights of resources were related to a specific resources uses and passions such as cases in this study like grazing, hillsides distributed resources

Stakeholders in this thesis, stakeholders refers to the individuals, groups/communities, or sectors with an interest in or involved in or impacted by the use of local natural resource, or with responsibility for resource management. Therefore, their roles, interests and capacity to participate should clearly define in the intervention process. In this topic, the stakeholders will include the rural

village community, government agencies (particularly at the district level), NGOs and research/academic institutions involved in SLM activities (Gebremedhin, 2004).

2.2 The Concept of Community Participation, Theories and Approaches

The notion of 'participatory development' has emerged to be the universally acclaimed thinking in development in the contemporary world (Keoph, 1998 cited in Abraham, 2002). Participatory approach is an outgrowth of the 1960s-and 1970s theory of 'participatory democracy' and 'industrial democracy'. The concept, idea, and issues visible in the 'participatory development' notion have long been the subject of the debate in the radical industrial sociologists and political theorist's philosophy of political and work place participation. Therefore, the concept of participatory approach being voiced everywhere, as a universal remedy in the third world development is not a new development concept (Yeraswork, 2000). Since the 1970s, many literatures broadened the concept of understanding on participation, but did not give any single definition or interpretation (Oakley, et al., 1991). However, in many ways participation has become an important concern of many development interventions. There are several debates concerning participation and its varying interpretations. The range of the interpretations as summarized by Oakley (1991) Participation is considered a *voluntary contribution* by the people in one or another of the public programs supposed to contribute to national development, but the people are not expected to take part in shaping the program or criticizing its contents.

According to Oakley et al., (1991) 'participatory development' is a voluntary contribution by the people in one or another of the public program in order to contribute to the national development. At the same hand ECFLA, 1973 cited in Oakley et al., 1991 With regard to rural development, participation includes people's involvement in decision-making process, in implementing programs, their sharing in the benefits of development programs and their involvement in efforts to evaluate such programs. Moreover, (Cohen and Up Hoff, 1977 cited in Oakley et al., 1991) stated that – *decision-making, implementation, benefits and evaluation* as key elements in the process of participation. Participation is concerned with...*organized efforts* to increase control over resources and regulative institutions in given social situations on the part of groups and movements of those hitherto excluded from such control. Community participation is an active process by which beneficiary or client groups influence the direction and execution of a development project with a view to *enhancing their well-being in terms of income, personal growth, self-reliance* or other values they cherish (Paul, 1987 cited in Oakley et al., 1991).

Community Participation means many things to many people. However, participation has generally believed to be a good thing in development theory and a key feature of CNRM, but it comes in many different forms. There are short reasons why NRM should be participatory. The user is typically part of the system and has his figure on the pulse (Walker et'al., 2002. cited in Christo, 2005).

2.2.1. Typology of Participation

Pretty et'al., (1994) cited in, Christo, (2005), highlights seven category of participation, along a gradient of community involvement and empowerment. At the least participatory end of spectrum, people are merely informed and do not contribute information or views. At the most participatory end, CNRM has self-initiated, every day CNRM falls in this category.

Table 2.1., Typology of Participation

1. Passive participation	People being told what is going to be happening or has already happened. Unilateral announcement without any listening to people's responses. The information being shared belongs only to external professionals
2. Participation in information giving	People answering questions; questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings; findings are neither shared nor checked for accuracy.
3. Participation by consultation	People are being consulted and external agents listen to views. External agents define both problems and solutions; may modify these on the light of people' responses. Does not concede any share in decision- making; professionals under on obligation.
4. Participation for material incentives	People provide resources- for example, labor-in return for food, cash or other material incentives. Much in -situ research and bio- prospecting falls in this category.
5. Functional participation	People forum groups to meet predetermined objectives; can involve the development of externally initiated committees, e.t.c. does not tend to be an early stages of project cycles or planning; rather ,it occurs after major decision have been made. Initially, dependent up on external initiators and facilitators; may become self dependent.
6. Interactive participation	Joint analyses, leading to action plans and the formation of new local groups or the strengthening of existing ones. Involves inter disciplinary methodologies. multiple perspectives and leading process. Groups take control over local decisions; peoples have a take in maintaining structures.
7. Self-mobilization	Initiatives taken independently. Of external institutions may challenge the existing equitable distributions.

Source: christo, 2005

2.2.2. Why Participation

In most of the centrally planned projects especially in South Asia and Eastern Africa, soil and water conservation programmes had promoted with standard technical solutions such as terracing, contour bunding etc. This has based on the assumption on that soil conservation measures are universally applicable and local farmers are unaware of soil erosion and ignorant of its causes and consequences (Pretty and Shah, 1999, cited in: Johnson et al., 2001). However, these measures, which had often enforced on the people, may cause more erosion than their own indigenous practices, either because the new conservation works had not maintained or are technically inferior to existing practices (Kerr et al., 1996).

In India, the large majority of watershed development projects has based on conventional approaches considering only physical planning without attention to socio-economic or ecological conditions (Farrington and Lobo, 1997). Managing a watershed involves not only individual plots, but also common property resources like forests, springs, gullies, roads and footpaths, and vegetation along streams and rivers (Swallow et al., 2001). The needs and priorities for different users are different in each watershed. By seeking information from farmers about their constraints and priorities, their potential for new technologies, appropriate policies and technology had designed for each watershed. Therefore participatory watershed management involves all actors to jointly discuss their interests, prioritize their needs, evaluate potential alternatives and implement, monitor and evaluate the project outcomes.

For the sustainability of watersheds, apart from technology and policies for resource use, better organizational mechanisms and processes (through which actors can come together to make decisions) are essential. Case studies of successful projects in Asia and Africa show that these watersheds have community forums for collective action in managing resources and rely on face-to-face contacts to build and maintain mutual trust and understanding. According to Johnson et al. (2001), three issues of particular relevance to watershed management are (1) scales and boundaries, (2) the roles and costs of facilitation, and (3) development of indicators and monitoring systems, so that the community can visualize the impacts of changes in land use. The geo-hydrological boundaries and administrative boundaries are generally different in watersheds and hence, for sustaining effective participation, management strategies should be flexible to allow the users to identify boundaries at which they prefer to organize themselves. In the Australian Land-care project and the Indo-German project on watershed management, the establishment and operation of the

village watershed committees required a lot of time and effort (Farrington and Lobo, 1997; Johnson et al., 2003). Although transaction costs were relatively high, these have considered as investments that will later increase the effectiveness of the interventions.

2.3 Community Participation in Natural Resource Management

The theory behind Community Natural Resource Management (CNRM) argues that the best way to manage natural resources is for local people to use their local knowledge and technologies. However, research from the University of East Anglia in the UK argues this theory has not reflected in practice and most CNRM schemes fail, as its aims were to achieve both sustainable environmental management and community development (Marianne, 1999). In CNRM, the concept has related to a variety of terms, including participatory, community, community-based, collaborative, joint and popular natural resource management. These concepts had often used interchangeably, but may also be used with the intention to emphasize specific characteristics of related approaches. Thus, the concept of CNRM tends to be associated with approaches where the focal unit for joint natural resource management is the local community. Sometimes, it has also applied to designate approaches where local communities play a central but not exclusive role in natural resource management (ibid).

Borrini-Feyer Abend *et al.* (2004, 69) cited in Kilpatrick (2007) prefer using the term co-management, which they define as follows:

Co-Management (CM) of natural resources is used to describe a partnership by which two or more relevant social actors collectively negotiate, agree upon, guarantee and implement a fair share of management functions, benefits and responsibilities for a particular territory, area or set of natural resources.

The advantage of this definition is that it covers different ways in which the planning and implementing authority over natural resources can be shared among various types of social actors, thus refraining from any a priori indication of which model is the most appropriate. Accordingly, this paper uses the term CNRM to designate all kinds of approaches to managing natural resources that fit the above definition of co-management Kilpatrick (2007).

Generally, the key arguments for community natural resource management are: it contributes to poverty reduction by using local labor and investment, it promotes the use of local knowledge and local technologies, which helps to preserve these, local management means local people have power

and make decisions, creating accountable and democratic local institutions. Moreover, the use of resources is also enforced locally by people who have a stake in its protection, which is more effective than government enforcement, it is a better solution to conservation than fencing off natural resources and excluding people from them(ibid).

2.4 Meaning of Watershed Management, Concepts and Approaches

The meaning of watershed management that has used in this paper has based largely on the definitions and concepts of Brooks et al. (1997), Gregersen et al. (1996) cited in Ffolliott, and Fogel, (2002).

Watershed management is the process of organizing the use of natural resources on a watershed to provide necessary goods and services to people, while mitigating the detrimental impacts of land-use activities on soil and water resources (Ffolliott, and Fogel, 2002). This approach recognizes the intrinsic interrelationships among soil, water, and land use and the connections between upland watersheds and larger downstream river basins. It incorporates soil and water conservation and land-use planning into a more holistic and logical framework. This more encompassing approach to land stewardship has achieved by recognizing both the positive and negative impacts on people that had caused by planned or unplanned interactions of soil and water with other natural resources (ibid). It is also necessary to appreciate that the nature and severity of these interactions had influenced by how people use these resources and the quantities of resources that they use. The effects of these interactions are more likely to follow watershed than political boundaries. Watershed management activities on the uplands of one political unit can significantly affect the well-being of people living on a downstream political unit regardless of the respective land ownership, often resulting in unacceptable downstream or off-site effects (Ffolliott and Fogel, 2002).

As Ffolliott and Fogel, (2002) stated that a *watershed management approach* to land stewardship accommodates the interests of the widest possible number of people. The approach examines the benefits obtained from good land stewardship by optimizing production and maintaining environmental integrity. It facilitates more effective conflict resolution from a sustainability perspective. A watershed management approach further recognizes that future generations of people deserve to inherit landscapes that are capable of producing the needed goods and services while maintaining ecosystem health and economic stability.

2.4.1 Watershed as Producing, Conserving and Sustaining Natural Resources

Watersheds provide a diversity of benefits to local inhabitants and to a greater number of people within the larger river basin through the flows of water and other natural resources off the watersheds. Inhabitants of watersheds manage their lands for the production, conservation, and sustainability of forage, food, and fiber that they require to survive and generate income. Therefore, water, forage, wood, and other natural resources on the watersheds has managed in the most economically efficient and environmental sound combinations possible to obtain the products, commodities, and amenities that the people need. The consumption or otherwise use of the natural resources on upland watersheds must also be balanced with the needs of people living downstream and the larger river basin (Ffolliott and Fogel, 2002).

2.4.2. Principles of Watershed Management

At all, production, conservation, and sustainability of natural resources had constantly threatened by a possibility of improper human interventions degrading the capacity of a watershed to support local people's uses of the natural resources found on the watershed. Some degradation of a watershed can occur because of natural phenomena such as drought, landslides, or wildfire. Managers have little control over these events other than to maintain the best possible landscape conditions so that the impacted watersheds are able to withstand the consequences of these phenomena. However, even with what seems to be well-planned and environmentally sound land-use practices, the activities of people living in the dry land regions of the world can inadvertently worsen the sources of degradation and, in doing so, make them central issues in the management of a watershed. It is imperative, therefore, that the inhabitants of watershed lands adhere to the best possible form of land stewardship (Ffolliott and Fogel, 2002).

A watershed management approach can greatly help in attaining this often-elusive goal. The planning and its implementation of the watershed had based on its principles. The main principles of watershed management has stated as follows by Ffolliott and Fogel (2002).

Participatory: Watershed communities need to be involved in all stages of planning, implementation and management of watershed development activities. It is continuous process and not a onetime exercise.

Building up on local experience, strength and what works: Local knowledge is essential to improve existing technologies, to adapt new ones and to manage natural resources and other measures once they introduced and established.

Realistic, integrated, productive and manageable: Watershed development planning should be realistic, based upon local capacity, locally available resources and other forms of government and partners support. Integrated conservative and development of the natural resources base is the guiding principle for watershed development together with the optimum use of social resource.

The need for flexibility at different levels: Flexibility is a key criteria required in watershed to fit local conditions and the choice and design of measures within the agreed criteria of quality and integration.

Cost-sharing and empowerment/ownership buildings: Cost-sharing by stakeholders contributes to the sustainable of a project for establishing the responsibility of various stakeholders in the management of the resource.

Gender sensitive: Women are the most affected by environmental hardships; for example, they need to walk long hours to fetch increasingly scarce water, firewood and animal dung in addition to attending livestock. Therefore, their involvement in watershed management is a key to ensure that they are equally benefit from the various measures.

2.4.3. The Concept of Sustainability

The concept of sustainability with reference to agriculture was defined by FAO (1991) in Getachew. 2005) as "...the management and conservation of the natural resource base, and reorientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generation. Such sustainable development (in agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, and it is environmentally non-degrading, technically appropriate, economically viable, and socially acceptable".

In general, sustainability refers to meeting the needs of the present generation without compromising the needs of the future generations. Sustainable development is improving people's material well being through the utilization of the resources at a rate that has sustained indefinitely.

Land resource is sustainable, if and only if the stock of natural resources remains constant or has improved over time.

The land resource bases of a country and its quality represent a common heritage for all generations. The preservation or loss of valuable land resources affects economic growth and human well-being. Swaran and Samra (2001) indicated that soil degradation does not discriminate. Generally, Sustainable management of natural resources leads to increased income and reduced food insecurity. Thus, an important share of the income could reallocate to productive re-investment rather than to consumption. Effective participation by the local communities and officials will increase their capacities for natural resource management. The capacity of local communities, local institutions and government organizations has enhanced for sustainable management of project activities that further reduce land degradation (GEF, 2008).

2.5. Meaning and Indicators of community participation in this Thesis

Participation is a range of processes through which local communities are involved and play a role in issues, which affect them. The extent to which they participate and play a role is differing according to the type of participation. Clearly, types of participation differ, so this thesis leans on Pretty et al., (1995), the six and the seven typologies (interactive participation and self-mobilization) are the focus of this thesis. The rationale for the interactive participation based on his definition implies that the communities are participated on their affair from identification of their problem to.... taking corrective action after implementing the resource development strategy. While the other self-mobilization were used as how the community leads, the initiatives after the project institutions made them outside based on the consent of time of the project. In other words, how the community currently leads independently on the management system i.e. shows the sustainability of their participation. If this is so, what are the indicators used to evaluate the nature of participation is the basic idea of this study.

The use of indicators provides a rational basis for assessing the existing nature of participation on the resource management activities, as well as, its sustainable contribution of the community, that leads us a guide in decision-making. Therefore, various indicators have set by different scholars in different studies to value the level of participation of the community in different scenarios.

According to (Oakley, et al. 1991), two indicators that used to assess and evaluate/know the condition of participation, which applied in sustainable, land management at participatory resource

development. These are *Quantitative indicators* – are tangible, readily visible and susceptible to statistical measurement. They are relevant dimensions of participation and could be evaluated by using quantitative techniques and *Qualitative indicators* - are less visible and less tangible.

Qualitative indicators are more concerned with describing the characteristics and properties of a process like participation over a period and then with interpreting the data and information available in order to make statements concerning the nature and extent of the participation achieved. The qualitative evaluation, thus, is different from that of quantitative evaluation and demands, different indicators, different methods of data collection and different analysis. However, both indicators of participation must be used in the evaluation in order for the outcome to be fully understood (Oakley, et al. 1991).

As a guiding principle, the monitoring process should be participatory, simple but effective and continuous exercise. Moreover, the evaluation of community participation has the following implications/rationale. First, the evaluation of community participation is a central part of sustainable change in development effort and is a dynamic, not occasional or separate activity. To be successful, it must build into the whole development intervention process. Second, to assess and evaluate both quantitative and qualitative indicators are used. Third, the evaluation of participation is a process and the last is therefore, it is important to develop and implement appropriate indicators for monitoring and evaluating the effectiveness of community participation to enhance sustainable land management. The process of implementation and its impact should also be monitored and evaluated using appropriate indicators. There should also be an *adequate period* to assess the impact of participation (Oakley, et al. 1991).

The following rationales and indicators of Participation used as indicators in this thesis.

For the rationale, the farmers should participate in the process of starting from problem identification, in planning and design, decision-making, implementation, maintenance, taking corrective action. Benefits and evaluation also take as key elements of participation.

The existing Socio-economic distinctiveness of the community households: The internal socioeconomic characteristics of community households like, level of education and skill & income influences/determines intensity/degree of community participation (Awortwi, 1999). When the level of education, health condition and occupational and income situation of the community members is

where there is a high rate of prevalence of drought, reduction in productivity, lack of access to food and resources and conflict and the existence of weak community rules ,norms and bylaws in government have a core values in their commitment participation.

To sum up, The decision-making process in politics and development has traditionally been top-down in Ethiopia, as elsewhere in Africa, and a participatory culture has only recently being introduced and is as yet limited in scope and acceptance (GEF, 2008). Therefore, participation in this thesis is the involving in all levels of the planning process. Moreover, decision on development activities particularly on resource conservation starting from its willingness on participation and contribution. Moreover, strength and empowerment and the commitment as well as their representation and freedom of community organizations to mobilize and enhancing community participation plus their support provide to better organize and bring changes to the existing conservation approach at community level as well as the role of stakeholders in participation also take in to consideration.

2.6 Causes of Natural Resource Degradation in Ethiopia

The degradation of renewable natural resources is a part of the broader environmental degradation that refers to a substantial “reduction in the availability of goods and services (quality and quantity wise) from the physical environment and the renewable natural resource base” (Getachew, 2005). . In Ethiopia deforestation, soil erosion, rangeland overgrazing are some of the manifestations of environmental degradation in general and flow resource degradation in particular. The causes of natural resource degradation have categorized in to two, underlying causes and direct causes. Underlying causes are the reason why these inappropriate types of land-use and management have practiced. Man has accelerated soil erosion by reducing and even removing the vegetation cover and by employing poor cultivation practices. The direct causes of land degradation include cultivation of steep slopes and fragile soils with inadequate investments in soil conservation or vegetative cover, declining use of fallow, limited recycling of dung and crop residues to the soil, limited application of external source of plant nutrients, deforestation and over grazing (ibid). The factors underlying or the direct causes are those which, socio-economic and institutional factors including population pressure, poverty, high cost agricultural inputs and credit, and limited access to agricultural inputs and credits, low productivity of agricultural production and many conservation practices. Moreover, these were also due to poor soil fertility, high risks facing farmers, fragmented land holdings and

insecure land tenure, farmers' perceptions and attitudes regarding introduced SWC technologies, and farmers' lack of information about appropriate alternative technologies (Getachew, 2005).

Land degradation is one of the fundamental problems confronting sub-Saharan Africa in its efforts to increase agricultural production, reduce poverty and alleviate food insecurity. With the land frontier shrinking, the future increases in agricultural production will have to come from yield increase rather than increase area expansion. Yet the production potential of the land resource is declining, due to soil erosion, nutrient depletion, soil moisture stress, deforestation and overgrazing. The continent confronts the challenge of agricultural production while maintain the future productive capacity of the natural resource base (Berhanu and Swinton, 2002). Land degradation has an impact on the various land functions such as production, biomass, biological habitat, filtration and buffering, and source of raw material, etc. In general, soil erosion has both on-site and off-site effects. The on-site effect comes due to loss in soil productive capacity, causing either reduced outputs (crop yield, livestock yields) or the need to increase input to achieve the same yield level. Off-site costs refer to the indirect effects of soil degradation, and usually take the form of externalities (Getachew, 2005). Moreover, Soil erosion has major ecological and economic consequences, particularly in populated areas. Soil erosion causes economic loss because of crop destruction and reduced agricultural productivity.

Erosion also leads to shortened investment life of water management infrastructures, and greater flood frequency caused by sedimentation and dimensioned infiltration capacity of soil (Getachew, 2005). Natural resource degradation particularly land degradation in the study area is immense and resulted in the threat to agriculture and resulted in low crop productivity, prevalence of drought, and abandoned some cultivated, grass and forest and farm land temporarily or permanently unless measure that has undertaken at the watershed try to reduce it.

2.7 Approaches to Natural Resource Management in Ethiopia

2.7.1. Past Conservation Efforts

In Ethiopia, until the second half of 1960's, conservation had understood in different from what come to be in 1980's (Dessalegne 1994, cited in Alula, 2001). First, it has taken to mean the preservation of wild life and the protection of their natural habit. Policy makers were keenly interested in using the country's wild life resources to stimulate the tourist industry as the part of the development initiatives underway at the time. The success of natural parks schemes of east Africa

had taken as the model to stimulate. Secondly, in attempting to reduce soil erosion farmers have developed their own conservation practice over the years. At the regional level, 27 types of indigenous SWC practices were identified (Betru, 2002). Construction of traditional ditches in the highlands of East and West Gojam known as "*fesses*" and *awara "fesses"* level bund around Dessie, contour ploughing of perennials around *Bati*, counter cultivation in many sloppy areas, agricultural trees in the farm areas, and others indigenous skills are practiced in the region. However, land degradation was until serious problem in the highlands of Ethiopia due to farmers misuse and mismanagement (Getachew, 2005).

The governments of Ethiopia had launched a massive soil conservation program in the 1970's, to arrest and reverse the process of soil degradation. Bekele and Holden (1998) indicated that despite the increasing land degradation problems, the issue of conserving agricultural land has largely neglected until the early 1970's. However, awareness of the problem as incited by the devastating famine in Wollo in 1973/74. Reforestation, terracing, pond construction and road construction program had begun initially in the Northern regions and followed by Eastern regions. In Ethiopia, to solve the problem of land degradation enormous inputs including technical, educational and incentives in soil conservation have made since the 1970s.

According to World Food Program (WFP) report, between 1980 and 1994, an area of 1,045,130 ha were covered with soil bunds and hillside terraces, 17880 km of check dams and cut of drains, 1,259,760 ha were covered by closure and afforestation, and about 170 small earth dams were constructed. This seems very impressive but is not very significant as it covers less than 10 per cent of all cultivated land in need of soil and water conservation (Getachew, 2005). This approach has focused on a) soil and water conservation; b) construction of terraces, check dams, cut-off drains and micro-basins, and c) afforestation and revegetation of fragile and hillside areas. The focus was on building physical structures to control soil erosion and to rehabilitate degraded lands and massive efforts were undertaken in this regard.

This effort has resulted in many ecological benefits such as restoring farmlands, increasing soil depth, water holding capacity and improved woodlot and pastureland. After almost two decades of implementation, different institution and researchers are conducted many evaluations on the adoption and diffusion of introduced soil conservation technologies. Largely they came to a similar conclusion, that land degradation is a widespread problem with a widespread failure of intervention too (Alemneh, 2003). Some of the reasons given for the failure of introduced soil conservation

measures can be classified under four major themes: approach, technology, and perception and land-users security issues (Getachew, 2005). The approach for the transfer of technology was top down, which marginalized land-users in decision making, while the technology, was predominantly physical structures with a wide range of risks and long-term benefits. Moreover, lack of awareness of land degradation problems among land-users and their lack of interest in soil conservation technology due to poverty has indicated as a major drawback among the subsistence farmers. Lastly, the absence of land security has mentioned to be the fundamental factor for the lack of adoption of introduced soil conservation technology (Dessalegne 1994, in Alula, 2001). Generally, the overall conservation efforts were not effective, as their basic strategy were not addressing the basic interest of the rural farmers. This idea supported and generalized by Alemneh (2003), the major weakness of the land conservation and rehabilitation effort over the past twenty years has been its top-down approach where government officials tell peasant association what to do to get the food aid. This approach gave local people little opportunity for discussion and participation on the initiative. The local people did not have a say on the design and their role was limited to provision of labor for the payment they get from the work. This made the local people see the initiative as imposition from the government and additional burden farmers have made to bear.

2.7.2. The Current Attempt

Currently, the country put a Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) as a development path, which is compatible with different agro-ecological zones as one of the basic principles governing agricultural development (Alemneh, 2003). With this, the government is trying to minimize the problem of land degradation, which is a base for rural agriculture, based on the voluntary involvements of smallholders and implementation of soil conservation project and programs in the water shed development. Moreover, most agricultural development projects consider natural resource developments in general and promotion of soil and water conservation activities in particular as the potential area of intervention for sustainable agricultural production and rehabilitating degraded areas of the country. Because of very low adoption of community based SWC and to create accountability, at present government started land ownership licensing to construct and maintain their farm by themselves (Getachew, 2005). Moreover, the country is already promoting a community-based integrated watershed development approach. The government prepared comprehensive community-based participatory watershed development in order to serve every development intervention by government and non-

governmental organizations throughout the country (GEF, 2008). Therefore, based on the above agricultural development strategy, particularly on community-based participatory watershed development an attempt had been made. Therefore, this study is an assessment of this development effort to a particular locality.

2.8. Common Property Resource Management

‘Common property resource’ (CPR) refers to a natural or human-made resource system, whose size or characteristics of which makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Common property resource management refers to arrangements for managing such resources (Farrington et al., 1999). Garret Hardin in his theory states that resources that are held as common property such as forests, lakes and grazing land will inevitably be overexploited and lead to problems like deforestation, soil erosion and overgrazing and overfishing. Many anthropologists and political scientists have critically argued against his theory and showed that local people around the world have developed institutions and practices that have entitled people to use common property resources in a sustainable manner. The ‘tragedy of the commons’ is not inherent to CPR-regimes but it may be triggered by general socio-political, economical and environmental issues. North and Ostrom (1990) have theoretically proved that CPRs has opened to local institutions, insuring grass-root community participation as well as security such as property rights, are the most effective ways of achieving sustainable use.

According to Hardin’s theory, in ‘the tragedy of the commons’, he concludes: Therein is the tragedy. Each man has locked into a system that compels him to increase his herd without limit, in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons (Ostrom, 1990).

Common Property Resources continue to be an important part of community’s natural resource endowment in developing countries. Despite their valuable contributions to people’s sustenance, environmental stability and the strengthening of private resource based farming systems, CPRs has neglected by researchers, policy makers and development planners alike. Disregard of CPRs and their productive potential is a major missing dimension of rural development strategies in developing countries and reflects much of the administrative indifference to environmental protection (ibid).

2.9. Land Tenure and Property Rights

There has been considerable concern at the alarming rate of natural resource degradation and agricultural production decline in Africa, including Ethiopia. Various arguments, therefore, have made in academic and policy cycles about the need for appropriate policy and institutional reforms. Much of the debate centers on the following overlapping and cross-cutting themes: issue of land tenure and property rights, of the state and governance, environmental degradation/ conservation and sustainability, and agricultural production and livelihoods (Berry, 1993 cited in Alula, 2001).

One line of the argument is that property rights have a determining impact on resource allocation, use and management. This position is mainly based on a Hardin's article on 'The tragedy of the commons' (1998). Understanding individuals and communities as 'resource degraders' led Hardin to advocate for complete private or state property rights in land and natural resource conservation (Lund, 1994, cited in Alula, 2001). This line of argument has gained wide currency with influential policymaking institutions and policy advisors to African government as a theoretical backing for land privatization. International consultants and some donor agencies have argued in favor of private ownership of land. The World Bank and IMF have spearheaded this, arguing that Ministry of Agriculture (MOA) experts suggested the privatization of land, including the privatization of common property of regions. The main justification in support of private tenure has stated as:

Private ownership of land, as under freehold tenure system provides the most secure tenure and enables the development of markets for land transactions on both counts, moving the present tenurial system toward freehold would improve efficiency in the use of the country's land resources and result in increased agricultural and forestry production (Alula, 2001).

Maintaining that security of tenure is a pre-requisite for sound Natural Resource Management, a second line of argument focuses on the institutional aspect of resource management. Accordingly, it has argued that the major impediment to environmental management and agricultural sustainability is the absence of legal and institutional mechanisms that affirm, hence recognize, the competence of resource users as managers of environmental resources. In response, decentralized management of natural resources, particularly the devolution of resource control to effective community based institutions is put forward as a principal solution for land rights and natural resource management (ibid).

2.10. Gender and Watershed Management

Sustainable development strategy to least developed countries context must also aim at identifying the socio- cultural, ideological and practical instruments of gender relations and inequalities. Failure to treat gender and cultural ideologies and practices are critical variables in development process has weakened the effectiveness of development strategies adapted to those countries realities. The socio cultural environment of most least developed countries justify gender particularly women, rural poor and disadvantaged groups have unequal opportunity and privilege over access and control over productive resources; mainly land (Margreet, 2007).

In some developing countries, much of the land within watersheds has not privately owned. Some are under the forest department or under the state and some are under village-based ownership. Forests and village commons have been important sources of supplementary livelihoods and necessities for rural households. In most of the developing countries watershed projects have linked with rural development and poverty alleviation. Managing watersheds may require restricted entry to common land and hence customary access rights of the poor may denied. Therefore, management of common property resources is important in the context of watershed management. Community participation in watershed management usually refers to the participation of only the men, and not really the community, as consisting of men and women.

Most rural households meet their subsistence needs from their immediate environment. Women's in some households who are responsible for accessing these natural resources like fuel and fodder. Therefore, degradation to these resources will increase the work burden of women. They have to spend more time and travel more distance to collect resources to meet the needs of the household. Hence, women resource users have a greater interest in conserving natural resources. Nevertheless, their participation has not always given importance in the planning and decision-making related to the watershed management. Besides, women hardly have control over land resources and landowners mostly control watershed activities, especially since most of the activities start on private lands. Influential members or well off farmers usually dominate the committees and women rarely get an opportunity to raise issues or voice opinions (Farrington et al., 1999).processes. Moreover, Women has considered as equal partners of the rural community. Thus, participatory development endeavors should consider them as equal constituents of the rural people. The rural women are responsible for over 50% of all productive activities even in those households where adult men are present (Burkey, 1993). To this, it is widely acknowledged that improved women's

access, control and ownership of land/ Natural and productive resources, is a key factor in eradicating Hunger and rural poverty. The targets and goals to eradicate Hunger and achieve food security will not be attained unless governments and international organizations take specific action to end the persistent discrimination against women in matters of access to, ownership and control over land and other resources (FAO, 2002). Thus, any community development program including land management in the watershed should include the active participation of women.

2.11. Role of Stakeholders in Watershed Management

The past decades have witnessed the planned development and top-down conservation practices of the state, which coerced their citizens to adopt often-unsuitable conservation practices that led to the failure of projects. Faulty design, inefficient implementation and corrupt organizations are the major causes for the poor outcomes of the state-centered policies. Kerr (2002) and Agarwal (2001) show that policy makers and researchers have to reconsider the role of the community in bringing about decentralization, resource conservation and management. According to Agarwal and Gibson (1999), the community must be examined in the context of conservation by focusing on the multiple interests and actors within communities, on how these actors influence decision-making and on the internal and external institutions that shape the decision-making process.

Community participation, empowerment, governance and sustainability are four main aspects that gained unprecedented visibility and respectability among the large multilateral and bilateral aid agencies. The World Bank, the United Nations and most bilateral programs have made participatory approaches an integral part of policy papers and project design criteria (Botchway, 2001). A community has been considered as a small spatial unit with a set of shared norms. In small units, each household can interact with their neighbors', with whom they share common resources (Agarwal and Gibson, 1999). In some societies, a community has common characteristics such as religion, caste, language or ethnicity. This will enhance the likelihood of cooperative solutions, reduce hierarchical and interactive conflicts, and lead to successful management of resources. For sustainable watershed management, watershed programmes would involve affected and interested people from the process of planning, secure their commitment to execute, monitor and evaluate and maintain the project. There may be conflicting interests, but by negotiation, conflicts can be resolved and can bring about joint decision making to attain the common goal. Once the community takes a decision, it becomes binding on all members. This is the essence of a success of a participatory approach to development (Hashim, 1999).

Institutions have formal and informal rules and norms, which constrains some activities and facilitate others; without them social interactions would be impossible (North, 1990). When actors do not share goals and are unequally powerful, institutions can define some powers regarding interaction among actors and to structure the interactions that take place around resources. Institutional analysis requires identifying a possible set of rules, which the group or individuals have to obey, and the processes by which rules have changed in a given situation. For the effective management of a resource, a consistent set of guidelines and rules at both national and local (grass-root) level is required (ibid).

2.12. Challenges and Constraints in Participatory Resource Management

Reluctance to change is perhaps one of the greatest challenges to CNRM. Most of CNRM constructs attested to government line ministries holding on to the classical top down planning and remain reluctant to consider or at least test the promising approach. With the introduction of micro-enterprises and communities establishing their own rules and regulations to govern sustainable resources use, there are enormous weaknesses over power at the dispensation of communities to enforce the rules and regulations (Marianne, 1999). Weak coordination among local level stakeholders who directly or indirectly involves in the management activities is the threat to the effective and efficient achievements. However, local level coordination among line agencies, NGOs and community organizations has expected to facilitate the mobilization of resources to address land degradation and create favorable conditions for collective site specific planning and the active participation of local communities.

Agarwal (2001) demonstrates how participatory institutions can exclude significant sections of society such as women. Participation has determined especially by rules, norms and perceptions, in addition to the endowments and attributes of those affected. These factors can disadvantage women both separately and collectively. Case studies of community forestry in South Asia show that the exclusion of women not only occurs in joint forest management but also in other collectivities like water user associations, village councils, and even in the new governance structure with decentralized institutions. Social and cultural norms have a considerable effect on women's water rights that were allocated through community membership (Meinzen-Dick et al., 1997 cited in Subha 2006). Not only in South Asia, but also in Western countries, social norms define domestic work and childcare as women's work, and social perceptions discount women's abilities and

opinions. Hence, women's ability to change rules and norms, perceptions and endowments in a gender-progressive direction would depend on their bargaining power with the state, the community and the family (Subha 2006).

The achievement of community-based integrated natural resource management goals could be affected by the occurrence of changes in the priorities of local stakeholders. Risks which could affect the successful implementation of technical solutions include unforeseen pests, climatic fluctuations (see following section) and drought variations in input costs and availability. Insufficient consultation between stakeholders at different levels or the tendency of one or another actor to use his/her administrative position or hierarchy to impose views on others comprises a significant failure risk to the project, especially at the decentralized, local, level (GEF, 2008).

High poverty levels that force people to over-exploit the natural resources to provide food to their families. Local community change agencies are commonly a target of interference from politicians and the few economically powerful at the expense of the majority. Organization of local communities into legally recognized entities to participate in collaborative management with other stakeholders like government and the private sector is not easy (IFAD, 2001). Generally, low level coordination among stakeholders, weak participation of the community, inefficiency, drought, of local government institutions, lack of support of women and community based organizations, low level of awareness among farming communities, women and youth about the degradation of natural resources and its impact on their livelihood are identified as the major challenges which are set by many natural resource development projects.

2.13. Conceptual Framework

As conceptual framework are defined the concepts and points of the variables, which will the focus of observation, this study is concerned the following variables under discussion are considered as the center of observation of the prospective investigation. According to Thomas. (2001), community participation has been widely advocated and used in natural resource management. It has been a major focus of research, both among human dimensions researchers and social science researchers. Research on citizen participation has tried to: identify the outcomes of different approaches to citizen participation; determine the characteristics of citizen participation processes that influence these outcomes); and explore how context influences citizen participation processes. With some notable exceptions, however, most writings do not present an explicit conceptual framework for

citizen participation. Although many authors identify purposes of citizen participation, these purposes are diverse and not obviously interrelated. They include such concepts as promoting fairness, encouraging competent decisions, allowing citizens to hold government accountable, and promoting acceptance of decisions (ibid). Several authors have argued that the diversity of reasons for which community participation is conducted makes it difficult to implement and evaluate (Thomas, 2001). The lack of a conceptual framework for citizen participation has impeded the development of a clear and comprehensive set of expectations about citizen participation, including:

- Desirable features of citizen participation;
- Activities citizen participation should include;
- Outcomes that should be expected; and
- When and how participation was occurring.

A recent survey of international agricultural centers found that 8 of the 17 watershed research projects reported some user participation (<http://www.cgiar.org/capri/project.htm> cited in Thomas, 2001). This relatively high number suggests that researchers recognize the importance of user input in developing technologies and practices for watershed resource management. However few current watershed management research projects can be described as fully empowering, meaning that they do not share authority and responsibility with users at all or even most of the stages of the research process (Thomas, 2001).

As Johnson et al., (2001) stated that community participation is increasingly recognized as critical for success in watershed development and management projects. Local residents were often not considered in the formulation of top-down watershed projects, resulting in plans and technologies that were inconsistent with people's needs and ignorant of local people's vast and detailed knowledge of land and land use practices. Empirical evidence suggests that giving users a role in managing their own watershed resources can lead to projects that are more efficient and effective than their top down predecessors (Johnson et al., 2001). Users were active in priority setting and project implementation, while the project managers dominated diagnosis, planning, monitoring and evaluation. This type of user participation is likely to improve the relevancy of project activities and in doing so increase the chance that they may be adopted to address specific problems. Such a process is not, however, likely to get significant user buy-in, nor generate a self-sustaining process of continuous innovation on the part of users (Johnson et al., 2001).

For the sustainability of NRM different factors were important and take in to consideration.

Conservation Technologies and Approaches: to achieve sustainable development, sustainable technologies need to be developed, transferred and adopted (Guerin, 2001 cited in Subha, 2006). Land degradation is a central challenge to sustainable development. At the global scale, key problems threatening natural resources and the sustainability of life support systems are soil degradation, the availability of water and the loss of biodiversity (Hurni, 2000). Natural resources can potentially be used in a sustainable way through appropriate technology. Moreover, following the sustainability paradigm, 'appropriate' would require that a technology should be ecologically protective, socially acceptable, economically productive, and economically viable and reduce risk (Hurni, 1997 cited in Subha, 2006). Management of watersheds can be made possible by using a variety of technologies such as vegetation conservation like grass contours, alternative tillage techniques and physical structures like terraces, stone bunds etc.

Institutions: All collective efforts within the community are mediated through institutions, and without institutional change, we will not move purposefully towards sustainability (Dovers, 2001, cited in Subha, 2006). Furthermore, the role of strong institutions at grass root level is crucial for successful watershed management. In the context of watershed management, two kinds of institutions need to link and interact frequently with each other: one involving the internal stakeholders and the other involving the external stakeholders (Farrington et al., 1999).

Participation: Participation of all who are involved in watershed development is the key element of good governance. This can be achieved through the involvement of external or internal stakeholders either directly or officially or through representatives. The stakeholders include all those who affect or are affected by the policies, decisions and actions of the system. They can be individuals, communities, social groups or institutions of any size, aggregation or level in society. The term thus includes policy makers, planners, and administrators in the government and other organizations, as well as commercial and subsistence user groups (Grimble et al., 1995, cited in Subha, 2006).

Rules and customs: Social relevance and effectiveness of a project depends on how the rules are enforced. Rules are to be enforced impartially. In addition, this had achieved through independent judiciary and uncorrupted officials. Secure tenure in land will encourage people to invest in land, which leads to increase productivity, and increase in efficiency. This may be facilitated through negotiation of tenancy or rent contracts with emphasis on land management to provide enough long term security to encourage soil and water conservation. Property rights in watershed management play an important role in governing resource management and may impact on the welfare of the people who depends on these resources.

Empowerment: empowerment of women's group may increase the efficiency in resource management. Working collectively, women are often better able to gain rights where they can benefit most. When an additional income is gained through women, they are likely to spend income on household food and inputs into child health and nutrition (Meinzen- Dick et al., 1997 in Subha, 2006)

Benefit: concept of 'conservation investment poverty' highlights poor people's limited capacity to mobilize cash, labour, machinery or other resources even for highly profitable and effective investments. In small farms, the poor may be able to invest incrementally without access to financial credit or hired labour by raising cash through off-farm employment. Through collective action and local credit groups, or through sharecropping and community labour, they could undertake resource-improving investments (Scherr, 2000, cited in Subha, 2006). Even though impacts are perceptible, it is difficult to assess the economic value of the numerous potential benefits that do not enter the market. These include ecorestoration, management of groundwater, lower risk of soil erosion and flood protection and maintaining or enhancing biodiversity. Hence the challenge is to introduce an innovative technology which fits into a farming system, which is cost effective and affordable to people. Generally, there is growing consensus in the watershed management community that a disproportionate amount of emphasis on the physical rather than the institutional problems associated with watersheds is a major cause of project failure. Further, it has increasingly realized that the sustainability of benefits generated during a project is a direct function of the sustainability of institutions participating in watershed management (Thomas, 1992). In sum, the above-discussed factors were summarized by the following figure as a conceptual framework of the study.

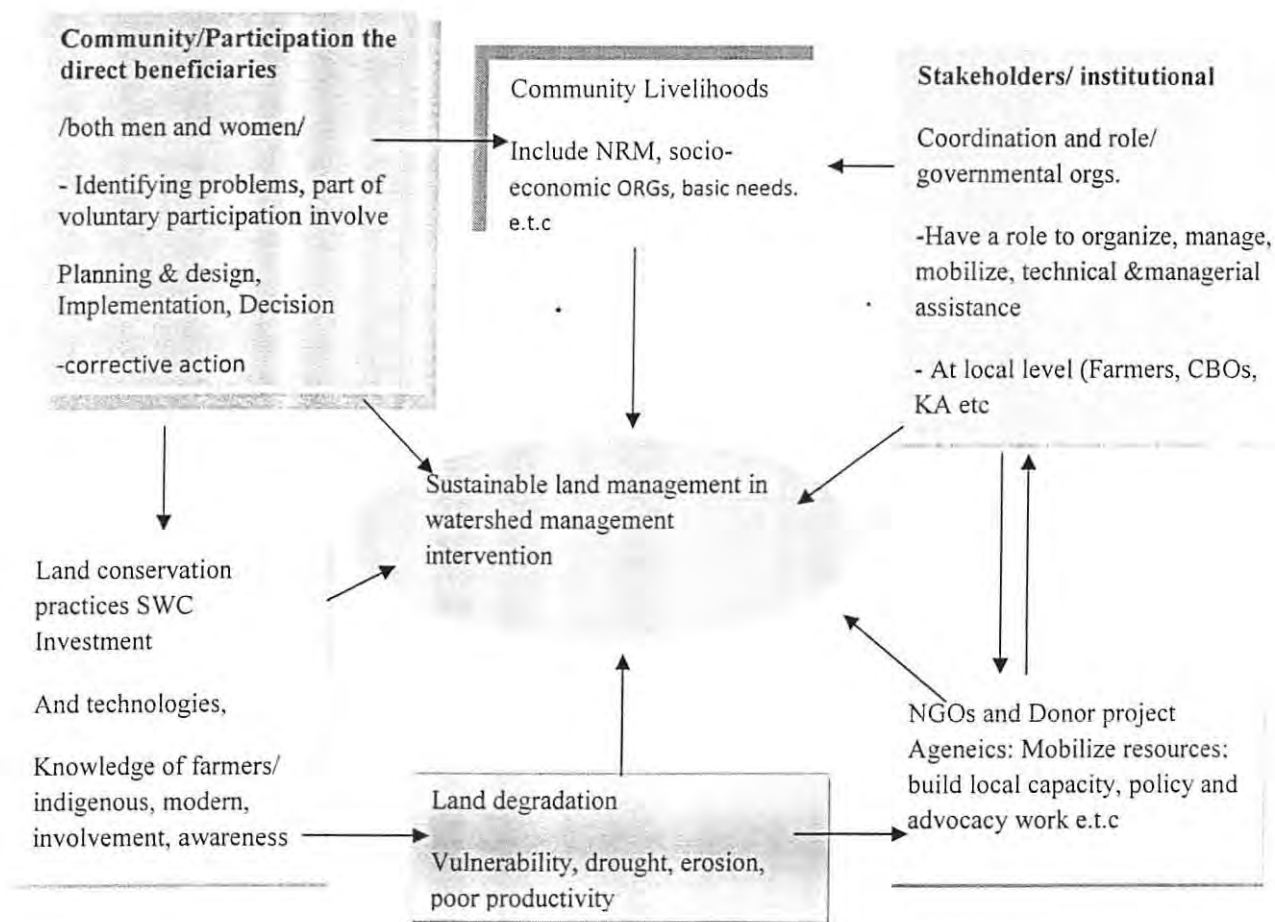


Figure 2.1. Conceptual Framework of Community Participation its Functional Environment on Watershed Management Intervention

Source: Adopted and modified on Christo, (2005)

2.14. Empirical Literature

This literature shows different studies and experiences which had been conducted in different areas and on Ethiopia. It has reviewed up on which supports this study and gives a better understanding of the scenario across different areas related to the study.

Community Participation at Watershed Management

Hakim (2008) is study on assessment of participatory integrated watershed management in the Hilkot Watershed, Mansehra, Pakistan. In the study area the community is mostly dependent on agriculture, forestry, livestock and remittances for their livelihood. Due to ever increasing population, overgrazing, illicit cutting of forests for timber and fuel wood, lack of fuel wood

alternatives, unawareness and extreme poverty, the natural resources are under tremendous pressure. The assessment of the study indicates that the participatory integrated watershed management program in Hilkot watershed brought social, economic, institutional improvements and watershed development, which led to increase in productivity and livelihood of people. The major social improvements were positive changes in the peoples' attitudes and awareness, high community participation, capacity building and skill enhancement of households, improvement in women role and linkages among stakeholders and coordination among governmental and non – governmental agencies.

The linkages and cooperation among the stockholders, supported activities well which often resulted in more interaction among them as reported by the majority of respondents. The economic improvements brought by the watershed program, as stated by villagers include increase in agricultural and forestry activities, crop yields, employment opportunities and increase in household's income. The overall natural management activities improved. A large number of the respondents reported increase in crop production (93%), number of trees planted (89%) and vegetable production (70%). Interestingly, majority of the respondents (98%) reported that the watershed program was helpful in raising household income and livelihood improvement. The watershed management impacts are the rehabilitation of degraded sites, improvements in field techniques, increase in water supply and reduction in soil erosion, the severe problems in Hilkot, which were addressed through adoption of several conservation technologies. The overall assessment can be concluded that the participatory integrated watershed management program implemented in Hilkot watershed was successful in bringing social, economic, and institutional and watershed management improvements in Hilkot watershed and increased the productivity and livelihood of communities.

Similarly, Bagherian et al., (2009) conducted a study on factors influencing local people's participation in watershed management programs in Iran and found that the degree of popular participation in development programs is a major determinant of success or failure, but the factors that make participation efforts successful remained a mystery. The findings of this study showed that level of participation in WMP was moderate; however, people preferred more involvement in social rather than economical and environmental activities. Correlation analysis indicated that six factors: 1) satisfaction of prior programs, 2) attitude toward WMP, 3) knowledge of WMP, 4) alternative monthly income, 5) total monthly income and 6) Met expectations of WMP have

positive and significant relationship with level of people's participation in WMP. However, regression analysis discovered that among these factors, five factors provided the best prediction for the level of people's participation in WMP and explained 45 % of the variation. These five factors were; level of people's satisfaction of prior programs, people's attitude toward WMP, people's knowledge of WMP, their monthly income from alternative occupation and their expectations of WMP. The result of this study also provided a number of theoretical and practical implications and recommendations to increase the level-of participation in WMP.

Participatory Watershed management, Experiences and Studies in Ethiopia

In Ethiopia, Participatory watershed management is one of the major interventions of the sustainable natural resource management particularly land. In this regard various studies have been conducted by researchers, experts and academicians. This section reviews some of empirical works on watershed management by, Woldeamlak Bewket (2002), Belay Semane (2002) and Aklilu Amsalu, (2004).

Belay Simane (2002) researched on the experience of sustainable agriculture and rural development program's at integrated watershed management in East Gojam and in South Wello. The study showed that the intervention used to implement the program through participatory approach (both bottom up and top bottom) has brought significant changes in the livelihood of the targeted community. As the study indicated, the farmer's Knowledge and experiences were used for analyzing the problems, implementing appropriate strategies and evaluating results. The study also recommends integrated watershed management for the fragile environment of the northern highland of Ethiopia to sustain agricultural productivity is crucial.

Woldeamlak Bewuket et al., (2000) his study on farmers' participation in soil and water conservation activities in the Chemoga Watershed, Blue Nile Basin, Amhara National Regional State, Ethiopia is also founded as an empirical literature on this study. The paper is analyzing the extent of farmers' participation in the watershed. Formal household survey, informal and focus group discussions and field observation was used to generate the Data. The result of the study indicated that the majority of the farmers' participated is against their will. Besides the study further put the most important factors discouraging them from participating freely was the perceived ineffectiveness of the structure under construction. Awareness about soil erosion as a problem, labor shortage and land tenure insecurity was found to be less important in providing for the disinterest shown by most of the farmers towards the SWC activities. Based on this the study recommended

that, the important factors that need immediate consideration for SWC activities in the study area or the region at large are: first, SWC structures have to be carefully designed and constructed taking in to account of ground realities and second participation of the farmers has to be through their own conviction regarding the effectiveness and efficiency of the technologies and alternative SWC technologies will have to be considered.

Moreover, Aklilu and Graaff (2004). Conducted a study on farmers' views of soil erosion problems and their conservation knowledge at Beressa watershed, Central Highlands of Ethiopia. The Data have obtained from a survey, in-depth interviews and group discussions. The results show that the farmers reported erosion problems, and they recognized that conservation was necessary. However, they considered erosion to be severe mostly when visible signs – rills and gullies – appeared on their fields. Furthermore, the majority of the farmers believe that erosion could be halted, and they use a range of practices for erosion control and fertility improvement. Nevertheless, despite decades of conservation intervention in the area, it appears that most farmers have developed negative attitudes towards externally recommended measures. The research concludes that under the conditions present in the Ethiopian central highlands, soil and water conservation interventions should consider farmers' conservation knowledge and practices to improve acceptance and adoption of the recommendations.

Community Participation in Natural Resource Management (NRM) in North East Ethiopia

As Berhanu and Swinton (2000). Studied on the issue community natural resource management in the northern highlands of Ethiopia and the study evaluates the nature and determinants of community management (collective action) of woodlots and grazing lands in the northern Ethiopian highlands of Tigray. The general conclusion and implication of the study shows that collective action for woodlot and grazing land management generally functions well in the highlands of Tigray. Community natural resource management can be an effective means of redressing natural resource degradation and increasing community wealth. The study notes that community natural resource management may be more effective and more beneficial if conducted at the most local level, and if involvement of external organizations is demand driven and complementary to local initiatives. Collective action for natural resource management may be more effective in areas with intermediate population, and those that are far from markets and have higher social capital. In areas of greater market access, high population or high wealth heterogeneity, private-oriented approaches to resource management may be more effective.

In line with this, in the aspect of sustainability, the study conducted by Gebremedhin (2004), the study indicates that sustainability of the community participation and soil and water conservation, therefore, depends on the degree of the renewability and sustainability of these natural resources and the degree of improvement of the community livelihood.

Addisalem Ambaye (2010) also did on Lenche Dima Watershed with a topic assessment of the drivers of land use and land cover changes in crop-livestock systems in the Semi Arid Regions of Ethiopia. Her study was conducted based on the survey analysis focus group discussion, and interviews of 120 household respondents in the watershed. Both qualitative and quantitative analysis approaches were used both at community and household levels to identify the drivers of LULCC in the area. Moreover, trend analysis as well as historical narrations were used to understand the background effects of these drivers. The study revealed that as the size of the population increases so does the size of cultivated land. Moreover, the increase of agricultural land was due to land cover types as trees, shrubs and bush lands. Furthermore, macro level factors such as change in political ideology, and subsequent changes in policies and institutional structures are the major drivers of LULC at community level. Drivers of LULC were also analyzed using Binary logistic regression. Eleven variables were selected to explain changes in the dependent variables. Based on this, the results show that from institutional factors tenure security and access to credits were positively associated with households level land decisions at 90% and 95% confidence interval. Moreover from socioeconomic factors age and labor availability were inversely related with LULC at 90% and 95% respectively. However, literacy, labor availability and cattle ownership were positively associated with LULC at 95% confidence interval.

Ginjo (2000) also conducted a study of NGOs natural resource management technologies: their adoption by farmers with evidence from Kindo Koisha Area, Southern Ethiopia. The finding of the study revealed that both the structural and agronomic NRM technologies were introduced by the project. From agronomic measures (multipurpose grasses and shared trees) and from structural measures soil bund was well adopted. From the adoption of technologies out of the total farmers more than 93% adopted soil bund 58% adopted grass strips and 50% adopted shared trees. Training, labor availability, participation and access to tools were found to be highly affecting the adoption process in the study area. Moreover, as compared to the previous government intervention, the adoption in the study area was better due to participation (during implementation), favorable attitude of the community towards the technology introduced. The technology introduced by the

project in the area was highly accepted however, its widespread explicability and sustainability seems needs additional technical and material assistance by the stakeholders. Moreover, the study also presents 78.6% of respondents in the survey showed farmers interest to continue with the intervention. However, some of them put material and technical pre condition to undertaken conservation measures in a sustained manner. In general, the study concluded that the project should design and implement sound socio-economic and institutional NRM package arrangements in addition to feasibility to ensure the sustainability of NRM interventions. Finally, NGOs efforts to manage natural resources should be encouraged through sector/ actor-NRM policy/strategy and its subsequent implementation procedure which might be designed by federal Ministry of Environmental Authority and concerned agencies in Southern Ethiopia to ensure the lasting benefit from such NGOs intervention.

The above discussion of empirical results revealed that some of them have been indicating the assessments of watershed management in relation to farmer's attitude, practices and their improvements on their means of livelihoods and the other also indicate approaches to the natural resource management aspects. In relation to this study irrespective of similarities in some variables and the methodological aspect i.e. survey approach, it has lack of assessing the role of the community with the approaches to the project intervention as well as it doesn't show on the predictions of the participatory approach with the withdrawals of the donor project. Moreover, as participation includes the dimensions of gender, the above empirical literatures lack the assessments of gender and community organizations. Besides, most of the studies lack also posts project institutional analysis rather focused with the life time of the project. And finally the impacts of incentive based participatory approaches had not reflected in their study. Thus, this study attempts to fill gaps in institutional analysis of community participation and community-based organizations involved in natural resources management with post stakeholder endeavors. The next chapter presents the methodological parts of this study.

CHAPTER THREE

3. RESEARCH METHODOLOGY

This chapter presents two major sections of the thesis. The first section presents description of the study area. Biophysical and socio economic characteristics of the study area are included in this section. The second section contains the research methodology used in the study. It describes the methods of data collection, sampling methods and procedures as well as data analysis.

3.1. Description of the study area

3.1.1. Location and Biophysical condition

The study site is located in North Wollo Administrative Zone. North Wollo is one of the eleven administrations of the Amhara National Regional State (ANRS). Its capital Woldia is located 360 Kms away from the capital city of the region, Bahir Dar, and 521 Kms from Addis Ababa in northeast part of the country. Agriculture was dominated by cereal-based farming systems. The zone is one of the drought prone, low potential with severe environmental degradation and known by provoked chronic food insecurity and famines. Currently, in the new administration structure, North Wollo comprises ten rural administrative woredas namely Gubalafto, Habru, Kobo, Wadela, Delanta, Dawnt, Meket, Lasta, Bugna, Gidan and three city administration woredas Kobo, Lalibela and its capital Woldia. The study Woreda (i.e. Gubalafto) consists of thirty-two kebele administrations that surrounded the Zonal capital Woldia. For the rationale of this study Laste Gerado kebele which is the location and site of Lenche Dima Watershed is selected (GWARDO, 2010).

Lenche Dima watershed is located mainly in Laste Gerardo kebele, Gubalafto wereda, North Wollo zone of Amhara Region. It is approximately 20 km from Woldia town. Geographically, the watershed extends from 11049.13. To 11051.57. North latitude and from 39040.07. To 39044.22. East longitude. The watershed drains to Alewuha river and finally into Awash River (Solomon, et al., 1999).

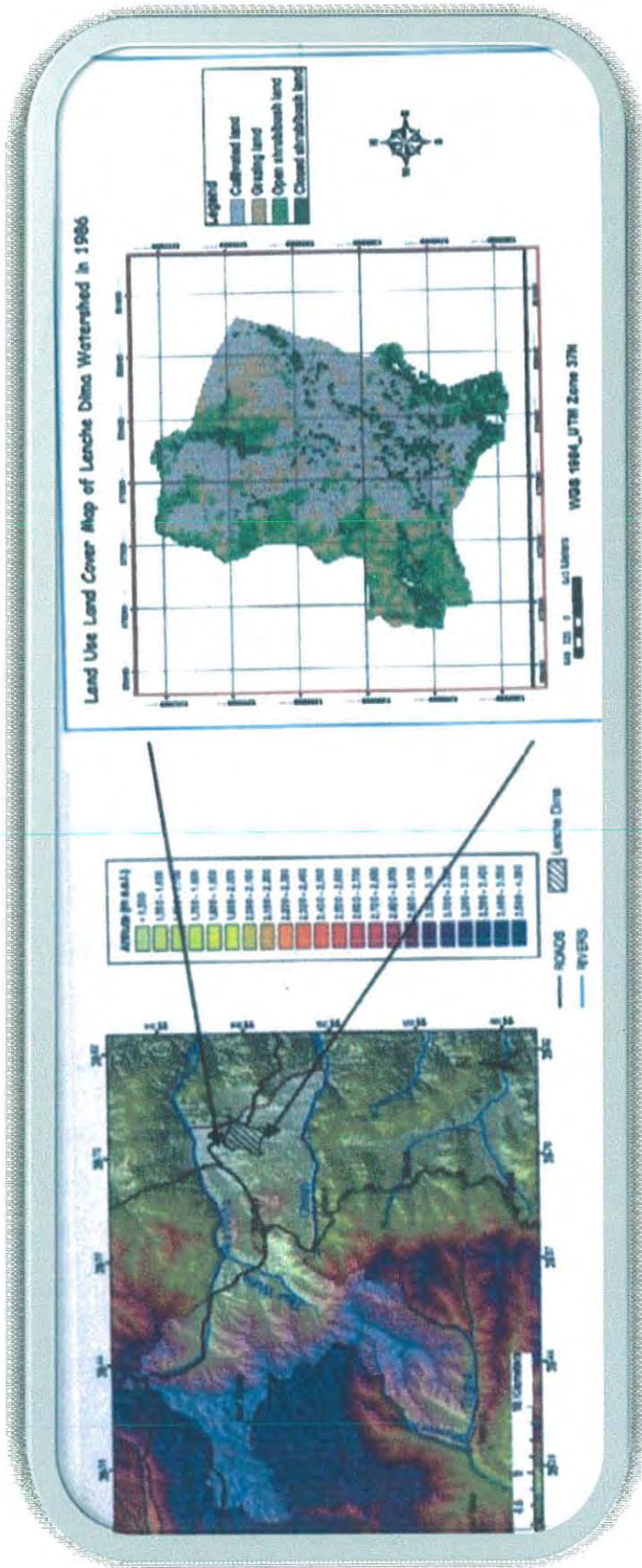


Figure3.1.1. Map of Lenche Dima Watershed

Source: Addisalem 2010

3.1.1.2. Topography, Geology and Soils

The watershed project area is located in the marginal graven of the northeast Ethiopian plateau escarpment in the Afar depression. The geology of the area comprises varieties of trap series rocks, graven fill quaternary sediments and valley-floor later granite intrusions of probably tertiary age. The trap series tertiary volcanic rocks in the area are moderately to highly weathered prophyritic olivine basalt, amygdaloidal basalt, dikes of aphanitic basalt and trachy basalt. The occurrences of the valley floor granitic intrusions are as stocks and dikes. The granite stocks are aligned in straight-line orientation within the valley floor (graven). The quaternary graven fill sediments can be divided into older and recent units. The older unit covers all the plain area and the recent unit is the alluvial deposit that covers the whole length of the middle and lower course of the river and its near vicinity (Solomon, et al., 1999). The hydrological condition of the area is governed by its geology and topography. The basalts of the mountainous terrain are highly fractured. However, secondary carbonate minerals fill the fractures. The composition of the valley fill sediments is salty clay and the topography is very steep. The aforementioned factors are responsible for the absence of springs and streams in the area.

According to Solomon, et al., (1999), the major soils of the watershed are Regosol, Leptosol, Luvisols, Vertisols and Fluvisol. Regosol and Laptosols (locally named as *boda*) are formed on high gradient dissected hills and mountains (> 30% slopes). They cover 507.6 ha. Regosols are the major soils of the upper foot slopes (15-30%) covering 91.4 ha. The soils of the lower foot slopes (8- 15% slope) are characterized by Vertic Luvisols (271 ha). Most of the cultivated lands (3- 8% slope) are covered by Vertisols. Fluvisols characterize the plain area, which receives fresh alluvial sediments almost at regular intervals, (ibid).

3.1.1.3. Climate and Vegetation

The climate in the watershed is characterized by arid and semiarid regions. The altitudinal range of the watershed ranges from 1520 to 1890 masl. Agro-ecologically, the watershed is classified as tepid to cool sub-moist mountains and plateaus (SM2-5). The watershed has a bimodal rainfall pattern with two rainy seasons. The short rainy season includes March, April and May, while the long rainy season falls in July, August and September. The average annual rainfall is 667.2 mm. The rainfall distribution is uncertain. The mean daily maximum temperature is 33 0C (June) and the mean daily minimum is 12 0C (November) (ibid). The vegetation cover described as type of semi arid regions in moisture resistant with scanty bushes, shrubs and woodlots, which dominantly found

in chain hillsides of the watershed. Moreover, the potential trees like *Acacia*, *Ziziphus*, are commonly found in the area (Solomon, et al., 1999).

3.1.2. Socio-Economic Characteristics

The entire population of the watershed belongs to Amhara ethnic group, and predominantly pursues Islamic faith. However, very few in number, there are also some Orthodox Christians.

i).Population

Based on data obtained from Kebele Administration leaders and Agricultural Development Agents/Das in Solomon et al., 2007, household size of the watershed is estimated to be 865. Accordingly, the watershed has an estimated average family size of 3.9 persons with a sex ratio of (Male: Female) 1:0.97. Total population residing in the watershed is estimated to be 3375. Population density is reckoned at 218 people per km². According to reports from kebele administration, the current sizes of the population were estimated to be 4890. However, documents from GWARD, in 2007 the total inhabitants of the watershed is estimated to be 4828, from which 52% are male and the remaining 48% are female. Furthermore, according to CSA, (2009), the population density of *Gubalafto woreda* is 137person per km² and the total area of the watershed were reported as 1546ha with the population density approaches to 312 people per km².

ii).Economic Activity

Agriculture is the major economic activity of households in the watershed. According to Solomon et al., 1999, the farming system of the watershed could be described as a rain fed subsistence mixed farming with little or no cash crops and absence of surplus production. Crop and livestock production dominate the farmer economy. The major crops grown are cereals (sorghum and *teff*), pulses (chickpea) and oil seeds (flax and *Niger* seed). Crop loss due to insect pests is a recurrent problem in the watershed. Moreover, livestock play a major role in agricultural activity in the area. Cattle, donkey, camel, mules, goat and sheep were the major livestock's found in the area.

3.1.3 Infrastructure and Institutions

3.1.3.1 Road access and Settlements

A dry weather road from Woldya to Afar area via Hara passes along the northern border of the watershed. There are also foot trails, which take into the different villages in the watershed. Besides, the settlement pattern of the watershed could be expressed as small hamlets/villages scattered in the hillsides. A total of 15 small villages are found in the watershed. Within the villages, there are about nine ponds, four mosques, one church and water well (Solomon et al., 1999).

3.1.4.2. Markets and Marketing system

As Solomon et al (1999) indicated that, there is no market center in the watershed. However, Hara (the nearest town) and Woldya towns serve once in a week (Thursday and Tuesday) as a primary and secondary market centers. Being linked with the Woldya/Allele Sulula road, Hara town gives better marketing facility. Hara is also a special market for camel and goats. The secondary market (Woldya) offers a relatively better price than Hara market. Despite the price incentive, farmers use Woldya market less often than Hara due to distance and/or transport cost. Prices of agricultural commodities fluctuate between post and pre harvest seasons. Seasonality analysis made on price fluctuation indicates also the negative correlation, which exists between crop and livestock prices. Post and pre harvest prices of crops and livestock are presented in whether they produce surplus or not, farmers are compelled to dispose off (to offer for sale) what they produced soon after harvest and suffer from lack of marketable produce when the prices are high. During the pre harvest season, most farmers are not self-sufficient in food crops. As a result, they often sell small stocks to buy food grains.

3.1.4. Institutions in the Watershed

3.1.4.1. Formal Institutions

i).Kebele Administration (KA)

The executive committee of Laste Gerado KA is responsible for civil/public administration affairs and various development activities. The KA executive committee has a strong cooperation link with Gubalafto woreda council and other sectoral departments at woreda level. It is one of the most influential and effective decision making unit. Its former strong link with the agriculture office of the vicinity is now loose. In fact, any sectoral woreda offices must now pass through woreda council when they want to contact the KA and respective communities. Political and administrative matters are now dominating the KA's duties and responsibilities. For administrative and or political purposes the KA is further divided into sub-KAs (Solomon et al., 1999).

ii).Kerbele Justice Committee

It is a judiciary branch of the Gubalafto woreda judicial office. In civil cases, they are vested with authority over those not exceeding Birr 500. In criminal cases, their jurisdiction revolves around minor conflicts. Moreover, the informal religious leadership such as *Sheh Lega* and *Abugar* who

have no formal authority vested in them but have the most effective power of influence and credibility. They play significant roles in maintaining peace and order in a society and are traditionally vested with informal authority to influence the community's belief and actions (Solomon et al., 1999).

iii). Agricultural Development Organization

According to Solomon et al., 1999 institutions, which support agricultural and natural resource development in the watershed include Gubalafto woreda agriculture office and DA centers (Hara Sybilcay and Laste Gerado). These institutions through supervisors, subject matter specialists and DAs in particular pursue rural development activities in general and agricultural extension services. At grass root, level three DAs (two at Hara and one at Lastie Gerado) are assigned. In addition to these, currently, one DA center was established in Lenche Dima sub Kebele Administration. At woreda level one supervisor is assigned to oversee activities of DAs. Moreover, subject matter specialists provide training services for DAs.

3.1.4.1. Traditional Associations

According to Solomon et al., 1999 *Kire* and *Jigie* identified as the major traditional associations established by the community. *Kire* is a traditional voluntary association established on village basis for mutual social benefits. A single village may form one or two kire or more villages may form a single kire. Formation of kire among others is a function of religion, i.e., it is an association of people of similar religious persuasion. Kire is formed to perform the following activities: mobilizes and coordinates the community to participate in burial ceremonies; coordinates the community in weeding activities; coordinates and mobilizes the community to participate in the construction and maintenance of ponds; organizes and arranges the community into prayer groups in times of misfortune such as occurrence of drought and epidemics a total of five *kires* with administrators are established in the watershed. Moreover, another traditional association is *Jigie*. It is a labor association formed voluntarily by a group of farmers for mutual assistance in agricultural activities (weeding and harvesting/threshing). *Jigie* may be formed among relatives, friends, or neighbors. Unlike *wonfel*, "reciprocity" is not a rule.

3.1.5. Social Service Institutions

3.1.5.1 Health institution and Education

i) Education

Level of literacy is used as a means to estimate the potential flexibility of a society to change (Addisalem, 2010). It also measures the openness and confidence of the society to adopt new technologies of production and other agricultural technology especially in the rural setting (ibid). According to the project base line illiteracy level in the watershed are 46%for men and 65% for women. Primary enrollment for male is 71% whereas females exhibit a slightly higher figure at 76% (Descheemaeker, 2008, in Addisalem, 2010). the general trend in enrollment rates shows a declining trend as the level of education go higher from first to second cycles of primary education and to high school. There is one elementary school in the watershed. Established in 1963, Hara Elementary School which incorporated students from grade 1 to 8. The data from the school's shows that there was 1261 student has registered at schooling. From the total number of students, 657 of students were first cycle (grade1-4) and the remaining 604 were students in the second cycle (grade 5-8). On the other hand, the numbers of students registered in Hara High School were 162. The following figure shows the distribution of educational level by sex.

Table 3.1. Distribution of Number of Students in the Year 2009/10

GRADES	Male		Female		Total	
	N	%	N	%	N	%
1 st cycle (Grade 1-4)	346	52.7	311	47.3	657	100
2 nd cycle (Grade 5-8)	363	60.1	241	39.9	604	100
Grade 9-12	104	64.2	58	35.8	162	100
Total	813	57	610	43	1423	100

Source: Gubalafto Woreda Educational Administrative Office.

ii) Health Service

With regard to health facilities, in the watershed there is one government health post and four private clinics which is located in Hara town. Malaria is the most common diseases in the watershed particularly residents around at Alawuha River. As Addisalem 2010, confirmed that most of the farmers in the watershed didn't go to this avail clinics unless it is an emergency case due to high service charges of these private clinics

3.1.6. Patterns of LULC

the major land use and land cover types in the PA are cultivated land, settled land, grazing land, infrastructure, land held by various organizations and institutions such as schools, health facilities, mosques, shops, and cafes (Solomon, et al., 1999, Addisalem, 2010 and Lastie Gerardo Kebele Administration, 2002). There is a total number of 1348ha. (54%) of cultivated lands in the PA. Out of the total 54% of cultivated lands, 8.8% were irrigated lands and 45% were used as rain fed. furthermore, 345ha (21%) trees. from the total lands covered by trees 175% (32.1%) were constituted in the rehabilitated hills and mountains. settlement and institutions is also one of the major land use type in the area. which covers 300ha (12%) of the total share of land use type. besides (6.2%) and (3.6%) also lands covered by gullies and barren lands and communal grazing respectively. The following figure shows land allocation across different land uses.

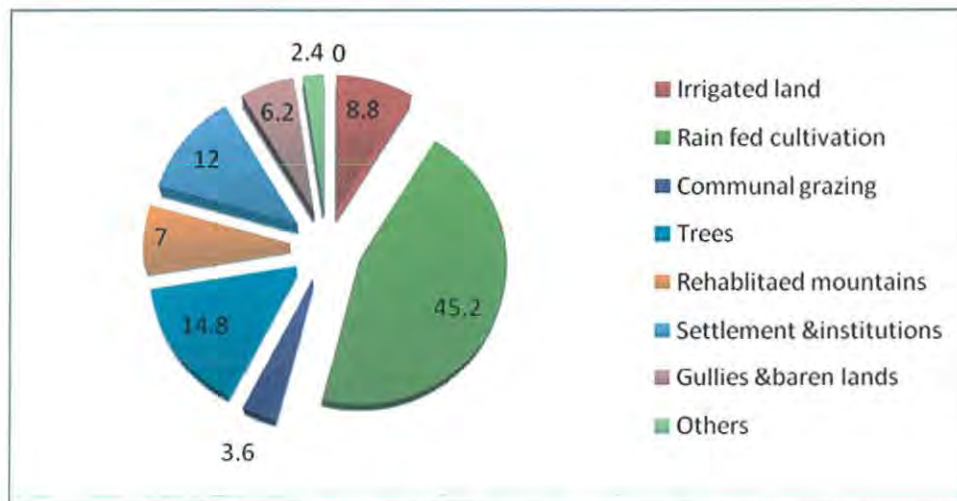


Figure 3.2 LULC in the Lenche Dima Watershed

Source: Lastie Gerardo Kebele Administration

The following section presents the methodological parts in which the study has been conducted.

3.2. RESEARCH METHODOLOGY

3.2.1 Research Design

The nature of the problem dictates the methodology of the study. The current study aims at assessing the various factors affecting and mitigating the existing resource conservation and rehabilitation based on community participation on the study area. As the study was conducted at a particular time and focused in depth-survey of the interaction of dependent and the prospective independent variables at the research due period, hence it had been commanded methodologically

cross sectional research design at the basis of case study. In addition to this, the study employs a combination of data analysis techniques; where both qualitative and quantitative methods of data analysis were employed as a strategy. Such methods were helpful to find adequate information to get households, groups and other stakeholders/institutional views on the issue in that particular area.

3.2.2 Sample Selection

3.2.2.1 Selection of the Study Area

The study site was purposively selected on the basis for the appropriateness to identify factors that constrain the degree of community participation at the established participatory watershed management at Lenche Dima Watershed project intervention. Integrated watershed development approaches were adopted as a strategy for agricultural development in the region. Lenche Dima Water Shed is one of the pilot projects of the regional government. The watershed management project was undertaken with the help of donor project and after its intervention, reports shows that it has demonstrable effects with its five years term of project implementation. Even though, its intervention on watershed management project shows some successful outcomes, the problem lies following the project termination. Currently, the report from woreda agricultural office and local government in the watershed indicated that, following the project withdraws the sustainability aspect of community management with the remaining stakeholders' roles become questionable in the area. This becomes an emphasis of this study with the experience of the approaches of the watershed management project. Moreover, experiences tell us particularly in Ethiopia, one of the major problems of understanding project intervention were lack of impact assessment following the withdrawals of the project intervention. This is also true in lenche dima watershed, in which no one can conduct the impact assessment of its changes and its sustainability aspects of participatory resource management.

Therefore, this study is an assessment following to the project termination and taken as one of an impact assessment of the approach of the project intervention. In addition, prior to this study, some were try to assess land use and land cover changes with different research approaches such as satellite maps survey e.t.c. however, their major emphasis were inclined to assess on the drivers of land use and land cover changes following the intervention. These types of studies give little emphasis to the participatory approaches of the project. This study becomes new in its subjective aspect, specifically the issue of community participation in natural resource management at Lenche

Dima watershed. Besides, the accessibility and the familiarity of the researcher to the issue on the area also considered for the selecting and conducting the study on the particular area.

3.2.2.2 Survey Population

According to Solomon et al., (1999) majority of the population on lenche dima watershed are farmers' that use the natural resources as their means of livelihoods like farming, fuel wood collection, and animal feeding e.t.c. Due to the long term interaction of farmers' with their surrounding resources, the resource degradation and the reduction of the level of production of farmers will leads to the needs of conservation and had been the focal site of the watershed management project. This research supposes that the assessment based on the existing local farmers who had the empirical knowledge on the issue might good result to the win-win finding of the study. Therefore, the central survey population of this research is the local communities or farmers who are participating on the management practices and which are included on the water shed development site. Moreover, as NRM involves the direct and indirect negotiation of actor players and stakeholders, the survey of this study considers the role of gender, community based organizations, local government administrations, and Woreda Agricultural Office and other concerned GOs and NGOs in the study area.

3.2.2.3 Nature and Sources of Data

Both primary and secondary data were collected from different sources at different levels. Quantitative primary data were generated through household survey, focus group discussions, individual in-depth interviews, and formal and informal discussions with farmers, DAs and departmental heads of WoA, concerned NGOs and other relevant actor directly or indirectly involved in the watershed management practices. As to the secondary data, information were gathered from books, journal reviews, reports, project documents and research papers. Given the purpose of qualitative method, which was to supplement the formal survey, different methods of data collection tools were employed in order to reach point or points of consensus. Group discussions, key informant interview and informal discussion were among the employed tools. Personal observation was at the heart of the whole process.

3.2.3 Sampling Frame, Sampling Techniques and Sample Size

3.2.3.1 Sample Size

To make the sample more representatives, the data was collected from direct participants who are the households and other stakeholders with considerable size. There are several approaches, which applied to determine the sample size of a given study. This include using a census, for small populations intimating the sample size of similar studies, using published tables and applying formulas to calculate a sample size(Derbew, 2009). This study applied a simplified formula applied by Yemane (1967) cited in

Derbew (2009). To determine the required sample size at 90% of confident level based on the following formula

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

n-is the sample size

N- Total population (total size of households)

e-the degree of precision (0.1)

$$n = \frac{(865)}{1 + (865)(0.1)^2} = 96$$

In this regard, according to Gubalafto Woreda Agricultural office, the total population of the watershed has estimated to be 3375 with 865 households. Based on the above formula the sample size of the study has found to be 96 households. Even though , there is as observable homogeneity of the characteristics of households(conducted at one rural kebele) as well as due to resource and time constraints, in order to increase the reliability of the data, approximately 10% of the total households i.e. 120 household respondents were supposed to be the representative sample size of the research.

3.2.3.2 Sampling Techniques

In order to make the representative sample, this thesis identifies the sampling unit as individual households. Based on this, the researcher also considers the characteristics of different segments of a sampling population (male, female, different stakeholders (at woreda and Kebele level) and positioned groups such as agricultural experts, NRM experts, and agricultural researchers in the research center, woreda organization and local community and kebele leaders). The sampling technique has made based on the list of households (name, sex and age) at the kebele

administration. Thus, both simple random sampling for the targeted household survey and purposive proportionate sampling for other targeted stakeholders (GWARD, research center, environmental protection unit, development agents, kebele administration and got leaders) with different segments were applied appropriately as sampling methods of the thesis.

3.2.4 Data Collection Methods

In order to meet the objective of the study, data collection methods were applied both data collection methods were applied at both the pre test and preliminary data collection due. The data collection method has found to apply at both the face of data collection in the red and preliminary data collection methods and materials. This is because data collection techniques are different in both circumstances. For this thesis, household survey, key informant interviews, focus group discussion and field observation were the main data collection methods for the study.

3.2.5 Data Collection Tools and Sources

3.2.5.1 Questionnaires

In order to have a clear, relevant and representative data on the study area in line with the problem under discussion, and to get basic information on the nature of the problem and method to be used, questionnaires (both include open and closed ended questions) were prepared. For the easiness and facilitation of data collection of the study, the questions were translated in to the local language 'Amharic' and that were used for the formal basis of data collection material. The open-ended questions were designed to address the opinions, suggestions and feelings of the respondents' and the variables that are not fully hand over by the researcher. The close-ended questions were used to prepare in which the researcher are delimit full knowledge of the boundary of the questions and are prepared on the form of choices. Overall, both open and closed ended questions were prepared for the survey households and structures and semi-structured questionnaires were designed for other woreda and local level stakeholders, as well as focus group discussions and interviews targets appropriately to this research.

3.2.5.2. Pre Testing

In order to have the overall features of the nature of the problem and the conditions of the study area as well as to have pre information about the study area, a pre- test of the instruments of the study were conducted. This pre testing were believed to be a basic strategy for a better development the formal survey of the thesis. Pre-test of household survey assessment (field observation and

discussion by using pre-planned questionnaires with randomly selected households, local administrators, experts and other stakeholders were made at the study area. In addition, the survey was also made to relevant personnel's on the issue such as Woreda Environmental and Natural Resource protection officials, Kebebe Administration Srinka Agricultural Research Center, Woreda Agricultural officers and professionals and other related GOs and NGOs. Therefore, this were an important method for the clear overview of the current conditions about the area before the formal survey has been conducted at face.

3.2.5.3. The Field Procedure

After the formal data collection tools for all data collection methods has been totally developed and finalized, the next step were conducted a survey by all appropriate data collection methods in the study area. Before the actual survey were undertaken, one day training for selected enumerators were given. Moreover, for the facilitation of data collection activities, discussions were done with WoARDO, the development agents, got leaders and kebele administration. Starting from initial survey up to the end of data collection activities, supervision and interviews as well as focus group discussion had been undertaken by the researcher. The day-to-day field assessments and reports by enumerators and researcher were summarized and documented.

3.2.5.4 Key Informant Interviews

In this case, both semi-structured and key informants interviews were undertaken. The advantages semi structured interviews are that these provide a rich source of data in a short space of time, thus being relatively effective with respect to time and cost. The farmers included stimulate each other to recall experiences and debate different point of view. Thus the approach allow the participants more scope to investigate what the community know and follow up topics of interest as they arise in the discussion, and were made with groups and individuals. A wide range or mix of criteria can be applied to select participants: gender, age, level of education, area of residence, socio-economic status, size and nature of land holding etc.

Moreover, experts and professionals at different organizations those who were identified as having special knowledge and contribution of the issue under study were interviewed. Under this method, the pre planned checklist were practiced for those selected as interviewed and the respondents are selected through purposive sampling (individual households from the community, community elders, GWARD, research center, environmental protection unit, development agents, kebele administration and got leaders). Interviewed notes are review after each interview.

3.2.5.5. Focus Group Discussions

This also provides basic information about the study area. Group discussion were conducted among the community, and the targeted organizations, such as Woreda Environmental and Natural Resource protection officials, Kebele Administration, Woreda Agricultural officers and other related GOs and NGOs. Thus, this was practiced through keeping the balance and composition of participants under discussion. This were also assisted with semi- structured checklist as an instrument to facilitate and make easy of the discussion. Generally, focus group discussion were targeted among 10 randomly selected households as well as 1 representatives among the concerned agencies (GWARDO, research center, environmental protection unit, development agents, kebele administration and got leaders) that is 6 and totally 16 participants were included. At the end of each discussion, field notes were reviewed.

3.2.5.6. Field Observation

A systematic field observation is a basic component of the survey to maximize the reliability of the data. In this regard, the physical nature of the topography, agro-ecology of the area, the nature of land use and covers, the structure of the natural resources and the existing socio- economic condition of the area were considered at the field observation. This was practiced with some selected local farmers, experts and Development Agents in the area. Finally, the enriched data from the observation were summarized and reviewed.

3.2.6. Methods of Data Analysis and Interpretation

After both qualitative and quantitative data have been collected properly, to facilitate meaningful analysis and interpretation, on the type and structure of the data, data coding and cross tabulation has been made. On this basis, the meaning and implication of results were described, defined and explained as well as quantified based on the strategy of analysis. Thus, this strategy of analysis i.e. quantitative data are analyzed through statistical tools like mean, ratios and percentages e.t.c. and the qualitative data are further interpreted and justified through narration, description and explanatory. Moreover, in order to see the relations of variables (dependent and independent); the quantitative data has also be analyzed through person's chi squares, creamer's v, Phi coefficient correlation: mean tests, multivariate analysis (ANOVA). Statistical package for social sciences (SPSS-16) were used as a foundation for the analysis of the research.

3.2.7. Definitions of Variables

Once the analytical procedures and their requirements were known, it is necessary to identify the potential explanatory variables and describe their measurements. Therefore, this part was treated in two divisions.

3.7.2.1. Dependent variables

The basic notion of participatory Watershed management project is the involvement of communities especially poor, marginalized and disadvantaged members of the community in the process of conservation activities and governance system. As a result, the involvement of participants in the WMP would be made by involving all members of the community to ensure that all groups have a chance to participation. In the planning process, participation made by the community were vary in different levels of watershed management project cycle. Even though, it is not practical, in participatory development approach particularly in watershed management, the community should expected to participate at least equally in all planning process. According to the average weight index calculated in Table 4.15. households were highly participating at **Implementation** during the watershed project and the lowest scores of participation are observed after the withdrawals of the project i.e. in **Maintenance** of conservation activities. These two extremes are significantly assumed as measure and able see different factors affecting levels of community participation to this study. Moreover, participation in implementation at the project time of conservation practices shows nature of participatory approaches from its ground and participation at the continuous process of maintenance of practices that had been undertaken during the project was assumed to assess factors that associated with hinders in sustainability of community participation in the watershed management. Thus, to assess the genuine participation of the community during the project time households participating during the implementation process used as one stage of dependent variable and sustainable community participation on the other hand, are analyzed based on the participation levels of households in the continuing contribution of the maintenance process. The dependent variable for this analysis are grouped in to two groups in the planning process and hence, a value 1 represents participant groups. A value 2 was assigned to represent non-participant groups in these two levels of dependent variables. Refer table 4.15.

3.2.7.2. The Independent Variables

The independent variables of the participation decision study are those, which are expected (hypothesized) to have association with the participation nature of farmers in natural resource conservation in the watershed.

Different researchers came up with different results as to what factors can influence farmers' levels of participation in NRM practices. Some mention the socio-economic factors as the leading. Sambrook and Akhter (2001) identified a marked association between socio-economic characteristics of the household and the practice of communities in conservation intervention. Others list out the knowledge of farmers on natural resource degradation, farmer's attitude to the watershed project benefit institutional and approaches of participation in management practices as a determinant factor, and others still consider a combination of socio-economic and institutional. Despite their differences in relative weighting of factors, most researchers (FAO, 1994) considered the socio-economic, cultural and technological characteristics, institutional as well as approaches of projects in participatory interventions were the decisive factors for community participation in natural resource management activities.

To mention some, during the project implementation phase, household characteristics (age, education level, family size, farmers knowledge, sex and so on), farm characteristics (crop production, labour availability, farm size, etc), and institutional arrangements (frequency of development agent contact, availability and adequacy of credit facility, etc) are some of the influencing factors of households participation. Moreover, for the sustainability aspects of participation (farmers attitude to the benefit from conservation, land tenure, technical assistance, stakeholder cooperation and so on) are to be considered. The next chapter presents the results and discussions of the study.

3.2.7.3. Specification of Analysis of Descriptive Statistics

While identifying the dependent and independent variables, specification of descriptive statistics to which the analyses were made is explained appropriately. This is particularly important to see the relationships of the dependent, which are the levels of participation with that of explanatory variables with the better prediction and estimation of the results. Therefore, the following specified descriptive statistics were the basis for the analysis of the study.

Chi-Square

Chi-square is one of the most commonly used nonparametric tests. The test can be conducted with variables measured at the nominal level. Relationships between two or more variables can be studied by using correlation, regression and Chi-square test. When the variables of interest are continuous and normally distributed, correlation and regression are appropriate, but if the variables are categorical in nature Chi-square test is more appropriate. Chi-square test is a very general test that can be used whenever we wish to evaluate whether or not frequencies which have been obtained differ significantly from those which would be expected under certain set of theoretical assumptions. It can also be used to determine whether the observed proportions differ significantly from a priori or theoretically expected proportions.

The Statistic used in these tests is:

$$\chi^2 = \sum \frac{(O_f - E_f)^2}{E_f} \quad \text{Degrees of freedom (df) = (R-1)(C-1)}$$

Where O_f = Observed frequency in the category

E_f = Expected frequency in the category

Like the t-distribution and the F-distribution, the Chi-square distribution is really a series of distributions, each with its associated degrees of freedom. However, unlike others, the degree of freedom for Chi-square does not depend on the sample size. It is completely unrelated to the number of scores in the sample but it is related to the number of categories.

Pearson Product Moment Correlation Coefficient (r)

The product-moment correlation coefficient is a descriptive statistic of the magnitude of the relation between two variables. A variety of formulas may be stated for calculating product-moment correlation coefficient. In computational situations and when you have raw data it is useful to use the formula for the correlation coefficient expressed in raw-score form, that is, in terms of the original observations. This formula is as follows:

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Other formulas can also be used to calculate the Pearson's correlation. The formula for correlation in deviation - score form is:

$$r = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}} = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$$

Phi coefficient (ϕ)

The special case of the Pearson r when both variables are discrete dichotomies is the Phi coefficient.

It is possible to determine the correlation coefficient for the data using Pearson r. However, Phi coefficient indicates more clearly the relationship between these variables than Pearson r. We can categorize the data into a 2x2 bivariate frequency table. The table is commonly referred to as a 2X2 contingency table. The numbers in each of the cells of the contingency table are frequencies.

$$\phi = \frac{BC - AD}{\sqrt{(A+B)(C+D)(A+C)(B+D)}}$$

The t - test

In case the sample size is small ($n < 30$) and the population variance (σ^2) is unknown it is the best test statistic. The t – statistic can be computed using the following formula:

$$t = \frac{\bar{X} - \mu}{\frac{s}{\sqrt{N}}}$$

Hypothesis to be Tested in One Way ANOVA

In ANOVA we test a null hypothesis about means by testing variances. That is, the ANOVA procedure is based on a mathematical proof that the sample data can be made to yield two independent estimates of the population variance (within group variance estimate and between group variance estimates). The hypothesis to be tested here is there is no difference between group means.

$$H_0: \mu_1 = \mu_2 = \mu_3 \dots = \mu_k$$

H_1 : H_0 is not true

The effect of the treatment can therefore be determined by computing the F ratio.

$$F = \frac{\text{Between - group variance estimate}}{\text{Within - group variance estimate}} = \frac{MS_B}{MS_W}$$

Computation Formulas

To simplify the notation,

- Denote the sum of all the observations in the j^{th} group by T_j . Thus

$$\sum_{i=1}^{N_j} X_{ij} = T_j$$

- Denote the sum of all observations in all groups by T . Thus

$$\sum_{j=1}^J \sum_{i=1}^{N_j} X_{ij} = T$$

$$\text{Thus: } SS_T = \sum_{j=1}^J \sum_{i=1}^{N_j} X_{ij}^2 - \frac{T^2}{N} \qquad SS_B = \sum_{j=1}^J \left(\frac{T_j^2}{N_j} \right) - \frac{T^2}{N}$$

$$SS_W = SS_T - SS_B \quad \text{OR} \quad SS_W = \sum_{j=1}^J \sum_{i=1}^{N_j} X_{ij}^2 - \sum_{j=1}^J \left(\frac{T_j^2}{N_j} \right)$$

ANOVA Summary Table Interpretation

Values of F less than 1 would automatically indicate that H_0 should be retained, since the between group variance estimate is less than the within group variance estimate. If H_0 is true, there is not treatment variance and the between group and within group variance estimates will be approximately equal. ANOVA is appropriate whenever you want to test differences between the means of an interval – ratio level variables across three or more categories of an independent variable. Instead ANOVA, why not just do t -tests for all the pairs? The t -test tells us if the variation between two groups is "significant". Multiple t -tests are not the answer because as the number of groups grows, the number of needed pair comparisons grows quickly. ANOVA puts all the data into one number (F) and gives us *one* p for the null hypothesis.

CHAPTER FOUR

4. RESULT AND DISCUSSION

This chapter presents results and discussions that were the foundations of this study. The first section of this chapter is dedicated to explaining the socioeconomic characteristics of sample respondents such as demographic conditions and resource ownerships. The second section of this chapter presents land degradation and grazing problems and household's awareness in the watershed. The third section is devoted to explaining community participation and community based organizations as well as factors that constrain the degree of household's participation. Women's participation and factors affecting women's contribution in resource management also presents in the fourth section. Section five and six were also presents NRM in the area and factors affecting sustainable NRM and the watershed household's perceptions and benefits from NRM activities undertaken. Moreover, section seven and eight finally analyses stakeholder's contribution and sustainability, property rights and policy support.

4.1. Demographic Characteristics of Sample Households

Demographic characteristics of households determine the nature and levels of participation in natural resource management as well as it have a contribution factor on the pressure at the existing resources. Availability of labor with compromising quality also has the most crucial indicators of the contribution in the conservation activities. Moreover, sex and age structure as well as their income and educational level of individual households have the determinant role on conservation and participation. This part of the discussion is therefore devoted to the analysis of the major demographic of the sampled household based on the collected data on the survey. The major demographic variables like age, sex, educational level, marital status and family size of the sample households are thoroughly discussed.

4.1.1. Sex Marital Status, Ethnicity and Religion of Household Respondents

As it can be illustrated from the Table 4.1 below, out of the total 120 sample household heads 84 (70 %) are male and 36 (30 %) are female.

Table 4.1. Characteristics of Sex and Marital Status of Sampled Households and their Participation

Demographic		participated		not participated		Total		<i>M</i>	<i>SD</i>	<i>x</i> ²	<i>p</i>
		(<i>N</i>)	%	(<i>N</i>)	%	(<i>N</i>)	%				
Sex	Male	80	95.2	4	4.8	84	70.0	1.17	0.734	0.439	0.000*
	Female	20	55.6	16	44.4	36	30.0				
Marital status											
Married		90	83.6	18	16.4	110	91.7	1.12	0.441	2.18	0.336
un married		6	100.0	0	0.0	6	5.0				
divorced		3	80.0	1	20.0	4	3.3				

X2 marital status and Cremer's V for sex *at0.01confidence interval

Source: Survey 2010.

Moreover, as illustrated from Table 4.1, out of the total interviewed farmers 91.7% are married. On the other hand, 5% was single, 3.3 % are divorced with a mean of 1.12 and a standard deviation of 0.44. The entire population of the sampled households in the watershed belongs to Amhara ethnic group and predominantly 94.2 % of the respondents pursue Islamic faith. The remaining 5.8% of the households are Orthodox Christians. According to chi square result in Table 4.1 there is a significance relationship between sex and participation ($\chi^2 = 0.439$, $p \geq 0.01$). The data implies those males are involved in conservation than female. However, for the participation of the households, their marital status doesn't matter whether they are participated or not even though the majority of households participated in conservation practices are married ($\chi^2 = 0.216$, $p = 0.336$). Moreover, this revealed that martial statuses of households are not importantly determining their levels of participation.

4.1.2. Age and Family Size of Sampled households

According to the age structure of the respondents, 52.5 % of the household respondents lie with the age category of 30-64years; and the rest of 32.5 %, 10% and 5% of the households are within the age category of 15-29years, above 64 years respectively with an average age of 36.63 years and a standard deviation of 2.12. The minimum and maximum age of respondents is 17 and 79 years consecutively. This indicates that the adult and the youth constitute the significant segment of

households' participation in management activities. Moreover, as shown in Table 4.2 below, the majority (49.2%) of households have large (above 7) members of households. Besides, 30.8% of the family size of the sampled households has a family size of medium (5-6) members; and the remaining 20% of households are categorized small (1-2) family members. The average family size of the sample household is 4.94, with the minimum of one and the maximum of eight members of the family size.

Table 4.2 Households Age and Family Size Characteristics and Participation

Demographic		Participated		Non- participated		Total		<i>t</i>	<i>sig.</i>
		(N)	%	(N)	%	(N)	%		
Age	Below 15	1	16.7	5	83.3	6	5.0	6.98	0.000*
	15-29	35	89.7	4	10.3	39	32.5		
	30-64	55	87.3	8	12.7	63	52.5		
	above 64	9	75	3	25.0	12	10.0	8.74	0.000*
Family size/ Small(1-3)		11	45.8	13	54.2	24	20.0		
Medium(4-6)		30	81.1	7	18.9	37	30.8		
Large(above 7)		59	100.0	0	0.0	59	49.2		
		Mean	SD	Mean	SD	F		<i>sig.</i>	
Age		2.48	0.89	1.35	0.49	5.1		0.026**	
Family size		2.72	0.637	2.45	1.1	16.8		0.000*	

*at 0.001 percentage, **at 0.005% confidence interval /Source: Survey 2010.

Descriptive result from Table 4.2 shows that with 95% confidence level there is a significance variation of age with participation ($F = 5.1$, at significance level less than 0.05) and ($t = 6.98$, $p = 0.000$) with a mean for participants (2.48) and standard deviation (0.089) and non participants mean and standard deviation 1.35 and 0.49 respectively. When age of farmer's increases, their participation level in conservation practices also increases and in participation the number of older farmers is higher than those of children and young. In sum, the level of participation varies according to age of farmers positively. Moreover, there is also appositively variation of family size of households and their participation in resource conservation activities in the watershed. This implies when the family size of households increases their probability to involve in conservation increases. The result of equality of variation i.e. mean variation shows ($F = 16.8$, 0.000, and $t = 8.74$, 0.000).

4.1.3. Educational Level of Households

As educational status of a household head increases, it is assumed to increase the transfer of relevant information and as a result increase farmers' knowledge about the cause, severity and consequence of land degradation and become active for the natural resource management approaches particularly for their intensive adoption and sustenance. Moreover, Education enables farmers to be active participants on the issues that affect them. It is also a means and essential to tackle land degradation using various ways of soil fertility improving practices, traditional and introduced soil conserving technologies in appropriately.

Table 4.3. Characteristics of Households Educational Status and Participation

Educational status	Participated		Non- participated		Total		<i>t</i>	<i>sig.</i>
	(N)	%	(N)	%	(N)	%		
Illiterate	39	81.2	9	18.8	48	40.0	-0.430	0.672
Reade& write	37	86.0	6	14.0	43	35.8		
Grade1-4	20	83.3	4	16.7	24	20.0		
Grade5-8	4	80.0	1	20.0	5	4.2		
	Mean	SD	Mean	SD			F	sig.
	1.91	0.854	2.00	0.858			0.315	0.576

*at0.01,**at0.05&***at0.1confidence interval

Source: Survey 2010.

As illustrates in Table 4.3., from the total sample households it was found that higher numbers (40%) of household heads are illiterate. However, 35.8% of the households are able to read and write through informal and formal education followed by 1- 4th grade and grade 5-8, 20 % and 3.2% respectively which are identified as households with formal education above. Despite the fact that rural areas are as it is usually known by unequal development of men and women particularly in education, women take the lion's share of the illiterate population. From the total 36 sampled female heads 15(44.12%) of them are illiterate, in relation to that of male heads 33(39.29%). Similarly, as it is depicted from the above table disparities are observed in all levels of education. The above Table, 4.3, illustrated that, there is a negative and weak relationship between households literacy and their levels of participation($r=-0.43$, $p=0.672$). This is confirmed that, farmer's educational

status has not significant effect on their participation. When the educational levels of farmers in the area increases, their level of participation in the management activities becomes decline. However, their level of education is not significantly determined their levels of participation as the majority of households in the watershed are illiterate. In many rural parts of the country when farmers become literate, they expected to engage in other local government and leadership activities than contributing labor for conservation. Moreover, there is little variation of educational status between households who are participate in conservation with that of not involved ($F=0.315$, $p= 0.576$).

4.1.4. Households Major Sources of Incomes

In many rural parts of Ethiopia, it is common that the major sources of their income are depending on agriculture. However, agriculture as a part of major sources of income may vary according to variation in agro-ecology and natural resource endowment such as soil, water, forest e.t.c.in the area. Households in the watershed engaged in different on and off farm, activities to sustain their means of livelihoods though their major incomes in the farming economy were highly associated with agricultural production Major sources of income of farmers in the study area are shown in Table 4.4. below.

Table 4.4. Households Major Sources of Incomes and their Characteristics of Participation

Major income Sources	Participated		Non- participated		Total		χ^2	sig.
	(N)	%	(N)	%	(N)	%		
Crop production	7	63.6	4	36.4	11	9.2	3.4	0.066***
Charcoal & fuel wood selling	6	85.7	1	14.3	7	5.8	0.03	0.670
Livestock rearing	13	65.0	7	35.0	20	16.7	5.81	0.016*
Mixed farming	94	84.7	17	15.3	111	92.5	2.05	0.163
Trading	8	80.0	2	20.0	10	8.3	0.087	1.000

*at0.01&** 0.05 confidence interval

Source: Survey 2010.

As the above Table 4.4. illustrates that, 92.5% of households confirmed that mixed farming (both crop and cattle rearing) is their major sources of livelihoods. However, livestock rearing (16.7%).

crop production (9.2%), trading and engaged in other activities like labor (8.3%) as well as fuel wood selling (6.2%) to the nearest urban town also have a contribution source for households income respectively. In Table 4.4 above shows that there is relationships of households as their major sources of income were crop production and livestock rearing with their participation in management activities ($\chi^2 = 3.4$, $p \geq 0.1$) and ($\chi^2 = 5.81$, $p \geq 0.05$) respectively. When farmers were dominantly practices this activities their dominantly existence around their farms were evident than those who involve in other sources of income activities. At communal activities farmers who dominantly practiced livestock rearing were highly contribute in participation of grazing management activities to secure better line share of benefits like fodder and grass.

4.1.5. Household Characteristics of Resource Ownership

4.1.5.1. Land Holding

Land is the main asset of farmers in the watershed as crop production and cattle rearing are the major livelihoods base. In this sense the well being of the land is a vital one. This indicates that both the participation and conservation intervention designed to address the land degradation problem of small holder farmer's interest and should consider the land holding size as an important component of participatory management approaches. Table 4.5, presents lands holding of sampled household in hectare.

As indicated the Table 4.5. below, based on the size of their farmland households plot size varies from 0.25ha to 5.0ha. The major 29.2% household plot sizes found in 0.6 to 1 ha. Moreover, the remaining also categorized at 1.1-1.5.00ha (20.8%), 0.25 to 0.5ha (18.3), 1.6- 2.0 (14.2%) and above 2.1ha.(3.3%) with the mean of 1.42 and a standard deviation of 1.083. The minimum and maximum plot size of the sampled households is 0.25 ha and 5.0ha respectively. The average land holding of Ethiopia and Amhara region in 2002 was 1.412ha and 1.115ha, respectively (CSA, 2007). Moreover, out of the total sampled farmers, the majority (102)85% have owned plots. However, the remaining 15% of the sample respondent in watershed were landless. Besides 16.7% and 29.2% and 22.5% of the respondents cultivated farm plot through sharecropping and rent-in and rented-out respectively.

Table 4.5. Households Land Size Characteristics and their Participation

*at 0.01 confidence interval

Land holding	Participated		Non- participated		Total		<i>r</i>	<i>sig.</i>
	(N)	%	(N)	%	(N)	%		
Plot size	22	100.0	0	0.0	22	18.3	0.053	0.114*
0.25-0.5ha.	32	94.1	2	5.9	34	29.2		
0.6-1.0ha	22	88.0	3	12.0	25	20.8		
1.1-1.5ha	13	76.5	4	23.5	17	14.2		
1.6-2.0ha	1	25.0	3	75.0	4	3.3		
Above 2.1ha	10	55.5	8	45.5	18	15.0		
Not								
	Mean	SD	Mean	SD			<i>t</i>	<i>sig.</i>
	2.65	1.45	4.6	1.43			-0.6	0.217*

Source: Survey 2010

Pearson's correlation result in Table 4.5, shows that there is no significant relationship between households farm size and their participation in land conservation practices($r=0.053$, sig. 0.114). Moreover, the mean test variation indicated that there is insignificant variation between participation and their land holding size ($t=0.6$ and probability of 0.217). As participation is based on project incentives, farmers with small and large farm size were equally participate in the watershed management activities. Moreover, this also confirmed agriculture in the area was characterized by low productivity. To fill the gaps of this low level of income from agricultural production will lead farmers to participate with no variation with their plots.

4.1.5.2. Households Owned Number of Plots

The total number of plots increases from time to time due to land fragmentation. The survey result indicated in Annex Table 9 shows that, farmers with maximum and the minimum number of plot holdings per household were 4 and 1 parcels respectively. The average number of plot holdings per household was 2.21 parcels and the standard deviation of 0.86. According to the survey, data out of the sample interviewed about 47.1% have two numbers of plots and 24%, 19.8% and 8.3% sampled households have three, one and 4 number of plots respectively. Moreover, based on the households

interview in the s the minimum and maximum time that the household arrive their plot is 2 hour and 45 minutes.

4.1.6. Farming System

The farming system of households in the watershed was described as a rain fed subsistence mixed farming with little or no cash crops and absence of surplus production. Crop and livestock production dominate the farmer economy. The major crops grown cereals are sorghum and tef, maize, pulses (chickpea) and oil seeds like flax and niger seed. Moreover, the major livestock reared in the area are ox, cow, sheep and goats, donkey and camel.

4.1.6.1. Crop Production

The household respondents in the watershed are growing crops under rain fed conditions. Therefore, the crops grown in the area are highly dependent on the availability of rain in *belg* and *meher* seasons.

Table 4.6. Crop Production Levels of Households (in Quintals)

Crop type	Total production In Quintals	Family Average	Utility		
			Consumed	Soled	Saved
Teff	306.5	2.55	2.01	0.30	0.14
Sorghum	626	5.21	5.04	0.10	0.07
Maize	27.5	0.23	0.20	0.03	0
Chickpea	21	0.18	0.12	0.03	0.03
wheat	6	0.05	0.05	0	0
barley	2.5	0.021	0.021	0	0
Total*	989.5	8.24	7.44	0.46	0.24
Mean		8.25			
SD		4.87			

*Total production is indicated production by the sample households

Source: survey 2010

As depicted from the table below, sorghum and *teff* (100%) and (98.4%) are dominantly produced crops in the area. Moreover, chickpea, maize, wheat and barley (24.2%), (14.2%), (5.8%) and (4.2

%) respectively are also produced. The types produced are highly influenced by the consumption habits of the community. Sorghum, teff (*Eragrostis tef*), maize, chickpea, wheat and barely are the major crop produced. According to the interviews from Woreda Agricultural Office illustrated that the watershed is suitable for the production of high value oilseeds such as sesame and lined which have a better market value than the crops currently under produced. This is an implication for the strong familiarization of farming only as subsistence. This idea is confirmed by survey data showed in Table 4.6., that. the combined annual average crop production per family is 8.25 quintals out of which 7.44 (90%) is used up for consumption. Moreover, based on the key informant interviews and focus group discussions the majority of households revealed that their crop production covers 9 of their livelihood and consumption of their family for a year. This shows that their crop production have 3 months deficit to feed their family in a year.

4.1.6.2. Livestock production

Livestock play a significant role in the mixed farming system of the area. Their main contribution is in providing draft power, cash generation, food (example milk), and as a status symbol. Livestock types kept by the farmers include cattle, sheep and goats. Oxen are kept to provide draft power, cows to provide farm households with milk and butter for consumption and sale, donkeys for transporting goods, whilst sheep, goats and poultry are mainly kept for sale as well as for their meat. The feed sources commonly used for livestock, are natural grazing and crop residues. The contribution of natural pasture as sources of feed is very limited due to the extensive coverage of the land by crops. Consequently, natural grazing for cattle in particular is limited to farm boundaries and the lower slopes of the hillsides. Goats and sheep however, are entirely fed from the natural vegetation in the bushes and hillsides. Results of the survey data have shown an average ownership of livestock as depicted in Table 4.7.

Table 4.7. Livestock Ownership of Household Respondents

Type livestock's	No. livestock's	TLU	Average	SD
Oxen	201	201	1.68	2.78
Cow	135	135	1.13	1.43
Heifer	39	29.25	0.224	0.33
Bull	24	8.4	0.07	0.24
Calf	21	5.25	0.044	0.56
Goat	204	26.52	0.22	3.91
Sheep	63	8.19	0.11	1.73
Mule	2	2.5	0.02	0.13
Horse	1	1.10	0.001	0.012
Donkey	21	14.7	0.12	0.22
Camel	3	3.75	0.03	0.18
Total	878	439.91	3.67	2.81

N.B. (TLU is calculated number of livestock's of households multiplied by conversion factors. see. annex table 8)

Source: survey 2010.

According to the survey result based on calculation at Annex Table 8, household respondents have a total TLU 439.91 with a mean of 3.67 and standard deviation of 2.81. The data also revealed that 60% of household respondents have less than the average livestock resource in TLU. 18% of household's respondents also indicated that there were not posses' livestock's particularly oxen and cow. According to focus group discussion and key informant interviews, women's household heads in the watershed are less and have no cattle resources. From the total households owned cattle 20 % of households have only one ox. Households who possessed only one ox were shared and negotiated with other similar farmers who have only one ox to use draft power for farming this is locally called *mekenago*. Moreover, according to Pearson's chi square result there a positive and significant relationships of households number of livestock's and their levels of participation ($\chi^2=0.342$, $p\geq 0.01$). As the number of livestock's of farmers, they have a high degree to participate in conservation practices.

Table 4.8. Yearly Income Distribution of Households from Food For Work Program

Incomes	participated		not participated		Total		<i>M</i>	<i>SD</i>	<i>r</i>	<i>p</i>
	(N)	%	(N)	%	(N)	%				
In Birr							1.17	0.374	0.94	0.000*
	0	0.0	20	100.0	20	16.7				
0	15	10.0	0	0.0	15	12.5				
50-500										
501-1000	6	100.0	0	0.0	6	5.0				
1001-1500	33	100.0	0	0.0	33	27.5				
1501-2000	42	100.0	0	0.0	42	36.3				
Above 2000	4	100.0	0	0.0	4	3.2				

*significant at 0.01

Source: survey 2010

As illustrated from the above Table the majority 42 (36.3%) of households annual income from participating at project management practices are 1501 to 2000 birr. However, the remaining 27.5%, 12.5%, 5% and 3.2% are 1001 to 1500 birr, 50 to 500 birr, 501 to 1000 birr and above 2000 birr of annual income from participation with a mean and standard deviation of 384.5 and 0.374 respectively. 16.7% of households did not get the benefit due to they are not involved in conservation activities done by the project. This is confirmed by the correlation test that there is highly correlation with their participation. Farmers who get larger income from project incentives tend to participate than who earn relatively low incentives. Moreover, farmers who did not get income from the project are not totally getting benefit from the project. Focus group discussion and key informant interviews also revealed that the amount grain and oil in terms of money were determined by the number of families devoted to involve in the conservation practices and listed and get the benefit independently.

4.2. Institutional support

Farmers' institutional environment has important bearing on the preferred status of the farmers with respect to their participation in natural resource management activities. The important institutional concerns, considered in this study, are market accessibility and agricultural extension (distance to the nearest development center).

4.2.1. Access to Credit by Sample Respondents

Rural credit helps farmers to diversify and increase their income through applying agricultural inputs and conservation technologies and engaged in non farm activities (Derebew, 2009). In the watershed the major sources of credits are ACSI, and cooperatives, and private lenders. In Hara town, one cooperative and ACSI institutions provide credits for farmers. According to the information from the ACSI institution there are different schemes of interest rates for those framers who take credits. 18% of interest for regular credit, 12.5% for revolving funds and 5% interest rates for savings. According to the survey Table 4.9., 19.2% of household respondents are access with credits in ACSI credit institution for the year 2009/10. How ever, the majority (97)80.8% of household respondents did not get credit from this organization. This were supported by key informant interviews and focused group discussions, why they didn't accessed with the credit services and revealed that high number of interest rates and the short time span of returning with one or the year in monthly terms are the cause for farmers that in fear to benefit from the services.

Table 4.9. Relationship between Households s Access to Credit and Participation

	Participated		Not participated		Total		χ^2	sig.
	(N)	(%)	(N)	(%)	(N)	(%)		
Access to credit Yes	16	69.5	7	30.5	23	19.2	3.31	0.219
No	84	86.9	13	13.1	97	80.2		

*0.05 confidence interval

However, Table 4.9, shows that, there is a positive association between farmers' access to credit and their level of participation but not significantly contribute to farmers to involve in participation or did not participate it.

4.2.2. Access to Agricultural Extension Services of Sampled Households

Agricultural extension is of paramount importance to introduce better agricultural practices and improved technologies to smallholder farmers in a country like Ethiopia where traditional practices are dominating. In the study area, like the other district of the region, the office of Agriculture through its technical experts and DAs at community level provides agricultural extension. The agricultural extension service in the study area mainly focused on providing basic agricultural education, teaching, and demonstration about the use of agricultural inputs, natural resource management (forestry development), soil conservation and livestock production aspects.

Table 4.10. The Relationships between Access to Farmer's Institutions and Households Participation

Access to farmers institutions		Community-led conservation WMP							
		Participated		not		total			
		N	%	N	%	N	%	r	sig.
Agricultural extension	Yes	73	73.0	5	25.0	78	65.0	0.41	0.036**
	No	27	27.0	15	75.0	42	35.0		
Distance to DA center								-0.22	0.026*
	Below 1km	18	69.2	8	30.8	26	21.7		
	1.1km to 2km	31	81.6	7	18.4	38	31.7		
	2.1km to 3 km	14	87.5	2	12.5	16	13.3		
	3.1 km to 4 km	25	92.6	2	7.4	27	22.5		
	Above 4.1 km	12	92.3	1	0.8	13	10.8		
Nearest Market distance								-0.207	0.008**
	Below 1km	10	58.8	7	41.2	17	14.2		
	1.1km to 2km	18	85.7	3	14.3	21	17.5		
	2.1km to 3 km	30	88.2	4	11.8	34	28.3		
	3.1 km to 4 km	27	84.4	5	15.6	32	26.7		
	Above 4.1 km	15	93.8	1	6.2	16	13.3		
		M	SD			t		sig.	
Agricultural extension		1.28	.448			0.82		0.415	
Distance to DA center		2.69	1.327			2.42		0.017**	
Distance to market		3.08	1.245			2.3		0.023**	

**0.05confidence interval

Source: Survey 2010

The survey results in the above Table 4.10., indicate that 78 (65%) of the respondents have access to agricultural extension. However, 35% of respondents are not accessed to agricultural extension services with a mean of 1.28 and standard deviation 0.448. Moreover, 31.7% of households are travel to 1 to 2 km to the development center as well 22.5% and 21.7% of households also travel

3.1km to 4 km distance to get the development center with a minimum of 200m and maximum of 6km and mean and standard deviation of 2.69 and 1.327 respectively. Regarding participation, there is a positive and significance relationships between households involved in conservation practices and agricultural extension services. This shows that with 95% confident interval farmers who get extension services are involved in conservation practices than who do not get the services($r=0.41$, $p= 0.036$)($t=0.82$, $p= 0.415$). However, the mean test result shows that there is a variation of participation between households with extension service and didn't get the service but extension service did not significantly influence households to participate or not. Distances of development centers also have a negative relationship between with participation, as distance of development center from farmers village is increased their participation becomes decreased. Moreover, distance of farmers village to development center create variation significantly to their participation, that means farmers near to development center have highly participate than farmers far from the center($r=-0.22$, $p= 0.026$)($t=2.42$, $p= 0.017$).

Distance of the nearest market also has its own contribution for the involvement of households in the management practices. Table shows that the majority (28.3%) of the sampled respondents travels to the 2.1km to 3km to the nearest market center (i.e. Hara town). Moreover, the remaining 26.7%, 17.5%, 14.2% and 13.3% 3.1km - 4km, 1km-2km, below 1km and above 4.1km respectively. The results from correlation test confirmed that there is low but negative and significant relationships between market distance households participation. This shows that, when market distance from farmer's village decreased by one unit, their participation is increased.

4.3. The Current Agricultural Problems in the Watershed

All sample farmers were asked to identify the major problems of agricultural production. The major problems identified by respondents included drought, soil erosion, poor soil fertility, small size (shortage of land), rainfall variability (coming late and going earlier), lack of input supplies and market problems, the adaptation of most cultivated land for inorganic fertilizer and its inability producing without it and high cost of fertilizer and unavailability at the time of cropping, crop failure and sometimes shortage of oxen are also identified as important problems. It was evident that a single plot could have one or more problems that are interdependent and equally important.

Table 4.11. Distribution of Household Responses on Agricultural problems

	Yes		No		Total	
	N	%	N	%	N	%
Shortage of farm lands	103	85.83	17	14.17	120	100.0
Soil fertility reduction	98	81.7	22	18.3	120	100.0
Scarcity of grazing land	68	56.7	52	43.3	120	100.0
Shortage of rainfall	91	75.8	29	24.2	120	100.0
Market problems	58	48.3	62	51.7	120	100.0
High Intensity of Drought	85	70.8	35	29.2	120	100.0
High Intensity of Soil erosion	49	40.8	71	59.2	120	100.0
Shortage of agricultural input	41	34.2	79	65.8	120	100.0
Poor land preparation	35	29.2	85	70.8	120	100.0
Food shortage	36	30.0	84	70.0	120	100.0
Shortage of oxen	49	40.8	71	59.2	120	100.0

Source: survey 2010

As indicated in the above Table 4.11., the majority 85.8% and 81.7% of household respondents reported that shortage of farmlands and soil fertility reduction respectively are the major agricultural problem in the area. Moreover, 75.8% households also indicated that the major agricultural problems are shortage of rainfall and the intense prevalence of drought. Besides 65.8%, 56.7% and 48.3 % of household respondents revealed that shortage of oxen, scarcity of grazing lands and market problems respectively are identified as the major agricultural problems in the area. However, from the indicated problems, 70.8%, 65.8, 59.2% 51.2 and 43.3% of household respondents acknowledged that poor preparation of land, shortage of agricultural input, high intensity of erosion, market problems and scarcity of grazing respectively has confirmed as little or not major problems in their agricultural production.

4.4. Farmer's Perception's on Past and Current Land Degradation and Its Outcomes

According to interviews from Woreda Agricultural Office, before the project intervention soil erosion was the major problem in the watershed. Rill, sheet and gullies were the major erosion types that result land degradation and they damage the low-lying cropland and hillside areas. Severe soil erosion has been occurring in the watershed since the first rainy season after the 1973 drought in northeast part of the country. Hillside bush/shrub and grasslands, which are used for grazing and

wood collection, are severely contributed for erosion. Rocky outcrops resulting from soil erosion are common on hillside areas. According to their severity on cultivated lands, types of erosion are gully, rill and sheet erosion. Similarly, sheet, rill and gully erosion have a significant impact on bush/shrub lands accordingly. Gullies and rills are commonly observed at foot slope areas being formed by runoff generated from uplands (hillsides). They are also common in gentle slope croplands. Cultivated lands are also severely affected by sheet erosion as well as collapse of gully banks is a common problem of almost all big gullies. Key informant interviews with framers and focused group discussion also confirmed that there was land degradation before the watershed intervention and a huge gullies around farm lands also impede their frequent travel to their farms and used long distance roads to arrive their farm which the main roads was degraded by the gullies.



Figure 2.1. Land Degradation in Lenche Dima Watershed before 2003

Source: GWARDO

The above figure presents that before the watershed intervention in the year 2003, land degradation in the watershed was so intensive and caused by erosion. The land degradation caused by soil erosion had been created the huge gullies and a problem for farm lands. With the intervention of the watershed project following the year 2003 gully treatment was started through sacked stone and check dams.

The productivity of most farm plots decreased year after year. Land degradation in the past particularly soil erosion is the principal cause of decline in agricultural productivity and total production (crop, livestock) in the study area. According to the survey, farmers suggest that the decline in the productivity of their farm lands in particular and land degradation in general were due to increase in soil erosion, prevalence of drought, and decline in the fertility of soil, inappropriate farming and resource management systems.

Furthermore, the households also try to confirm the intensity of land degradation in different land covers before and after the intervention of the watershed development. Before the watershed development, inappropriate farming with the lands are highly cultivated in continuous cropping without fallowing were identified as one of the major causes of decline in farmland productivity. About 90 % of the sampled farmers perceived this problem, its severity as the cause of land degradation in the study areas. Almost all farmers understand the decline in the fertility of their plots and the presence of high erosion-in the area in the past. Moreover, in the past, the majority of farmers agreed that runoff was an increasing trend from year to year. Furthermore, according to interviews of GWoARD, the amount of rainfall in the area has been small and unreliable, and the previous apparent increases in runoff during the *kremet* seasons are due to the absence of vegetation cover at hills and gullies. This was due to the absence of resource conservation and low adoption of improved soil and water conservation practices, miss-use of farmland, deforestation, overgrazing, uncontrolled drainage system etc in the past. Because of this, there is high destruction in the topsoil by soil erosion. Comparatively, according to the survey, there were variations in the intensity of land degradation problem with respect to the past and current intervention of the project. According to the survey, the sampled households in Lenche Dima watershed agreed and responded that the main causes of the land degradation are poor management of natural resources, drought, inappropriate farming practices, overgrazing, tenure insecurity, deforestation, heavy rainfall and population growth. Besides, particularly to their productive farm, inappropriate use of agricultural inputs and fertilizers would lose its fertility of the soil (dried up) and cause soil erosion by detaching the upper layer particles. To hold up the above discussion the following table shows a detailed analysis of household's responses.

Currently, different natural resource management practices in the watershed had been undertaken and shown demonstrable changes to tackle land degradation problems. Thus, in order to get the extent of the problem, the assessment inclined to see households' perceptions' to the current problem and does the activities done by the project reduces land degradation. Based on this idea, to the status of degradation problem with the existing conservation practices, again the households also expected to describe the magnitude of the problem of soil erosion. However, the survey result indicated in the above table. 13.3 and 22.5 percent of households responded there is and is no land degradation problem respectively. However, the majority (64.2%) of the households confirmed that they observed declining of the magnitude of erosion problem.

As indicated in Annex Table 1., households in the study watershed are very well aware of the soil erosion problem. Moreover, they also observe changes in the intensity of erosion problems to past and the current watershed interventions. Based on the survey, 78.3% of household's there was soil erosion problem in the past and 12.5% of the respondents acknowledged that the current land degradation the problem is moderate. While 9.2% did not respond soil erosion as a problem in the past at the area. Asked which part of the land was degraded before the watershed development, the households respond that soil, grassland and forestland put according to its severity 91.7%, 74.2%, and 67.5% respectively. Therefore, before the watershed development soil erosion particularly in their plot was the major problem next to grasslands and forestlands in the watershed. In order to understand the prevailing causes of land degradation the households also identified as (75%) weak management of natural resources, (79.2%) drought, (81.7%) inappropriate farming practices, deforestation (67.5%) and overgrazing (55.8%) are the major problems for land degradation. Moreover, (42.5%) population growth (30.8%) tenure insecurity, and (28.3%) heavy rainfall were raised as land degradation problems in the watershed. Therefore, the survey indicates that the magnitude of land degradation problem is becoming decreased and moderate. Similarly, the current degradation problems are rated forest, grassland, and soil as 85.8 percent, 66.7 percent and 54.2 percent respectively. Besides as indicated also Annex Table, the current major causes of land degradation identified by sample households', drought, inappropriate farming practices, deforestation and overgrazing, population growth 87.5 percent, 85.0 percent, 68.3 percent, 65.0 percent, 51.7 percent respectively.

Table 4.12.. The Relationships Between Household's Awareness of Land Degradation and their Participation

*at0.01,**0.05&***0.1confidence interval

Knowledge of land degradation	Participation		Non participated		Total		Mean	SD	χ^2	sig
	(N)	%	(N)	%	(N)	%				
Degradation YES	75	94.9	4	5.1	79	65.8	1.34	0.48	22.4	0.000*
before NO	25	61.0	16	39.0	41	34.2				
Current degradation										
YES	8	38.1	13	61.9	21	17.5				
SOME WHAT	32	45.1	39	54.9	71	59.2	2.06	0.64	3.407	0.082***
NO	7	25.0	21	74.0	28	23.3				

Source: survey 2010

According to Table 4.12, results of chi-square test, (χ^2 22.4, $p \leq 0.001$) shows that, there is a significance relationship between awareness of farmers to the past land degradation problem and their participation to NRM practices. The result from households implied that, 64.2% of them understand the land degradation problem and indentify how the intervention for resource conservation was reduces extent of degradation problem. This also confirmed with chi-square result (χ^2 3.4, $p \leq 0.1$). Therefore, Aklilu et al., (2004) that, farmers' decisions to conserve natural resources generally, supplement this result and soil and water conservation particularly were largely determined by their knowledge of problems. Moreover, different studies have confirmed this result. This result is accordant to the study done by Ebrahim, (2000) in his study in Iran there is positive and significant correlation ($p < 0.01$) between level of awareness of degradation impacts of natural resources and level of rural people's participation in WMP.

4.4.1 Grazing Resources of Households in the Watershed

The increasing livestock density and the associated overgrazing on both arable and grazing lands have serious impact on the land and vegetative cover. Some of the past as well as the current conservation Strategies of Ethiopia, such as hillside and area closure, have underestimated the role of livestock and grazing practices in the process of natural resources degradation (Alemneh,2003). Communal grazing areas, private pastures and crop residues are the principal source of feed in both watersheds. Overgrazing is one of the main threats to land degradation and it is a widespread

problem in the watershed. According to the survey grazing sources is becomes decreased. Reduction of grazing sources is mainly caused by the nature of grazing type, the protections of some of the grazing lands, lack of grazing products from conserved hillsides, the expansions of farming lands, lack of private grazing sources, drought and shrinkage of grazing land. This consequences farmer's move to other areas for their animal food and the overexploitation of the existing grazing lands become rampant. Moreover, according to the key informant interview, solutions to the problem is also difficult particularly in communal grazing lands in which free access to grazing land are unregulated by the community. The following table shows the status of communal grazing in the watershed.

Table 4.13. Perception's of Households for Causes of Grazing Degradation in the Watershed

Causes		(N)	%	Decreased		Increased		No change		Total	sig.
				(N)	%	(N)	%	(N)	%	χ^2	
Expansion of farm lands	Yes	61	70.9	14	100	12	60	87	72.5	6.98	0.030*
	No	25	29.1	0	0.0	8	40	33	27.5		
Covered by weed	Yes	32	37.2	8	57.1	3	15.0	43	35.8	1.11	0.333
	No	54	62.8	6	42.9	17	85.0	77	64.2		
lack of quality	Yes	52	60.5	8	57.1	9	45	69	57.5	1.59	0.442
	No	34	39.5	6	42.9	11	55	1	42.5		
Policy change	Yes	15	17.4	5	35.7	8	40.0	28	23.3	5.97	0.042*
	No	71	82.6	9	64.3	12	60.0	92	76.7		
Drought	Yes	72	83.7	6	42.9	15	75.0	93	77.5	11.62	0.000*
	No	14	16.3	8	57.1	5	25.0	27	22.5		

*at 95%of confident interval

Source: survey 2010

According to Annex Table 2, in the watershed 85 %, 78.3 % and 41.7 % of the households respondents identified as grazing sources are bush covered open access and forest covered grazing types respectively. Moreover, regarding the nature of communal grazing resources, 71.7% of the sampled households revealed that communal grazing were decreased and 16.7% of respondents acknowledged that there is no change on the status of communal grazing lands. However, 11.7% of

households were responded communal grazing become increased. Moreover, according to annex table 2 also, the major causes of the decline in grazing resources are the prevalence of drought, expansion of farmlands, and quality of grazing and covered by weed and policy effects 77.5%, 72.5%, 57.5%, 35.8%, and 23.3% respectively. Besides, the uses of this communal grazing were characterized as continuous grazing (84.3%), cut and carry (83.3%), differential grazing (23.3%) and rotational grazing (20.8%). Accordingly, Table 4.13, above shows that, the chi square results of the variables of causes of grazing resource decline, expansion of farm lands, decline of quality of grazing and policy changes are found to be significant at 5% probability level. This result were supported by Addisalem (2010) revealed that in Lenche Dima watershed the increase agricultural land was due to the expense of land cover types as trees, shrubs and bush lands. Moreover, she also supported that in the watershed macro level factors such as political ideology with a subsequent changes with policy and institutional structure were responsible on LULC in the watershed.

4.5. Community Participation in Lenche Dima Watershed

The active participation of the farmers in the planning, design and implementation of the land management work and their training in conservation techniques, i.e., on the establishment and management of watershed helped guarantee success in the community driven projects. Community based management of natural resources has become an increasingly acceptable approach for environmental management. Empirical evidence shows that community resource management can increase efficacy, legitimacy, and sustainability of natural resource management (Western and Wright 1994 in Subha, 2006). There is still relatively little empirical work that were analyzed the factors that determine participation in community. This section discusses and analyzes past experiences of participation, the nature and levels of community participation and factors determine participation of the community in watershed management.

4.5.1. Past Experiences of Community Participation in the Watershed

Past experiences of the communities in the involvements of collective actions by themselves have a significant role for the existing conditions in which they does not become novel, inactive and unwilling to the new system developed and affected them through externally induced development projects. Based on key informants and local administration evidenced that, before the initiation of watershed management project at 2003, the farmers had been experienced in participation at social and other economic activities through their traditional institutions like edir, equb, jgie. Therefore,

this supported that farmers have little participatory experiences in development activities that are initiated by formal development projects. However, participation in social activities with their traditional institutions were so well experienced and developed. And according to interviews with kebele administration currently, this was evidenced and confirmed by the interview more than 90% of households in the area were a member at one from each of the traditional institutions in the area.

4.5.2. Households' Responses of Participation on the Planning Process

The appropriate level of user participation in development depends on the specific goals and circumstances of the project and its expected beneficiaries. In the case of participatory watershed management, the community needs are diverse and different levels of participation are appropriate.

Table 4.14. Participation of Households in the Planning Process

Planning process	very high		High		Fairly		Low		very low	
	N	%	N	%	N	%	N	%	N	%
Problem identification and prioritization	11	9.2	18	15.0	1	.8	59	49.2	31	25.8
Planning and design	0	0.0	15	12.5	25	20.8	45	37.5	35	29.2
Implementation activities	61	50.8	29	24.2	20	16.7	10	8.3	0	.0
M&E	3	2.5	9	7.5	33	27.5	57	47.5	18	15.0
Maintenance	0	0.0	0	0.0	27	22.5	73	63.8	20	16.7
Involve in decision making	0	0.0	17	14.2	38	31.7	10	8.3	29	24.2
On training and workshop	16	13.3	22	18.3	38	31.7	33	27.5	11	9.2
Community meeting	28	23.3	38	31.7	28	23.3	26	21.7	28	23.3
In taking corrective action	8	6.7	0	0.0	12	10.0	89	74.2	11	9.2

Source: survey 2010.

The data (Table 4.14.) further revealed that, 15 % of respondents from WMP were highly involved in problem identification and prioritization and 9.2 % very high. However, 49.2 and 25.8 % of households confirmed their participation in problem identification and prioritization was low and very low respectively. Moreover, more than half of respondents were involved in project planning were very low and low. However, 20.8% and 12.5 % of households were acknowledged that, they

fairly and highly participate in project planning. Participants in both of problem prioritizing and planning and designs were representatives of all *gots* in the watershed selected by the households with in the *got* community. They were less 2 or 3 in numbers for the representation of the total watershed community. even though, farmers are identified as a source of information and knowledge for their problem, their little participation in identifying and designing their problem might challenge to improve the efficiency of the farmers in conservation and provide constraints for the agents for little understanding of farmer's needs and constraints.

Moreover, Though, farmers are considered as limited capacity to involve in the planning process, less involvement of farmers in planning and design of the initiated project were not helpful for identify in advance what the farmers will accept and what they will not for further involvement in implementing conservation activity. As implementation is a critical and contributing factor in natural resource conservation, (50.8%) and (24.2%) of respondents had been involved in project implementation activities were very high and high respectively. So, participation of households in implementation activity might be encouraging in this result and that the farmers also evidenced during key informant interview and focus group discussion that there were self-evident for their collective implementation of conservation practices. The importance of collective actions in areas of labor-intensive work particularly natural resource conservation is evidently vital. As a result, it scores demonstrable change at community level.

These results are contradictory to earlier findings of households participate in implementation where majority 63.8% of respondents did not involved in maintenance of the watershed project. The results show that only minor percentage of respondents was involved in maintenance on basis of implementation experience. This contradiction regarding involvement of farmers/respondents might be due to different management style of executing authorities and approaches to achieve the project goals. Moreover, regarding monitoring/evaluation of watershed project 47.5% did not participate in the process. However, 27.5 % of respondents were involved for knowledge and valuable suggestions. Besides 21.7 and 14.2 % of households very high and highly participate in decision-making and 31.7% of households fairly participate in decision-making process. In training and workshop, 31 % and 18.2% of farmers reported that, they were fairly and highly participate. Finally, the majority 74.2% of respondents were not participate in taking corrective action. While 7.2 and 6.7 % of households were acknowledged their highly and very highly participate in taking corrective action.

From the above general result, in all levels the households are participated disproportionately. While genuine participation in watershed management was the sum total factors of all levels of participation. nevertheless the result in levels of household's participation entails two categories. Relatively, the households are highly participated in implementation levels, community meeting, and in decision-making. More strictly, the weak participation at one level has a negative impact on the participation of the other process of participation. For example, households participation in implementation with no participation in problem identification and planning and design have an implication that household's were involved for labor contribution as most of resource conservation activities are aimed i.e. labor intensive.

On the other hand, farmers score low participation at problem identification, planning and design, the continuous levels of managing and controlling conservation practices and in making corrective actions. If farmers were not participated at the initial process of problem identification, the problems rely on weak acceptance of conservation technologies. Furthermore, low levels of participation in their prioritizing their own problems will wear down farmer's responsibility on the activities that had undertaken and initiated by the watershed management project. Clearly this implies that conservation activities are initiated, identified, planned and designed by the project and other government organizations, which the community call the *top-down*, and were directed to the local development center and watershed management committee and finally to the village community through the village leaders for discussion before implementation.

Low participation and contribution in the making and measuring of corrective action shows that, it has not a contributing effect in the knowledge of farmers for further contribution through influential and stable decisions to responsibly participate is considerably essential. According to key informant interviews the discontinuation of benefits provided by the project is the major contributing factor for the process of weak sustainable participation in the watershed. Furthermore, one interviewed farmers explained by comparing the participation at a time of the project and the current status, during the project when the project provides oil and grain assistance irrespective of young and adults more than 400 farmers beginning from children up to the olds including women's coated as '*kelige eske awaki*' was equally engaged in the practices. Moreover, even all parents at one roof were actively participating in conservation implementation activities appropriately for the sake of the benefit.

However, after the project discontinued the incentives little farmers have been participate at communal activities initiated by agricultural office. As per this one development agent explained that one of the current problems in the area were lack of farmers involved in the continuous development of resource conservation as well it becomes the challenge of the practices in the process of destruction. What's more, the development agents and WARDO are trying to train and educate farmers to maintain conservation practices but little farmers were mobilized for the management of activities. On the contrary, farmers who participate in maintenance justify their motives to participate; currently during the time of the project, these farmers hold under the government safety net program benefits and some farmers who have close affinity in information or benefit with local government in the watershed. Moreover, according to local leaders interviews, village leaders itself and women's around the maintenance site were active participants in continues conservation practices. In a nut shell, as Okeley et al., (1991), support this participation process as the existing planning procedures for the project are not based on the understanding of the critical ingredients of participation; namely participation in decision-making, participation in implementation, participation in benefit sharing and participation in evaluation. When the villagers undertook projects on their own... the participation of the local people in terms of all these dimensions was total.

4.5.3. Measures of the Relationship between Participation Levels

In participation analysis to examine the process of participation, identifying in which level planning process does households participate and which does not, is essential for the better prediction of the planning process of the project. It is also important to identify factors influencing their participation level if we compare the scores of each participation levels. For this purpose, the following table shows average weight scores of different participation levels.

Table 4.15. Average Weight Index of Relationships of Participation

Participation	very high(4)	high(3)	fairly(2)	low(1)	very low(0)	sum
Problem identification	11	18	1	59	31	159
Planning and designing	0	15	25	45	35	140
Implementation	61	29	20	10	0	381*
Monitoring and evaluation	3	9	33	57	18	164
In Maintenance	0	0	27	73	20	127**
Participating in meeting	0	38	28	26	28	196
Decision making	26	22	38	10	29	256
Training and workshop	0	17	38	33	37	160
Corrective action	8	0	12	89	11	145
total						1728

*highest level of participation ** lowest level of participation

N.B. calculated of average weight index is (the number of household responses for each level of participation multiplied as very high by 4, high by 3, faire by 2, low by 1 and very low by 0 and the sum total of each independent levels of participation).

Source. Survey 2010.

The Table above shows that, between comparisons of different participation levels. Based on the average-weighting index, household's participation in implementation level scores 381 the highest weight score. In addition, households participating in decision making also scores the highest 256 next to implementation level. However, household's participation in corrective action and in maintenance activities are the lowest scores of participation levels 145 and 127 respectively. Concisely, household's participation in the implementation levels during the project intervention were higher and becomes low following the project withdraws. These two extreme scores of participation levels (i.e implementation and maintenance) are used to assess factors that influence the genuine participation of the community with the participatory approaches of the project and the sustainable contribution of the community in the watershed.

4.5.4. Decision of Community Participation in the Watershed Management

The decision of participation was important for the willing contribution of participants in development activities. When the projects were externally induced, the decisions to involve

communities were made at different levels of stakeholders mainly where the project approach were based on incentives. However, the major contributors in participatory development were the farmers. Therefore, the willing of the farmers and their decision with their local organization were critical for the successful contribution of their labor as well as their local materials and resources. The following Figure shows households responses on the decision made for their participations.

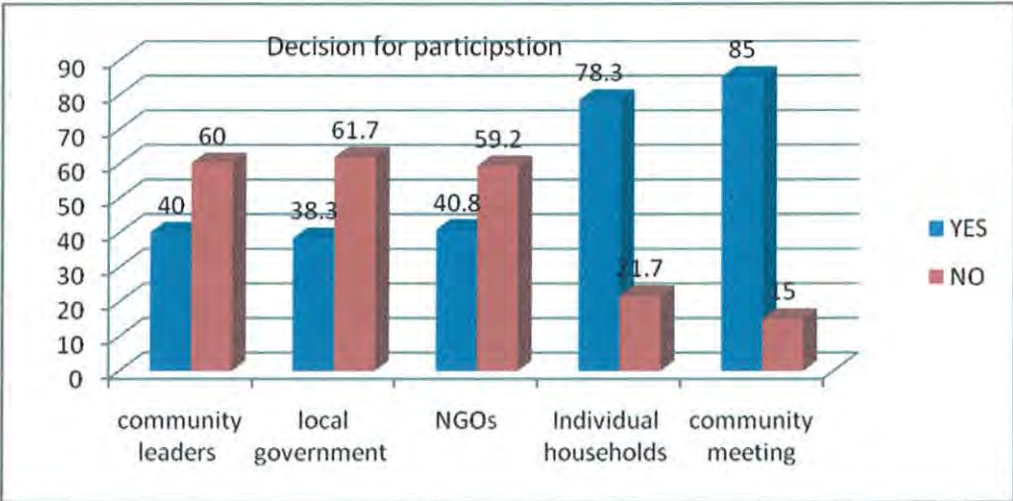


Figure 4. 2. Households Responses on the Decision for their Participation

Source: Survey 2010

As illustrated in Figure 4.2, the majority (85%) and (78.3%) of households confirmed that, the decision to participate in the conservation activities are determined by made at community meeting and their own willingness respectively. Collectively, households’ discussions in meeting were the approach for deciding to participate in conservation practices particularly in communal activities. This also experienced with community meeting and identified conservation works at *got* level. Apart from decision made by community meeting, 73.3% of households revealed that household’s willingness and their decision were importance to involve in communal activities. However, households also revealed that village (*got*) leaders 61.7%, the project executives 40.8% and local governments 38.3% also decides their involvement in communal conservation practices done with the project.

As chi square result from Table 4.16, shows that, there is a significant relationship between the decision made by village leaders (χ^2 12.3, $p=0.000$), households (χ^2 7.7, $p=0.006$) and NGOs (χ^2 4.3, $p=0.038$) to farmers participation in conservation practices. During the watershed project, intervention village or *got* leaders were first informed from the project and then disseminate the

information what was intended, expected and approaches about the project activities to the village communities. After also the project runs their role in mobilizing the community and a medium of communication between the community and the project officials. Therefore, the village leaders have a mandate and decision role position in the watershed communities.

Table 4.16. Relationships between Household Responses and Decision for Participation

Decision to participate		Participated		Non participated		Total		χ^2	P
		(N)	%	(N)	%	(N)	%		
Household itself decide	Yes	83	88.3	11	11.7	94	78.3	7.70	0.006**
	No	17	65.4	9	34.6	26	21.7		
Community meeting	Yes	87	85.3	15	14.7	102	85.0	1.90	0.170
	No	13	72.2	5	27.8	18	15.0		
Local government	Yes	38	82.6	8	17.4	46	38.3	0.028	0.867
	No	62	83.8	12	16.2	74	61.7		
Village leaders	Yes	47	97.9	1	2.1	48	40.0	12.3	0.000*
	No	53	73.6	19	26.4	72	60.0		
NGOs decide	Yes	45	91.8	4	8.2	49	40.8	4.3	0.038**
	No	55	77.5	16	22.5	71	59.2		

*at0.001, **0.05 & 0.10 confidence interval

Source: survey 2010

4.5.5. Households' Response on the Motives to Participation

Farmers in the area are engaged in multiple activities such as farm activities, home activities, caring their children, marketing and others. The involvement in these diverse activities has its own impact for participation or not unless the benefits gained from conservation activity have a comparative advantage and a supportive contribution to their livelihood systems. Moreover, the degree of participation were determined by the activities they willing to involve. For instance, households have different attitudes on their participation at owned or private farms, communal resources and conservations done by the responsibility of the government and other agencies such as closures, gullies, and hillsides. The following Table shows responses of sampled households on the motives behind participation in conservation practices.

As indicated in Annex Table 3, households rated the major reasons for the involvement on land management practices and the reasons that impeded their participation. The majority 85 (70.8%) households respond that the major reasons to participate are looking for benefit. Households need benefit to participate on conservation particularly in communal management. This finding concerns with that of (Betru 2000, Yeraswork 2000) that the community was not free of a dependency syndrome on the Government or donor project. That is, the community members were habituated with expecting the Government to do developmental works. Key informant at Woreda agriculture pointed out that the community was not very much interested to work for communal activities without any payment. Some NGOs including World Food Program gave the community money or wheat for resource conservation activities performed by the community as FFW or Cash for Work Program in different area in Amaha Region.

As illustrated in Annex Table 4. 64.1% of respondents revealed that the deriving force to their participation is their interest to decide details of conservation practices initiated by the project. Moreover, (63.3%) of respondents confirmed that is trained/model farmers were the means to initiate households to participate in conservation activities of the watershed. 63.3% of respondents also acknowledged that their motives to participation were determined in respecting of the rules and norms of the community by laws. Besides more than half of respondents also responded that village/community leaders, community meeting, local governments, ordered to do are among the derives and motivations of participation in the watershed. This is also confirmed by key informant interviews, focused group discussions, and shows that to get incentives/benefit from the project, community meeting, and *got* leaders are the major derives of community participation in the watershed management activities.

As illustrated Annex Table 3., results at chi square test shows that, the interest of farmers to get benefits were the major deriving force to involve in the conservation activities with significant level less than 0.001. Moreover, there is a significant relationship between farmers participation and the motivation by village (χ^2 4.8, $p=0.029$), to decide in a conservation activities (χ^2 3.5, $p=0.062$) local government (χ^2 3.24, $p=0.072$) and community meeting (χ^2 3.25, $p=0.071$).

4.6. Participation, Equity and Conflicts in Resource Management

Participation in development activity should address equity and conflicts among the involved communities in order to address sustainability. Within a particular community, there are micro

differences in interest, economy, access and control of resources. Unless these difference can not be addressed and it becomes the missing link for the effective nature of participation and erodes community support and ownership as well solving the problem at the needy. Therefore, the farmers should equally participate and share the benefits gained from the participation in order to maintain conflicts and integrity. The sampled respondents also accordingly put their reasons why they did not equally participate and contribute in conservation activities. Half 10 (50%) of household respondents who did not participate confirmed that they have other activities during conservation time. Moreover, 7 (35%) also acknowledge that they willingly withdraw themselves from participation. While 3(15%) of household respondents confirmed that unfair decision is their major reason that they did not involve in the management practices.

Table 4.17. Relationships between Households Decision and Not Participated

Responses	Participated		not participated		Total		<i>r</i>	<i>sig.</i>
	(N)	%	(N)	%	(N)	%		
I believe sustain myself	0	0.0	7	35.0			0.34	0.000*
Unfair decision	0	0.0	3	15			-0.084	0.360
Other work during participation	0	0.0	10	50.0			0.59	0.000*
all equally contribute	74	84.1	14	15.9	88	73.3	0.034	0.715
there are free riders	77	95.1	4	4.9	81	67.5	0.454	0.000*
large were not involve	39	84.4	7	15.2	46	38.3	0.031	0.740
village rules & norms	85	96.6	3	3.4	88	73.3	0.590	0.000*
government rules	68	88.3	9	11.7	77	64.2	0.179	0.051**
conflict Yes	28	87.5	4	12.5	32	26.7		
Sometimes	53	76.8	16	23.3	69	57.	-0.064	0.489
No	19	100	0	0.0	19	15.8		
Safeguarding interests	62	87.3	9	12.7	71	59.2	0.129	0.161

Pearson's R correlation *at 0.01%confidence interval&**at0.05%confidence interval

Source: Survey 2010

Table 4.17 indicated that, Pearson's correlation result there is a moderate and positively correlation between households mentioned reasons that, they have other works during conservation practices

and their level of participation ($r= 0.59$, $p=0.000$). This implies that most of farmers are not participation due to mismatch of the time of conservation and households time of individual works. The same result is found in farmers believe they confirmed that they believe to sustain by themselves and their levels of participation ($r=0.34$, $p=0.000$). This is also triangulated by key informant interviews and focus group discussion and shows that some of the farmers willingly sustain in participation of conservation activity is their health problem and laboriness of the work. Moreover they also raised as The comparative advantages to fulfill their livelihoods means results the households to sustain themselves during pick agricultural time, engaged other social and economic activities were some of the justifications for their willingly sustain to participate. During implementation process, there was also a problem with the scheduling of developmental activities in relation to farmers' seasonal tasks at the watershed. There was also Problem of prioritizing private tasks over communal activities. This was more prominent in the relatively disadvantaged groups of the community.

The poor are to earn their daily living than to work for other communal developmental activities. Many of the projects undertaken by the support were infrastructure development and natural conservation activities; these were secondary tasks for a poor who did not have any thing for daily food. However, regarding their reasons for unfair decision, this was related to participants in safety net program undertaken by woreda agricultural organization.

With this regard, the researcher tries to interview and get responses on woreda agricultural office safety net expert. Thus, the respondent reported that, when the farmers deliberately sustained from the program it is not simply but it is based on the criteria of two years assistance. After this two years assistance, the farmer is expected to develop its own assets and that farmer become graduate on the system of the programme and the cotta of that farmer will transfer to cover another farmers. Moreover, the selection processes were clearly and responsibly done with the community and the local government in the watershed. Moreover, Table 4.17, illustrated above, 73.3% of respondents confirmed that all farmers in the watershed are equally participate and contribute in the management practices. However, 67.5 % and 38.3 % of sampled households acknowledged that there are free riders within the community and they are not equally participates and contributes on the conservation activities respectively.

With this respect the chi square result described that there is a moderate and significant relationship between households participation and the existence of free riders in resource management

($r=0.454$, $p=0.000$). Scale of free riders (social penalties and sanctions) has an impact on discouraging of farmers participation and contribution in management activities. However, the result of Pearson's correlation indicated that there is no significant relationship between participation and household responses of large number of households participant and not otherwise. The existences of the free rider were initiated by the different individuals in the community, which there are disparities on the benefits they gain from the conservation and contribution of households for their conservation of land degradation problems. Households who derive benefit with little or no contribution from the fruit of management practices on the expense of participant who have a great contribution to treat the land degradation will contribute the high number of free riders. This is also confirmed by key informant interviews and focus group discussions and reported that there are free riders and robbers who stolen the construction materials and stones during the initial development of the watershed. However, this was solved by the watershed community with traditional religious leaders such as *abegar* and *shehlega* at meeting and give to the promise do not steal this construction resources.

As free riders and conflicts with in the community are impediments for the contribution of the resource development, there should be a mechanism to control and protect them. To this, the majority 95% of the respondents emphasized that village community rules and norms are the major controlling mechanisms for free riders. However, these local platforms were ineffective to halt the prevalence of large number of free riders. Multiple factors contributed for this, including their bylaws. Furthermore, 46.6% of households responded that local government rules and regulations were the mechanism to protect free riders. Regarding in the use of shared/ communal resources like water, grass and forest e.t.c. 71.7 %, of respondents indicated that conflicts are arisen sometimes. However, some of the remaining respondents revealed that there is no conflict and there were conflict in the study area respectively. As well, conflicts are mediated by the mechanisms of rules and norms of traditional and religious institutions and leaders such as *idder* and *shehlega*, village community rules and local government rules 85.8%, 72.5% and 35.7% respectively. In addition to this, 71.7% of households acknowledge that the communities were safeguarding common interests. While 28.3% of the respondents were responded that the communities were not safeguarding common interests, rather they disobey the rules and norms established by the community. Regarding conflicts in the watershed, there is a negative and weak and insignificant relationships with that of households participation ($r=-0.064$, $p= 0.489$). This implies when conflict with in the community increases their participation in solidarity of conservation practices decreased. However,

with little prevalence of conflict in the watershed, conflict is not a significant factor for their participation. Besides there is positive relationship between participation and communities safeguarding common interests in the watershed. This also implies that when the communities highly safeguarding their common interests their solidarity increases and at the same time, they are genuinely participated in communal conservation practices.

4.7. Community Based Organizations in the Watershed

Grass-root participatory watershed development process can only be achieved with strong Community Based Watershed Management Organizations (CBWMOs), which facilitate the introduction of appropriate management strategies and, even more importantly, continue the effort sustainably. These organizations include both formal and informal institutions, which are found in the watershed. This study emphasizes Development Agents, watershed management committee as well as *idders* and other social organizations in the watershed. Community based organizations, which are established by the community for the purpose of the aim, and interests of the community should serve the needs and priorities of the community itself.

According to Annex Table 4, the survey result indicated 85.8% of household respondents acknowledged that community based organizations are truly representing their stable mutual consensus. This shows that the interests and views of the majority of households might be truly reflected by these organizations. However, 14.2% didn't acknowledge the true representativeness of these organizations. This also implies that there might be unfair decisions that had been taken with little or no reflections of the interests of the minorities. In most cases, the power of this organization to influence others on behalf of the community might be vital and for this purpose, they should, established and strengthen in resource poor societies. Powers in community organizations are helpful to influence decision-makings; to encourage decision-makings and making power relations more transparent improve participatory processes. To this fact, 72.5% of the respondents viewed that community organizations are moderately powerful. Besides, 15.8% and 11.7% of the result shows that community organizations in the watershed are highly powerful and not powerful. Generally, this entails that community organizations in the area are same what good in current power structures. However, to ensure the watershed management has a sustainable future, the improved and efficient of the existing power of community organizations is preferred.

Some of the identified encountered problems are weak enforcements of regulations and by laws, miss understanding of rights and responsibilities in various activities, the growth of free riders, weak managements of resource conflicts, and results for weak contribution and participation of the community. Besides, 48.3%, 43.3% and 8.4% of households viewed as community organizations are reasonably free from external influenced or domination, highly free and they are highly influenced by other external agencies respectively. This implies that during the time of the project intervention the major role of these organizations due to capacity and other constraints did reflect and work as a bridge and passengers between the community and the project rather than it stands alone with its mission.

On the other hand, 52.5% and 77.5% of households identified that leaders of these organizations are capable to lead the community activities and are committed to the achievements of the common goals respectively. However, 28.3 % of households also identified as community organization leaders are less capable. In addition, 22.5% and 19.2% of respondents respectively viewed as the leaders are less committed and incapable to serve the community in general and to lead organization in particular. Supports of community organization are vital for the development of participatory process. 56.7% of households reported that these organizations get material, financial and training supports. However, 27.5 % and 17.7 % of sampled households affirmed these organizations are not in support and they didn't know the issue of support of the organizations respectively.

Table 4.18. The Relationships Community Organizations and Households Participation in WMP

CBOs at WMP	During the project		CBOs current efforts	
	X ²	p	χ ²	p
Truly represent	11.8	0.000*	4.15	0.052**
Power of CBOs	6.2	0.030**	1.15	0.564
Free from influence	5.78	0.056	1.153	0.083***
Leaders capacity	8.2	0.006**	0.12	0.740
Leaders commitment	2.63	0.105	6.01	0.014**
Financial support	1.00	0.317	0.21	0.647
Material support	12.7	0.063***	0.65	0.420
Training support	0.25	0.244	0.32	0.570

*at0.001, **at0.05 and 0.01 confidence interval

Source: Survey 2010

The above Table 4.18, result shows that, during the time of the project with 99% confidence that there is a positive and significance relationship between the truly representativeness and their levels of participation ($\chi^2=11.8$, $p=0.000$). Moreover, power of CBOs ($\chi^2=6.2$, $p=0.030$), leaders capacity to lead and organize the community ($\chi^2=8.2$, $p=0.006$), material support given by the project ($\chi^2=12.7$, $p=0.063$) as well as their influence and given by the project for the conservation practices by got level($\chi^2=5.78$, $p=0.056$) are also significant with community participation during the project working time. The participation of the community are associated with the above factors of community organization with the project However, with the withdrawals of the project community based organizations are come weak and less successful with the sustainable participation of the community. This is also confirmed with chi square result only factors farmers participation in continuous maintenance activities are positively significant and weakly associated with their truly representativeness ($\chi^2=4.15$, $p=0.052$), got leaders commitment($\chi^2=6.01$, $p=0.014$) and free from external project influence($\chi^2=1.153$, $p=0.083$).

The existing conditions of these organizations are supported by key informant interviews and focus group discussions as they are weakly involved in the management practices and no one can inform and mobilize these organizations to do so. In the first place, some of community resource management organizations established by the project becomes vanished and not continued with their mandate for whom to establish. Leaders also did not have salaries and incentives rather only development agents of the watershed made efforts for educate and mobilizing the community for the maintenance of conservation practices undertaken before. Moreover, leaders of these community organizations were engaged in multiple private activities also raised as a problem of community organization to the sustainable efforts in concerned resource conservation.

The effort applied to empower communities in all aspects of Sustainable Watershed Management through community-based organizations was so encouraging. Although is this partly related to the good-looking side of grass root development. The bottom-up planning approach were shown to play its greater role. This finding is also supported by the views of Uphoff and Esman (1984) in Addis. (2005). They argue that local organizations have ample contribution to rural development in terms of efficient utilization of resources, equitable share of resources and empowerment of members. They are preferred to be the best channel for rural development efforts particularly in resource poor areas of most developing countries. Moreover, use of *iddirs* by this NGO has been found to be the right point of intervention because the *iddir* meeting has been used as a forum for

communication, the leaders have a strong influence in mobilizing community resources and upgrading the capacity of *iddirs* increases the sustainability of projects.

4.8. Women's participation and Empowerment in Lenche Dima Watershed

In some parts least developing countries, women are being deliberately mobilized to constitute the unpaid labor force to meet the demands of conservation projects under the banner of 'women's participation', drawing on a view that women are the principal fixers of degraded environments.

4.8.1. Traditional institutions and Women's Participation

According to interviews with got leaders and lastie gerado kebele administration, as well as development agents reported that, during the project planning and intervention period any person receiving food aid with his involvement and automatically became a member of the CWMO in the respective watershed. However, this were done with each of the four village clusters selected four males and four females to form the organization's leadership. Gender equity was a major concern in strengthening the community participation process.

Social and cultural norms combined with a lack of land ownership discourage women from participating in leadership positions. Before the project intervention, women's empowerment in these organizations was minimal. However, after some initial opposition, the project women's get position and the project had become acknowledged that the 50% women ruled and resulted to be a stronger part of these organizations. This planning group split into four focus committees: natural resources, crop production, livestock and social development. Greatly enhancing extension possibilities, the influential watershed management organizations half of the members and leaders of this organizations was women's and also these organizations were serves as a conduit for further information dissemination such as soil and water conservation, post-harvest storage, and animal health.

4.8.2. Household Respondents on Women's Participation

According to the above Table 4.19., 81.7% of household respondents indicated that women's are equally participated with men in conservation activities of the watershed. However, in this study there are challenges, which are raised by household respondents that hinder women's participation in the area. Thus, sampled respondents viewed as, lack of awareness (65.8%), weak or un-functional

women's organization (51.7%), housework loads (76.7%), cultural influences (64.2%), lack of women's support (64.2%) the major problems that impede women's participation in resource development in the area. Moreover, 62.5% 43.3% and 43.3% of household respondents revealed that, laboriness of the conservation activity and the perception that, male are more effective than women in conservation works as well as women's health problems also identified as constraints of women's participation respectively. Furthermore, based on the principles of watershed management and approaches of participation scenarios, the concern of women were not only their labor contribution but also their equity, but also access, control and use are the vital concern of gender issues.

Table 4.19 The Relationships Between Household Responses and Women's Participation

Women's' Participation	Participated		Non participated		Total		mean	SD	χ^2	P
	(N)	%	(N)	%	(N)	%				
Equally participate	81	82.7	17	17.3	98	81.7	1.18	0.40	0.347	0.762
male effective than women	36	69.2	16	30.8	52	43.3	1.57	0.50	9.51	0.004*
laboriness of the work	64	85.3	11	14.7	75	62.5	1.38	0.49	1.61	0.225
house work load	71	77.2	21	22.8	92	76.7	1.23	0.43	5.32	0.024*
increase women participation	67	79.8	17	20.2	84	70.0	1.30	0.46	0.71	0.455
awareness	61	77.2	18	22.8	79	65.8	1.34	0.48	3.1	0.080**
culture and norms	56	72.7	21	27.3	77	64.2	1.36	0.48	11.5	0.001*
lack of support	71	92.2	6	7.8	77	64.2	1.36	0.48	16	0.000*
lack of benefit	63	75.0	21	25	84	70.0	1.30	0.46	8.3	0.004*
health& physical problem	41	78.8	11	21.2	52	43.3	1.57	0.50	0.51	0.635
leadership represent	65	74.7	22	25.3	87	72.5	1.28	0.45	0.22	0.001*
use and control of assets	85	89.5	10	10.5	95	79.2	1.21	0.41	3.6	0.056**
women's contributive role	59	90.8	6	9.2	65	54.2	1.46	0.50	7.9	0.005*
lack f women's organization	49	79.0	13	21.0	62	51.7	1.48	0.52	1.7	0.191

*at90%, **95% and***90% confidence interval

Source: survey 2010

Thus, 79.2% of households viewed as, women's in the area has equally access and controls of common resources like water, grass, forests and e.t.c. moreover, the majority (72.5%) of respondents acknowledged that women's are equally participated in local leaderships like resource development committee, group leaders, women associations women's league, kebele administration.

judiciary committee and other social institutions like ekub e.t.c. In order to develop the empowerment of women's local organizations play a pivotal role. Among others, women's organizations are the major one. According to the respondents 51.7% of households responded that there is women's organization that gives special attention for the affairs of women. However, 48.3% of respondents didn't know the women's organization. Women's organization in the watershed established in name at least rather it is not provide services and functions for their established mission. According to interviews from head of kebele executive, no payment and incentives for the organization leaders, lack of awareness of women's in the area to get services, lack of financial and material supports from other organization, the organization leaders are loaded by their house work are the major reasons for the organization problems.

Moreover, 70% of the household respondents viewed that for the last three years women's participation in conservation activities become increased. However, 30 % of households stated women's participation has not shown an increasing trend for the last three year. For the contribute role of conservation 54.2% of households believed that women' involvement in all natural resource management practices have a major contributive role. To 45.8% factors, households did not confirm women's potential role on resource conservation. About half of (53.3%) of sample households acknowledged that there is no support to empowering women in the area; however, bellow half of respondents 46.7% of women's are with support. Based on key informant interviews and focused group discussions the Management of these hillside areas was given to self-help groups comprised of persons with limited or no land holdings, often women-headed households are given special attention for support and empowerment. However, the group discussion concluded that effort for women's support and empowerment as they are still depressed by socio-cultural factors in the area.

Regarding the equal participation women's in the conservation practices, chi square results in Table 4.19. Shows that. there is no significant relation between women's equality and participation. This implies that women's are not equally participating in conservation practices. However, women's contribution role and their participation in conservation have a strong and positive relationships ($\chi^2=7.9$, $p\leq 0.05$) this implies that; when women's role in conservation increases their participation have a great contribution in participatory management activities. Moreover, for the role of participation women's with leadership role have weak relationship but significant ($\chi^2 =0.22$, $p=0.001$) and their access to and control of resources have a moderate but relationship with their involvement in conservation activities ($\chi^2 3.6$, $p\leq 0.01$). Among the factors household respondents

confirmed chi square test revealed that culture and norms plus lack of women's special supports were strong relationships with a significance level less than 0.001 with their participation level in management practices. Moreover, male effective than women, housework load, lack of women's benefit also have strong relationships with their low level of participation at a significance level at ≤ 0.05 .

4.9. Household's Responses on Factors that Constrain the Degree of Community Participation

Comparison between group scores on different indicators, in different project locations, will show which groups are strong, which are weak, and why. Comparison over time will indicate progress (or its absence) in various qualitative terms. Comparison between group scores on different indicators, in different project locations, will show which groups are strong, which are weak, and why. Comparison over time will indicate progress (or its absence) in various qualitative terms, Will show which group are strong, which are weak, and why. Moreover, comparisons participatory indicators over a period of time with and without the project and before and after the intervention are helpful to assess the progress (or its absence) in various qualitative terms (ODA, 1995 in Oakely et al., 1999). Different factors that hinder community participation in sustainable natural resource management had been raised and emphasized by different studies and scholars in different part of the world. Among others factors that affecting farmers for their genuine participation towards playing their role in natural resource management are: low level of income, low level of education, lack of benefit from conservation activities, lack of knowhow and skills for management practices, lack of policy and stakeholder supports. Moreover, lack of the available labor, lack of awareness and lack of training and technical assistance also rose as constraints for the genuine participation of the community. Unless we are trying to address these constraints at the community, it is difficult to benefit from participatory development approaches.

The data indicated Annex Table 5. that, 104 (86.7%) household sample respondents acknowledged that, low level of income of their family constrains their degree of participation. While remaining respondents (13.3%) expressed their dissatisfaction. Moreover, lack of benefit from the involvement of conservation (61.7%), lack of training and technical assistance (65.8%), lack of stakeholders support (63.2%), lack of awareness for participation (56.7%), distance from their home (56.7%), lack of family labor (52.5%) and low status of health condition (51.7%) and low status of education/literacy (47.5%) are identified as the major factors that affect the potential role of

participation of farmers towards natural resource management in the area. Lack of policy support and lack of know-how for conservation, which are 45% and 39.2% respectively, has also identified as constraints to play their role through participation.

Besides, the remaining 73.5%, 58.4%, 56.4, 31.9%, 34.2%, 42.5%, 38.1%, 50% and 51.7% of household respondents expressed that, lack of policy support, lack of know-how, lack of awareness for the management activities, lack of benefit from the involvement of conservation , low status of education/literacy, lack of training and technical assistance , lack of stakeholders support , distance from their home , lack of family labor , and low status of health condition respectively are identified as little or no impact for influencing their participation and involvement for the contribution of natural resource management activities.

Table 4.20. Variations of Factors Influencing Community Participation

Factors	<i>F</i>	<i>p</i>	Factors	<i>F</i>	<i>p</i>
Low level of income	8.73	0.000*	Lack of policy support	4.36	0.015**
Low level of education	1.42	0.246	Lack of technical assistance	1.57	0.213
Low level of health constrain	1.01	0.366	Lack of stakeholders support	4.14	0.010*
Distance of home constrain	1.54	0.077***	Lack of awareness	1.18	0.311
Low level of benefit from conservation	4.86	0.010*	Low level family labor	2.32	0.143
Low level of knowhow for conservation	1.97	0.143			

Pillai's Trace multivariate statistics *at 0.01 & **0.05% ***0.010confidence interval

Source: survey 2010.

As illustrated in Table 4.20 above, among factors affecting household’s participation, which raised by the sample respondents, results from the statistics shows that, there are variations between these factors. Low level of households income were highly significant on the variation of households participation (F=8.73, P=0.000). Moreover, their lack of benefit from participation (F=4.86, p=0.010), lack of policy support (F=4.36, p=0.015) and lack stakeholders support their degree of participation (F= 4.14, p=0.010) creates appositive variations on their participation. In addition, distance of their home or village also an impact with their variation in participation at a probability less than 0.01. This implies that an increase or decrease of participation of households may matter with an increase or decrease of these significant variables.

4.10. Natural Resource Management in the Watershed

Soil and water resources provide the foundation for agricultural and natural resource development in Ethiopia. In many rural parts of countries, Pressures on natural resources are intense, as rural populations and livestock increase, their demands for food, forage and other natural resources increase, thereby applying stress to marginal lands. Undertaking natural resource conservation practices in these stressed areas where, undeniable fact. As agro- ecology and climatic conditions are vary across places, these variations in agro-ecology and climatic condition results in distinction of natural resources endowments. The unique features in resource endowment also have an implication on differences in the utilization and conservation approaches in different places. Moreover, like other parts of the country, the watershed experienced both traditional and modern or conventional resource management approaches. Besides, these traditional and modern conservation practices was discussed by different studies in different areas, however, this study also describe and explain major practices and approaches of natural resource management in the watershed based on the survey data.

Table 4. 21. Household Responses on Land Conservation Practices in the Watershed

Major Practices in the area	yes		No			Total
	N	%	N	%	N	%
Soil bunds	100	83.3	20	16.7	120	100.0
Area closure	68	56.7	52	43.3	120	100.0
Check dams	73	60.8	47	39.2	120	100.0
stone bunds	64	53.3	56	46.7	120	100.0
Soil and moisture conservation	57	47.5	63	52.5	120	100.0
Construction of waterways	46	38.3	74	61.7	120	100.0
Tree planting	35	29.2	85	70.8	120	100.0
Terracing	88	73.3	32	26.7	120	100.0
Tie ridge	65	54.2	55	45.8	120	100.0

Source_ Survey 2010

Based on the above Table 4.21., the majority 100(83.3%) of household respondents confirmed that, soil bund were their major SWC in the area. Moreover, 73.3% and 60.8% of respondents were answered terracing and construction of check dam were their major land conservation activity in the watershed. Besides the management of closures, tie ridge stone bund household respondents were also 56.7%, 54.2% 53.3% included in their practices respectively. Less than half of household

respondents rated in their practices of natural resource management practices as construction of waterways and tree panting.

Table 4.22. Household Responses on Adoption Conservation Techniques

Conservation approaches	Yes		No		Total	
	N	%	N	%	N	%
Indigenous technique is applied	113	94.2	7	5.8	120	100.0
Modern technique is applied	50	41.7	70	58.3	120	100.0
Farmers used mixed approach	21	17.5	99	82.5	120	100.0
practical knowledge on Traditional	96	80.0	24	20.0	120	100.0
knowledge on Modern approach	25	20.8	95	79.2	120	100.0

Source: Survey 2010

Table 4.22 shows that, 80 % of farmers acknowledged that, they have a practical knowledge on traditional conservation practices than modern conservation approaches. However, 20 % of households responded that they are well aware of modern conservation approaches. Besides, as also illustrated in the above table, the adoption and application of these technologies are depending on their knowledge and experiences of farming, the majority 94.2 % of the sampled households have applied and adopted indigenous technologies. In addition, 41.7 % and 17.5 % of households uses modern and mixed (modern and indigenous) conservation approaches respectively. According to the key informant interview and focus group discussion, their awareness, . access to and their long experiences in indigenous practices on the one hand and lack of training . perception, low productivity, land holding size and their knowledge on modern conservation approached creates a big difference among them.

Table 4.23. Relationships Farmers Knowledge on Conservation Approaches and their Participation

	Participated		Non participated		Total					
Farmers knowledge	(N)	%	(N)	%	(N)	%	Mean	SD	χ^2	P
Farmers knowledge										
Indigenous	86	87.8	12	12.2	100	81.7	1.18	0.39	7.53	0.006**
Modern	41	89.1	5	10.9	46	38.3	1.60	0.49	1.81	0.179
Mixed	23	88.5	3	11.5	26	21.7	1.78	0.19	0.628	0.426
Indigenous practice	79	86.8	12	13.2	91	75.8	1.20	0.42	3.28	0.070**
Modern practice	19	79.2	5	20.8	24	20.0	1.79	0.41	0.375	0.54
Combination	52	81.2	12	18.8	64	53.3	1.45	0.50	0.43	0.51

*at0.001,**0.05 and 0.1confidence interval

Source: Survey 2010

Results of Table 4.23 indicated that, farmer's knowledge on conservation practices have significant relationships with their participation. This implies that as the conservation practices were based on their knowledge, their participation to that practical approach becomes high. As a result in this case, farmers who have knowledge on indigenous technology were highly and significantly involved in conservation practices of the watershed management ($\chi^2= 7.53$, $P \leq 0.05$). Moreover, there is a positive and significant relationships between farmers participation and farmers who dominantly used and practiced indigenous management approaches ($\chi^2=3.28$, $P \leq 0.1$). This shows that farmers who practically used indigenous technologies are highly participate than farmers who practically used mixed or modern land conservation approaches.

4.11. Perceptions' of Households on Sustainable Natural Resource Management

Sustainable natural resource management in participatory approaches was determined by different factors. At community level, among others perceptions of households to conservation activities, the effectiveness conservation practices, and the expected benefits from the management of resources as well as the willingness and attitudes of farmers towards the activity reduces vulnerability are the major ones. Household's perceptions on changes after the intervention of the project would have its own effect on the continuity of their contribution towards management activities. According to the

survey on Table 4.24, 62.5% of household respondents revealed that, there are observable changes in the improvements of the resources after the intervention of conservation outcomes. These observable outcomes might be livestock fodder improvement from rehabilitated hillsides, the reduction of erosion of farmlands, controlling of floods on the gullies e.t.c. However, 37.5% of households did not acknowledge the observable changes on the improvements of conserved resource outcomes. This may also be related with their expectations related to conservation.

Moreover, according to focus group discussions and key informant interviews some of the respondents and participants reported that their perceptions and expectations are more or less related to improvements of the productivity of their farmlands. Therefore, though the hillside conservation and gully rehabilitation have a long and short-term benefit on farmer's plot, still the question of household on conservation practices were highly associated with their farmlands poor productivity in which their livelihoods entirely depend. This implies that any conservation practices should be related with their short-term demand of farmers for their farm land productivity.

Table 4.24. Households Perception to Observable Changes of Conservation Practices

Changes	Yes		No		Total	
	N	%	N	%	N	%
Observable change in resource rehabilitation	63	52.5	57	47.5	120	100.0
Restoration of land degradation	84	70.0	36	30.0	120	100.0
Reduce continuous grazing	75	62.5	45	37.5	120	100.0
Closure reduce deforestation and Overgrazing	79	65.8	41	34.2	120	100.0
Rehabilitation of hillsides and gullies	96	80.0	24	20.0	120	100.0

Source: Survey 2010

Besides, related to restoration of degraded lands, 70 % of respondents were assured that the initiated conservation practices are visually controlling land degradation in the area. However, the remaining 30% of respondents were responded that little or no observable changes related to land degradation. Moreover, this observable changes also varies with different land resources. Furthermore, as illustrated the data on Table 4.24., 80 %, 65.8 % and 62.5% of households understand changes, that rehabilitation of hillsides and gullies reduces erosion, closure areas, reduce deforestation, overgrazing, gullies, and reduction of open and continuous grazing respectively. However, 37.5%, 34.2% and 20 % of respondents responded that they did not visualize changes for the improvements

of resource management through activities done on closures, grazing areas and gullies and hillside rehabilitation to halt land degradation respectively.



Figure 4.3.Rehabilitated Hillside in Lenche Dima Waterhsed

Source: field survey2010.



Figure 4.4. Treated Huge Gullies from the Hillside in the watershed

Figure 4.5. Hillside trenches constructed on the closed area

Source: field survey 2010

The above Figure 4.3, indicated that filed observation of conservation works at the survey time and that shows current conditions of rehabilitated hillsides in the watershed. According to field observation this rehabilitated hillsides are in a position to reduce and controls erosion from hillsides, which was a problem, discussed at the prior section of this study. Moreover Figure 4.4.also shows that the huge gullies treated and conserved around farm plots of the watershed. These huge gullies due to effectively treated and conserved it serves as a waterway to the water erosion from hills and farm lands. Like wise it is important to describe

what participatory approaches did in building trenches by the community. Figure 4.5 shows that hillside trenches constructed in the watershed and it protects rapid run off from hills as well after a certain year it will covered with some plantations like figure 4.3.

4.12. Household's Perception of Benefits from Conservation Activities

A comparative economic/resources gain for farmers is an important measure of watershed management interventions. A number of benefits could be gained from effective watershed management intervention. Such benefits include land fertility, donor incentives, crop production, grazing resources, wood production, availability of water and reduction the level of erosion and flooding. The amounts of benefit they render from conservation activity were pertinent on their participation and adoption of conservation technologies. For example as Paudel and Thapa. (2004), stated that any land management initiative should aim at enabling watershed settlers to adopt practices conducive to increase income as well as to enhance land conservation. Even though people adopt traditional conservation methods, they do accept innovative technologies that improve productivity. Even if the technology is economically viable, the economic return from the conservation measures should cover all the farmers input to be sufficiently attractive to be maintained by the farmer. Therefore, it is desirable to measure economic viability not only in terms of crop yield but also in terms of function, such as resource conservation and risk minimization (Prinz, 2003). It is very difficult to say how much livelihood security or sustainability has changed in the watershed because it needs multi scale analysis. Nevertheless, according to the sampled respondents the following table illustrated the benefits they achieve from the conservation activities through the watershed development.

Table 4.25. Relationships Between Household Benefit and Participation

Type of benefits	Participant		Non-participant		F	P
	Mean	SD	Mean	SD		
Land fertility	3.14	0.49	3.3	1.10	1.1	0.310
Crop production	3.43	0.73	3.3	1.03	0.46	0.500
Fodder and grass	2.88	0.73	3.4	1.42	6.9	0.010*
Wood production	3.45	0.50	3.1	1.11	6.6	0.011**
Water supply(drink& irrigation)	3.55	0.50	3.8	0.52	4.1	0.145
Livelihood improve(reduce poverty)	3.63	0.53	3.8	0.83	1.4	0.239
Decline soil erosion	2.90	0.85	3.4	1.05	5.4	0.002**
Aid dependence	2.70	0.80	3.2	1.11	20.7	0.001*
Restoration of grazing land	2.92	0.81	3.6	1.21	10.0	0.002***
Decline of flooding	3.50	0.80	2.6	1.20	6.3	0.114

*at 99% and ** at95%confidence interval

Source: survey 2010

According to Annex Table 6, the household rated their benefits gained from conservation activities. 83.3% of household respondent's benefits of land fertility were moderate. However, 10% and 6.7% of households acknowledge benefit of land fertility were decreased and increased respectively.

In relation to the crop production/ yield benefit derived from conservation, more than half (55.8%) were acknowledge the decreased benefit. However, 44.2% acknowledge the benefit of crop production were moderate. 68.3% and 56.7% of household respondents accepted that, they moderately improved benefits of fodder and grass supply and wood production from management activities respectively. As the general target of development, practices were to reducing poverty 65.8%of households were revealed that the conservation activity that had been undertaken by the project has not reducing poverty or improve our general livelihood improvement. However, the remaining 34.2% confirmed there is moderately improve the livelihood development through the benefit derived from the project intervention, more than half of respondents(57.5%) of respondents reported that, there is low benefit derived from conservation practices in the development and improvement of water for drinking and irrigation purposes.

However, the remaining 42,5% responded there is a moderate level of benefit derived from the intervention. The general intervention has a great impact on the protection of erosion from hillsides as the major area of intervention of the project was off-sites. The majority (84.2%) and (80.8) of households highly acknowledged that the intervention give benefit in the reduction of soil erosion and flooding respectively in the area. However, the remaining19.2% and 15.8% also accept the moderately gained benefit in the decreasing of flooding and soil erosion respectively. In sum, households also respond in the approach of food for work or assistance, 92.5% there were a moderate dependency after the project benefit leaves.

As illustrated in Table 4.25., there is a variation of participation with that of the benefit they render from participation. This implies that household's participation was determined by the levels of benefit they provided with. Results from Pearson's chi square the benefit of grass and fodder were highly associated with their participation (χ^2 6.9,P= 0.010). Moreover, the amount of wood production from conservation benefit also associated with their participation (χ^2 6.6. p= 0.011). Decline of erosion (χ^2 =5.4, p= 0.002) and restoration of grazing lands (χ^2 =10.0 , p=0.082) benefit farmers gain from conservation activity in the watershed were also have a positively relationships with their participation to the conservation. However, in the aspects of sustainability, the benefits gain from assistance of the project was creating dependency and an effect with conservation. When assistance by the project decreases participation also decreases and otherwise (χ^2 =20.7, 0.001).

4.13. Stakeholders Technical Assistances

Households accessed with technical assistance for conservation practices have an impact on the practical implementation and the adoption various technologies. This technical assistance was given to farmers in a better to which it should close to their farmlands and villages. As natural resource management involves a multiple of stakeholders, these stakeholders should assist the farmers for the facilitation and adoption of conservation technologies. Therefore, the following table shows those households responses with or no technical assistance provided by different actors.

Table 4.26. Stakeholders Technical Assistance and Decision Made for Participation

Independents factors	Participated		Non participated		Total		Mean	SD	χ^2	P
	(N)	%	(N)	%	(N)	%				
Technical training	58	93.5	4	6.5	62	51.7	1.48	0.52	9.62	0.002*
DAs	33	100	0	0.0	33	27.5	1.72	0.448	9.10	0.333*
WARDO	30	78.9	8	21.1	38	31.7	1.68	0.467	0.77	0.380
NGOs/project	63	95.5	3	4.5	66	55.0	1.45	0.50	15.52	0.000*
CBOs	39	76.5	12	23.5	51	42.5	1.58	0.496	3.01	0.183
Research center	19	90.5	2	9.5	21	17.5	1.8	0.382	0.935	0.334

*at 95% confidence interval & **at 90% confidence interval

Source: Survey 2010

The data from Table 4.26 presented above indicated that, 55% of household respondents get technical assistance from various agents. However, 45% of households revealed that they didn't get technical assistance from other actors. For further analysis of this question, the households who didn't get any technical assistance were implemented conservation practices through traditional and on experience based knowledge of farmers itself. Lack of technical assistance implies that farmers choices and adopts indigenous conservation practices and more relies than modern approaches in the area. This result is the same with that majority of household respondents used indigenous natural resource management approaches than modern one. Furthermore, 64.2% , 58.3% , 49.2% , 44.2% and 30.0% of households responded that development agents, NGOs, woreda agricultural office, CBOs and research center respectively gives technical assistance for the community. As indicated in Table 4.19, household's participation was intimately related with the training provided by different stakeholders in the watershed. Training provided by development agents were highly correlated with farmers participation in conservation practices ($\chi^2= 15.52$, $p=0.000$). Moreover, conservation trainings provided by the project were a positive and significant correlation with farmers involvement in conservation practices ($\chi^2=9.62$, $p=0.002$).

4.14. Households Response Regarding Factors Determine Natural Resource Conservation

As natural resource management i.e. the objective aspect is so complex and problems are varies across agro-ecology, it hampers the subjective aspects i.e. peoples participation to conserve it. Not

only the nature of natural resource that constrain its conservation but also there are challenges which are identifies by different studies prior to this study. These problems are categorized in to socio-economic, natural and technical as well as socio-political factors that determine the success and sustainability of local natural resource management. These factors are in fact, conditions predispose to sustainable natural resource conservation at the local level. In relation to this, as problems are varies and different across area and society, problems presented in the following table are raised by the sample respondents in this study. *

Table 4.27. Household Responses on Challenges of Sustainable NRM

Responses	Yes		% of Cases	No		% of Cases
	N	Percent		N	Percent	
Lack of external support	85	6.8	70.8	35	3.4	29.2
Lack of farmers participation	83	6.6	69.2	37	3.6	30.8
Lack of compatibility of conservation technologies	45	3.6	37.5	75	7.3	62.5
Lack of control and responsibility	63	5.0	52.5	57	5.6	47.5
problems	85	6.8	70.8	35	3.4	29.2
Lack of quality of conservation works	71	5.7	59.2	49	4.8	40.8
Weak extension service delivery	54	4.3	45.0	66	6.4	55.0
Lack of training and technical assistance	84	6.7	70.0	36	3.5	30.0
Lack of stakeholder support	72	5.7	60.0	48	4.7	40.0
Conservation policy	37	3.0	30.8	83	8.1	69.2
Farmers attitude and	58	4.6	48.3	62	6.0	51.7
Lack of family labor force	63	5.0	52.5	57	5.6	47.5
Shortage of farm lands	63	5.0	52.5	57	5.6	47.5
Lack of education of farmers	37	3.0	30.8	83	8.1	69.2
Lack of farmers	54	4.3	45.0	66	6.4	55.0
Lack of incentives for the community	73	5.8	60.8	47	4.6	39.2
Total	1253	100.0	1044.2	1027	100.0	855.8

a. Dichotomy group tabulated at value 1&2.

Source: survey2010.

According to the data presented in Table 4.27, the majority 84 (70.8%) of households responded that, the prevalence of drought were the identified challenge for their sustainable conservation of natural resources particularly for land rehabilitation practices. this due to the area is the major drought prone region in the country. Scarcity of water and moisture on their land results the area exposed to food insecurity. This problem is also the cause for other constraints for resource management as well it hinders and consequences for land resource degradation.

Moreover, 74.2% and 70.8% of households also ranked that weak performances and practices of maintenance and lack of training and technical assistances provided by the concerned agencies are also challenges for the existing natural resource management in the watershed. As some respondents justified during interview and focus group discussion, though training and technical assistance with a project also have seen a problem, without a project the problem becomes rampant, and little emphases were given to the watershed, and the movement of the management becomes calm and stops. Moreover, this is also similar to that of the problem of maintenance in which the conserved resources becomes distracted. They also stressed that no one except the development agents, a contact close to the community as a mandate and little with that of WoARDO experts try to mobilize, educate, and announce the community to maintain the conserved resource.

More to this, , 63.3% weak performances of quality of works are as well the challenges for the conservation of resources encountered in the area. However, 36.7% could not raised performance of quality of works as conservation problem. Besides, 62.5%, 60.8%, 59.2%, 58.3, 57.5%, 55.8%, 54%, 52.5%, 50.8%, 45.5% , and 40.8%. of the sampled household respondents raised as, shortage/scarcity of farmlands, low level of literacy, lack of stakeholders support, lack of awareness, lack of control and responsibility of resources, lack of input supplies for conservation activities, lack of technical know-how of conservation technologies, lack of the available family labor force, lack of policy support, low level of participation of the community and weak extension services also challenges for the sustainable conservation of natural resources in the watershed respectively.

Conversely, the remaining percent of respondents were not acknowledged challenges for conservation as low level of literacy, (59.2%), weak extension services, (54.5%) low level of participation of the community, (49.2%) lack of policy support, (47.5%) lack of the available family labor force, (46%) lack of technical know-how of conservation technologies, (44.2%) lack of input supplies for conservation activities . Moreover, (41.7%) lack of control and responsibility of resources, (40.2%) lack of awareness, (39.3%) lack of stakeholders support, (37.5%) shortage/scarcity of farmlands and (36.3%) lack of quality performance of conservation works were considered as less to be the challenge of conservation practices in the watershed..

As illustrated in Annex Table 7., among factors affecting household's participation which raised by the sample respondents, chi square statistical test shows that. with 99% confidence level, the there are a strong and positive relationships between households sustainable participatory natural resource management and external stakeholder involvement ($\chi^2=0.502$, $P=0.000$), ($\chi^2=0.604$, $P=0.001$) lack

of incentives from participation, ($\chi^2=0.59$, $P=0.000$) the prevalence of drought, ($\chi^2=0.32$, $P=0.000$) and quality of conservation. Moreover, with 95% and 90% degree of probability there is an association between sustainable participatory natural resource management and ($\chi^2=0.62$, $P=0.002$) with sustainable maintenance actions, ($\chi^2=0.51$, $P=0.066$) strong stakeholder involvement, ($\chi^2=0.42$, $P=0.071$) shortage of farmland and ($\chi^2=0.19$, $P=0.050$) lack of control and responsibility.

4.18. Sustainability and Post Project Stakeholders Participation

Experience suggests that externally motivated development projects frequently fail to sustain themselves once the initial level of project support or inputs either diminish or are withdrawn. Participation is seen as the antidote to this situation in that it can ensure that local people maintain the project's dynamic. Arguments, which link sustainability with participation, are largely economic ("the maintenance of an acceptable flow of benefits from the project's investment after its completion"), but others touch on issues of project ownership, political support and the maintenance of delivery systems. On a more general level, sustainability refers to continuity and sees participation as fundamental to developing a self-sustaining momentum of development in a particular area (Oakley et al., 1991)

What has been the existing conditions of stakeholders after the withdrawal of the project in the assessment of this research as it was conducted with the ex-post of the project is considered as one part of the study. For the mere fact that, a number of stakeholders asked and interviewed for the purpose of analysis but they reported that the stakeholders who involved during the project time becomes less role and at a position of rest, except the woreda agricultural office which have a jurisdictions role to serve the watershed community like any communities within the woreda. In any participatory watershed program there is a consent conditions of all major stakeholders during the time of the project intervention and after its end up. With their consent of stakeholders it has expected to continue for the sustainable management of the watershed after the project withdraws. However, as this finding identified that less was true for stakeholders involvement after the project leaves in Lenche Dima watershed.

Inadequate consideration of institutional sustainability contribution Issues during the life of the project might be a key cause of failure to the existing weak role of stakeholders. Moreover, there is growing consensus in the watershed management community of developing countries that a disproportionate amount of emphasis on the physical rather than the institutional problems

associated with watersheds is a major cause of project failure to the sustainable contributions of stakeholders after the leaves of the project. Furthermore, it is increasingly realized that the sustainability of benefits generated during a project is a direct function of the sustainability of institutions participating in watershed management. Project management and planning are interrelated with other factors that affect project success. For example, the smaller projects in our modest survey seemed to experience better coordination, integration, communication, and local participation than the larger, more complex projects. Similarly, more focused projects seemed to be more successful in achieving project objectives. Projects with less complex institutional and administrative structures had more flexibility and seemed to have greater success in monitoring benefits attributed to project measures. Therefore, for the existing weak ex-post stakeholder support this might be the responsible condition for the existing condition. Lenche Dima watershed was a good ground for learning and demonstration of expertise for other areas in the region. However, the existing stakeholders' efforts weaken this demonstrable works for a sustainable manner.

In a nut shell this research finding in the issue of stakeholder coordination found as abbey situation. The current respected institutions put the major problems why their role to the watershed becomes abruptly eliminated following the project leaves. In this context it would be appropriate to look at both during the project and current patterns of political and social organization, particularly effort exchange, among the various groups concerned, patterns of interaction among those groups and between them and government officials, and the relative success (or lack of it) of previous attempts to promote coordination within watershed areas. This idea was supported by most donors report a strong correlation between the sustainability of development outcomes and the effectiveness of institutional intervention (Morgan and Qualman, 1996, in Subha, 2006). Furthermore, they also clarify that achieving some sort of institutional sustainability is an ongoing process rather than an end state. Therefore, based on interviews with different stakeholders the following at woreda level and community as well as community organizational problems are identified as the major challenges for the existing involvements of stakeholders.

4.18.1 Woreda Level Stakeholders

- According to the interview and checklist response on woreda agriculture and research center level, there is no due budget that specially allocated for the watershed after the project ends. This implies that donor dependent budget mobilization.

- Lack of responsible organization for the mobilization of the remaining institutions under continually playing to their mandate and role in the watershed and the responsible WARDO and others also engaged in diverse works to their wide coverage woreda.
- High turnover of wereda experts result for the shortage of human power particularly for agricultural department.
- Some respondents acknowledge that the watershed development was project based, so during the project we play our role in facilitation and joint implementation.
- Weak linkage development of government institutions.
- Lack of searching alternatives sources of support organizations particularly NGOs in working with the sustainable development of the watershed.
- WARDO and Environmental Department respondents expressed their reluctance to the current contribute to project activities, mainly because watershed management is dependent on external resources and there was no resources allocated by the project that are insufficient to run the watershed management activities than their usual office activities. They also claimed that local people are relatively poor at record keeping of financial transactions for further continuation during the project time and the system that the project designs were a problem to run.

4.18.2. Community and Community Organizations

I) Farmer's attitudes

- When the funding and the implementing agencies withdraw, the people's attitude and participation determine the future of the system. Therefore, whether the system can be sustained or not depends mostly upon the household's degree of responsibility, i.e. the project has been implemented for their benefit and they themselves should take care of the system. Respondents revealed that they are more interested in direct benefits like water source protection, income generation, and commodity and grain as well as irrigation canal improvement rather than projects like the previous one than with longer gestation periods before benefit distribution.
- At the community and individual households, level during their interview and focus group discussion they viewed that after the benefits discontinued their participation becomes decline. Moreover, after the project leaves most of the committee that function in mobilizing the community becomes less function.

- Regarding the problems of sustainable community participation in conservation practices of the watershed, focus group discussion and key informant interviews confirmed that, lack of benefits from the conservation practices particularly land productivity, lack of stakeholders mobilization and collaboration, participation is only possible with incentives like the former projects. More than that, the prevalence of drought is considered as the major problems raised by the community as they are one of the local stakeholders in the watershed.

II) Community Organizations

- Lack of support and initiation of CBOs by the existing government organization to mobilize collective actions in the watershed. This is supported by key informant interviews and revealed that, that any activities wither government or not priority were given to the local cadres than the community leaders. In addition, there is no mutual respect with the local governments and community based leaders, this is identified as lack in contentious to sustainable participatory conservation practices.
- A legitimized and effective organization is essential to achieve goals. Therefore the CDGs were formed to develop sustainable management of institutions for the continuation, maintenance, and dissemination of skills related to soil conservation and watershed management practices. The basic objective underlying the formation of CDGs has been to search for alternatives that could be sustained in the future. Therefore, lack of legal ground for CDGs might be the cause for the existing condition in Lenche Dima watershed
- Benefit dependent of local institutions is one major reason. The discontinuity of incentives of the project is the major responsible for this.
- kebele administration depending on top down approach from its higher main organization and also devoted to government ordered issues than any other.
- The *Kebele* Administrators behave as political appointees and did not feel that they were responsible for developmental activities.
- The CDG as an institution is inevitably a part of village political life and political support to development work: this enhances smooth and effective functioning of development programmes. Therefore the stronger the political support the better the success of the particular programme activity will be. According to the interviews with leaders of CDGs the overall

political support for watershed management activities to them was not encouraging. This is attributable to lack of coordination with local leaders and their biases.

- The promotion of group savings as the basis for revolving credit facilities for group members has also been an important factor in sustaining community-based groups. Presently the main sources of income are savings from the project activities, monthly savings, membership fees, and interest from investment. However this system were not developed in the area and implied that project based than community based management approaches and leads impact negative impact for sustainability
- The formal registration of the CDG and CBOs affords the organizational status of the project. However, there are some legal problems with the formally registered organizations. A community development group registered under the AMAREW or safety net development project framework is always a non-profit making corporate body. Lack of formal government registration of community development groups and other community organizations in the area is identified as the challenges of local institutions in the watershed. Thus, the NGO framework is not helpful in the sustainable promoting of the individual profit-sharing expectations of community development groups.
- In most cases, the respondents seemed to have reduced interest in participating in maintenance work compared to participation at the project implementation stage. However most of the work needs higher labor contribution. A more or less similar rating was found in all of the CDGs for the conservation practices. This difference in the level of farmer's participation indicates that participation in maintenance work depends on their needs.
- Diverse institutions, both formal and informal or acting together, shape the ways in which different actor's access, use and follow-up derive well-being from environmental resources and services which will in turn have sustainable ecological impacts. However, during the survey of all stakeholders, the researcher assured that no follow-up reports of the watershed except at oral reports by development agents that lack of quality of works and maintenances who indicate the effectiveness of the project works or sustainability of the activity are publicly available. This is also one of the failures identified at the sustainable roles of stakeholders In sum, there is consensus in the literature of sustainability for the need of an expanded continued role of local, cooperative institutions in watershed management, but practically concerning such institutions, how they might be identified, evolve or be promoted are limited in Lenche Dima.

4.19. Participation, Sustainability, Property Rights and Policy Support

‘Sustainability’ is the other most important and common concept in rural development and environmental related literatures, but the most difficult one to define. It is more so than the concept of ‘natural resource management’. The concept originated from different disciplines, applied at different levels of aggregation, is multidimensional (including economic, social and institutional), and may have a contest-based and specific meaning. Thus, it is not important to dwell on the concept of definition here. Rather the concept is used in its narrower sense to serve the purpose of this study. Community participation, empowerment, governance and sustainability are four main aspects of natural resource management that gained unprecedented visibility and respectability among different concerned agencies. Moreover, policy and institutional support is essential for watershed management projects to become integrated into long-term programs that have lasting impacts on people and their use of land and water resources. Institutional issues are many and involve all aspects of land and resource use. Therefore, among others, for the sustainable management of natural resources, the perception of farmers for continuous efforts and participation, ownership and property rights, control of resources and governance, sustainable use and management of this resources and policy supports are vital.

4.19.1 Responses on Continuity of Participatory Conservation Practices

Table 4.28. perceptions’ of Households on Conservation Activities and their Outcomes

	Yes		No		Total	
	N	%	N	%	N	%
dominantly practiced						
On farm management approaches	81	67.5	39	32.5	120	100.0
Closures is the management approaches	78	65	42	35	120	100.0
Hillsides is the management approaches	108	90	12	10	120	100.0
Gulley lands is the management approaches	113	94.2	7	5.2	120	100.0
On farm conservation is effective	76	63.3	44	36.7	120	100.0
closures is effective	67	55.8	53	44.2	120	100.0
Hillsides is the effective management approaches	117	97.5	3	2.5	120	100.0
Gulley land treatment is effective	101	84.2	19	15.8	120	100.0
On- farm farmers are interested to participate and conserve	109	90.8	11	9.2	120	100.0
Government owned lands are interested to participate and conserve	29	24.2	91	75.8	120	100.0
Communal lands farmers are interested to participate and conserve	67	55.8	53	44.2	120	100.0
The land conservation activities carried has been decreased the degree of land degradation	91	75.8	29	24.2	120	100.0

Source:survey2010

According to the data from the Table 4.28., the majority (94.2 %) and (90 %) of respondents reveal that, gully treatment and hillside rehabilitation of land resource management practices are more dominantly practiced. However, the remaining 5.2 % and 10 % of respondents did not acknowledge the gully treatment and hillsides conservation respectively. From this data, we can understand that the respondents are well aware of the changes in conservation and are prior problems of land degradation in the area.

Moreover, this gully and hillside rehabilitation was the major objectives of the project in the watershed. This finding is related to the previous result analysis of this study identified by respondents that the major degraded land that were a cause for the degradation of farm lands before the intervention of the project was gullies and hillside parts of the land. Of this we can understand that the prior problem selection of the project and its intervention is the needy to the achievements of the existing changes. Moreover, 67.7 % and 65 % of the sampled households also respond that, the development of closures and farmlands the prior management practices areas respectively in the watershed. However, the remaining 35% and 32.5% respond closures and farmlands are not the focal position of land management practices particularly related to the initial stages of the project. This result is supported by during field survey that the major demonstrable works are inclined to hillsides and gully rehabilitation. Generally, survey results and field assessments assure these practices are specialized and the project end up with some success achievements.

Any development works at and with community level needs the response how they understood and perceive the development of the works in relation to their problems. In this case we can also found that the dimensions of sustainability even their contributions for further management approaches. Therefore, majority(97.5%) and (84.2%) of households respondents assured that, hillsides and gully rehabilitation are more effective in their management approaches in which that addresses the problems of flooding erosion and farm land degradation. This shows that, as hillsides are shared and conserved to village communities and managed and controlled through by-laws of the community through their sustainable management and appropriate use of resources were assured by the community. Likewise, gullies also identified as effective measures of the problem however, it is less to that of gullies as the grasses and some plantations might be unconditionally used particularly after the end of summer rainy season.

This is also true that gully have regulated with strong by-laws like that of hillside rehabilitations unless it might be controlled by the individual two or more farmers who have farms near to the

gully with negotiation rather with by-laws. Furthermore, 63.3% and 55.8% of farmers accepted management practices that had done also effective for their land resource development. In this case the relative also the short term ambition of farm land productivity and the access to the resources of closures might have little contribution for their responses compared to that of perceptions on gully and hillside outcomes. Regarding the observable changes identified by the farmers in different land resources and perception of the type's livelihoods or benefit they desire to get, their responses will have a significant change on the willing and interest for the involvement and choices of practices of these different land resources. According to the data illustrated table, surprisingly the majority 90.8% of respondents were interested to conserve their farmlands. For further analysis of their interest, and the remaining 9.2% of households has no interest to the conservation activities if farmlands. Moreover, 55.8 % of respondents acknowledged that, they have an interest to conserve and participate in communal land resources.

However, the remaining 44.2% will not have a tendency for the management of communal resources. Besides, 75.8% and 24.2% explained that, there were no inclination and interested to conserve and will participate government owned land resources respectively. The researcher asked the farmers for further analysis during key informant interviews and focused group discussions, and then they justified and confirmed that, though we participate and done effective outcomes with the help of the project with incentives, however, our livelihoods depend on our cultivable farmlands and we are willing to involve practices in our farmlands. Moreover, our farmland gives subsistence food for our family life and the other land resources for instance hillsides communally owned and closures or protected forest areas owned by the government gives us little fodder and/or fuel wood for my livestock's and my home consumption. Therefore, until our life were relies to this farm land no doubt that our interest to involve in management of farmlands to increase livelihood productivity. To the other way round, even though conservation at hillsides and gullies are effective and magical as was also intended to protect degradation of farm lands by erosion, the identified land resource conservation were central to the mission of the project through providing incentives rather to the interests of the farmers. Therefore needs for identifying the interests of farmers were vital for sustainable community grounded resource conservation approaches.

This result were supported by (Shaxson, 2000) and revealed that, collective action for catchments management may be successful when it appeals to the self-motivation of farmers to improve their fields and the welfare of their families. Moreover, Case studies from the Philippines and Kenya on

(Tiffin and Gichuki, 2000) show that, the primary motivations for individual farmers to adopt soil and water conservation practices are: reduced risk, and increased possibility for cash crop production. In line with this as (Unasyuva 1991 IN Thomas, 2001) in his synopsis of watershed management project Experiences stated that, Inadequate Consideration of Institutional Issues Conventional Project Experience Development planners have generally approached watershed management, and the design of watershed projects, from an engineering perspective, focusing on the physical linkages of soil, water and vegetation, and targeting select, degraded watersheds. Project decision-makers have generally promoted a select number of internationally standard mechanical structures for treating contiguous public and private lands, and are biased to the protection of off-site rather than on-site benefits.

The condition of sustainability also determined by household's perception that management approaches carried with related to vulnerability. About 75.8% of sample households prevailed that the conservation activity undertaken had been decreased the degree of land degradation. However the remaining 24.2% of respondents were not agreeing with the degree of land degradation decreased through the intervened conservation practices. Moreover, the willingness of farmers for a particular land resource management area have an implication for future intervention with the community and the sustainably use of the current managed resources. Therefore, based on the data on the table, 84.2% of the households responded that they are willing to continue on conservation activities that have been carried under their farmlands. However, 15.6% were not willing to continue the conservation approaches at farmlands. Similarly, 67.5%, 52.5% and 40.8% of households agreed their willingness to continue on hillsides rehabilitation activities on grazing land and closure areas respectively. To the contrary, 59.2%, 47.5% and 32.5% of respondents responded they are unwilling to continue conservation activities at closures, grazing areas and hillside management areas respectively.

4.19.2. Protection and Responsibility of Conserved Resources

Protection and responsibility were also one of aspect of sustainability in which it manifests senses of ownerships. From household survey illustrated Table 4.29.. below, the majority (74) 65.8 % of households respond that, household itself were protect and responsible for communally conserved resources. Moreover, 64.2%, 57.5%, 45.8% and 34.2% of respondents acknowledged that CBOs, kebele administration, agricultural bureau and NGOs respectively.

According to Table 4.29 below, there is appositve a relationships between households protection responsibility towards their participation. Therefore, as correlation result indicated in table 4.29($r = 0.85$, $p \geq 0.001$). Moreover, household's participation, protection, and responsibility of CBOs also moderately correlated at a significant level at $p \geq 0.05$.

Table 4.29. Relationships Between Household's Responsibility and Participation

Protection& responsibility	Participated		Non participated		Total		r	P
	(N)	%	(N)	%	(N)	%		
Household itself	74	93.7	5	6.3	79	65.8	0.853	0.000*
CBOs	69	89.6	8	10.4	77	64.2	0.445	0.012**
Kebele	57	75.2	12	14.8	71	57.5	0.272	0.437
NGOs	34	82.9	7	17.1	41	34.2	-0.08	0.932
WARDO	48	87.3	7	2.7	55	45.8	0.10	0.300

*at99% and**and 95%cotidence interval

Source survey2010.

4.20. Policy Support

As government policy and political will impact decisions made by local individuals and institutions, governmental support, even if rhetorical, could indirectly facilitate the formation of farmers cooperation and participation in development aspects. The idea of land distribution is to give land to the ever-increasing landless rural population and ensure a fair distribution of land among the community. In Iecne dima watershed, as farmers in the area respond during the survey, more than 107(89.1%) of sampled households get their land certification.

According to the survey data, (48.3%) of households confirmed that, there is shortage of land in the watershed. However, more than half of respondents (51.7%) were reported that, there is no shortage of farmlands. With respect to the existing grazing lands, 68 (56.7%) of households revealed that, grazing lands are inadequate, while the remaining 52(43.3%) of households accept grazing lands in the watershed were acknowledge there is adequate grazing lands in adequate.

When households directed to their justification on the problems of shortage of farm and grazing land inadequacies, for farmlands, respondents confirmed that, there is shortage of land 31, (70.7%) were not taking land redistribution as a current solution for solving for shortage of farmlands. However, the remaining 17(29.3%) take as land redistribution were a solution should be needed to take as a measurement for their problems.

During key informant interview and focused group discussion farmers put their reason for this two sides. In the case of farmers land redistribution were not taken as a measurement explained that, land shortage were not solved though redistribution as a general as a general feature of the watershed caused by population growth and land use changes in the watershed management. Moreover, land redistribution that has been undertaken before solve land shortage problem as we want to get from redistribution as well as some farmers put their fear that from the previous redistribution they understand some lost their farms therefore they considered as this might not be the solution. To the contrary, small numbers of farmers need land redistribution because they desired and expected to get land from the coming land redistribution. From their profiles of farmers need land redistributions are respondents who are youth landless and farmers who have small plots. As to the grazing land, the majority of farmers have confirmed they had not private grazing and little benefits gain from the communal resources and others owned by the government.

For their investments in conservation practices, households also responded conditions of land tenure securities. 37(30.8%) of households remarked that, farm lands should makes more committed to their short term and long term investment on their farm plots. However, 83(69.2 %) were not acknowledged making land ownership private resulted for commitment for their long and short term investment of farmers. For the mere fact that, how they understood the essence of land ownership will become difficult to get full answer to this question, but some of farmers not support privately owned land rights acknowledged stated that for long and short term investment if the government were belongs to us along with his technical assistances on conservation approaches the existing land stratification were better solution and choice.

The government has also given due consideration to certification of communal lands – community forest and grazing lands – to assure communal use rights and judicious management of the resources. Besides, in the area of their participation in the management of communal resources, households multiply responded the tenure security of the area for their sustainable investment and benefit render from these resources. 56.7%, 40.0% and 35.5% of households confirmed that

communal ownership, private and government respectively of closures, hillsides and grazing areas. however, the result of this study were contradicted by the result found by Azene and Kimaru, (2007), in his report of Tikurso watershed, Ethiopia, that land tenure is known to affect farmers' decisions to accept and implement soil and water conservation measures such as constructing long-lasting terraces or planting trees on their farms by 13 % each. Sustainable participation of farmers to land management practices and investments were vital. As chi result from table 4.24, shows that there is highly relationship between households land inadequacy and their levels of sustainable participation or long term participatory land resource management ($\chi^2=15.02$, $P\leq 0.001$).

To the solution of land shortage problem farmers participation with that of land redistribution were weak but positively associated, however, to their levels of participation land redistribution as a solution for land shortage problem were not significant. Moreover, regarding their tenure security their participation also positive and strongly correlated. To this effect, land should be privately owned and their level of participation result expresses with chi square result as ($\chi^2= 5.6$, $P=0.018$). after the hillsides and grazing areas of the area conserved by the project were distributed to communities in groups, thus understanding their security in managing the conserved hills were important whether they are sustainably conserve and use or not. thus the result of chi square test shows there is a strongly and highly significant association between grazing tenure security and their sustainable contribution in management activities particularly grazing areas hillside rehabilitation ($\chi^2=15.7$, $P= 0.000$) and ($\chi^2=12.5$, $P=0.006$) hillsides should be privately owned. According to the interviews households with privately owned grazing areas were small with small amount per hectare/timad/ and the grazing benefits also inadequate from the distributed hillsides therefore this reflects farmers they need to get privately owned grazing land tenure.

Table 4.30. Perception of Households in Policy Support and their Participation

Resource ownership		Participant		Non-participant		Total		χ^2	P
		(N)	%	(N)	%	(N)	%		
The existing land is inadequate	YES	78	91.8	7	8.2	85	70.8	15.02	0.000*
	NO	22	62.9	13	37.1	35	29.2		
Land redistribution solves land shortage	YES	56	80.0	11	20.0	55	45.8	0.81	0.367
	NO	44	86.2	9	13.8	65	54.2		
Land should be privately owned	YES	76	88.4	10	11.6	86	71.7	5.6	0.018**
	NO	24	70.6	10	29.4	34	28.3		
Land should be state owned	YES	54	88.5	7	11.5	61	50.8	2.41	0.146
	NO	46	78.0	13	22.0	59	49.2		
Grazing land should be Privately owned	YES	82	91.1	8	8.9	90	75.0	15.7	0.000*
	NO	18	60.0	12	40.0	30	25.0		
Rehabilitate hills should Continue communally	YES	39	81.2	9	18.8	48	40.0	0.25	0.617
	NO	61	84.7	11	15.3	72	60.0		
Hills should be privately	YES	63	94.0	4	6.0	67	55.8	12.5	0.006**
	NO	37	69.8	16	30.2	53	44.2		

*at 99%, ** at 95%. & ***90%confidence interval

Source: Survey 2010

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the research outcomes and findings based on the research objectives, theoretical and conceptual frameworks and the analysis and discussion of the data from the field survey. It summarizes the findings and presents the major conclusions and possible recommendations accordingly.

5.1. Summary and Conclusion

This study discusses how the community of watershed management participates in natural resource conservation practices in the study sites of lenche dima watershed, North East Ethiopia, the outcomes which it brings about sustainability and factors influencing participation and sustainable natural resource management with the participation of the community. This watershed is one of the major interventions of watershed management in Amhara Region. Applying participatory research methods, with the measures of participation of the community, the research does quantify data using different statistical methods and strive to go in to depth of survey.

The study take in to account, the aspects of farmers perceptions on land degradation problems with the association to their participation in the project intervention, the way how they organize and participate, the nature of their participation in the planning process of the watershed management intervention, women's important role in participation and their challenges, discussing on the dominant conservation practices and farmers knowledge on the conservation approaches, assessing post stakeholder involvement in sustainable participatory natural resource management as well as challenges and factors influencing sustainable natural resource management and policy support. Besides, a literature review to understand other research and debates as well as emprerical literatures around the issues, the research collected primary and secondary data through survey questionnaires, checklists, key informant interviews as well as focus group discussion and field observations. 120 household respondents in the watershed community were taken as a representative sample size of the research.

The data are analyzed through both qualitatively and quantitatively in which the quantitative data are analyzed through frequencies, correlation, chi square, meant tests and bi-variant analysis to make and show the association and relationships as well as variation of different factors with

households' levels of participation. To see the variations, implementation the highest levels of participation of households with the project were identified as one stage of dependent variable as well as to assess the aspects of sustainable participation, households' lowest levels of participation in maintenance also take as other stage of dependent variable. However, households' socioeconomic variables, access to institutions, perception of farmers towards land degradation of the problem, factors influencing participation, women's participation, and sustainability issues in the study take as the independent variable to the analysis of community participation.

Given the experience over the past few decades there was little evidence that watershed management is becoming woven in to the fabric of natural resource management and agricultural development. Furthermore, the role of local farmers the importance of change of land use practices and conservation approaches by the local farmers and agencies are critical factors in achieving successful programs in the watershed (GEF, 2009). Therefore, this study is devoted to assess the nature of farmers' participation and project intervention with their role in to natural resource conservation. At the first stage of socioeconomic analysis, gender, farmers' age, family size, households' income and their ownership of resources such as land and livestock are significant variables for the genuine participation of the community in the watershed. However, marital status and educational level have no relation with their levels of participation. Moreover, access to institutional services such as credit, extension services as well as distance to the market also signifies their participation role in the conservation of natural resources.

Lack of productivity are challenged by agricultural problems like lack of soil fertility, drought, shortage of rain fall e.t.c. Farmers knowledge and nature of grazing resources in the watershed have also a contributing role to their participation. Participation in the watershed community was experienced in social institutions like *idder*, *jegie*, e.t.c before the institutionalization of the intervention of the participatory watershed management project. This shows that the community has strong solidarity and unity to participatory approaches. Thus, key informant interviews revealed that, currently more than 90% of household respondents are a member of one of those social and local institutions. A level of participation of the community varies across in different the planning process of the project and decision to participation were highly influenced by individual households, community meetings as well as community leaders. The deriviers of community participation also have a significant influence on the levels of community. Households the need to benefit is from the project is the basic motives to participation. A numbers of factors are influencing community

participation in natural resource management. Low levels of family income, low levels of education, and distance from their village to their conservation site as well as low levels benefits from conservation practices are the identified and significant factors that influence community participation in natural resource management. On the other hand, there are also different indentified challenges of natural resource management in sustainability in the watershed. Lack of coordination and sustainable involvements of stakeholders, incentive based approaches of the project, lack of awareness, drought problems and lack of quality of works are the identifies

A finding shows that communities' participation in the first stages of participation at problem identification and planning and design as well as in monitoring and evaluation were very low. However, 83.3% of the household respondents confirmed their participation at the practices of the project conservation intervention and participation in the implementation of this watershed conservation practices were very satisfactory and high. Moreover, households' participation at meeting and decision making also better for approaches development. Households their willingness to participation at the one hand and their knowledge on land degradation problem before the intervention of the project also positively contribute their participation. Community continuous involvement is one of the major determinants' for sustainable managements of natural resources. Their annual incomes gained from the food for work programme is one of the major contributors to their high levels of participation at implementation with the project. However, benefits from conservation practices have little influence to their continuous efforts to the maintenance of the conserved resources. The decline of erosion problem is identified as farmers benefit from conservation practices and play its role to their participation. Moreover, grass and fodder as well as wood production improvement also contribution to households' participation in the watershed.

Findings of this study also shows that community based organizations during the project initiation are the true representatives of the community and are alight to better participation during the life of the project. According to the finding this organizations are powerful within the community and the leaders are committed to the conservation and participation of the community. Moreover, they are efficient and capable to lead and mobilize the community. However, this become not practical with the termination of the project that they become under functioned and become collapsed within a year. Before the intervention of the project, key informant interviews indicated that women's participation particularly outside their home highly challenges by awareness and cultural norms and values. However, the bright light has come following the initiation of the project and the approach

to address gender problems become valuable for women's participation in which within the watershed conservation practices 50% of the committee and leadership leaders become women's. To this finding, women's are not equally participating in conservation activities. However, the finding revealed that they equally possess and use resource like hillside fodder, water. Even though women's participation are identified as a contributive role specially in resource management still their participation are determined by awareness problem, housework load and the ruminants of cultural and social norms. Moreover, this study also stresses with the finding that with the existing condition, lack of women's support as well as lack of women's organization in the watershed are the major hindrances for their participation. Conflicts are arisen some times in the watershed. However, the prevalence of conflict are not the significant determinants of participation in the watershed. Moreover, there are free riders that are not equally contributing their effort in conservation activities rather they benefit on the expense of participants. The existence of free riders has a significant impact to community participation in the watershed. In both cases, village rules play a pivotal role to control both free riders and conflict in the watershed.

94.2% farmers are applied indigenous conservation technologies in the watershed. But little farmers use and applied either modern or the combination of modern and indigenous land conservation technologies. Stone bund, construction of check dams or deb, terrecing and tie ridge is the major conservation practices in the watershed. Lack of practical knowledge and lack of awareness are the case for little implementation and practical use modern conservation practices. However, farmers in the watershed confirmed that indigenous technologies are more effective than modern one. The approaches of the project are incentive based and the community in the watershed also developed dependency syndrome and becomes reluctant for sustainable maintenance activities starting from the project leaves. Moreover, the project initiation also identified and found as project based in which, peoples participation are designed for the better implementation of the project activities than peoples and other stakeholders share a certain parts of the project const and institutionalized by those stakeholders. Generally, this is found that one of the challenges of sustainable watershed management of the area. Post stakeholders participation in the watershed management is almost found as the position of rest. Moreover, the existing coordination mechanisms of the remaining stakeholders at the district level are simply limited at completion of sectoral plans prepared by line agencies. It is observed that, particularly to the particular watershed, stakeholders show a weak coordination in the watershed management practices.

Policy support is one of the basic components in the sustainable watershed management project. A result shows that, communities' wants to continue in conservation activities of the particular on-farm activities than off farm like hillside rehabilitation by the former project. Regarding property rights, households specifically, with its contribution and investment in sustainable management practices as well their participation have positive, strong and significant association with farm lands and rehabilitated hillsides should be privately owned. Finally, this study concluded that, even though the development of participatory resource management by the project was so encouraging, however, participation of the community with the existing district level stakeholders are shown limited and declining role for the sustainable management of the watershed.

5.2. Recommendations

As it has been indicated in different sections of the study, community participation are affected by different factors. Some of them are socio-economic factors, some of them are institutional and the others are project intervention approaches. The role of each of these factors need to be taken into account so as to provide well informed recommendations on how the existing problems of sustainability approach in the watershed can be address. Therefore, based on the findings and urgency of the problems the following specific recommendations are forwarded in this study.

Socio- economic characteristics of households (such as land holding size, age, age sex, as well as family size) have its own contribution for the success and failures of sustainable community participation in the watershed management project. Therefore, the project intervention should consider and understand the socio economic profiles of the community before the execution of the project activities. This is also helpful for the equitable distribution of benefits from the project intervention.

The thesis has shown that the role of the community in watershed projects is crucial, since people are closest to the real problems. However, community participation in all planning processes particularly in the watershed management project was less evident. Genuine community participation was concentrated in a certain or less counted number of planning processes. Therefore, participatory watershed management project to be successful and sustainable, the communities of the watershed should be equally participated in all the ways of the planning processes starting from problem identification and prioritization to decision making across different stages. Moreover, it is evident that in the context of watershed management, projects can use different type of participation

at different stages. As watersheds are unique in all aspects of management processes, therefore, the right type of participation should be decided and developed based on the characteristics of the watershed community.

The shortage of cropland due to high population growth and shortage of land in the watershed coupled with lack of alternative livelihood opportunities has resulted in continuous cultivation of the same land with inefficient ploughing technologies. Therefore, alternative livelihood means should be developed in the watershed.

Moreover, credit institutions, and the credit services in the country especially in rural areas, are at a rudimentary stage. This impedes adoption of improved technologies, which are vital for the realization of sustainable natural resource management. Therefore, there is a need to well developed and expanded credit institutions in the rural communities for the better management of natural resources as well as to improve livelihood diversification.

There was very little involvement of women at the beginning of the project, but this gradually improved towards the end. In order to make women equal participants in all development activities, it is not sufficient to introduce legislative measures ensuring equal rights and opportunities for women. What are needed here is that, the creation of general awareness and a change of attitudes by both sexes, and dissolving age-old, arbitrary, deeply-rooted prejudices and discrimination against women. However, a greater effort is still needed to help women build their self-confidence, undertake independent actions, become integrated in decision-making processes within communities, and participate in the development process.

Internal fund generation by local institutions strengthens them financially and permits them to take responsibility for resource management and community development. Local institutions can mobilize their group funds to solve pressing problems related to resource management and community development as well. Therefore, watershed management projects should be based on the community in which the community has a certain amount of financial contribution more than that of labor for sustainable management of the resources

Both horizontal and vertical coordination are important for the successful co-planning and co-implementation of watershed management programmes. Horizontal (inter-agency) coordination is extremely important for efficient planning and implementation of multi-sectoral programmes at watershed level.

Watershed projects are generally evaluated after completion to assess whether the project was a success or a failure. In addition, watershed guidelines are formulated taking into account the experiences of successful case studies. However, before in formulating guidelines for watershed projects, important knowledge can be gained from failures of the past project intervention approaches particularly post stakeholders sustainable involvement is always questionable. Therefore, policy makers should draw a lesson from failures of pose stakeholder involvement and conservation practices for sound WMP in the country.

This study also identifies that, one of the major challenges of sustainability particularly, following withdraws of the project is lack of the remaining stockholders' continuous function in the watershed management. This was caused by lack of institutionalization of the donor project by the government organizations during its intervention in the watershed especially at the district level. This is identified by all the responsibilities of the watershed is totally considered as the mandate of the project during the project activities and following the termination of the project that no government organization were responsible for the continuous management of the watershed which was initiated by the project. Therefore, watershed management project intervention should be institutionalized with government institutions to attain and to be the insurance of sustainability.

For the particular watershed, which similarly developed like lenche dima, there should be the development of the experience an approach of community based than project based. Sustainability is possible in which communities as well as other woreda and local level stakeholders should also a certain shares of capital as well as materials during the process of resource conservation. this will experienced with the end of the project and becomes an easy journey for sustainability. This is identified by following to the withdraws of the project all the total expenses that run the approach becomes stack and peoples will lose their responsibility due to they developed dependency syndrome on the material benefits from the project. Besides not only the community, all stakeholders also become stop following the project withdraws, this implies that at the initiation of the project all stockholders lack responsibility and in the watershed they only exercise based on the assistance of the project.

Some donor project intervention had been experienced on the biased conservation of off sites than on sites. This is also true in lenche dima watershed and farmers usually claim lack of benefits from the conservation and lack of land farm productivity. Therefore due emphasis should be given to the on farm conservation practices particularly as the area is drought prone, moisture harvesting

technologies is in need, as peoples raised any of the challenge to participation and conservation is the prevalence drought.

Large number of farmers has practice knowledge on indigenous conservation practices. This is sometimes good for the cost effectiveness of the management practices but in the watershed, it is not successful to attain land productivity in the watershed. Therefore training, learning and demonstrations of modern conservation technologies to increase farm land productivity in the watershed.

With due to population growth and other factors shortage of farm land has become in chronic in the watershed community. There is need to the development of off farm activities and small enterprises in the watershed. Thus this is also an approach for reducing further degradation of natural resource on the one hand and farmers' livelihood improvement at the other hand.

Awareness creation should be made at the community level to mitigate the sustainable participation of the community as well as their attitudes towards the maintenance activities of conserved resources.

In resource conservation, activities multipurpose trees and other natural resources should be foster at the one hand the natural resource conservation and at the other hand to increase the benefits of the community from conserved resources.

Again, to become sustainable watershed management and to achieve sustainable farmers' participation any intervention should be considered as a process of property creation, because ownership and responsibility of land and water conservation nearly always coincide. Therefore, land and resource tenure (property rights regimes) should be given attention within watershed management areas to encourage community investments in resource development.

Finally, the study also recommends that similar research should be conducted in other watershed management projects to validate the findings of this study and a more in depth study should be done by incorporating other variables to improve the prediction of the level of people's participation in resource development practices.

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ANNEX

Annex Table1. Households Perceptions' on the Past and Current Land Degradation and its Causes

Current and past Land degradation and its causes	yes		no		To some extent		Total	
	N	%	N	%	N	%	N	%
There is land degradation before	94	78.3	11	9.2	15	12.5	120	100.0
land degradation on soil	110	91.7	10	8.3	0	.0	120	100.0
land degradation on forest	81	67.5	39	32.5	0	.0	120	100.0
land degradation on river	0	.0	120	100.0	0	.0	120	100.0
grassland degradation	89	74.2	31	25.8	0	.0	120	100.0
weak management of resources	90	75.0	30	25.0	0	.0	120	100.0
inappropriate farming	98	81.7	22	18.3	0	.0	120	100.0
tenure insecurity security	37	30.8	83	69.2	0	.0	120	100.0
heavy rainfall	34	28.3	86	71.7	0	.0	120	100.0
Over grazing	67	55.8	53	44.2	0	.0	120	100.0
drought	95	79.2	25	20.8	0	.0	120	100.0
population growth	51	42.5	69	57.5	0	.0	120	100.0
deforestation	81	67.5	39	32.5	0	.0	120	100.0
Currently there is land degradation	16	13.3	27	22.5	77	64.2	120	100.0
land degradation on soil	65	54.2	55	45.8	0	.0	120	100.0
land degradation on forest	103	85.8	17	14.2	0	.0	120	100.0
land degradation on river	0	.0	120	100.0	0	.0	120	100.0
land degradation on grasslands	80	66.7	40	33.3	0	.0	120	100.0
weak management of resources	41	34.2	79	65.8	0	.0	120	100.0
inappropriate farming	102	85.0	18	15.0	0	.0	120	100.0
tenure insecurity	26	21.7	94	78.3	0	.0	120	100.0
drought	105	87.5	15	12.5	0	.0	120	100.0
population growth	62	51.7	58	48.3	0	.0	120	100.0
heavy rainfall	40	33.3	80	66.7	0	.0	120	100.0
over grazing	82	68.3	38	31.7	0	.0	120	100.0
deforestation	78	65	42	35	0	.0	120	100.0

Source: Survey 2010

Annex Table 2. Nature of Grazing Resources of Households

Communal Grazing	Yes		No		Total		Use and grazing Type	Yes		No		Total	
	N	%	N	%	N	%	Use	N	%	N	%	N	%
Increased grazing resource	14	11.7											
Decreasing grazing resources	86	71.7											
No change	20	16.7											
Causes of decreasing													
Expansion of farm lands	87	72.5	33	27.5	120	100.0	Continuous	100	83.3	20	16.7		
Covered by weed	43	35.8	77	64.2	120	100.0	Differential	28	23.3	92	76.7		
Quality problem	69	57.5	51	42.5	120	100.0	Rotational	25	20.8	95	79.2		
Intensive/continuous	93	77.5	27	22.5	120	100.0	Cut and carry	101	84.2	19	15.8		
Policy change	28	23.3	92	76.7	120	100.0	Grazing type -----						
Drought	99	82.5	21	17.5	120	100.0	Open access	94	78.3	26	21.7		
							Covered by forest	50	41.7	70	58.3		
							Covered by bush	102	85	18	15		
												120	100.0

Source: Survey 2010

Annex Table 3. Relationships Between Households Motives and their Participation

Motives		Participated		Not participated		Total		χ^2	P
		(N)	%	(N)	%	(N)	%		
To get benefit	Yes	78	91.8	7	8.2	85	70.8	14.92	0.000*
	No	22	62.9	13	37.1	35	29.2		
Ordered to do	Yes	53	88.3	7	11.7	60	50.0	2.16	0.220
	No	47	78.3	13	21.7	60	50.0		
Local Gov't	Yes	57	89.1	7	10.9	64	53.3	3.24	0.072***
	No	43	76.8	13	23.2	56	46.7		
Respected by law	Yes	66	86.8	10	13.2	76	63.3	1.84	0.180
	No	34	77.3	10	22.7	44	36.7		
Decide on conservation	Yes	67	88.2	9	11.8	76	64.1	3.5	0.062***
	No	33	75.0	11	25.0	44	35.9		
village leaders	Yes	66	89.2	8	10.8	74	61.7	4.8	0.029**
	No	34	73.9	12	26.1	46	38.3		
Community meeting	Yes	45	83.3	9	16.7	54	45.0	3.25	0.071***
	No	47	71.2	19	28.8	66	55.0		
model farmers	Yes	66	86.8	10	13.2	76	63.3	1.84	0.208
	No	40	90.9	4	9.1	44	36.7		

*at99%,**95%,***90%confidence interval

Source: Survey 2010

Annex Table 4. Household Responses on Community Organization in the Watershed

Community organizations		N	%
Provided a truly representative decision-making	Yes	103	85.8
	No	17	14.2
The power to influence the community	Highly powerful	19	15.8
	Moderately	87	72.5
	Not	14	11.7
	Total	120	100.0
Free from external influences	Highly free	52	43.3
	Reasonably	58	48.3
	Not	10	8.4
	Total	120	100.0
Leaders capable to lead and management activities	Yes	63	52.5
	Less	34	28.3
	Not	23	19.2
	Total	120	100.0
Leaders committed to manage and organize management activities	Committed	91	77.5
	Less	29	22.5
	Total	120	100.0
CBOs get external assistance	Yes	68	56.7
	No	33	27.5
	I don't know	19	15.8
Total		120	100.0

Source: survey 2010

Annex Table 5. Household Responses on Factors that Constrain Sustainable Participation

Factors	Yes		Percent Cases	No		Percent Cases
	N	Percent		N	percent	
Low level of income	104	10.7	86.7	16	2.1	13.3
Low level of education	57	7.9	47.5	63	10.6	52.9
Low level of health	62	8.5	51.7	58	9.8	48.7
Distance of village	68	9.4	56.7	52	8.8	43.7
Low level of benefit from conservation	74	10.2	61.7	46	7.7	38.7
Low level of know how	47	6.5	39.2	73	12.3	61.3
Lack of policy support	54	7.4	45.0	66	11.1	55.5
Lack of training and technical assistance	79	10.9	65.8	41	6.9	34.5
Lack of stakeholders support	76	10.5	63.3	44	7.4	37.0
Lack of awareness	68	9.4	56.7	52	8.8	43.7
Low level family labor	63	8.7	52.5	57	9.6	47.9
Total	726	100.0	605.0	594	100.0	499.2

a. Dichotomy group tabulated at value 1 and 2
Source: survey 2010.

Annex Table 6. Households Perceptions on Benefits from Conservation

Benefits	increased		to some extent		decreased		Total	
	N	%	N	%	N	%	N	%
Increased Land fertility	8	6.7	100	83.3	12	10.0	120	100.0
Increased Crop production yield	0	.0	53	44.2	67	55.8	120	100.0
Increased Fodder and grass supply	9	7.5	82	68.3	29	24.2	120	100.0
Improvement Wood production	0	.0	68	56.7	52	43.3	120	100.0
Your livelihood improvement (reduced poverty)	0	.0	41	34.2	79	65.8	120	100.0
Efficiency Water supply (drinking and irrigation)	0	.0	51	42.5	69	57.5	120	100.0
Reduction Soil erosion	0	.0	19	15.8	101	84.2	120	100.0
Your dependency on aid or assistance/FFW	0	.0	111	92.5	9	7.5	120	100.0
Restoration of grazing lands	39	32.5	71	59.2	10	8.3	120	100.0
Reduction Flooding	0	.0	23	19.2	97	80.8	120	100.0

Annex Table 7. the Relationship between Factors that Constrain and Sustainable Natural Resource Management

Constraints of Sustainable NRM	Community-led conservation investment							
	Participated		Non participated		Total		χ^2	P
	(N)	%	(N)	%	(N)	%		
Lack of external support	21	24.7	64	75.3	85	70.8	0.502	0.000*
Lack of farmers participation	23	30.3	53	69.7	76	63.3	0.24	0.117
Incompatibility of technologies	17	37.8	28	62.2	45	37.5	0.22	0.883
Lack of control and responsibility	31	47.7	34	52.3	65	54.2	0.19	0.050**
Lack of maintenance	30	37.5	50	62.5	80	66.7	0.62	0.002**
The prevalence of drought	41	48.5	44	51.8	85	70.8	0.59	0.000*
Lack of quality of conservation	37	52.1	34	47.9	71	59.2	0.32	0.000*
Lack of extension service	22	40.7	32	59.3	54	45.0	0.30	0.883
Lack of training & technical assistance	27	32.1	57	67.9	84	70.0	0.22	0.216
Lack of stakeholder involvement	14	19.4	58	80.6	72	60.0	0.51	0.066*
Lack of conservation policy	15	40.5	22	59.5	37	30.8	0.02	0.903
Lack of farmers awareness & attitude	24	41.4	34	58.6	58	48.3	0.044	0.783
Lack of family labor force	27	42.9	36	57.1	63	52.5	0.11	0.600
Shortage of farm land	25	39.7	38	60.3	63	52.5	0.42	0.071***
Lack of farmers education	13	35.1	24	64.9	37	30.8	0.055	0.750
Lack of farmers knowhow	24	44.4	30	55.6	54	45.0	0.20	0.533
Lack of incentives from participation	33	41.2	47	58.8	80	66.7	0.604	0.001*

Chi-square Cramer's V result*at99%, ** at 95% & ***90% confidence interval

N.B Continuous participant N=47 & Non-continue in participation N=73

Annex Table 8: Conversion Factors that Used to Estimate Tropical Livestock Unit

Animal Category	TTLU	Animal Category	TTLU
Calf	0.25	Donkey (young)	0.35
Weaned Calf	0.34	Camel	1.25
Heifer	0.75	Sheep & Goats (adult)	0.13
Cow and Ox	1	Sheep & Goats (young)	0.06
Horse	1.10	Chicken	0.013
Donkey (adult)	0.70		

Source: Stork, et al, 1999

Annex Table 9. Household Respondents Number of Plots

	Number of plots	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One parcel	24	19.8	20.0	20.0
	Two parcel	57	47.1	47.5	67.5
	Three parcel	29	24.0	24.2	91.7
	Four parcel	10	8.3	8.3	100.0
	Total	120	100.0	100.0	
M	2.21				
SD	0.859				

ANNEX TWO

A QUESTIONNAIRE ON COMMUNITY BASED SUSTAINABLE NATURAL RESOURCE MANAGMENT FOR HOUSEHOLD HEAD RESPONDANTS.

Confidentiality

This study was conducted for the partial fulfillments in the master's degrees in the departments of IRLDS at Addis Ababa University. It doesn't relate to any of political and organizational missions, so respondents should understand this and any of your responses have a fruit contribution for the successful achievement of this study. Thanks in giving me a responses

Instruction

Encircle or use tick mark or write the answer as may be necessary to indicate your appropriate response.

Name of enumerator _____ Date _____

Time began (local time) _____ time end (local time) _____

Identification of respondent _____

A. GENERAL

1. Household location

Region Amhara Zone North Wollo

Woreda Gubalafto (Local district Hara. late Gerado kebele).

2. Basic information about the respondent

2.1 Sex 1. Male ____ 2. Female ____

2.2. Age _____

Marital status

2.3 1. Married ____ 2. Unmarried ____ 3. Separated ____ 4. Divorced ____

2.4 Level of education

1. Illiterate _____

2. Read and write _____

3. Grade 1 to 4 _____

4. grade 5 to 8 _____

5. Grade 9 and above _____

2.5 Family size

1. 1 to 3 _____

2. 4 to 6 _____

3. 7 and above _____
3. House holds resources and means of livelihoods
- 3.1. Size of landholding (in hectares)
1. Own _____ 2. Rented _____ 3. Others _____
- 3.2 If you have land holding what is the total size of your family plot? In ha.
1. 1 ha. _____ 2. 2ha. _____ 3. 3ha. _____
- 3.3 What is the major occupation of the household?
1. Crop production _____ 2. Fuel wood selling _____ 3. Animal husbandry _____
4. Mixed farming _____ 5. Trading _____
6. Others specify _____ ?
- 3.4 If you are producing crop rank the major crops at the following table

Types of crops	Land cover	The amount of production	Their importance as staple food	Getting amount of money by selling this crops	remarks
Teff					
Sorghum					
Maiz					
Wheat					
Barely					
Others specify	1. _____ 2. _____ 3. _____				

- 3.5 Does your households have own livestock? Yes _____ No _____
- If yes for Q 3.5 put the number of each livestock's accordingly

Type of livestock	Yes 1 No 2	Yes how many?	remark
Ox			
Cow			
Donkey			
Horse/mule			
Camel			
Goat/Sheep			
If others specify? _____			

- 3.6 What is the major source of animal feed for the livestock of this household?
1. Communal grazing _____ 2. Around back yards _____
3. Household own grazing land _____ 4. Cut and carry owned by government _____ 5.
5. Grazing owned by the government _____
6. Crop residue _____

7. Others? _____

3.6.1. how much distance you travel to the near by market

1. less than 500m 2. 500 to 1km 3. 1km to 1.5 km 4. 1.5km to 2km, 5. 2km to 2.5km 6. More than 2.5km

3.6.2. Did you face any marketing problem to your farm products? 1. yes 2. no

. If yes, mention the problem.

3.6.3 do you get agricultural extension services 1. Yes 2. No

3.6.4. Distance from the nearest development center

1. less than 500m 2. 500 to 1km 3. 1km to 1.5 km 4. 1.5km to 2km, 5. 2km to 2.5km 6. More than 2.5km

3.6.5. Did you get credit service for the year 2009/10 1. Yes 2. No

If your answer is yes for Q3.6.5. mention your sources of credit access

3.7 What are the major problems that faced on the agricultural productivity of these households? Rank the problem interms of their intensity

Problems	Rating				
	Very high 1	High 2	Moderate 3	Low 4	Insignificant 5
Shortage of farm lands					
Soil fertility reduction					
Scarcity of grazing land					
Shortage of rainfall					
Market problems					
Drought					
Soil erosion					
Shortage of agricultural input					
Poor land preparation					
Food shortage					
Shortage of oxen					

3.9 What are the supplementary incomes of the households?

1. Charcoal selling _____ 2. Fuel wood selling _____ 3. trading _____

4. Others _____

B. Past and current land degradation problems

4. Is there land degradation problem before the intervention?

1. Yes _____

2. no _____

4.1 Which part of the land had been degraded?

1. soil _____ 3. grasslands _____

2. forest _____ 4. rivers _____

4.2 what are the causes of land degradation before the intervention?

1. weak NRM _____

2. inappropriate farming practices _____

3. tenure insecurity _____

4. deforestation _____

5. drought _____

6. others _____

4.3. Land degradation with the intervention of the project?

1. yes 2. Somewhat 3. no

4.4. if yes to Q4.3. which part of the land affected?

1. Soil _____ 2. Grass _____ 3. Forest _____ 4. rivers _____

4.5. What are the causes of the current land degradation problem?

1. Weak NRM _____ 3. deforestation _____

2. drought _____
 4. inappropriate farming practices _____
 5. Tenure insecurity _____
 6. heavy rain fall _____
 6. continues grazing _____
 7. others _____
- 4.6. Do you think that the conservation intervention decrease land degrading problem?
1. Yes _____
 2. somewhat _____
 3. no _____
- 4.7. What are observable changes with the intervention practices undertaken?
1. hillside rehabilitation _____
 2. gully treatment _____
 3. land fertility _____
 4. decrease erosion _____
 5. others _____
- 4.8 grazing sources of households
1. Communal grazing
 2. Around back yards
 3. Household own grazing
 4. Cut and carry owned
 5. Grazing owned
 6. Crop residue
- 4.9. Utilization of communal grazing
1. Utilized continuous grazing type
 2. Utilized differential grazing type
 3. Rotational grazing type
 4. Cut and carry grazing type
5. Nature of grazing type
1. An open access grazing type
 2. Swampy grazing type
 3. Covered by forest grazing type
 4. Covered by bush grazing type
- 5.1. Graze is DESCRIBED AS 1. yes _____ 2. no change _____ 2. no _____
- 5.2 What are causes of grazing decline?
1. Expansion of farm land 1. yes _____ 2. no. _____
 2. Covered by weed land 1. yes _____ 2. no. _____
 3. Decrease quality of grazing 1. yes _____ 2. no. _____
 4. Policy change 1. yes _____ 2. no. _____
 5. Drought 1. yes _____ 2. no. _____
- 5.3. Do you have a private grazing 1. yes _____ 2. no _____
- 5.4. Private grazing in hectare/timed _____
- 5.5. Does u have privet forest resource 1. yes _____ 2. no _____
- 5.7. Households owned forest resource in Ha _____
- 5.8. What type of your private grazing?
1. an open access grazing type _____
 2. swampy graing type _____
 3. Covered by forest grazing type _____
 4. Covered by bush grazing type _____
- 5.9. How do you utilize your private grazing?
1. Utilized continuous grazing type _____
 2. Private graze is utilized differential grazing type _____
 3. Rotational grazing type _____
 4. Utilized cut and carry grazing type _____

C. community participation

7. For how long did you participate in the water shed? _____ Years
- 7.1. What was your free contribution toward the water shed management (put according priorities)?
1. _____

2. _____
 7.2. is the contribution according to your capacity? 1. Yes _____ 2. No _____

7.3. What motivated you to contribute (put according priority if more than one answers)?

1. My own willingness 2. The decision of the village community

7.4. Do the following constrain the degree of your participation in conservation approach?

1. Low income 1. Yes _____ 2.No _____

2. Low level of education 1.Yes _____ 2. No _____

3. Low level of health 1. Yes _____ 2. No _____

4. distance of of your home 1.yes _____ 2. no _____

5. low benefit from conservation 1. Yes _____ 2.No _____

6. lack of nowhow on conservation 1. Yes _____ 2.No _____

7. shortage pf farm lands 1. Yes _____ 2.No _____

8. lack of support 1. Yes _____ 2.No _____

9. others _____

7.5. What are the motives for your participation?

1. To get benefit 1. Yes _____ 2.No _____

2. Ordered to do 1. Yes _____ 2.No _____

3. Respected by law 1. Yes _____ 2.No _____

4. Village leaders 1. Yes _____ 2.No _____

5. Trained farmers 1. Yes _____ 2.No _____

6. Decide details in conservation practices 1. Yes _____ 2.No _____

7. local government 1. Yes _____ 2.No _____

8. Others _____

7.6. . The decision of government agencies 4. Others _____

7.7. If you participate in FFW activities what is the amount of food you receive every year (average of the last 3 years)? _____ Quintals.

7.8. Who decides your participation in land rehabilitation practice?

1. Households it self _____ 2. Village community meeting _____ 3. Community leaders _____

4. Government agencies _____ 5. NGOs _____ 6. Others _____

7.9 . If you did not participate in natural resource conservation what is the reason?

1. The believe that I can sustain myself

2. Due to unfair decision of concerned bodies

3. I have other work to do during the conservation period

4. Others _____

7.10. From your experience, do you believe that your village was able to safeguard common interest through collective action?

1. Yes 2. No

7.11 What about from the individual benefit you received?

1. Highly satisfied 2. Satisfied 3. Neutral 4. Dissatisfied

5. Highly dissatisfied

D1. BENEFITS FROM NRM project intervention ACTIVITIES

8. Indicate the benefit gained from land management using the following indicators:

Indicators	Rating Benefits				
	Highly increased 1	Increased 2	To some extent 3	Decreased 4	Highly decreased 5
Land fertility					
Crop production/yield					
Fodder and grass supply					
Wood production					
Your livelihood security (reduced poverty)					

Your dependency on aid/FFW					
Water supply (drinking and irrigation)					
Water use efficiency for irrigation					
Soil erosion					
Number of trees					
Restoration of grazing lands					
Flooding					

8.1. If you are dissatisfied, what is the reason?

1. The benefit is inadequate 2. I didn't get any benefit 3. others _____

D2. COMMUNITY EMPOWERMENT

9. What is the extent of CP in SWCM taking the following indicators?

Indicators	Rating				
	Very high 1	High 2	Fair 3	Low 4	Very low 5
Problem identification					
Planning and designing					
Implementing					
Maintenance					
Meeting					
Training and workshop					
Monitoring and evaluation					
Taking corrective action					

9.1. What are the existing village community organizations directly responsible for natural resource management?

1. _____
2. _____

9.2. To what extent are they powerful?

1. Highly powerful 2. Moderately powerful 3. Less powerful 4. Not powerful

9.3. To what extent are these organizations free from external influences such as government (higher level authorities) or political organization or elite groups while making decisions?

1. Highly free 2. Reasonably free 3. Not free 4. Dominated

9.4. Are your village leaders capable to lead and coordinate soil and water management activities?

1. Yes capable 2. Less capable 3. Incapable

9.5. What about their commitment?

1. Committed 2. Less committed 3. Not committed

9.6. If incapable and not committed, what is the problem's (put according priority)?

1. Lack of training 2. Lack of incentive 3. Corruption 4. Others

9.7. Does your village community organization need external support?

1. Strongly need 2. Need 3. Fairly need

4. Do not need

9.8. If yes, what type of support (put according the priority need).

1. Finance 2. Supplies 3. Training 4. Others _____

9.9. Which technique is more effective and SWC efficient for your village?

1

9.10. Have you acquired adequate technical knowledge necessary to continue on your own with activities introduced by SWCM?

1. Yes 2. I need more training

9.11. Do women (both household and spouse) equally participate in LM work?

1. Yes 2. No

9.12. If no, why (Put according to the weight of the problem)?

1. Male are more effective 2. Housework load 3. Capacity problem (labor)

4. Others

9.13 Are women equally represented in the leadership of the village NRM?

1. Yes 2. No

9.14 Do women of the village equally participate in the use and control of the assets (land, plants, fodder and water) of the village? 1. Yes 2. No

9.15 Which village size is appropriate to ensure effective and efficient participation in SWCM? 1.

Large 2. Medium 3. Small

9.16. Is the existing size of your village community appropriate to ensure effective and efficient participation in SWCM?

1. Yes

2. The size of the community is large and unmanageable

3. The size of the community is smaller and has less resources

4. Others

9.17 Do all community members equally participate and contribute in community works?

1. Yes 2. There are free-riders 3. A large number of people do not participate

9.18. If there are free-riders how do you control them?

1. According to village rules/norms 2. According to government rules

3. No controlling mechanism

9.19 Are there conflicts concerning use of the commons such as grazing land, water sharing? 1. Yes 2. Sometimes 3. No

9.20 What resolving methods are applied in the community?

1. _____

2. _____

9.21 Give the name of the organizations that assist your community organization and the type of the assistance they give while your village conducts SWC activities (put according to priorities)?

1. _____

2. _____

3. _____

9.22. Is the assistance adequate? 1. Yes 2. No

9.23. Did the assistance create self-reliance or dependency?

1. Self-reliance 2. Dependency

9.24. Should the assistance be continued or discontinued?

1. Continued 2. Discontinued

9.25. If your answer is the assistance should continue, why?

1. _____ 2. _____

3. _____ 4. _____

9.26. When was the last land redistribution made in your village? _____

54. Do you believe that there should be land redistribution?

1. Yes 2. No

9.27. Do you have sufficient size of farmland?

1. Yes 2. No

9.28. What should be done if the existing landholding is insufficient?

a) _____ b) _____

c) _____ d) _____

9.30. Is the existing grazing land adequate?

a) Yes b) No

9.31 What should be done if the existing grazing land is inadequate?

a) _____ b) _____

9.32. Which type of ownership do you think makes a farmer to be more committed to make short-term and long-term investment so as to develop his/her farmland?

1. Public _____ 2. Private _____

9.33. What should the ownership on closures and grazing be?

1. Communal? _____ 2. Public? _____ 3. Private? _____

9.34. To what extent have the SWC activities carried on so far has decreased the degree of land degradation and plant/forest depletion?

1. Highly decreased _____ 2. Decreased _____ 3. No change _____ 4. Rather increased _____

9.36. Do SWC activities carried out so far brought about a significant improvement in your livelihood?

1. Yes _____ 2. Fairly _____ 3. No _____ 4. Rather worsened _____

9.37. Are you willing and committed to continue with the conservation, protection, maintenance and expansion of the natural resource conservation activities on your own if FFW and other assistance are discontinued?

1. On-farm 1.1. Yes 1.2. No

2. Grazing areas 2.1. Yes 2.2. No

3. Closures 3.1. Yes 3.2. No

4. hillsides 1. Yes _____ 2. No _____

9.38. what are the current major challenges that constrain in you community? _____

9.39. what are factors affecting sustainable NRM IN watershed? _____

D. natural resource practices in the area

6. What are the major land rehabilitation practices in the area?

1. afforestation

2. soil and water conservation

3. Area closure

4. Checkdams

5. Others _____

6.1 Which practice is more dominantly practiced? (List according to their proprieties)

6.2 Which technique of rehabilitation practice is applied in the areas?

1. Traditional (e.g. earth bunds) _____

2. Modern (e.g. stone bunds) _____

3. The combination _____

6.3 in which technique do you have a practical knowledge

1. Traditional (e.g. earth bunds) _____

2. Modern (e.g. stone bunds) _____

3. The combination _____

6.4 do you get technical assistance and training to implement the practice?

1. Yes _____ 2. No _____

6.5 If the answer for Q 6.4 is No how do you implement the practice?

6.6 who decide the involvement of the community on conservation approach?

1. The community leaders

2. The local government

3. NGOs

4. Individual households

5. Others _____

6.7. Do you get technical assistance and training to implement the practice? 1. yes ____ 2. ____

6.8. Which stakeholder gives you technical assistance?

1. DAs as an agent give technical assistance to farmers

2. NGOS as an agent gives technical assistance to farmers

3. Research centers as an agent gives technical assistance to farmers
4. Woreda Agricultural offices as an agent give technical assistance to farmers
5. Environmental protection experts as an agent give technical assistance to farmers
6. CBOs as an agent give technical assistance to farmers

6.9. In which particular areas do the management approaches practiced?

1. On farm
2. off farm
3. Both of them

6.10. In which particular area conservation mostly you are interested to participate?

1. on farm
2. off farm
3. Both of them

If on farm why? _____

If off farm? _____

6.11. What are on farm (agronomy) alternative approaches more practiced in the area? (Put according to their dominance)

1. Rotation /Inter cropping& ally cropping _____ 2.variety _____
3. Mulching _____ 4. Crop yield trends _____
5. Others _____

5. Among the alternative which one is more preferable by the farmers? And why?

E. Checklist for existing stakeholders

10 What is your organization role in the watershed?

1. _____

10.1 What activities do you undertake with the project?

10.2 How do you explain participatory approach and the community in the watershed? _____

10.3 Does your organization continue after the project withdraws? _____

10.4 How do you explain the other stakeholder's coordination the activities in relation to your organization?

10.5. How do you explain the community participation in the watershed?

What are the identified organizational problems to sustain in the watershed? _____

10.6.Finally how do you explain challenges, constraints of sustainable CP, NRM and stakeholder problems _____ in _____ the area?

10.7.How do you suggest the solution and what should be made for sustainable NRM in the watershed? _____

QUESTIONNAIRE TWO

A QUESTIONNAIRE ON Interviews and FOCUS GROUPS

1. How do you evaluate the current socio-economic strength of the village members in terms of level of income, education and health?
2. Does the low level of income and low level of education and health limit the degree of CP in SWCM? When was SWC introduced in the three villages?
3. What experience does the village community have in the past in terms of collectively managing natural resources including soil, water and forests/plantations?
4. Where community members able to safeguard common interest through collective action?
5. For the future do you believe that continuing with the collective action can result more benefit?

6. What is the extent of the tangible amount of social and economic benefit the community members received as individuals and groups (e.g. agricultural Yield, water supply, wood production, fodder, services etc.) resulted from SWC management?
7. Which are the major tangible benefits to the members of the villages from:
8. On-farm activities? b) Off-farm activities? c) A fforestation?
9. Have the benefits from the natural resource bases increased, remained the same, or decreased after SWCM is introduced?
10. Did dependenc y on food aid decrease or increase? Why?
11. Ho w do you evaluate the degree of empowerment of the community in terms of adequacy of power and capacity to make decisions, control resources & benefits and enforce decisions without external interference?
12. What is the extent of capacity and commitment and democratic nature of the village organization leadership? What are the strengths and weaknesses of the village leaders?
13. What is the extent of community participation in planning, designing, implementing, monitoring and evaluating and executing SWCM decisions?
14. Ho w are decisions regarding contribution of resources made (land, labor, others) by community or community organizations?
15. Ho w willing are the village community members to commit resource?
16. 21) How are dif ferent tasks assigned and fulfillment of responsibilities enforced?
17. Ho w are closures protected and their protection sanctioned?
18. Ho w are resources from closures/plantation distributed?
19. Who does the on -farm SWCM activities of private plots (put according priorities)?
20. Who is responsible for the conservation, maintenance and protection of the off farms. closures? Under what arrangement?
21. If the external support including FFW is reduced /discontinued, do you believe that communities will be capable, willing and committed to continue to conserve, protect, maintain and expand
22. . On -farm conservation works? 2. Off-farm conservation works? 3. A forestation
23. Ho w was the SWCM introduced in the villages? (Query for the whole process including initiation by whom and how its introduction selection of sites contribution of resources organization of labor etc? Explain.
24. To what extent would you say have the ordinary members of the community acquired the technical knowledge necessary to continue on their own with activities introduced by SWCM?
25. What traditional SWC tec hniques were in practice in the villages?
26. Which techniques are more effective? Traditional or the new techniques? Do you believe the existing conservation techniques are appropriate and sustainable? Which ones? Why?
27. What is the extent of Women Participation in the community with regard to SWCM? Do they equally participate?
28. Do women in the village equally participate in the use and control of the assets (land, plants, fodder and grasses)?
29. What problems do the y face?
30. What solut ions where given to their problems?
31. Is the existing village community size manageable and resourceful to run the SWCM programs? What should be the appropriate size?
32. Ho w do you evaluate the degree of Solidarity and cohesiveness of the village community toward collective action in SWCM? How are free-riders controlled?
33. Ho w are conflicts resolved?
34. Ho w do you evaluate the extent and condition of outside support (resource, training - both managerial and technical, etc.)?
35. To what extent are the government agencies and NGOs capable of implementing the participatory programs in terms of resources, skill, institutional strength, commitment, policy, regulatory mechanisms and enforcement of policies and decisions?
36. To what extent are government and NGO employees motivated and committed to work closer to the community to effectively implement the participatory programs?
37. If the y are not motivated, what are the constraints?
38. Do you believe that research institutions have made significant contribution in enhancing SSWCM?

39. Do they apply participatory research methods?
40. Are the results of their findings disseminated to the community concerned?
41. From your experience is there any monitoring and evaluation system to assess the relationship between community participation and SWCM?
42. Are there defined qualitative and quantitative indicators adopted for this purpose?
43. Is there any periodic/annual review on community participation in SWCM based on the indicators? If there is what is the result?
44. Do you believe that there is adequate policy support (e.g. land tenure, participation guidelines, regulations and rules) for soil and water conservation management?
45. When was the last land redistribution made?
46. Which type of tenure system do you think motivates farmers to make short-term and long-term investment on: a) On-farm? b) Off-farm? c. Should the farm plots be public or private?
47. Should the off-farm/commons be communal or private?

Declaration

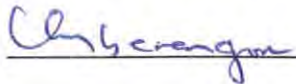
I, the undersigned, declared that this thesis is my original work, has not been presented for a degree in any other university, and all the material sources used in this thesis are duly acknowledged.

Name: Zenebe Fentaw

Signature: 

Confirmation

I confirmed that the advisee could submitted this thesis for defense



Place: Addis Ababa University, College of Development Studies Institute of Regional and Local Development Studies (IRLDS).

Date of Submission: 18/10/10