Mekelle University
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Department of Management

Factors Affecting Forest User's Participation in Participatory Forest Management; Evidence from Alamata Community Forest, Tigray; Ethiopia

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Award Master of Arts Degree in Development Studies

(Regional and Local Development Studies)

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Declaration

The thesis entitled **"Factors Affecting Forest User's Participation in PFM; Evidence from Alamata Community Forest, Tigray/Ethiopia"** is my original work and has not been presented for a degree in any other university and that all the sources of materials used for the thesis have been dully acknowledged.

Declared by: Abay Tafere

Signature: _____

Date: _____

Certification

This is to certify that this thesis entitled "**Factors Affecting Forest User's Participation in PFM; Evidence from Alamata Community Forest, Tigray/Ethiopia**" Submitted in partial fulfillment of the requirement for the award of the degree of MA, in Development studies of the college of Business and Economics, Mekelle University, through the Department of Management, done by Mr. Abay Tafere, ID, No, CBE/PR001/04 is carried out by him under our guidance..

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ACRONOMY

ACES……Activities for the Changing Earth System

ADF……..African Development Forum

BoARD…….Bureau of Agriculture and Rural Development

CBFM……...Community Based Forest Management

CBNRM……Community Based Natural Resources Management

CEE……...Center for Environment and Education

CFM……..Community Forest Management

EU…….European Union

FAO……..Food and Agriculture Organization

FRA……..Forest Resources Assessment

GTP…….....Growth and Transformation Plan

HHH…….Household Head

IGES…….Institute for Global Environmental Strategies

IISD……..International Institute for Sustainable Development

LDCs…….Less Developing Countries

MDGs……...Millennium Development Goals

MoFED…….Ministry of Finance and Economic Development

NGOs…….....Non Governmental Organization

PASDEP……A Plan For Accelerated and Sustainable Development to End Poverty

PFM……Participatory Forest Management

RLDS…….Regional and Local Development Studies

SFM……Sustainable Forest Management

UNCED…….United Nation Conference on Environment and Development

UNDESA……...United Nation Department of Economic and Social Affairs

UNDP……United Nation Development Program

UNEP…….....United Nation Environmental Protection

USDA……United States Department Of Agriculture

WB…….....World Bank

WCED……..World Commission for Environment and Development

Abstract

This study attempted to explore factors affecting forest user's participation in Participatory Forest Management. The general objective of this study is assessing factors affecting Community Participation in PFM in the study area. Specifically, the study to examining awareness of the community about the cause of deforestation; assessing the perception of the community towards PFM; identifying the pull factors that influence forest users to participate actively in PFM, and to identifying the restraining factors that affect forest user's participation actively in PFM. Primary data were collected through questionnaire distributed to 157 sample respondents and interview with Development Agents, forest supervisors of the woreda, and local administrators. Information was also gathered from woreda agriculture office. Purposive, stratified and systematic sampling methods were employed in sample selection process. The study found that forest depletion is the relevant issue in the study area. The major Causes of forest depletion in the study area are illegal cutting of wood, over grazing, agricultural expansion, natural drought and urbanization. To overcome these problems, it was found out that people positively perceive the approach of PFM due to the fact that it brought positive change in forest conservation, empowerment and accountability. This happened as a result of the privileges of ownership and use right granted to the community. The benefits obtained from PFM are the driving force for such active forest user's participation. On the other hand factors that discourage participation in the study area were found to be conflict arising between those community forest users and nonusers as well as women's productive and reproductive role. Furthermore, the fear of losing their forest due to expansion of agricultural land, lack of incentives and weak legal actions taken on illegal users were some of the hindrances that adversely affect community participation in PFM.

KEY WORDS: forest users, participatory forest management, attracting factors, restraining factors, illegal cutting, overgrazing, and deforestation.

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CHAPTER ONE

This chapter presents background and motives for current study. The problem statement is described and research objectives are specified. Besides, this chapter states the significance, scope, and limitation of the study.

1.1 BACK GROUND OF THE STUDY

According to FAO (2010), the livelihood of most rural people of developing countries is strongly linked to natural resources like forest. Currently problems related to environment and climate changes like land degradation, deforestation, over extraction of both renewable and nonrenewable natural resources are a controversial issue throughout the globe particularly in LDCs since the lives of the people directly and indirectly depend on the existence of these resources (Bedru, 2007 & FAO, 2010). Terefe (2003) pointed out that the major factor to exacerbate such severe problems are high rate of population pressure with low rate of economic growth and low level of technological improvement, increased consumption of nonrenewable natural resources. Moreover, the rural poor who have not accumulated wealth are unable to build reserve asset from the utilization of these resources in order to tackle problems in hard times (Tola, 2005). He further explained that rather depletion has continued and the remaining resources especially those endemic species both fauna and flora are in endanger position. In addition to human factors topography is also another factor of land degradation and forest depletion i.e. highland areas are more vulnerable than the lowland areas (Gebremedhin, 2004).

In Ethiopia renewable natural resource degradation has become the most serious and acute problem. During the second half of the 20th century, the country has experienced severe deforestations and degradation (UNDP, 2012). According to Winberg (2010), between 1955 and 1979, over 77 % of the country's forested area disappeared and it continues to lose 8 % of its remaining forests annually. Her study clearly stated that natural forests and woodlands covered in Ethiopia were around 15.1 million ha in 1990 however, due to different factors the forest area declined to 13.7 million ha after ten years in 2000. Another study revealed that in 2005, the forest cover had further declined and was estimated to cover 13.0 million ha (FAO, 2010 cited in Million, 2011). This statistics showed that Ethiopia lost over 2 million ha of her forests, with an

annual average loss of 140,000 ha in fifteen years. According to the same reference data indicated currently, the area is estimated at 12.3 million ha, with 11.9 % of the total land area. The study concludes that, the remaining closed natural high forests are 4.12 million ha or 3.37% of land area. In Ethiopia the fast growing population that has led to increasing need for farmland, wood for construction, unsustainable harvest for timber and fuel wood extraction, high urbanization rate, road construction and over grazing is taken as the major causes of environmental degradation and forest depletion (Tola, 2005 & UNDP, 2012). Obviously, the country has an agrarian economy with 83% of the population is living in rural areas, concentrated in the highlands, and depends on subsistence agriculture (MoFED, 2013). According to him the need to provide for an increasing population combined with other social, economic and political factors has resulted in an ever increasing expansion of the agricultural frontier and hence, subsequent deforestation and land degradation. In line with this, some writers estimated that within a year about 80,000 ha of natural high forests are changed to farmland for subsistence agriculture; and about 50,000ha of acacia woodlands are deforested for charcoal production and for state farm expansion, and about 30,000 ha of woodland, thickets and bush are cut for fuel wood in the country (UNDP/ World Bank, 1988 cited in Tola, 2005). Moreover, this study advocated that wild fire, land tenure insecurity, various inappropriate conservation approaches, lack of integration between new innovative approach and indigenous knowledge, and lack of awareness are considered as the contributing factors to deforestation. Imagine how much forest is cleared every year due to human factors like deforestation and soil degradation; these big problems become a key factor challenging food security, community sustainable livelihood, and sustainable development at large in the country (PASDEP, 2006).

Since the mid-1970s the management of forest resources in Ethiopia was mainly carried out as state and community forestry programmes. These non-participatory approaches failed to reduce tree felling and clearing, especially in Protected National Forest Priority Areas (FARM Africa, 2000). Further this problem was beyond the control of the state therefore, the ultimate solution for this severe problem will be encouraging of local people to manage and conserve their resources since they live with forests and they are primary users of forest products (FAO, 2010). According to Yemiru (2011), in Ethiopia there is a growing understanding that deforestation and land degradation will further exacerbate poverty, which brings natural resource conservation to

the forefront of rural development initiatives. Terefe (2003) on his side stated that community participation is very crucial, to overcome the rate of deforestation. Participatory Forest Management (PFM) is a new paradigm system of forest management which is adopted and implemented in order to fulfill the interest, respecting of traditional users, and bottom-up approach which encourage a sense of belongingness to the rural people in general and landless rural youth in particular (winberg, 2010). She further explained that this new paradigm shift was mainly introduced as a complementary mechanism which safeguards forests. According to FARM Africa (2000) and UNDP (2012), the government also created spaces for NGOs' engagement in sustainable forest management, through participatory forest management (PFM) practices and a number of NGOs and bilateral programs launched PFM in the mid-1990s. PFM was first introduced to Ethiopia few years ago but the approach is expanding to cover more and more hectares of forest across the country (UNDP, 2012). PFM in Ethiopia is well adopted recently including regional governments and at every woreda offices (winberg, 2010).

Tigray, the northern region of the country, is considered as one of the most extreme cases posing degraded environment difficult challenges to farmers contributes to low agricultural production, in turn exacerbating rural poverty (FAO, 2010 & Mastewal, 2010). According to this study except in some remote areas and around churches, by 1975 the natural dry land forest and woodland vegetation of the Tigray region had been destroyed. This was because of overgrazing, the progressive increase in demand for fuel wood and land for cultivation. According to FAO (2010), since the 1990s, The Tigray natural resource bureau has made concentrated efforts to conserve environment and forest resource by integrating communities, since one of the major Millennium development goals achieving food security and reduce bio diversity lose specifically forest resource by motivating and mobilizing the rural people in the region using participatory forest management policy measures. This study further explained that many areas of natural forest and woodland have reappeared on hillsides following agreements by local communities to restrict access by people and grazing animals to these areas. For instance, the by-laws of Habes Tabia of Atsbi-Womberta district and Sasun-Bethawariat Tabia of Ganta-Afeshum district on how to use grazing lands could be cited as a good example (Gebregziabher and Gebrehiwot, 2011)

1.2 Statement of the Problem

Scholars forward that it is important to conduct studies on the factors that determine the successful of common resource management (Agrawal, 2001; Poteete and Ostrom, 2003). In line with this some researchers tried to assess factors affecting community participation in forest conservation and management in Ethiopia. Among the researchers, Alemtsehay (2010) had dealt with; Determinating Factors for a Successful Establishment of Participatory Forest Management: A Comparative Study of Goba and Dello Districts, Tewodros (2008) Factors Affecting the Knowledge, Attitude and Practice of Forest Dependent Manja Community towards Forest Conservation in Kaffa Zone, SNNPR, and Terefe (2003) Factors Affecting People's Participation in Participatory Forest Management: The case of IFMP Adaba-Dodola in Bale zone of Oromia Region. All studies concluded that nothing could be done without community participation and involvement. Hence, instigating and motivating the community should be taken as the backbone and indispensable asset or input of forest management and conservation.

Likewise, Tirhas (2009) dealt with forest conservation and management with due emphasis on indigenous knowledge in Tigray region of Alamata Wereda. According to Tirhas (2009), in rural areas of Alamata, there are communally managed forests over which the surrounding society relies for different purposes. In this case, the society use their own indigenous ways of forest conservation and management backed by rules, regulations and sanctions as well as punishments over those who misuse forests. So far, no study has been conducted on factors affecting community based forest management in Alamata. Hence, empirically, it is intended to study the factors influencing their household participation level in community forest management and depict the magnitude of their impacts. Moreover, this study contributes to the current literature providing a better insight into context specific factors affecting community participation in community forest management in the study area.

1.3 Research Questions

1.3.1 General Research Question

- What factors affect forest user's Participation in Participatory Forest Management in Alamata Woreda?

1.3.2 Specific Research Questions

- What is the level of awareness of forest user's about major causes of forest degradation?
- What is the perception of the forest user's towards participatory forest management?
- What are the pull and push factors that influence forest user's participation in participatory forest management?
- What are the determinant factors that affect forest user's participation in participatory forest management?

1.4 Research Objectives

1.4.1 General Objective

The general objective of this study is to assess factors affecting forest user's Participation in PFM in Alamata Woreda.

Specific Objectives;

The specific objective of the study included the following

- To examine the level of awareness of the forest user's about the cause of deforestation.
- To assess the perception of forest user's towards participatory forest management.
- To identify the pull and push factors that affect forest user's participation in participatory forest management
- To identify the determinant factors (demographic, bio-physical and economic) that affect forest user's participation in participatory forest management

1.5 Significance of the Study

The findings of this study will have great role in contributing with critical assessment of the topic under discussion which is called exploring factors forest user's Participation in community forest management. In this regard, this research study is expected to be indispensable for all

stakeholders that have their own stakes and being engaged in the enhancement of the PFM and provide basic information to all stakeholders like private, governmental and nongovernmental organization which, operate their duties in community centered forest conservation with community in the central focus. Furthermore the study examines what activities are undertaken in the study area to tackle the biodiversity losses as well as serves as a good basis for forthcoming researchers who have a strong desire to carry out a research on this or related topics in this area or elsewhere.

1.6 Scope and Limitation of the Study

1.6.1 Delimitation of the Study

The study focuses on rural areas of Alamata woreda. It limited a rural set-up simply because many community forest are found in the rural areas. As such, the researcher needs to investigate whether the existence of coordination between local and government institutions and the participation of other stakeholders in order to maintain the forestry program. The study was further delimited to rural Alamata communal forest of three peasant associations. The study was conducted purposely in the surrounding of Alamata town which is relatively forest abundant areas in three peasant association which local peoples are participate in these communal forest management. As the researcher information gathered from preliminary discussion with forest supervisors of the woreda this makes the area unique and this uniqueness has attracted attention of researcher in to researching about the area. Furthermore, the researcher was seen it fit to choose this area because the area is inhabited by active communities that value their participation in forest development as a key to sustainable the forestry program.

1.7 Limitation of the study

It is difficult to address all issues in this study by the researcher due to time and finance constraints. Further the study also selected three *tabias* within Alamata for one reason mentioned above. As a result conclusion drawn may not represent for all forest user's perception towards PFM in other areas.

CHAPTER TWO

This chapter tries to deal with theoretical, conceptual and empirical literature review related with major influences of people's participation in community forest management and cause of deforestation. Theoretical literature review tries to capture theoretical background related with PFM. The, empirical literature review addresses the main empirical results obtained by various studies

2. REVIEW OF RELATED LITERATURE

2.1 Deforestation and the Extent of the Root Problem

Deforestation is the continuous cutting down of forests without any replacement activities which completely conversion of forest area to another land use or the long-term reduction of the tree canopy cover due to proximate and underline factors (FAO, 2011). Deforestation serves as a proxy for the loss of critical ecosystems and biodiversity, as well as increased risk of soil erosion in steeply sloped areas (Dasgupta et al., 2004).The current deforestation rate particularly in less developing countries is the worry of world Community because its impact is dangerous to all countries (Terefe, 2003).

Deforestation is the most prominent problem in tropical regions such as Africa, Latin America and parts of Asia. "The total net change in tropical forest area in the period 2000–2010 is estimated at 5.2 million hectares per year, an area slightly bigger than the size of Costa Rica, or equivalent to a loss of more than 140 km^2 of forest per day (FAO, 2011). This study asserted that Africa accounted for a net loss of 4.0 million hectares per year (which equals about the size of Belgium and is equivalent to 0.3% of the entire African forest cover) and an average annual negative change rate of -0.62% from 2000 to 2005. Africa suffered the second largest net loss in forests per annum with Burundi having the second largest deforestation rate in the world, followed by Togo and Mauritania (Rademaekers et al., 2010). As far as annual net loss is concerned, hotspots include Sudan, Zambia, Tanzania, Nigeria and DR Congo (ibid).

Another study revealed that in Africa forests are being cleared 0.8% per year. According to the study among the regions highest deforestation rate is occurring in West Africa where 4% is being

cleared each year. The study shows that the degree of forest depletion has become critical in many African countries including Ethiopia. Based on the study in the region some countries have already lost over 80 percent of their total forests: Burkina Faso, Burundi, Chad, Ethiopia, Gambia, Ghana, Guinea-Bissau, Liberia, Mauritania, Niger, Rwanda, Senegal and Sierra-Leon (Gaffar et al., 1998:10 cited in Terefe, 2003).

2.1.1. Causes of Deforestation

Though forests have a huge significance in environmental and socio-economic development of most African countries, the rate of deforestation is very high due to poor forest management practices. For example from 2000 to 2010, Africa recorded an annual loss of about 3.4 million hectares making it second largest net forest loser in the world (FAO, 2005). Therefore, urgent policy measures are needed to ensure the sustainable management and development of forest resources. According to Geist & Lambin (2001) and Rademaekers et al., (2010), deforestation may occur due to proximate and underline causes. They further explained that Proximate causes are human activities (land uses) that directly affect the environment and thus constitute proximate sources of change for example; 'excessive logging' or 'forest conversion into agricultural land' directly implies a reduction of forests. Scientists today agree that agricultural expansion is the most important direct driver of land use change globally, followed by infrastructure development and wood extraction. For example the direct drivers of deforestation in Africa reflect the global pattern with agricultural expansion as the main driver of deforestation (FAO, 2005). Direct conversion of forest area into small-scale permanent agriculture accounts for approximately 60% of the total deforestation whereas direct conversion of forest area into large-scale permanent agriculture accounts for another 10% (FAO, 2002). However, also wood extraction and infrastructure development play a significant role in deforestation across Africa (Geist & Lambin 2002). According to this study the main direct drivers of deforestation in Africa (ranked based on relative importance) are thus: Small-scale permanent agriculture (deforestation); Large-scale permanent agriculture (deforestation); Fuel wood consumption (degradation); Commercial logging and timber production (degradation); illegal logging (degradation); and Infrastructure development (deforestation).

Underlying driving forces (or social processes) are seen to be fundamental forces that underpin the more obvious or proximate causes of tropical deforestation (Geist & Lambin, 2001). In terms of spatial scale, underlying drivers may operate directly at the local level, or indirectly from the national or even global level. The indirect drivers of deforestation vary from country to country and even within a country and are often complex in nature. Due to Africa's diverse set of cultures, traditions, languages and political systems, a tendency is seen that in the majority of cases, deforestation is driven by the full interplay of institutional, demographic, economic, technological, and cultural variables rather than by single-factor causation. For Africa the following indirect drivers are most often mentioned in deforestation studies (in order of importance): demographic, economic, technological, governance and socio cultural (Geist and Lambin, 2002). Furthermore, worldwide bio energy policies and demand also play an indirect role in deforestation. Some of the underline causes of deforestation are; Demographic drivers, Socio cultural driver, Economic driver and Government driver.

In contrast to the above idea some studies showed that The idea towards causes of tropical deforestation have changed in the 21st century, which has required changes in the policies necessary to protect tropical forests (Karkee, 2004). For many years, scholars assumed that tropical forests was clear largely for the purpose growing numbers of subsistence farmers moving into forests and cutting trees down for cropping such as corn, beans, and cassava. But several recent scientific studies show that not subsistence farmers are the cause, large commercial agricultural and timber enterprises are the major actors and principal agents of tropical deforestation (ibid). Though small subsistence farming through shifting cultivation and clearing forests have its own impact of tropical deforestation large commercial agriculture, infrastructure development and timber enterprise are the prominent factors for climatic change in general and forest depletion in particular in tropical forests of Africa.

2.1.2 Poverty and Environmental Degradation nexus

Environmental sustainability is one pillar of sustainable development and eradication of poverty is the core goal of the MDGs. in order to properly understand the sustainable development-MDG linkage, it is essential to grasp the environment-poverty nexus (Jehan & Umana**,** 2003). Many studies have argued there is a strong linkage between environment and poverty for many years

since in most developing countries the life of households are directly and indirectly dependent on the natural resources especially the common property like forest resources (Bhattacharya & Innes, 2006).

According to Jehan and Umana **(**2003), environment-poverty nexus is a two-way relationship. They explained that environment affects poverty situations in three distinct dimensions: by providing sources of livelihoods to poor people, by affecting their health and by influencing their vulnerability. Poverty again affects the environment in different ways: poor people are forced to deplete the environment, increase economic growth of countries at the expense of environment, and by inducing societies to downgrade environmental concerns.

Another study also revealed that the poor's exposure to environmental degradation is distinctive mainly for two reasons. First, the surroundings of the locations inhibited by the poor are often environmentally vulnerable or degraded. The areas where the poor can gain access are often fragile and hence the riskiest for health and income generation. Second, lack of strong resource base makes it difficult for the poor to opt out of the degraded environment and try to eke out living with alternative sources of livelihoods which are less degrading. In that sense they are more victims rather than degraders of the environment. Thus there exists a two-way relationship between poverty and environment in the developing countries. Poverty causes environmental degradation, and in turn, the degradations in environment exacerbate poverty. Again, poverty itself is a product of unequal resource distribution between groups and classes (Rahman, 2000).

> *Generally according to Economic and Social Survey of Asia and the Pacific (2003:271), the relationship between poverty and environment are, "The poor live in places which are ecologically more vulnerable and are forced to earn their living from low-productivity natural resources. The rural poor often live in low-lying, flood-prone areas, on steep mountain slopes or on dry land and possess low-productivity marginal land devoid of any irrigation facilities. The number of the rural poor in developing countries living on "marginal" land could be twice the number found on better-developed land. Environmental deterioration in the form of land degradation, frequent flooding, increased pollution and other*

hazards reduces the income of both the rural and urban poor and worsens their health disproportionately by comparison with the rich.

2.1.3 Population and Environmental Degradation nexus

Most of the time some literatures reviewed that population growth is considered as the major cause of environmental degradation and natural resources depletion. An important origin of all theories explaining the relationship between population growth and environmental degradation can be traced to the Malthusian model of population, resources and development (Mal-thus, 1987 cited in Kreager, 2009) and the 'classical' debate that followed. Malthus thought that Population increases exponentially with the increase in the means of subsistence (Marquette, 1997). As such, output declines and the land resource is impoverished, Land degradation could thus implicitly be seen as a result of extreme levels of population pressure.

Unlike Malthus, Boserupians treat population growth as an independent variable and see it as a major factor determining agricultural development (Boserup, 1965 cited in Kreager, 2009). This constitutes an important alternative hypothesis where technological change is treated as endogenous. Population pressure is seen as inducing technological innovation, causing the farmers to search for new technology or adapt by changing cultivation practices to preserve and improve their land resources. Therefore people can be a source, input and asset of scientific knowledge and new innovative technology which results increasing production and productivity if we properly utilized**.**

2.1.4 Social, Economic and Environmental Impacts of Deforestation

The major effects of deforestations have been deterioration of ecological systems with resulting negative impacts on soil fertility, water flows and biological diversity (NEMC 1995; Misana and Nyaki, 1993 cited in ACES, 1993). Soil erosion has become a serious problem in many parts of the world. Sheet and gully erosion widespread, rendering most of the land unproductive (FAO, 2011). Deforestation has also affected water catchment areas and the quantity and quality of water supplies they contain. There is extensive evidence of reduced dry season river flows and drying up of springs and seepages. There is also increased sedimentation of rivers and dams and frequency of flash floods. Ground water supplies have also been depleted because of reduced

infiltration of rainfall into the soil caused by deforestation. The lack of and poor quality water have in most cases has been associated with incidences of many waterborne diseases such as typhoid, diarrhea and cholera.

According to ACES (1993), Deforestation has also led to acute shortages of fuel wood and results Women in rural developing countries are forced to walk long distances up to 7 km or more with heavy burden of wood. Furthermore, there has been loss of wildlife habitat and biodiversity as a result of fragmentation and loss of critical ecosystem linkages and over-exploitation of the natural habitats. This study further advocates that the depletion of forest resources is affecting not only the economy of any countries, through negative effects on agriculture but also the health of the people this problem ultimately results less level of participation and undermining the potential for sustainable development at large. Lastly but not least loss of tropical forest impacts soil erosion and soil infertility, loss of biodiversity, increase CO_2 level, change and reduction in precipitation pattern, increase in global surface temperature (Houghton, 2005).Therefore, to overcome such severe problem efforts must need through community put at the center to be made to reverse the trend.

2.2 Definition of Key Terminologies and Concepts

2.2.1 What is community participation?

The available literature indicates that there is no single definition of the term participation because every individual, organization and various government policies defined based on their own values, culture and contexts (FAO, 2003). Participation in development is a highly contested term with no finite meaning (Zocher, 2010). He further argued that currently participation becomes as one of the “catchwords” of contemporary development dissertation.

Many scholars defined participation in different ways among these Edward and Mejos (2007), defined Participation is an inclusive and a positive relation between persons which encourage working together and allows the person to get experience from others. They further explained that it is important to understand the significance of participation as fundamental human right which promotes the other rights. According article 27(1) of the *Universal Declaration of Human*

Rights “everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and share in scientific advancement and its benefits.”

The concept of participation emerged between 1960s and 1970s after the critics of most development projects unable to achieve their intended objective because of lack of community participation (Isager et al., 2004). According to them, though most development projects directly and indirectly affect the lives of the people, too many projects were designed, and implemented without active involvement of the people; since then participation become imperative word of development and every development project encompasses ‘participatory approach’. Moreover, Participation in development perspective is all communities, organizations, stake holders and responsible bodies are involved in and have a stake in decision making related to development activities that will affect them in the short and long period. While the outcome of genuine participation is effective and sustainable for all development projects in general and forest resources conservation project in particular.

2.2.2 What is Sustainability?

Currently the term sustainability is a fashion, paramount term and is not an option it has become an imperative. For a better life human beings need good and clean air, pure and fresh water, nutritious food, healthy and clean environment and green area around (Kuhlman & Farrington, 2010).Without the concept of sustainability, environmental deterioration and economic decline will be feeding on each other and going on in opposite direction, finally leading to poverty, pollution, poor health, political upheaval, conflict and unrest (UNDP, 2012). Due to this fact the world community give due emphasis on their policies how resources can be used in sustainable manner without deteriorating the natural environment. Sustainability as a policy concept has its origin in the Brundtland Report of 1987. That document was concerned with the tension between the aspirations of mankind towards a better life on the one hand and the limitations imposed by nature on the other hand (Kuhlman & Farrington, 2010: 3436).

2.3 The Definition and Concept of Sustainable Forest Management

Sustainable forest management is the process of managing and conserving forests to accomplish one or more clearly specified objectives of management with regard increasing continuous production and without undue reduction of its inherent value and future productivity and with effective physical and social environment protection (UNDP, 2012). FAO (2011) stated that SFM is a multipurpose practice not only focus on ensuring to balance the ecosystem by reducing the concentration of carbon in atmosphere but also maintain the capacity to provide other goods and services for the benefit of current and future generations. Therefore, Management practices need local people's participation in each specific ecosystem plan in order to avoid over exploitation and forest degradation. Generally sustainable forest management provides a multidimensional benefits and values to the users themselves, and to the living organisms at large at the global level. Based on the idea of FAO (2008), Sustainable managed forests provide vital services to both nature and society. Putz (1994), pointed out that SFM is methods that jeopardize or violate neither future harvests of forest products nor future benefits of environmental services. Moreover the author clearly defined the important of SFM as, nevertheless the overall sustainability of management cannot be conclusively proven since future is uncertain, and the application of day to day good forest management practices undeniably helps maintain the value of forests as sources socio-economic benefit and balance of climatic condition. Even good management may result in unforeseen losses of non-target species and help protecting the endanger species of fauna and flora that are very essential for modifications of ecosystem processes (ibid).

According to UNDP (2012), the term forest sustainability, sustainable forestry, and sustainable forest management are interchangeable terms which closely linked to the definition of sustainable development. The department further explained that these terms generally include or imply the following elements: the continued existence and use of forests to meet human physical, economic, and social needs; the desire to preserve the health of forest ecosystems in perpetuity; and the ethical choice of preserving options for future generations while meeting the needs of the present.

To achieve the sense of sustainability concept in forest management, it is indispensible encouraging and creating social responsibilities of Sustainable Forest Managers. Experiences revealed that to bring sustainable forest management programs there must put priorities which local people at the center and based on local, regional and national level. For instance due to discussing logging systems and annual coupes with local farmers is not a traditional approach to forest management in many of the world's rainforests, forests have vanished where their needs and desires have not been considered (Putz, 1994)

This all indicate that sustainable based forest management practice is a powerful system of conservation which based on decentralization, participation, interest and willingness of local people that evolved not only ensure conserving of biodiversity but also have a good implication of in equitable distribution of access to and benefits from them. Therefore SFM is the core solution to the continuous destruction of forests which causes much misery to the poor.

2.4 Approaches and Significance of People's Participation in Community Forest Management (PFM)

PFM is the system of management whereby a community forest is managed by the members of the local community, and not by some external, remote governing body (Gobeze et al., 2009). According to FARM-Africa and SOS Sahel Ethiopia (2002), Participatory Forest Management (PFM) is used as a broad term to describe systems in which communities (forest users) and government services (Forest services), work together to: define rights of forest use; develop ways of sharing management responsibilities; and agree how to divide forest benefits. The term PFM includes Joint Forest Management, Collaborative Forest Management, and other similar terms, that are all used to describe modes of community based forest management systems.

According to FAO (2003), the role of active community participation in ensuring sustainable development is obviously known and undeniable. Currently, people are considered as the most important factors and agents of development and their participations are highly required as it is the central focus (Gebremedhin, 2004). According to him development is unthinkable without the participation of the native people and People should be placed first in development projects if their development is what the activity plan aims to promote and the real aim of development should be to improve and change the livelihood of local people. Directly and indirectly a given

development project particularly forestry program affects the life of indigenous people; since they live with forests and they are primary users of forest products (Wily, 2002, & FAO, 2010). This study stated that living near or within forestlands, local communities are presumed to have greater knowledge and understanding of the resources and easily identify their constraints and opportunities. Then "*Who can manage forests better than those living within or beside them?"* (Agrawal & Angelson, 2009: 201). Generally Isager et al., (2004) contended that forest conservation without genuine local participation has not only become a subject of failure but also results in conflict, violence and the participation itself provides no guarantee of success. That is why Agrawal and Angelsen (2009), justified excluding local communities is likely to work against community interests, and may aggravate illegal harvesting, fire and fire-raising in forests or other illegal activities that reduce carbon storage. From this point of view community participation is imperative at every stage to be effective and sustained the PFM.

Natural resource management theory and practice has been well adopted significantly in recent decades. According to Wood (2008), historically showed in most countries natural resources management had been geared towards in the hands of national or state governments, with little recognition of the people living closest to the resource. However, the idea that local people have a greater role to play in the planning and management of their surrounding environments is gaining ground. Studies show that the last two decades have witnessed a paradigm shift in conservation and natural resources management away from costly state centered control towards approaches in which local people play active role (Wily, 2002). The authors' further advocate that reforms purposely aim to increase resources user participation in natural resources management decisions and benefits by restructuring the power relation between central state and communities. By decentralizing natural resource management, CBNRM is an effort to incorporate local communities into guardianship of their immediate environment in an attempt to meet ecological and social goals on both local and global scales (Agrawal & Gibson, 1999). Moreover CFM is one of the most excising and productive part of CBNRM which is well known throughout the world currently.

Another study from Nepal community forestry showed over the last 25 years gain a large positive impact in terms of enrichment of greenery and growing stock. Forests under government management systems unlike CFM is not only depleting but also degrading the resources lead

tragedy of the commons. Currently there are some basic facts which indicate that Community Forest User Groups are also generating financial resources, which are used mainly in better forest management and community development activities (Kanel and Dahal, 2008). Generally community forest is highly threatened but provides numerous services like balancing the environment; serve as human consumption and habitat for animal species.

According to Agrawal and Angelsen (2009), Community forest management (CFM) encompasses two essential things: the resource (forests) and a class of owner/manager (communities). In addition to this the term CFM broadly known in different specific forms of names throughout the world like: participatory forest management (PFM), joint forest management (JFM), forest co management and community-based forest management (CBFM). Though Participatory forest management known in various forms, it has two clear key essential goals that are conserve bio diversity and improve rural livelihood. According to Wily (2002), 'Community' in the context of PFM refers to people living within or next to forests. According to him Participatory Forest Management (PFM) is broken old concepts and open new thinking in the forestry sector; in order to involve local community in the management of forests through community forestry, participatory forestry and joint forestry based on the contexts and policy of the country. Osumba (2011) advocated that the main objective of PFM was to devolve forest governance to the local levels. For instance the act proposed the following measures to enhance community participation in forest conservation: encouraging sustainable use of forest resources; supporting the establishment of community forests associations through which communities can be able to participate in the conservation and management of forests; and Protecting and encouraging the traditional interests of local communities customarily resident within and around forests Purity.

2.4.1. Function of Community Forest for Socio-Economic and Environmental well being

Forest provide a wide variety of social and economic benefits, ranging from easily quantified economic values associated with forest products, to less tangible services and contributions to society. In order to measure progress towards the implementation of sustainable forest management, it is necessary to monitor changes in the outputs provided by forest management in social and economic, as well as environmental dimensions (FAO, 2010).

Forests and other natural resources are crucial to the livelihoods of millions of poor people worldwide. According to the World Bank, over 90% of the 1.2 billion people living in extreme poverty depend on forests for many parts of their livelihoods. Eradicating poverty is therefore impossible without paying specific attention to the 410 million people (including 60 million indigenous people) who live in or near tropical forest areas and depend on these forests for their subsistence and survival needs (ADF, 2010). Community forests contribute substantially to the livelihoods of millions of rural people in the developing world. Development agencies have estimated that forests provide substantial livelihood benefits to more than half a billion people, many of them are very poor (World Bank 2004; Eliasch 2008 cited in Agrawal and Angelsen, 2009).

From five sustainable livelihood assets natural capital which incorporates both renewable and non renewable resources, are estimated to account for 24% of sub Saharan Africa's total wealth (FAO, 2011: 10). According to this report forests resources represent critical renewable assets and inputs to economic activity and livelihood in Africa account for 23% of the continent's total land area. These forests provide a wide range of goods and services that create opportunities for development, and support the livelihoods of millions of people living in and around the forest (FAO, 2005). According to this study the importance forest resources is further demonstrated, for example, the value of wood products (both fuel wood and industrial round-wood) removed from the forest which increased from $2.6 billion in 1990 to $2.9 billion in 2005, and in some key forest countries such as Central Africa Republic and Cameroon timber accounts for 50% and 25% of foreign exchange respectively.

According to African development forum (2010), some of goods and services that are obtained from the forest resources are, wood for fuel and construction, are quite evident while others, such as water sources, are less obvious. According to him forest other than direct economic benefit they have indirect functions including protecting catchment, purifying water and regulating river flows, which in turn ensure the supply of water for hydropower generation. Forests and woodlands also help prevent soil erosion (from water and wind) and thus are critical for agriculture and food production. They supply timber, wood for energy, construction materials and food and medicines. Moreover, Economic and Social Survey of Asia and the Pacific in (2003), pointed out that well managed Forest and forest products are the major support system of

livelihood income to the rural poor. Some of these life support systems of major economic and environmental importance are: supply of timber, fuel wood, fodder, and a wide range of non-wood products; Natural habitat for bio-diversity and repository of genetic wealth; Provision of recreation and opportunity for ecotourism; Playing an integral part of the watershed to regulate the water regime, conserve soil, and control floods; and Carbon sequestration and carbon sink.

Other than economic benefit Forests have a strong social services like provision of shade habitat functions, grazing, cultural (sacred groves, shade, peace trees and plants, meeting places, boundaries and training areas) and aesthetic values. The overall value of these goods-and-services is enormous: it has been suggested that if the value of carbon sequestration is added to the above values, the local value of forests could easily support flourishing local livelihoods, while allowing forest-adjacent communities to maintain their security (UNEP, 2010). According to IGES (2012), In the case of communities, additional uses must be accounted for such as food and medicinal production, and cultural, aesthetic and spiritual uses.

Over the course of last decade, forests have regained prominence o[i]n the international agenda due to increased awareness of environmental challenges and climate change (ADF, 2012). Since Forests provide a basis for livelihoods to people as well as serve as carbon sinks and stabilize global climate, regulate water cycles and provide habitats for biodiversity while hosting a wide variety of genetic resources (FAO, 2011: 10). CFM is securing the supply of environmental services, such as watershed and biodiversity protection, and carbon fixation and storage, all of which are crucial for the attainment of climate change mitigation goals (UNEP 2011 cited in IGES, 2012)

2.5 Determining Factors of Common Resource Management

Currently throughout the world there is a continuous change about the effectiveness and sustainability of common resource management approach. Focusing on direct community participation in forest management has the advantage to observe individuals' behavior. Common resources management concept mainly focuses on individual's actions that consciously seek to minimize the negative impact of human activities on the forest resources (Kugonza, 2009). IGES (2012) refers to those personal actions that are directly related to environmental improvements. Some daily activities, such as minimizing resource and energy consumption, reducing and

recycling waste, or using public transport are private actions which contribute to the improvement of nature. In the same way, participation in environmental organizations can be seen as a kind of pro-environmental behavior and are highly relevant to achieve the effectiveness of some environmental policies which require behavioral changes.

Agrawal (2001) analyzed in four categories from well known studies that other than these factors there are other determinant factors that affect the community participation in common resources management as described in table below.

Table 2.1 Factors that affect the success of collective common resource management

1. Resource system characteristics (biophysical)
size of the resource clearly defined boundaries level of mobility/ movement of the community from place to place possibility of storage of benefit from resource predictability
2. User group community characteristics
group size clearly defined boundaries prevalence of shared norms prevalence of past successful experience/ social capital leadership/ local hierarchy heterogeneity in endowments heterogeneity in identity and interests interdependence among group members 1 and 2 relationship between resource system characteristics and group characteristics Overlap between user group residential location and resource location Level of dependence by group member on resource system Fairness in allocation of benefits from common resources Nature of changes in level of users demand
3. Institutional arrangements
local vs. external devised and management rules degree to which rules are simple and easy to understand easy in enforcement and monitoring of rules availability of low cost adjudication accountability of monitors and other officials to user
4. External environment
Cost of exclusion technology time for adaptation of new technology related to commons level of articulation with external markets nature of changes in articulation with external markets central government undermining of local authority external sanctioning institutions levels of external aid to compensate local user for conservation activities

Source: Agrawal 2001 Common Property Institution and Sustainable Governance of Resources.

2.5.1 Institutional and Local Knowledge factors

Many researchers have conducted researches about factors that determine the effectiveness of community based resource management. Majority of the study have almost similar assumptions regard to the important factor, institutions, for the success and achievement of collective action in managing a common resource (Wade, 1987; Agrawal, 2001; Agrawal, 2006; Van Vugt; 2007 cited in Alemtsehay, 2010). But this does not mean that institution is the only factor for the success of common resources management since other factors can affect the management of the resources. For example, according to (Agrawal and Gibson, 1999) to be more accurate in the efforts to depict communities and their relationship with their forest resource and thus to be more relevant to policy making he argued that great attention should be focused on three critical aspects of communities. Thus three proposed foci for the study of community based forest conservation allows for better understandings of the factors critical to success or failure of efforts aimed at local level community based forest resource conservations. These three critical aspects are; Institutional Arrangements, Multiples actors with multiple interests and Local level process.

Management of natural resources is best learned through experience. Knowledge of local ecosystems helps in sustainable management of resources (Sinha, ND). Community based forest management provided more opportunities to the local inhabitants to design forest institutions incorporating their knowledge and values.

2.5.2 Gender of the household head heads

Studies in Kenya by Musyoki *et al*., (2012) revealed that among demographic factors gender had a significant influence on participation of community members in forest conservation Moreover another finding agrees with the observation made by Coulibaly-Lingani *et al.,* (2011) in Burkina Faso, that there is a highly significant relation between gender and participation in forest conservation. This implies that gender is indispensable for some aspects of participation in forest conservation just as reported for developing countries such as Burkina Faso and Kenya. According to this study Male and female community members experience different circumstances that affect their participation in forest conservation activities such as wild fire fighting and forest tour among other activities. Women's personal and household attributes constrain their participation in community organizations in Southern Burkina Faso. Women are

quite disadvantaged due to their social and household obligations such as childcare, fetching water, cooking food and farming.

2.5.3 Age of the household heads

As some studies conducted age is also an important determinant factor in household decision to participate in PFM. for example communities respect the decision of the aged and the young people having various commitments that they value more than participating in PFM activities the younger upland farmers of Vietnam who have more options do not usually participate in the forest management program because the pay is lower than their other economic activities (Thoai and Rañola 2010). The older may also be interested because they have time to participate and the fact that they value their forests and are interested in conserving them. In contrast to the above study one finding by Chhetri (2005), Determinants of User Participation and Household Dependency in the Hills of Nepal: indicates that the older people are less likely to participate compared to the younger ones. This was as result of, the forest related work requires more physical strength and the younger people remained more active while the older people may find themselves unable to perform.

2.5.4 Household sizes

In Common resources management most Scholars agree that there is a positive or negative relationship between household size and community participation in forest management (Agrawal, 2006). For instance in Kenya there was significance effect large family size with soil erosion control by adopt labor intensive technology this activity contribute a lot to the improvement of soil erosion control (Thoai and Rañola 2010). Hence, household size is an important determinant factor of household decision to participate in forest management this agrees with the observations of Chhetri (2005) that households with large family size are in better position to utilize the community forest resources hence are likely to participate more in PFM to meet their needs for forest products. Similarly, Dolisca *et al.*, (2006) in a case study from Haiti identified household size to be having a positive effect on social level participation in forest management. This indicates that households with fewer members are less likely to participate in social forestry activities.

2.5.5 Level of education of forest adjacent communities

A higher level of education provides a wider range of job options hence making fuel wood collection unprofitable due to greater opportunity costs of collection (Dolisca *et al.*,2006). Therefore according to this study level of education and participation has inverse relation. This shows that education level has a tendency to reduce forest dependency, because educated need to find other options than costly fuel wood collecting results. In contrast Finding of Coulibaly-Lingani *et al.*, (2009) and Musyoki *et al.*, (2012) revealed that level of education did not have relation with level of participation in forest conservation. Another finding by argued that that education is an input/support in awareness creation about forest conservation and increase the participation of the people (Chhetri, 2005). Therefore level of education has its own influence on the participation of the people, also different from place to place and context as well.

2.5.6 Distance of homesteads from the forests and market

Finding from Thoai and Rañola 2010 showed that there is an inverse relationship between distance of the house of the farmer from the forest area to be managed and probability of participation. This is because the transportation cost increases with distance and thus becomes more expensive, especially because their activities related to protection of the forest require more of their regular presence. In contrast to this another study revealed that distance is not a determinant factor in household decision to participate in forest management (Musyoki *et al*., 2012). However, considering the relationship between general participation of all community members in forest conservation and homestead distance from the forest had a very significant influence on the number of community members participating in forest conservation. As the distance of homestead from the forest increased, the number of community members participating in forest conservation activities decreased.

Scholars of common have mixed thought about the effect of distance from market on participation. Writers, who are in a significant literature, on the effects of roads and markets found a positive relationship between distance from market and conservation of forest. (Argawal and Chhatre, 2006).

2.5.7 Economic value of forest/ benefit derived from forest

Incomes from environmental sources in general and forest resources in particular play indispensable role in rural livelihood of most developing countries (Bedru, 2007). According to Alemtsehay (2010), majority of the study revealed that economic value of forests have strongly affected on individual decisions whether to participate or not in the management of a common resource. In most countries Villagers typically use the forest products as an open access resource due to weak management activities. For example in Tanzania local people use wild forest whether as a source of products primarily to be consumed at home, such as non-timber forest products (NTFPs) such as fuel wood, forest fruits and vegetables and medicine, and building materials, or for income generating activities such as timber and charcoal production this mainly influence their participation in PFM practices (Bedru, 2007).

2.5.8 Training and awareness

According to (Ogada, 2012) Participation in community forest management, households' decisions to plant trees and conserve the forest resources may be directly influenced by household level requires some education, either formal or informal, obtained through schooling or extension services. For example attitude of the community towards common resources can be changed by educating the community about common resource management (Kugonza et al., 2009). Thus, better educated household heads or households with access to government or farmer-farmer extension services may have a positive attitude towards PFM. This also explains why households with good social networks may have a higher possibility of planting trees because they are able to get extension services through such networks.

2.5.9 Secure land tenure

According to whly (2002), security of tenure logically provides the most profound incentive of all towards sustainable forest conservation, allowing the community to adopt a *long-term horizon* to management decisions and therefore more cautious conservation measures. Secure land tenure arrangements have been found to influence tree planting decisions among farmer groups. Since Trees take a longer gestation period and only farmers who are confident of continued use of a

given plot would be encouraged to plant them (Bannister and Nair, 2003; Deininger and Feder, 2001; Gebreegziabher *et al*., 2010; Warner, 1995 cited in Isager, 2004).

However, some studies do not agree with the idea that secure tenure may encourage tree planting where communal ownership of land has been more conducive for development of farm forestry (German *et al*., 2009 cited in whly, 2002). Perhaps tree planting in areas with ambiguous land tenure system is a means used by households to place a claim of legitimacy of ownership and/or access.

2.6 Other Inhibiting factors of people's participation in common resources

The livelihood of the rural poor depends on forest therefore, PFM policy and programmes should be based on the interest and willingness of the local people to be sustained (Kugonza et al., 2009). According to them a major constraints and reason for the high failure rate of most participatory forestry projects is unsustainable or weak economic incentives for local forest users and weak participation of other stakeholders to participate in PFM. Moreover, majority of rural poor are marginal, live in risk prone area and they are also prevented from participation in development activities due to prejudice and discrimination (Tola, 2005, FAO, 2010:11). In addition to this plans to protect forest ecosystems have failed to consider the needs and knowledge of local people (Anan Ganjanapan 1996; Wily 1997; Tuxill and Nabhan 1998; Kumar 2000 cited in Isager et al., 2004). There is also a problem of identifying the gap clearly between what is ongoing on and what the policies and principles set by the government are dictating to do as far as community participation in environment and forest conservation is concerned (Gebremedhin, 2004).

According to FAO (2000), conflicts often emerge because people have different uses for resources such as forests want to manage them in different ways. Disagreements also arise when these interests and needs are incompatible, or when the priorities of some user groups are not considered in policies, programmes and projects. Such conflicts of interest are an inevitable feature of all societies. In recent years, the scope and magnitude of natural resource conflicts have increased and intensified. These conflicts, if not addressed, can escalate into violence, cause environmental degradation, disrupt projects and undermine livelihoods.

2.7 Conceptual frame work of the study

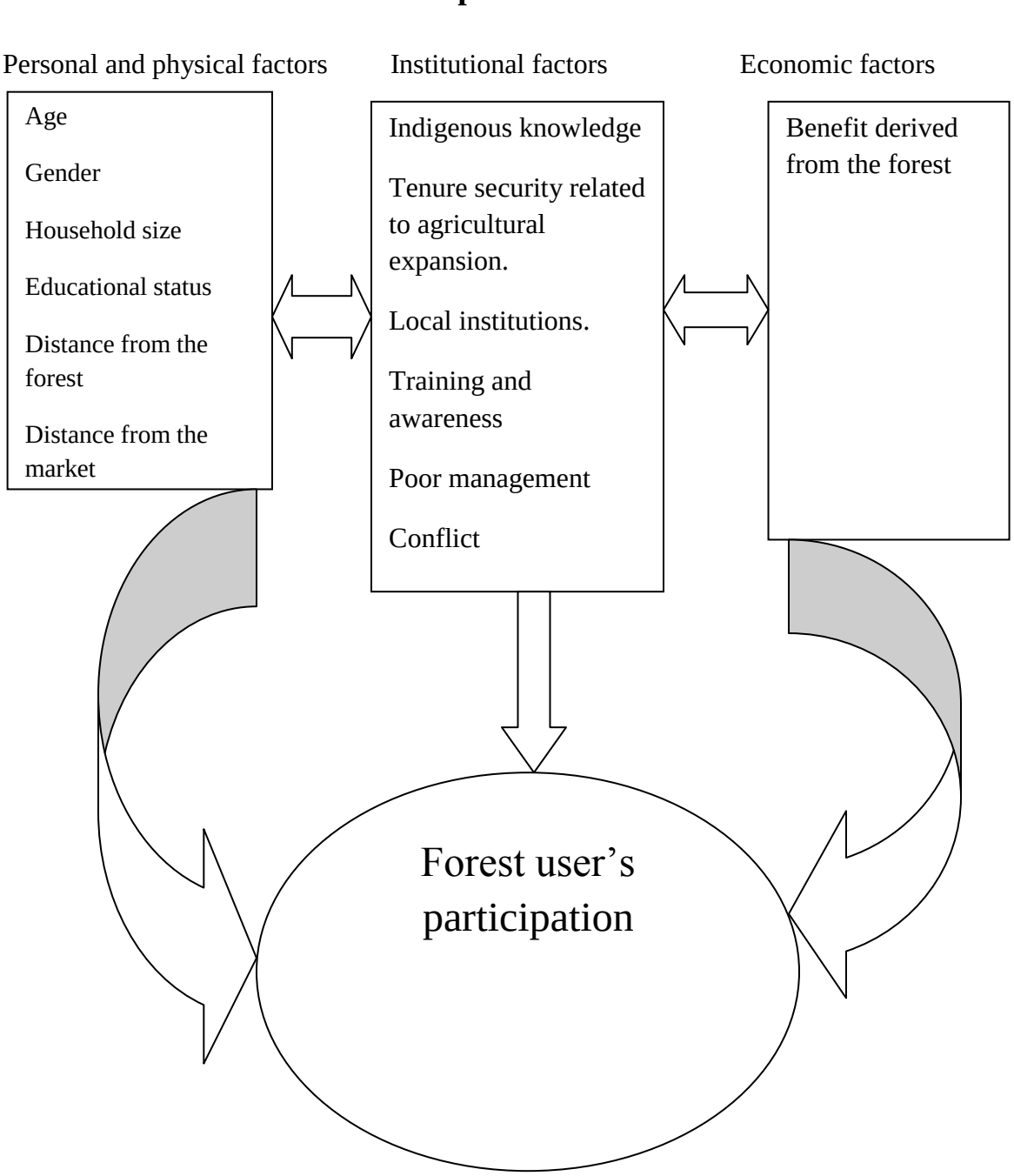


Figure 2.1 Conceptual framework for participation of a household in community forest management activities.

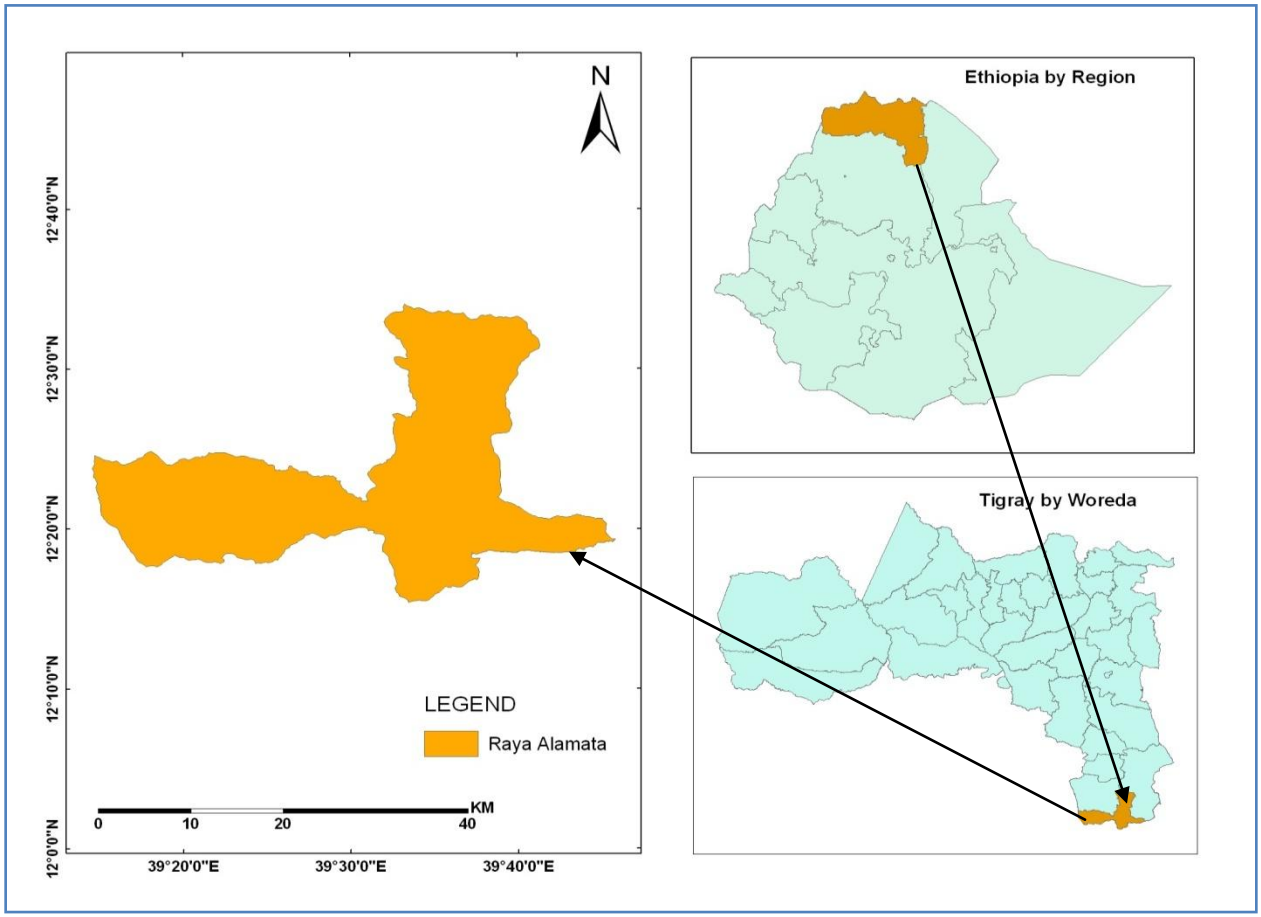
CHAPTER THREE

This portion described the approaches and methods that were employed for data collection and analysis. The first sub-section of this chapter presented the description and site selection of the study area. Then the details of methodology used to conduct the overall study, such as sampling procedure and techniques, method and instrument used for data collection and data analysis were also presented in this section.

3.1 RESEARCH METHODOLOGY

3.2. Description of the Study Area

Figure 3.1 Description of the Study Area



Source; Mekelle University GIS Lab, 2013

Raya Alamata is located at 600 km north of the capital city Addis Ababa and about 180 km south of the capital city of the Tigray regional state Mekelle. It is the south most boundary woreda of

the Tigray Region and borders with the Amhara Regional state by the south and west, Afar regional state by the east, *Raya Azebo* woreda by North east and *Oflla* woreda by north. This woreda has 15 *tabias* (peasant associations) and 2 town dwellers associations. The number of agricultural households of the woreda is approximately 17,597. The total population of the woreda was 128,872 in 2003/04. Altitude of the woreda ranges from 1178 to 3148m above sea level; and 75% of the woreda is low land (1500 meter above sea level) and the remaining 25% is found in intermediate highlands (between 1500 and 3148 meter above sea level). The small undulating mountains surrounding the woreda are very steep. The total area of the woreda is estimated about 550 sq. km. Altitude and rainfall increase from south to north and east to west. Shortage of rainfall (moisture stress) is a major constraint of agricultural production in the woreda. Rainfall is usually intense and short duration (IPMS, 2005 cited in Luchia, 2010).

The district is characterized with bimodal rain fall with average annual rain fall of 663 mm. Flood diversion is the most commonly used traditional system of supplementing the erratic rain fall pattern of the area. In eight of the seasonal rivers that pass through the district, it is estimated that around 6621 hectares of land can be irrigated using flood coming from high land areas of the district during summer season (REST, 1998). The average annual temperature is 29.7 *degree Celsius* with the minimum 14.6 *degree Celsius* and the maximum averaging 22.2*degree Celsius*. Agricultural production is the main income of the community. Like in other parts of the country, the farming techniques used by the rural communities are traditional. The study area is characterized as mixed farming system where the livelihood of the rural community depends both on livestock and crop farming. Crop production is almost dependent on rain fed. The dominant crops produced in the district are cereals, pulse, and horticultural crop and oil seeds. The cereals are mainly sorghum, teff, and maize takes the largest portion of production. It is estimated the district has livestock population 106,461 of which cattle population 74,853 comprises the major share followed by small ruminants with a population of 24,971 (Raya Alamata BoARD, 2013).

Table 3.1 Available forest coverage of the Raya Alamata with their respective area coverage in hectare

Type of forest coverage	**Forest Area in hectare**
State forest	3500
Community forest	6771.4
Individual and village forest	7771.05
New regenerating forest	9241.23

Source; Raya Alamata BoARD, 2013

3.3 Site Selection

The general objective of the study is exploring factors affecting forest user's Participation in PFM in Raya Alamata Woreda. The study was conducted purposely in Alamata woreda of three *Tabias* that have potential communal forest, from different geographical location both near steep mountain and plain. At all selected community forest people participate to manage the forest was deliberately consider for selection as sample *tabias.* Though each *tabia* has its own communal forest, from the fifteen *tabias* only three *tabias* are found to fulfill the above characteristics. The three *tabias* are located at different geographical area, distances and direction from the center of the town, that is *Selenwuha* located 18km south east direction, *Harle* South direction and 11km away, and *Lma't* is located south west direction and 8Km away from the town.

Table3.2 Distribution of study sites by *Tabias,* villages and name of communal forests with their respective area coverage of Raya Alamata.

Name of Selected *tabias*	Name of villages	Name of communal forest	Current total area of community forest in hectare
Lma't	Kutche	Kerenta'o	940ha
Selenwuha	Bedenaleko	Alage	977ha
Harle	Belaytedla	Kobaharle	50ha

Source: Raya Alamata BoARD and researcher computation 2013

3.4 Data Type and Source

3.4.1 Data Type

In order to furnish this research, the researcher employed both qualitative and quantitative data types. The researcher used qualitative data type in order to achieve objectives set in number one and two. Likewise, quantitative data types were used to achieve objectives set in number three and four. Moreover, in order to make the study more accurate and reliable through triangulation, the researcher used both qualitative and quantitative types.

3.4.2 Data Source

For the accomplishment of this research, the study used the following both primary and secondary sources of data.

Primary Sources: Since primary sources are more closely related with the problem under study, they are more reliable and accurate. Therefore, the study uses primary data from households selected *tabias*, Wereda and local administrators, experts of forest management more particularly from local administration of Alamata Wereda, (elders, knowledgeable peoples, and local administrators), development agents (DAs) and technical forestry supervisors.

Secondary Sources: Secondary data that could support primary sources were collected from published and unpublished documents obtained from different sources. These included manuals on participatory forest management, journals (annual, monthly and even weekly publications), reports, internet (web-sites), policy statements, proclamations and regulations (from the government).

3.5 Research Strategy and Design

3.5.1 Research Strategy

The research study adopted a case study that used both quantitative and qualitative approaches. Qualitative data is used for the purpose triangulation. Moreover, the study is a developmental case study descriptive survey and logistic model was used for the study as a result of this it was imperative to use both qualitative and quantitative approaches. Cross-sectional data is used for this study.

3.6 Target population and Sampling

3.6.1 Target population

The target population of the study was the three *tabias* households' of users of the communal forest. Sample size was determined from the total households who are participants from three *tabias* proportionally. Due to the incapability of the researcher to manage the total target population, the total 950 households, the researcher had used 163 households as respondents. The population was homogenous as far as population characteristics are concerned. But the researcher used stratified sampling to select sample respondents from each *tabias* to identify male and female forest users.

3.6.2 Sampling design and procedures

3.6.2.1 Sample Size Determination

There are several methods for determining the sample size of respondents from the finite population. The sample size of the study was determined based on Kothari's formula of (2004), as follow:

$$n = \frac{z2.\ p.\ q.\ N}{e2\ (N-1) + z2.p.q}$$

Where

N= size of population

p = sample proportion of successes;

n = size of sample

$q = 1 - p$;

z = the value of the standard deviate at a given confidence level

e = acceptable error (the precision)

Thus, N= 950 p= 0.02 z= 2.005 e= 0.02

$$n = \frac{(2.005)2\ (0.02)\ (1\text{-}0.02)\ (950)}{(0.02)^2\ (950\text{-}1) + (2.005)^2\ (0.02)\ (1\text{-}0.02)}$$

$$n = \frac{(4.020025)\ (0.02)\ (0.98)\ (950)}{(0.0004)\ (949) + (4.020025)\ (0.02)\ (0.98)}$$

$$n = \frac{74.8528655}{(0.3796) + (0.07879249)} = \frac{74.8528655}{0.45839249} = 163.29426\ldots$$

Therefore, n≈163

This sample size was allotted to the three *"tabias"* using proportionate stratified sampling formula. Through this formula each *"tabia*" is fairly represented as follow;

1, sample size for Selenwuha is $\frac{350 \times 163}{950} = 60.0526 \approx \mathbf{60}$

2, sample size for Lma't is $\frac{350 \times 163}{950} = 60.0526 \approx \mathbf{60}$

.

3, sample size for Harle is $\frac{250 \times 163}{950} = 42.8947 \approx \mathbf{43}$

As already mentioned above under target population, from 950 total households of the target population, the researcher took163 respondents as calculated based on the formula used above.

3.6.2.2 Sampling Design

Detailed discussion with the local forestry leaders and forestry staffs was held for analyzing the past records regarding the criteria/indicators of the participation. Based on the local criteria; forest protection (finance funding to the forest guards), plantation, and decision-making are the major criteria to identify high from low level of participants. To be an active participant there must full fill two indicators of participation. Respondents were asking to respond to each statement pertaining to the level of participation in terms of two-points called 'low' participation and 'high' level of participation. The researcher adopted probability sampling namely stratified and systematic sampling to select the households. The users of communal forest were stratified into male and female household heads. This is because male and female could have different attitude and perception towards PFM this is to give equal chance for the whole target population to be selected as a respondent.

3.6.2.3 Sampling Frame

The sampling frame of this research is the total list of each and every household that was participated in community forest from selected *tabias.*

Table 3.3 The targeted *Tabias* and their respective household numbers and the sample size to taken from each *Tabias* (sampling frame) using proportionate stratified sampling.

Selected Tabias of Alamata Wereda	Total user HHHs	#of male HHHs	#of female HHH	#of male HHH sample size	# of female HHH sample size	Total HHH sample size of each PAs	Type of Sampling (Probability)
Selenwuha	350	220	130	38	22	60	Systematic and Stratified
Lem'at	350	234	116	40	20	60	Systematic and Stratified
Harle	250	150	100	29	14	43	Systematic and Stratified
Total	950	604	346	107	56	163	

Source: Alamata Wereda and researcher computation 2013

3.6.2.4 Sampling Procedure

The researcher used 163 respondents from three *Tabias.* These respondents were chosen using probability sampling particularly stratified sampling and systematic sampling. As a result of this; the researcher believed that, these respondents are more likely the representatives of total users of the communal forests from the Woreda.

3.6.2.5 Unit of Analysis

The researcher gathered both primary and secondary data through, interview, focus group discussion, questionnaire, reports and documents from agriculture and rural development office of Alamata Wereda. Conclusion was made based on this information derived from 157 households from three *tabias* (six questionnaires were not returned from respondents), forestry supervisors, development agents and village elders. Therefore, the units of analysis are the households of selected *tabias* of Alamata Wereda.

3.7 Data Collection and Instruments

The methods of data collection depend upon the type (qualitative and quantitative) and sources (primary and secondary) of data collection. In this study to collect primary data, interview, focus group discussion and questionnaire distribution were employed and to collect secondary data, websites and external sources also utilized. Hence, both set of methods of data collection employed; special emphasis had given for the primary data collection tools; as prior research had not been conducted in the area. Therefore, secondary data collection tools were employed to supplement the primary ones. In addition to this, the researcher believed that, employing and using different tools would help for triangulation purpose. The details of each data collection tools used as stated as follow;

Interview: So long as the study focuses on current issues it has to be highly backed by primary data. This data was gathered from experts primarily from agriculture and rural development office, local administrators, forestry supervisors and development agents.

Questionnaire: Questionnaire method would be the most important approach through which the primary data in this study was collected. The content of the questionnaire included semi-structured questions. The reason why the researcher used semi-structured questions is to get more qualitative data to achieve the intended objective.

Focus Group Discussion: The major target of FGD in this research was local elders, women and youths in order to get detail information from different group of community about major factors affecting forest user's participation in PFM in the study area. In each village the researcher conducted focus group discussions with forest users. The participants in the focus group discussions comprised of 6-8 household heads. The focus group discussions were handled using a checklist prepared by the researcher.

3.8 Data Collection Procedures

The researcher selected 163 respondents from three *tabias* of Alamata woreda. The respondents were selected using probability sampling specifically both systematic and stratified sampling. Data was gathered using interview, questionnaire and focus group discussion. For the purpose of reliability of the data, the researcher himself administered all the data collection process. As a

result, in order to administer questionnaires and collect data in a way that the researcher intended, the researcher employed three enumerators and one supervisor and gave them one day training on the purpose and questionnaire collection procedures are concerned. The researcher himself participated as a supervisor. Following this, the final questionnaire prepared on the basis of the pre-testing questionnaires was administered by the enumerators to the sample selected at the time of rest on Sunday, during public meetings and during forest conservation activities. Interview was held with supervisors of forestry department, development agents as well as local administrators. Moreover, as already mentioned above, the researcher conducted focus group discussion in all three villages with one group: namely local elders, women and youths. The size of the focus group was six to eight. All the focus group discussions were held immediately after the collection of the questionnaire.

3.9 Data Processing and Analysis

Data processing is an important part of the whole survey operation. It includes manual editing, coding, data entry, data cleaning and consistency checking. The researcher made all these activities of data processing. Descriptive statistical tools and econometric analysis methods were used to analyze the collected data. Descriptive tools such as frequency, percentages, graphs and cross tabulation were employed to present results using SPSS version 16. In addition to this econometric analysis was employed to study the effect of explanatory variables on participation. STATA version 12 was used for this part of analysis.

Table 3.4 Summary of explanatory variables and hypotheses

Independent Variables	Specification	Characteristic of variable	Expected Effects on participation
Gender	0-Male 1-Female	categorical	_
Age	Year	continuous	+
Distance from the market	Minutes/km	continuous	_
Distance from the forest	Minutes/km	continuous	_
Family size	Number of people living in the household and/or are economically dependent	continuous	+
Educational status	0-illitrate 1-litrate	categorical	_
Benefit derived from forest	0-no benefited 1-Fully benefited	categorical	+
Forest location	0-harle and Selenwuha 1- lma't	categorical	+

3.10 Econometrics model

To explain the observed variation in participation, logistic model in which the dependent variable forest user's participation is regressed as a function of the explanatory variables, demographic, social and economic was used. The response of the participants as to whether they participate in PFM can be outlined as a binary choice model, with an outcome (decision of households) of participation high or low level of participation. The decision of households whether participates actively or less actively in PFM depends on economic, social and demographic factors (see Table 3.4 for detail explanation of explanatory variables). Simply put, in the logistic model, Yi represents the dependent variable, participation, which equals to a household is coded 0 if a household member rarely participates in a particular community forestry activity. A household is coded 1 if any one of the household members always participates in a particular community forestry activity (1 if the respondents participate actively in PFM and 0 if participate less actively). The probability of household participation in PFM, Pr (Yi = 1), is a joint probability density function/ likelihood function evaluated at $Xi\beta$, where Xi is a host of explanatory variable and β is coefficient of the predictor variable explaining the change in the dependent variable as a result of a unit change in an explanatory variable. The estimation form logistic transformation of the probability of participants' opinions in favor of participation in PFM Pr (Yi= 1**)** can be represented as:

$$Pr\ (Yi=1) = \frac{\exp\ (XiB)}{1+\exp\ (Xip)}$$

The above equation can be reduced to:

$$Pr\ (Yi = 1) = B0 + B1X1 + B2X\ 2 + ... + BiXi$$

Where:

P is the probability of presence of the characteristic of interest, community participation.

B is the coefficient of the predictor variables and is estimated from calibration data using maximum likelihood technique.

X is a host of explanatory variables

The dependent variable: The outcome variable is participation of households in PFM, which is coded 1 to signify active participation in PFM and 0 if community participates less actively (less participation).

Independent variables: refers to a host of explanatory variables assumed to influence respondent's decision to participate in PFM.

The model, which represents participation (coded 1 if the household has actively participated and 0 if less participated) and a host of explanatory variables, is given by:

P(P)=B0+B1(G)+B2(AG)+B3(DM)+B4(DF)+B5(HHZ)+B6(LL)+B7(H)+B8(EB)

Where:

P is a binary dependent variable indicating participation in PFM

G is dummy variable indicating gender

AG is a continuous variable indicating age of the respondents of forest users

DM is a continuous variable indicating the time to reach the nearest market in minutes

DF is a continuous variable indicating the time to reach the nearest forest in minutes

HHZ is a continuous variable indicating the number of people who live in a house and/or are economically dependent on the members' living in that house

LL is a dummy variable indicating the literacy level.

H is a dummy variable indicating the place/location where the households live.

EB is a dummy variable indicating benefit derived from forest

CHAPTER FOUR

This chapter deals with description and interpretation of findings on the basis of both qualitative and quantitative data collection instruments. Even though questionnaire was administered for 163 sample selected respondents of forest users in Raya Alamata, only 157 questionnaires were collected back. Hence, the remaining 6 questionnaires were not part and parcel of the analysis.

4.1 RESULT AND DISCUSSIONS

Results of the study are presented as the following three groups.

(1) The first group consists of results derived from descriptive statistics (frequencies and percentages) and graphs so as to gather general information on variables of the study. These results show differences or similarities of forest user's perception, willingness, awareness, and understandings towards cause of deforestation and about participatory forest management.

(2) The second group displays relationships between variables that help further analyze the data using cross-tabulation, descriptive statics (frequencies and percentages) and graphs regarding the variables both encouraging and restraining factors on forest user's participation in PFM.

(3) The third group of results consists of an analysis of variables that helps to verify the hypotheses of the study. These results were computed using econometric analysis to detect different variables (Household socio-economic, bio-physical and demographic characteristics) influences on forest user's participation.

There is no as such significant difference among the three *tabias* regarding to demographic characteristics such as male to female ratio, age distribution, marital status, educational status, family size and wealth status; thus, in this study it is reasonable to treat all samples as one when necessary.

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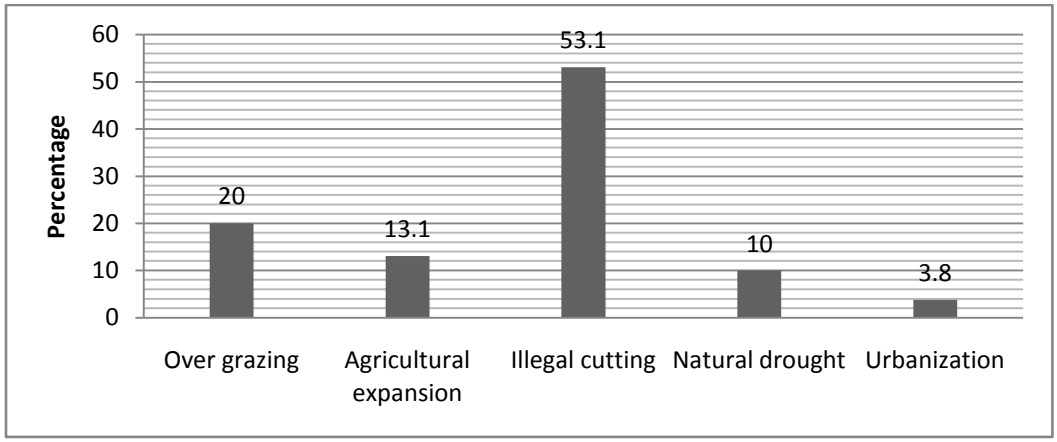
4.2 Communities' Understanding about Cause and Impact of Forest Depletion

In this study out of the total respondents 82.8% of the sample respondents had knowledge regarding the cause and impact of deforestation. People's level of understanding what is happening in their environment in terms of change in climate, land productivity, water resource and forest coverage could be taken as one measure of their knowledge and awareness of the environment (Tewodros, 2008). All respondents felt that forest is degraded and recognized this as a problem. The information obtained from the respondents indicated that they are aware of the deforestation is going on in their locality. Though throughout the study sites there are many proximate and underline causes, those aware respondents' rank the most destructive agents of forests in terms of seriousness; illegal cutting of fuel wood, Over-grazing, agricultural expansion, natural drought and urbanization as figure 4.1 showed below.

Figure 4.1 Major causes of deforestation in the study area



N=130 aware respondents Source: Survey questionnaire, 2013

Figure 4.1 indicated that illegal cutting of wood was common problem in the three *tabias*. From the total sample respondents 53.1% of them agree that the major cause of tree depletion in the study area was illegal cutting of wood. According to the respondents this kinds of severe problem mainly under taken in the study area by neighborhood non users and some users, this had much misery on environment. According to Kobbail (2012), the misuse of the natural

resources leads to irregularity or intermittency and reduction in rainfall and such conditions do not favor any form of productive cultivation. This misuse of resources also has its own negative impact on active participation of the community and results conflict among users and non users. Though people's involvement in various forest practices like illegal cutting of tree, fuel wood collection and harvesting other forest products etc. in the studied villages are significantly reduced compared to earlier time, but still the practice is going on due to weak legal action on illegal users and lack of alternative energy sources.

Table: 4.1 Source of energy for cooking as indicated by respondents

Variables	**Cases**	**Count**	**%**
	Fire wood	98	62.4
Major sources of fuel for	Charcoal	43	27.4
Cooking in the study area	Agricultural residue and animal dung	16	10.2
	Liquid like petroleum gas	__	__
	Electric city	__	__
	Total	157	100.0

n = 157 respondents Source: Survey questionnaire, 2013

According to the focus group discussant and information from informants the reason to continue the above practices was due to lack of alternative energy sources they use wood and other forest products for cooking. For example information from all focus group discussant and around 62.4%, 27.4% and 10.2% sample respondents from table 4.1 revealed that, their major sources of fuel for cooking was from fuel wood, charcoal (from community, individual and state forest) and other agricultural residue respectively. Results indicate that the parts of the tree used by respondents for different purposes in the Study area varied considerably. It was found that although the majority of local people concentrated very much on the use of deadwood, there was also a clear tendency towards the use of living branches as sources of wood products rather than using the whole tree.

As Table 4.1 indicated no respondent used alternative energy sources like petroleum gas and electricity. The villagers depend heavily on forest resources to meet energy demands, since

alternative modern energy sources are not widely developed. As Zewdu et al., (2010) noted that one challenge Ethiopia faces in light of managing forest resources for multiple purposes including carbon is that the national energy balance is dominated by fuel wood, which is the main source of energy to both urban and rural areas, accounting for over 90% of the primary total energy supply. From this, one can understand that, cutting of wood for energy sources is not only the major problem of deforestation in the study area but also the country at large.

According to Kobbail (2012), increasing numbers of animals and decreasing grazing resources, lead the land to falls progressively into stark desert conditions. To overcome such kinds of problem the regional government of Tigray had proposed policies, strategies, rules and regulations for participatory forest management as well as the 2005 Zero Grazing Policy. In the study sites feed shortage for animals is a critical problem mainly during dry season. As the 20% sample respondents from figure 4.1 proved that, both the *harle* and *selenwuha* farmers did use community forest for animals grazing especially when finish stored feed this indicated that zero grazing is not implemented. According to respondents, their major reason for grazing was the existence of large livestock population with wide area of communal forest irrespective of the quality and quantity of feed, this condition did not enforce them to apply zero grazing. In addition to this, the policy need big number finance and labore to apply feeding large livestock animal population through cut and carry system. The respondents from both *harle* and *Selenwuha* during focus group discussion pointed out that "*it is impossible to feed large cattle of herds and a number of camels through cut and carry system*." In addition to this, Farmers with large number of animals are considered as the wealthiest; due to this, they do not want to sell animals even during hard time. Moreover awareness of farmers about policy of zero grazing is under questionable.

Similar to this finding, according to Gebregziabher and Gebrehiwot (2011), the constraints for the implementation of zero grazing in Tigray is; low level of awareness towards zero grazing; culture of keeping high number of livestock; consider livestock population as saving asset. However in *kerentao* community forest is better compared to the *kobaharle* and *alage* community forest, animals are forbidden to graze throughout the year except some miss users grazed illegally; here the grass is used in a cut and carry system.

Picture: 4.1. Usual grazing and illegal cutting at Kobaharle community forest

Owned field survey; 2013

In this study from total households around 10% of the sample respondents and information from focus group discussion indicated that another cause of deforestation was natural drought/shortage of rain fall. These sample respondents proved that this problem is not only the cause of forest depletion but also influence their participation. Since, absence of rainfall has a negative impact on planting seedlings. Moreover during dry season the regenerating trees are grazed, and this grazing area is highly exposed to erosion.

According to figure 4.1 around 3.8% of the respondents said urbanization is another cause of forest depletion due to the increasing demand of fuel wood, charcoal and other forest products in the study area. One study proposed that the growing population is demanding ever-larger forest supplies and increasing numbers of people are settling and recreating on the primary forest resources for large cities (Minahan 2000). Today urbanization is the most pressing land use issue affecting forest quality and quantity in the study area due to the increasing demand of the above elements.

4.3 Perception of the community towards PFM

Attitude is understood to be an important predecessor of individual behavior in relation to natural resources management or conservation; thus, many contemporary studies take up local people's attitudes as a major topic mostly in relation to natural resources management (Badola, 1998, Gillingham and Lee, 1999, Kideghesho et al., 2007, Lee et al., 2009, Mehta and Heinen, 2001, Mehta and Kellert, 1998 cited in Yimeru, 2011). These studies share a common interest in exploring local forest user's attitude towards participatory forest management and what intervention measures to prevent natural resources depletion in general forest resources in particular in Raya Alamata community forest. To understand the perception of the households towards participatory forest management forest users were asked to select a response ranging from strongly agree to strongly disagree on whether or not they were motivated to participate in forest conservation.

Table 4.2 The perception of the forest users towards PFM

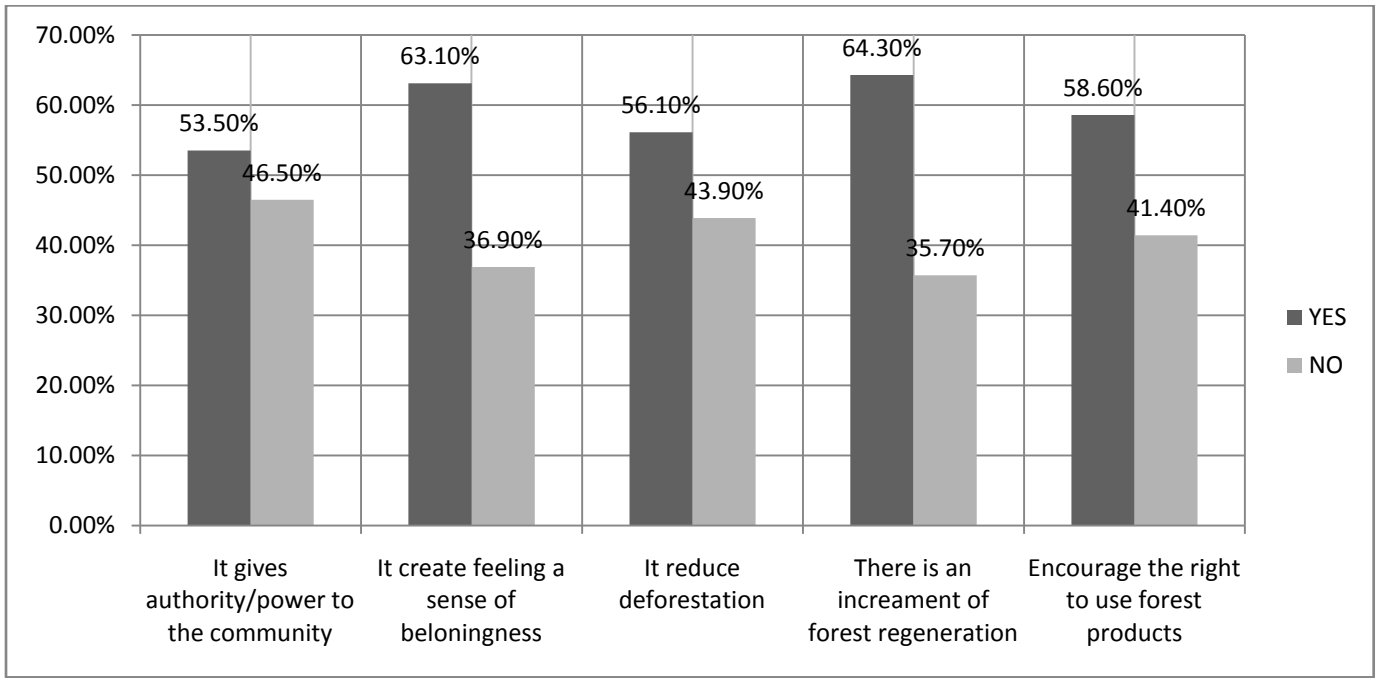
Variables	Cases	Count	%
Forest users perception	strongly agree	138	87.9
On PFM	Agree	19	12.1
	Disagree	___	___
	Strongly disagree	___	___
	Total	**157**	**100.0**

N=157 respondents Source: Survey questionnaire, 2013

The survey result from Table 4.2 presented that, approximately 87.9% of the household respondents strongly agree that PFM is a very important solution and while 12.1% agree/believed that PFM is important to alleviate the destruction of forest. This implied that majority of the forest users had positive attitude towards PFM. Observation by Gebremedhin (2004), agree that development is unthinkable without the participation of the native people and People should be placed first in development projects in general and forestry program in particular. Therefore, forest users are the major actor of sustainable forest management since they are the primary users and live adjacent to the forest.

The major reason respondents suggested important solution for forest depletion in the study area as indicated by figure 4.2, about 53.5% of the respondents believed that PFM is very important in forest conservation and protecting forest depletion because it gives authority to the community to manage forest. While 63.1%, 56.1%, 64.3% and 58.6% respondents believed that PFM was important because it create feeling a sense of belongingness, it reduce deforestation, there is increment of forest regeneration, and encourage the right to use the forest product respectively.

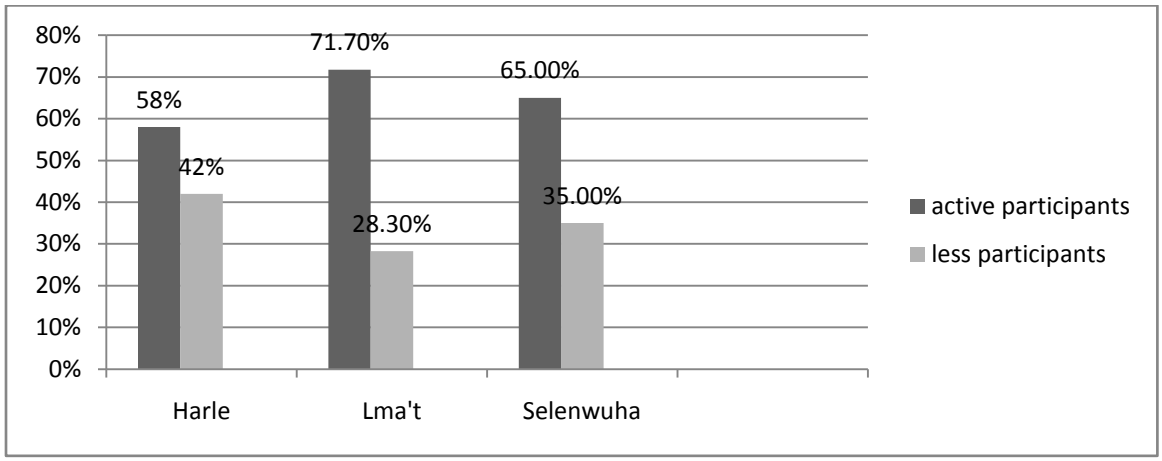
Figure 4.2 The major reason of the households having strongly agree and agree towards PFM



Source: Survey questionnaire, 2013

A better understanding of community members' motivation for participation in PFM is fundamental to the development and implementation of management strategies that are both sustainable in the long term and sensitive to the local need. Participation of rural community members in management of protected forests may vary according to socio-economic and demographic backgrounds of the individual farmers.

Figure 4.3 Each *Tabias* household level of participation in PFM



Source: Survey questionnaire, 2013

To evaluate the degree of community participation in forest conservation activity, the researcher asked about level of participation. Based information record from the list of forest users and survey result, out of the total sample population selected, 68.1% of the respondents said they had fully practiced and while 31.9% of them was low level of participants. From the total participants approximately 88% of forest users engaged in decision making, and plantation during rainy season and the rest 12% were participating protecting of the regenerating trees /harvestable trees (finance funding to forest guards in protecting).

Though majority of the people in all three community forest participate actively, due to shortage of providing seed, low level of rain fall and poor management, the degree of high level of participation was not as expected. This adversely affects the potential of the forest in the study area. In addition to this in the study area except three government nursery sites, individuals, NGOs and other stake holders are not parts of PFM. It is obvious Sustainable forest management without active community participation and other stakeholders' involvement is not effective and may not be sustainable. According to UNDP/World Bank (1988), the participation and co-operation of local communities, particularly those living next to the forest are recognized as necessary factors in the sustainable use, management and protection of forest resources.

As a conclusion all the respondents benefited from this participatory forest management activity. Their benefits range from satisfying basic domestic needs like encourage the right to use the

forest products up to gives authority/power and create a sense of belongingness. It is safe to say that community forestry play an increasing economic role in communities' life. According to the respondents this role has not been appreciated in the past, due to the forest resources under the control of the state and tenure insecurity. At present, most forest users appreciate PFM practices.

4.4. Factors Encouraging forest user's Participation in Forest Conservation.

4.4.1 Local institutional rules

Institutions are a set of complex norms regulating the action of persons in the process of social interaction. They represent established local systems of authority and other phenomena, derived from the socio cultural and historical processes of a given society (Agrawal and Gibson, 1999). They constrain some activities and facilitate others; based on information from local leaders during interview, in *Kern Tao* the rules of the local institution are not allowed users cutting non dry trees for any purpose. The only access the users were allowed collection of dry fuel wood and harvesting grass. Because the community is highly aware about the significance of avoid cutting the forests for natural regeneration. Similarly the users of *Alage and kobaharle* get benefit from some naturally grown fruits like cactus; oxen grazing from regenerating grass then allowed to other livestock during dry season and are allowed to get access from non dry woods in addition to dry wood and grazing. However, the users should ask first to the local leaders and they should also explain for what purpose they need the wood. They are also restricted to ask wood during the events of social and religious occasions like marriage and mourning, locally *serg, teskar, sedeqa mahber*, and the like. Asking wood for house construction and fencing is forbidden in all *tabias*. The community with the leaders will decide the amount of wood they take and the leaders will select the tree or trees to be cut. This indicates that the local communities have clear and environmental protection rules and they are obeyed by this rules and regulations. Moreover, giving priority for the forests rehabilitation is very high. This all indicates that the local communities in each *tabia* are well aware of land degradation and how forest is managed through descion making and active participation.

Majority of the study have almost similar findings regarding the important factor, institutions, for the success and achievement of collective action in managing a common resource (Alemtsehay,

2012). The same is true in this study all three *tabias* have their own local institutions to manage their communal forest.

Table: 4.3 The role of local institutions in community forest management

Variables	Cases	Count	%
They are initiators	yes	138	87.9
	No	19	12.1
	Total	157	100.0
They are inhibitor	yes	8	5.1
	No	149	94.9
	Total	157	100.0
No effect	yes	11	7
	No	146	93
	Total	157	100.0

Source: Survey questionnaire, 2013

Out of all respondents in the three *tabias* about 87.9% of the sample respondents indicated that, the effect of local institutions in participation of the community are seen as initiator/enhancing factors. Because all users respect the rule and regulations of the endogenous institution, since the rule is formulated by themselves based on their own living condition and contexts without external intervention. Practicing local institutions and managing local resources are the manifestation of decentralization. This encourages benefit sharing derived from forest and forest products are based on fair distribution, these all persuade the participation of the community and create confidence and feel sense of belongingness. According to the respondents in addition to the above significance local institutions, served as a prominent input in natural resources conflict resolution. In all the study sites the rules of local institutions are almost similar and all *tabias* had similar response on the importance of local institution and its role as an initiator of forest management. Therefore, local institutions are significant enhancing factors of forest user's participation in study area.

4.4.2 Cultural and Indigenous knowledge Factors

Local knowledge and cultural activities had their own significance influence on forest user's participation. Community interests and knowledge in participatory process consists of a strong power and sustainability. Information collected through the questionnaire and interview proved that, the users have a good knowledge and skill of resource management practices and thus they want to use their knowledge for the better management of their available local resources based on their local culture, tradition, customs, norms and age-old values.

Table :4.4 The cultural value or belief of the community towards the forest

		Tabias							
		Harle		Lma't		Selenwuha		Total	
Variables	**cases**	Fr	per	Fr	per	Fr	per	Fr	Per
Protecting forest from	yes	23	53.5	38	63.3	28	51.9	87	55.4
Unnecessary damage	No	20	46.5	22	36.7	26	48.15	70	44.6
	Total	**43**	**100**	**60**	**100**	**54**	**100**	**157**	**100.0**
Sustainable use of forest	yes	30	69.8	37	61.7	31	57.4	98	62.4
resources	No	13	30.2	23	38.3	23	42.6	59	37.6
	Total	**43**	**100**	**60**	**100**	**54**	**100**	**157**	**100.0**
Using as much as	yes	4	9.3	__	__	7	12.7	11	7
Needed for personal	No	39	90.7	60	100	47	86.3	146	93
consumption	**Total**	**43**	**100**	**60**	**100**	**54**	**100**	**157**	**100.0**
There is no relation	yes	8	18.6	5	8.3	6	11.1	19	12.1
With Forest	No	35	81.4	55	92.7	48	88.9	138	87.9
	Total	**43**	**100**	**60**	**100**	**54**	**100**	**157**	**100.0**

N.B Fr = frequency per = percent Source: Survey questionnaire, 2013

In the study area from the total sample respondents around 93.6% of them indicated that, the cultural value or belief of the community towards the forest was very high. According to table 4.4 from the three *tabias* respondents around 63.3% of from *lma't* believed that cultural value had great relevance in forest conservation by protecting forests from unnecessary damage. While 53.5% and 51.9% of respondents from *harle* and *selenwuha* had the same belief in terms

of both protects forest from unnecessary damage and Sustainable use of forest resource transferring to the next generation. Species preservation, care of plantation, grazing rotation, and seasonal tree cutting for rehabilitation is found to be sacred among forest dwellers in the study area. In each *tabias* respondents and information from focus group discussants believed that forest towards the community is vital not only for supporting the livelihood of the community but also for socio-cultural values like, serve as shade in social meeting, shelter for their animals, sources traditional medicine and skip from enemies etc. This showed that cultural value is one prominent enhancing factor and motivating participatory behavior of the community. This is in line with the observation of Adhikari (2011), no doubt that there are certain cultural and social variables, which are influential in motivating participatory behavior of the forest users. From this point of view, community forest resources management would be effective and attractive when communities adopt using their own style and fashion.

4.4.2 Awareness and Training on Forest Management and Conservation.

Among the expected factors that community living adjacent to the forest to participate in PFM practice are, awareness creation and training. Awareness creation influences the level of participation in forest conservation activities and depending on the type of training provided

Table: 4.5 The impact of training and awareness on forest users participation

Tabias	Have you ever been trained about forest use?					
	Yes		**No**		Total	
	Count	%	count	%	Count	%
Harle	33	25.4	10	37	43	27.4
Lma't	58	44.6	2	7.4	60	38.2
Selenwuha	39	30	15	55.6	54	34.4
Total	130	100	27	100	157	100

N= 157 respondents Source: Survey questionnaire, 2013

According to table 4.5 from total sample respondents over 82.8% of respondents are trained though government alone engaged in this activity; to enhances participation of users, awareness and training was mainly focused on activities, such as, tree planting and tree nursery establishment and protecting the regenerating trees.

As table 4.5 indicated from the three *tabias* of sample respondents the number of trained was better in *lma;t* (96.6%) compare to *harle* (76.7%) and *Selenwuha* (72.2%). It is known having a better Knowledge and understanding about the social and economic impact of deforestation encourages people to take part in forest management. Training does not only help the community members manage the forest appropriately and hence increase forest cover but also provides the appropriate environment for farmers to exchange views on better agricultural production technologies and issues related to other income generating activities (Musyoki et al, 2012). In *lma't* local institutions are very strong, for example grazing and cutting of non dry wood is forbidden even during dry season this may be the result of training and awareness. In addition to this the impact of training and awareness on participation from total participant in *lma't* (71.7%) of them were active participants where as 58% and 65% were from *harle* and *selenwuha* respectively as table 4.5 indicated clearly.

Table 4.6 The impact of training on active participation of forest users.

Variables		Have you ever been trained about forest use?		Total	
		yes			
		Count	%	Count	%
If yes, do these initiate you to participate actively in forest management	Strongly	93	71.5	93	71.5
	Slightly	35	27	35	27
	No	2	1.5	2	1.5
	Total	130	100.0	130	100.0

N=130 trained respondents Source: Survey questionnaire, 2013

According to table 4.6 due to access training and awareness creation around 71.5% of the sample respondents were strongly active participants and 27% of them slightly initiate them to participate actively only 1.5% did not initiate them to participate actively. This statistics clearly revealed that the effect of training in participation is an attractive factor. Another study focus on considering factors that affect people's participation in PFM in Oromia region, Terefe (2003) found out that, awareness creation contributed to the understanding of the importance of forests users, hence encouraging community members to participate in forest management actively. This can be proved in this study due to day to day awareness creation and training the participation of the people was better in *lma't.* From this point of view training is the best prominent enhancing factor of participation in forest conservation in the study area.

4.5Restrain factors of forest users' participation

4.5.1 Related to forest use rights and expansion of agricultural land

The lack of secure land tenure or forest user rights is a key reason why local people do not commit themselves to participate actively in forest conservation.

> *Observation from Isager et al (2004) pointed out that "People without such secure land tenure rights face an uncertain future and are less willing to invest their labour in conserving forests. Experience in many developing countries has shown that there are numerous constraints in fostering and motivating community participation in forest protection and management. The successful establishment of such forest management schemes depends upon the nature of resource tenure in existence. Trees are considered to be a long term investment and it is difficult to encourage farmers to plant trees unless security of tenure enables to certain of accessing economic benefits from the investment."*

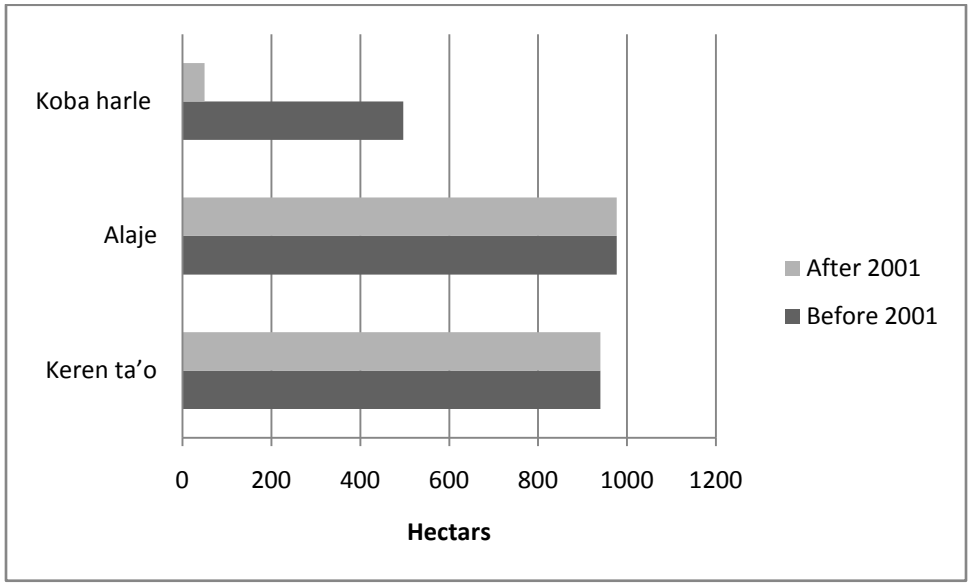
Table: 4.7 The effect of expansion of agricultural land on active participation of the forest users.

Household Tabias	Does related to expansion of agricultural land affect your participation in forest management?				Total	
	Yes		No			
	Count	%	Count	%	Count	%
Harle	38	100	5	4.2	43	27.4
Lma't	-	-	60	50.4	60	38.2
Selenwuha	-	-	54	45.4	54	34.4
Total	38	100.0	119	100.0	157	100.0

N= 157 respondents Source: Survey questionnaire, 2013

According to Table 4.7 forest users from *kerentao* and *alage* had no effect on their participation related to expansion agricultural land. However majority of the forest users around 88.4% from *kobaharle* community forest had fears their participation related agricultural land expansion. From the three community forest under the study of rural Alamata, only *Kobaharle* is located in the plain the rest are located next to big mountain this issue is not the concern of *kerentao* and *alage* community forests. Accordingly the main reason to impede the participation of forest users of *kobaharle* was, most community forest of the woreda especially that are geographically located in the plain are in continuous changing to farmland following large ground water emerged since few years. For example investment bureau of the woreda indicated that, large acres of land had changed to farmland that is from 2005-2007 around 102.217 hectare of land was distributed to eight investors for agro processing and other purpose. In addition to this from 2007-2009 around 1172.25 hectare of land was distributed to 4776 land less rural youth for the same purpose. Though the current statistics did not accessed, we can understood from the statistics above how much large acres of land change to farm land within few years. In line with this, figure; 4.4 revealed that the area coverage and potential forest of *kobaharle* community forest has rapidly in decreasing rate due to the above factors.

Figure: 4.4 Distribution of study sites by villages and name of communal forests with their area coverage of Raya Alamata.



Source: Raya Alamata BoARD and researcher computation 2013

This shifting of community forest to farmland was the main restrain factor of participation in this site. In addition to this the major obstacle to participate in this area was, the left narrow area of community forest is going on distribute to some part of the community. Moreover, some new exotic species are becoming expanding rapidly in various areas of this woreda. *jatrofa* is new invasive plant it helps to protect gardens and fields against roaming animals. The oil from seed of *jatropha* can be used for making of soap, for lighting and cooking and as fuel in special diesel engines. Since few years some members become beneficial from selling the seed of this plant. However due to its exclusiveness to the whole forest users and lack of multi functional unlike endogenous plant species that support the community to feed their animals, used for traditional medicine and sources of farmland equipments. Totally it is not acceptable by the forest users. While the researcher asked what were the major criteria to be a member and beneficial from this activity, response from the members was "we have not been a farm land". This all restrain the participation of the whole forest users in this site.

4.5.2 Poor management and lack of incentive

Table 4.8 Role of local management in community forest management

Variables	Cases	Count	%
	Very strong	43	27.4
Role of local management in	strong	55	35
Enforcement of PFM	weak	30	19.1
	Very weak	29	15.5
	Total	157	100.0

N= 157 respondents Source: Survey questionnaire, 2013

In this study though information from the Table: 4.8 revealed that about 62.4% respondents believed that in the study area there was very strong and strong local management to enforce and motivate participatory forest management, about 34.6% of the respondents believed that in the study area there is very weak and weak management related to forest conservation. The major reason for weak management was skills related to effective management of the program, day-to-day decision-making, resolve internal conflicts, and ensuring community benefit sharing are often lacked this mainly led to impede the participation of the community. In addition to this, as the sample respondents and information from interview of development agents and forestry supervisors of the BoARD Alamata woreda revealed that not only poor local management impedes the participation of the people but also there are problems at the woreda level. According to the interviewee this short coming was emanated from disincentive, incentive must create to ensure that they will obtain proper benefits from participatory forest management and gives people more moral support in many forms. In addition to this, lack of upgrading technical staff and lack of experience sharing also results the staff members become demotivated and turnover of staff members for searching better job and problems related forestry programme to solve on time.

Moreover, shortages of modern technology that support the study are also other underline problems. In the study area except government there is no nongovernmental organization, no research and development which support in finding of new and resilience trees species which adoptable to the environment. In addition to this according to the DAs of each site there are common problems like lack of enough vehicles. Since most forestry areas of the woreda are

located far from the town. DAs were use their foot to move the long distance, this results consuming time, they become tiresome and boring to the task. Finally this all resulted for the delay of solving problems on time, causes forest depletion and impede the participation of the staff and community as well.

4.5.3 Natural resources related conflict

The major conflict raised in the study areas were related to natural resources conflict with Afar and other non users from other villages. According to Tirhas (2009), in *Kern Tao*, the major conflict raised was with the neighboring *'villages'* in 1992. Based on her observation the cause of conflict was the residents of *kutiche* village needed to use the forest in restricted use but the neighboring *'village'* needed to use the forest as free access . Similarly, in *Alage* community forest the nearby villages and sometimes conflict is also occurred specially during dry season with Afar needed to use the forest as free access for grazing. Though the people of other villages had their own communal forest in their village the only thing they want was to get additional benefit. As the respondents explain, conflict among users is rare. If there is, it is easily solved by discussion using indigenous institution conflict resolution mechanism. But the conflict with non users is about the benefit sharing and property right and usually solved with the help of the local administration or *kebelle* agriculture office with higher costs and need high experts. The researcher tried to get real information through open ended questions from the respondents and key informants like elders and local leaders to understand the influence of conflict on participation. Both the *kutiche* and *bedenaleko* residents proved that conflict was one major hindrance to participate, especially during dry season the Afar and other non users grazed the regenerating tree. But the level of participation is not that much problem related to natural resources conflict in *harle* comparatively from *lma't* and *Selenwuha*. Conflict results not only restrain the participation of the community but also famine, vulnerability and migration are often amplified and resiliency weakened (Shibru, 2007). Therefore, forest resource use under conflict situation is not only damage the bio-physical resource base itself but also harm community interests and willingness of participation also.

4.6 Determinants of Participatory Forest Management

The descriptive part uses statistical tools like percentages and summaries using data collected from 157 respondents the SPSS statistical package is used to present results.

4.6.1 Age of the house holds

Table: 4.9 Age of the household head*level of participation in PFM

Variable		Level of participation in PFM				**Total**	
		Yes very actively		Yes, but less actively			
		Count	%	Count	%	Count	%
Age	18-25	10	9.34	14	28	24	15
	26-35	41	38.31	21	42	62	39.5
	36-45	36	34	8	16	44	28
	46-60	16	15	4	8	20	13
	>60	4	4	3	6	7	4.5
Total		107	100.0	50	100.0	157	100.0

N= 157 respondents Source: Survey questionnaire, 2013

The mean ages of forest users was 44, in this study age was an important factor in household decision to participate in PFM. In the study area more aged people were better participant than the younger ones. According to information from the sample respondents, this could be young people had mobile nature of searching other job. In the study area majority of literate and illiterate youngsters are landless, this mainly push them engaged in off farming activities like (farm cart, waiter, taxi driver and the like) and hiring in governmental and nongovernmental organizations this may lose relation with active participation in PFM.

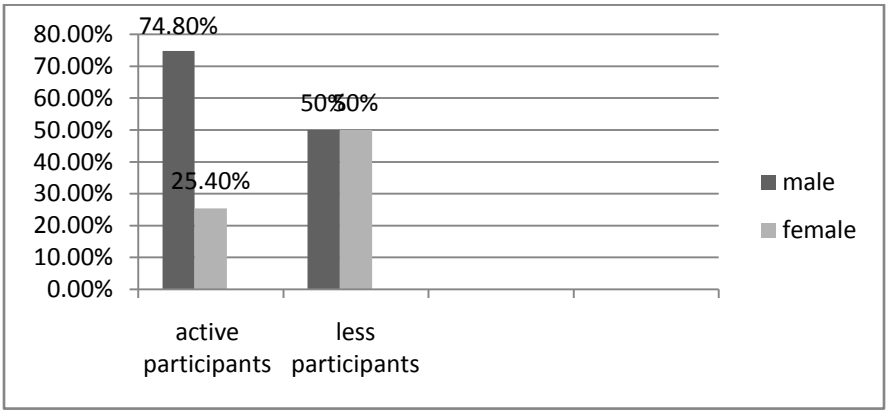
In contrast to this the older aged are interested to participate actively, because they have time to participate and most of them are land holders this fact mainly influence to participate actively. According to Table 4.9 highest participation in forest conservation for all community members in the three study sites was noted for respondents within the age cluster of 36-60 years when compare with other age category. This is agreeing with the observation of Thoai and Rañola

(2010), Decision Making by Upland Farmers on Forest Management in the Northwest Mountainous Region of Vietnam. This study show that older farmers are more likely to participate in the forest management program, because their opportunities to be employed or engaged in other livelihood activities such as working in construction projects or as porters is more limited than younger people who tend to have more employment choices. This indicated that the youngsters have more options to engage in other activities, this influence on their active participation.

4.6.2 Gender of the household's heads

In each site women's share of active participation was very low compare to their counterparts.

Figure 4.5: Gender of the household heads and level of community participation in PFM



Source: Survey questionnaire, 2013

As figure 4.5 indicated clearly from total active participants of forest users the share of women was only 25.4% compare to their male counter parts. This was due to women's productive and reproductive tasks constrain their participation in all sites of the study *Tabias*. Information from less participant women respondents (50%) revealed that their major constraint for active participation was multiple burdens both productive and reproductive roles such as childcare, fetching water, cooking food, travel long distance market and farming. The unavailability of water sources within the proximity will also compound the burden on women in most villages to participate actively. In addition to this women were not much benefited from the forest products due to the above factors and lack of free time specially during harvesting season compare with

male counter parts. For example in *lma't,* it is allowed to harvest a grass one labor (one sickle) from each home, in principle it is fair but, male household headed are beneficial than that of female household headed. Women in *Selenwuha*, in addition to the above factors their participation impend fear of kidnap, since the forest area is located far from the village compare to other community forest. It is agree with the observation of Nuggehali and Prokopy (2009) the role of women as care givers and nurturers hinders them sparing time from domestic chores to participate in conservation activities or attend forest management meetings. Therefore women's work load is the most restraining factor of active participation in forest management in the study area.

4.6.3 Level of Education

In the three sites of the study area most forest users have low level of education/ illiterate. From the total sample respondents around 66.9% was illiterate while the rest 33.1% were elementary educated and up to diploma. The survey result indicated that, there was significant association between the level of education and degree of participation in each of the forest sites. As table 4.10 indicated as level of education increases the level of participation is decrease. The main reasons for this was, most educated in the study area are engaged in off farm activities like small business, trade, hiring governmental and nongovernmental organization. This goes down their participation. Some studies revealed that education level has a tendency to reduce forest dependency because those educated provides a wider range of job options hence making fuel wood collection unprofitable due to greater opportunity costs of collection (Adhikari *et al*, 2004). In contrast some study revealed that education is an input/support in awareness creation about forest conservation and increase the participation of the people (Chhetri, 2005).

Table 4.10 Educational status* level of participation

Variable	Level of participation in PFM				**Total**	
	Yes very actively		Yes, but less actively			
	Count	%	Count	%	Count	%
Status of education						
Cannot read and write	77	71.9	28	56	105	66.9
Elementary school	21	19.6	8	16	29	18.5
High school	9	8.4	9	18	18	11.5
Diploma and above	__	__	5	10	5	3.1
Total	107	100.0	50	100.0	157	100.0

N=157 respondents Source: Survey questionnaire, 2013

4.6.4 Household size

Another factor that influences community participation in this finding was household family size. Response from sample respondents of the three *tabias* had almost similar answer. As table 4.11 indicated, participation based on family size, as the number of family size increases the number of active participants also increases but as the number of family size reduce the undo is true. The major reason was, large family members have a greater demand for forest products such as firewood, cutting grass and other activities due to their larger household sizes hence the decision to participate in CFM in order to increase their chances of accessing forest products the counter part of small family size are unable to actively participate easily due to work load or lack of free labor specially during harvesting time. It is agrees with the observations of Misyoki et al., (2013),in their finding Household Decision to Join Community Forest Associations in Kenya that households with large family size are in better position to utilize the community forest resources and hence are likely to participate more in PFM to meet their needs for forest products. At the same time Ogada (2012), pointed out that larger households have labour time to devote to participate in PFM activities. Moreover, such households participating in PFM and benefiting from forest products could be viewed as a viable livelihood alternative for the larger households.

Table 4.11 Family size * level participation in PFM

Variables		Level of forest users participation in PFM				**Total**	
		Yes, very active		Yes, but less active			
		Count	%	Count	%	Count	**%**
Family size	<3	16	15	21	42	37	23.5
	3-4	32	29.9	16	32	48	30.5
	5-7	44	41.1	12	24	56	35.3
	6-9	10	9.3	1	1	11	7
	>10	4	3.7	-	-	4	3.7
Total		107	100.0	50	100	157	100.0

N=157 respondents Source: Survey questionnaire, 2013

4.6.5 Benefit derived from forest resource

Livelihoods of Local People

According to Bedru (2007), incomes from natural resources in general and forest resources in particular play indispensable role in rural livelihood of most developing countries. The local people in rural Alamata are engaged in diverse livelihood activities. About 79.6% of the sample households practice mainly crop production, 11.5% engaged in animal production, only 2.5% are engaged in fuel wood selling and the rest, 6.4% are engaged in other off farm activities like trade, own small business, cart, daily labor or hired in governmental and nongovernmental organization.

Table: 4.12 Household Tabias and major occupation

Tabias	Major occupation								Total	
	Crop production		Animal production		Off farm activities		Fuel wood selling			
	Fr	Per	Fr	Per	Fr	Per	Fr	Per	Fr	Per
Harle	31	24.8	5	27.7	7	70	-	-	43	27.4
Lma't	45	36	8	44.4	3	30	4	100	60	38.2
Selenwuha	49	39.2	5	27.7	-	-	-		54	34.4
TOTAL	125	100.0	18	100.0	10	100.0	4	100.0	157	100.0

N.B Fr = frequency per = percent Source: Survey questionnaire, 2013

About 75.2% respondent from *lma't* and *selenwuha*, was engaged in crop production while animal production and off farm activities were the major activity for the remaining. But in *harle* 24.8% of the interviewed households are engaged mainly in crop production, the remaining of the community depend on, animal production and other off farm activities. Unfortunately from total respondents only four households engaged in fuel wood selling that were from *lma't.* According to them their source of wood for sale was from community forest, individual forest and government forest.

Table: 4.13 Forest users belief about the impact of wealth difference on household participation in the three sites.

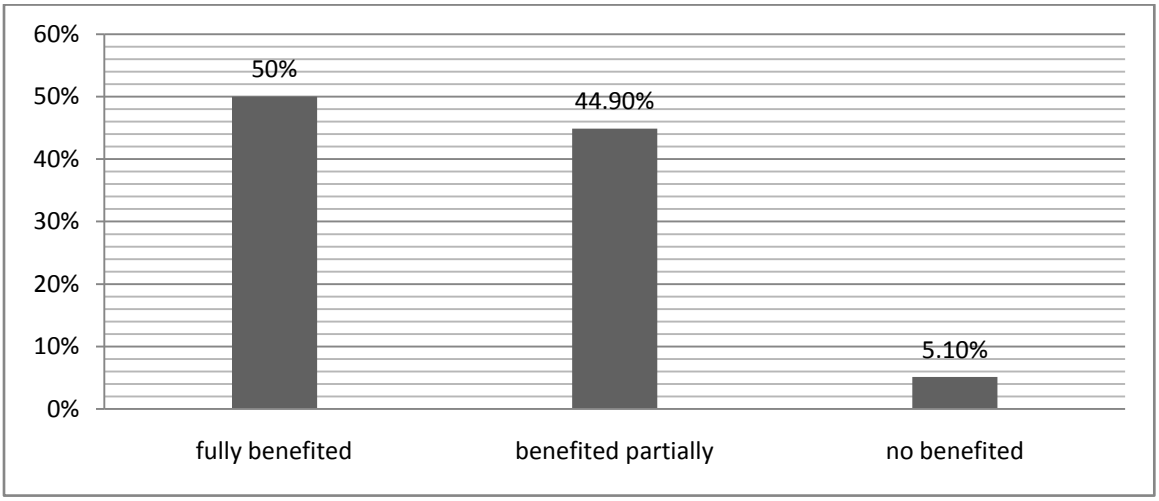
Household Tabias	Do you believe that wealth differences cause participation differences?				Total	
	Yes		No			
	Count	%	Count	%	Count	%
Harle	-	-	43	28.9	43	27.4
Lma't	5	62.5	55	36.9	60	38.2
Selenwuha	3	37.5	51	34.2	54	34.4
Total	8	100.0	149	100.0	157	100.0

N= 157 respondents Source: Survey questionnaire, 2013

According to Table:4.13 out of the total sample respondents around 94.9% believed that though there is high and slight wealth difference among the villagers there was no such a significance impact on actively and less actively participation of the forest management. Fortunately all respondents had similar reason according to them; all users had responsibility to manage the forest based on the rules and regulation of the local institution irrespective of wealth difference. Because if a users is absent regularly without permission from participation, based on the rule he/she exposed to penalty it may reach up to exclude from member and benefit from forest and forest products. In contrast only 5.1% of the respondents believed that those higher income groups participate actively than that lower income group and those lower income group participate actively than those higher income groups. According to the former respondents those rich are better in participation, even during harvesting time they sent labore or made a fee to compensate their absenteeism. While the poor could not participate actively specially during harvesting time and when they become absent to full fill their livelihood they could not afford to compensate through payment. In contrast those latter respondents has complain they said that the poor did not absent due to fear of penalty but the rich are respected and are not exposed to punishment since they are influential and respected by local leaders.

Majority of the study revealed that economic value of forests have strongly influenced on individual descion whether to participate or not in the management of a common resource (Alemtsehay, 2010). In the study area majority of the community around 94.9%, livelihood directly and indirectly depend on the forest. As the figure 4.6 indicated, out of the total respondents 50% of the sample respondents fully benefited from community forest, 44.9% of them benefited partially and the rest around 5.1% no effect on their life.

Figure 4.6: Household potential benefit from forest and forest products



Source: Survey questionnaire, 2013

Benefit Sharing implies, where profits or products from forest are distributed among community members in a fair way. Benefit sharing is an important element for enhancing user's participation in common property resource management. In the absence of such mechanism total participation of users cannot be plausible (Adhikari, 2011). This leads neither success of participation nor Community forestry program. There are various ways in which benefit sharing can take place. In the study area all forest users are benefited equally from the community forest. In three *Tabias* common potential benefit derived from forest are; dry fuel wood, grass, fodder, bee keeping, some fruit, and medicinal trees in the entire user groups were carried out. In addition to the above benefits in *harle* and *selenwuha* it is allowed to use non dry wood, farm equipments and grazing during dry season.

The researcher was asked to what extent the benefit derived from forest initiate them to participate actively, 82.8% of the respondents indicated that it strongly motivates them and while the rest 17.2% respondents was slightly motivate to participate in PFM. One study from Vietnam realized that forest management today recognizes the rights of local people to harvest forest products from pilot areas for subsistence, and facilitates their participation in the design of management actions (Sikor and Quang Tan, 2011). One can understand from this result that the level of benefit that the users derived from forest is in conformity with the level of participation

in forest management. This mainly revealed that benefit from the forest encourage the participation of the almost all forest users in the study area.

4.6.6 Distance home from the forest and the market in hours

It was noted that the result about the range of homestead distance from the forest had a very significant influence on the number of forest users' participation in forest conservation in all *tabias/kebelles* of the study area. As the distance of homestead from the forest increased, the number of community members participating actively in forest conservation decreased. Number of those actively participating in forest management from the total active participants around 69(65.305%) was taken (1-10 minutes), reduced to 27 (18.4%) (11-30minutes), and reduced further down to 4(2.72%) (31-60 minutes) as clearly indicated in the table 4.14. This was due to a number of factors like those forest users far from the forest are exposed for transportation cost, time delay, information problems what happen in the forest as well as reduce their access benefit from the forest compare to users resident nearest to the forest.

Table 4.14. Distance home from the forest in hours * level of households participation in PFM

Variables		Level of forest users participation in PFM				**Total**	
		Yes, very actively		Yes, but less actively			
		Count	%	Count	%	Count	**%**
Distance home from the forest in hour	1-10 minutes	74	69.1	15	30	89	56.7
	11-30 minutes	29	27.1	23	46	52	33.1
	31-60 minutes	4	3.8	10	20	14	8.9
	>60 minutes	-	-	2	4	2	1.3
Total		107	100.0	50	100.0	157	100.0

N=157 respondents Source: Survey questionnaire, 2013

Similarly like distance home from the forest, it was expected that the closer the respondents home to the market, the more they were willing to participate. As distance market from home is increase the probability of participation of the community reduced. According to the respondents this was due to the difficulty of selling and bought the forest products. Therefore, the effect of roads and markets has its own impact on the participation of the forest users in this study. It is in

line with the works of recent scholars of commons such as, Argawal (2006), found that forests located in rural areas experienced which are located near to the market has higher amount of net protection and gain more benefit than located remote areas This can also explain the unexpected inverse relationship between distance from market and participation.

4.6.7 Location

Due to different geographical location, access to training, potential forest and other factors there was significant variation in participation among *tabias* in the study area. There was a significant positive relationship with participation in some *tabias*. In contrast there was low level of participation in others. As the researcher try to know the level of participation among *tabias* it is clearly show that in objective two figures 4.3 that, *lma't* (71.7%) respondents were actively participate in PFM while in *harle* (58%) and *Selenwuha* (65%). This was because of the place where they are living. Lma't is located near to Steep Mountain which is not vulnerable to agricultural expansion. In addition to this, since it is near to the town around 8 KM, has an advantage the community easily access to training by agricultural experts compare to the two sites. At the same time due to the above factors it is better in terms of potential forest compare to other *tabias*. This potential provides and increase expectation benefits to the users, this encourages participation of residents from *lma't.* Agrawal (2006) and Chhatre (2005) in their study in India found that location is a determinate factor for success of common resource management. Therefore location has significant factor in varying the level of participation among forest users.

4.7. Determinants of Participatory Forest Management: Econometric Analysis and results

For econometric analysis the study uses the logistic regression model. Classical model specification tests for multi collinniarity (correlation) and heteroskedasticity (robust standard error) were made so that the data meets the assumptions underlying the logistic regression model.

An in-depth discussion of the determinants of community participation was given in the literature review part (See Table 2.1). In this section, only context specific factors, which were assumed very relevant for this study, are discussed. Participation in PFM is the dependent

variable. The explanatory variables for logistic estimation were presented in the third chapter (See Table 3.4)

A logistic regression (reporting odds ratios) is performed to determine the joint effect of different independent variables on participation and to explore the reason why PFM participants are active in some of the sites and relatively low in others. The odds ratio shows the strength of association between a predictor and the responses of interest. The estimated model, taking participation as the dependent variable along with other biophysical, social and economic as explanatory variables, is presented in Table 3.4. The logistic estimation result shows that about 33% of the variation in the dependent variable is explained by the variation in the explanatory variables. The overall significance and fitness of the logistic model is determined by its chi-square value. The chi-square value is Pr = 0.0000 thus the explanatory variable can significantly predict the dependent variable. Robust standard error was used to minimize the problem of heteroskedasticity. A Logit estimate with non-robust standard error is presented below for comparison between the two results.

Table 4.15 Logistic estimation reporting marginal effects

Variable	Coef.	Robust Std. Err.	z	P>|z|	95% Conf.	Interval
age	.2562837	.2930952	0.87	0.382	-.3181723	.8307397
gender	-.7990467	.4752754	-1.68	0.093	-1.730569	.132476
fam_size	.8882221	.2714606	3.27	0.001	.3561691	1.420275
educ	.3044153	.2952075	1.03	0.302	-.2741807	.8830114
levl_ecobe~t	.662434	.2043581	3.24	0.001	.2618995	1.062969
dist_forest	-1.725798	.3249845	-5.31	0.000	-2.362756	-1.088841
dis_mkt	.3727445	.2695089	1.38	0.167	-.1554833	.9009722
location	1.322492	.5480938	2.41	0.016	.2482477	2.396736
_cons	-.7837734	1.52977	-0.51	0.608	-3.782068	2.214522

Table 4.16 Logistic estimation reporting marginal effects

Variable	Marginal effect	Std. Err.	z	P>|z|	95% Conf.	Interval	X
age	.0450835	.0501	0.90	0.368	-.053113	.14328	2.51592
gender	-.1405624*	.08241	-1.71	0.088	-.302091	.020966	1.28025
fam_size	.1562495**	.04753	3.29	0.001	.063089	.24941	2.35669
educ	.0535505	.05257	1.02	0.308	-.049482	.156583	1.50955
levl_ecobe~t	.1165305**	.03594	3.24	0.001	.046093	.186968	1.18471
dist_forest	-.3035898**	.06301	-4.82	0.000	-.427079	-.1801	1.54777
dis_mkt	.0655705	.05017	1.31	0.191	-.03277	.163911	3.24841
location	.2131362*	.07629	2.79	0.005	.063611	.362662	.382166

Note 1 *= significant at 5%, ** = significant at 1 *** = significant at 10%

Note 2 Number of obs = 157

Log likelihood = -65.986211

Wald chi2(8) = 46.25

Prob > chi2 = 0.0000

Pseudo R2 = 0.3283

Source: STATA result

Age of the household heads

Age could be an important determinant factor in household decision to participate in PFM. The econometric result was consistent with prior expectation the variable is found to influence community participation positively but statistically not significant.

Gender of the household's heads

The relationship between participation and gender had significance association hence gender is an important determinant in household decision to participate in PFM. This variable is also consistent with the expectation and statistically significant that is Male (0) has 14% higher likelihood of having a better level of participation than their counterparts. In other words, in each site women's share of active participation was very low compare to their counterparts. This was due to women's productive and reproductive tasks constrain their participation in all sites of the study *Tabias*. Information from less participant of women respondents (50%) revealed that their major constraint for active participation was multiple burdens such as childcare, fetching water, cooking food, travel long distance market and farming. It agrees with the observation made by Musyoki et al., (2013) Determinants of Household Decision to Join Community Forest Associations: A Case Study of Kenya that there is a highly significant relation between gender and participation in forest conservation. Women are quite disadvantaged due to their social and household chores both indoor and outdoor tasks. Therefore, their multiple roles hinder them to participate actively in conservation activities or attend forest management meetings.

Household Sizes.

The household size is an important determinant of household decision to participate actively or less actively. In this study the econometric result indicated that the researcher expectation the influence of household size participation in PFM is positively, is consistent and significant as well. In this study as the family size increases by one, 15 % higher level of probability of better level of participation. The major reason was, it is most likely that large family members have a greater demand for forest products such as firewood, cutting grass and other activities due to their free labore compare to the small family size, that unable to participate actively due to work load specially during harvesting time. It agrees with the observations Ogada (2012), of that

households with large family size have labour time to devote to the activities of PFM. Moreover, such households would be better placed in terms of labour for extraction of forest products. It is meant that house hold that hold large families are more involved in participating in forest management than their counter parts small family members.

Benefit derived from the forest

It is also not surprising to find that households that get more benefit from participating in the forest management activities are more likely to participate in the forest management program. In a similar fashion, the variable, Level of perceived economic benefit derived from forest to households, is positively related and significant level with participation. The results for this variable can be interpreted to mean that when households assess their community forest to be more useful for livelihoods, their probability to participate in PFM increases by 12%. This means, a high level of forest dependency leads to greater participation in forest management. This is in line with findings of Behera and Engel (2006) from India, Argawal and Chhatre (2006) from the northern part of India and Gebremdhin (2008) from Ethiopia. The justification for this can be that, as a rational being, community has reason to preserve forests. Higher economic benefits from forests encourage the community to participate in the management of forest resources.

Distance home from the Forest.

This variable is also goes with the expectation of the researcher negatively and statistically significant. Distance to the forest has a negative effect on the probability of a household active participation in PFM. There was a significant difference between the average active participant and less participant home distances from the forests. Therefore, home distance is a determinant factor in household decision to participate actively and less actively. As the distance of home from the forest increased by a minute/hour, the probability number of forest user's active participation in PFM decreased by 30%. In contrast as the distance home from the forest decrease by minute/hour the probability of household participation increases by 70%. This is due to those forest users far from the forest are exposed to time delay, information asymmetry and are not easily access benefit from the forest compare to users resident nearest to the forest. This result concurs with Ogada (2012), Effects on Household Farm Forestry Decisions for

participation in Kakamega/Kenya, households join CFA to benefit from extraction of forest products, and households that are far from forests will have less impetus to participate because it would be more expensive for them to travel to the forests for such products.

Location

In general, in this study, *tabia/* location is used as an indicator of other variables such as quality of forest and whether the household is native in the area. The variable *tabia 1 (lma't)* has a 21% higher probability of having higher level of participation. The interpretation for this variable is that the possibility of household's participation declines by 21% as respondents changes their residence from *lma't* to *harle* or *selenwuha.* The researcher anticipates that one possible reason why changing residence house from other *tabias* to *lma't* increases household participation is because their understanding about the aim of livelihood diversification programme is very high. Another reason could be the increase in respondent's forest income as they change their residence from the two to *lma't.*

4.8 Status of forest before and after the introduction of PFM in the three community forest

According to all three *tabia* sample respondents, information from interviewee and focus group discussants the potential forest during imperial regime was very dense at the same time the forest was controlled by the state but freely access by the community. Due to low population density and the presence of high rain fall the potential forest was very high. This was supported by the information obtained from elder. The informant with the age of 74 from village *belaytedla* recalled that, in former time:

> "*The condition of forest kobaharle, due to its dense," in short distance from our resident we had lost the direction of our home, children and women had not walked alone to fetch wood throughout the forest because there was large number of wild animals, hunting and gathering fruit was common habit in this area, but now due to illegal cutting of wood and charcoal collection the forest is disappeared."*

Based on the information from all the three study site focus group discussants, during the Derg regime, the ownership and access for forests were change and community forest was under the control of the state. The potential forest during this time was highly degraded due to open access/tragedy of the commons for trees with an increasing number of populations and the result of drought. According to Tirhas (2009), as a result of the 1985, high drought in the whole parts of the country, many people used to come from outside the village and the *tabias* and cut trees for sale. There was charcoal making inside the forest too. As a result the forest was highly exploited. She added that this is due to undetermined property right of the forests. The government did not give authenticity to the communities.

Most sample respondents approximately 77.7% replied that before the introduction of participatory forest management in all three sites the potential forest was very low. Because majority of community forest was vulnerable to open grazing and illegal cutting. This all results forest area are highly degraded and exposed to erosion.

However, this new forestry program has been encouraged all communities equally participate in forestry program and become beneficial. Since, the government has been distributing open land

to rural land less youth, locally called ‘Gobo mekello’ to manage the land by their own rules and local institution. While community forest has a large positive impact not only environmental protection but also many households are improved their lively hood through diversified their income in off farming activities like bee keeping/apiculture, harvesting the grass and some plants for sell through reforestation. Generally communities have planted seed in the open/free land susceptible to the flood before and currently the area is free from degradation.

Picture 4.2 community participation at kerentao community forest in open and degraded land

Owned field survey; 2013

Table: 4.17 the level of forest stock in each community forest after the introduction of PFM

Household kebelles	What is the status of forest stock around your living area after the introduction of the new PFM?						Total	
	decreasing		increasing		Remaining the same			
	Count	%	Count	%	Count	%	Count	%
Harle	14	60.9	29	22.7	-	-	43	27.4
Lma’t	5	21.7	49	38.3	6	100	60	38.2
Selenwuha	4	17.4	50	39	-	-	54	34.4
Total	23	100.0	128	100.0	6	100.0	157	100.0

N= 157 respondents Source: Survey questionnaire, 2013

Observation from around 81.5% of respondents and information from focus group discussion and interview had similar response about the potential forests recently which increase due to the introduction of PFM. This mainly encourage the participation of the users since it is based on bottom up approach without any external intervention. In addition to this, this new paradigm shift encouraged sense of belongingness, and strengthens the participation of the local people in general and gender participation in particular. The other important point here is some areas that are highly degraded and overgrazed before are now increasingly rehabilitated after the introduction of this new forestry program as you seen in the picture below.

Picture: 4.3 the rehabilitated area in keren tao community forest after the introduction of PFM

Owned field survey; 2013

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The purpose of this study was to investigate factors affecting forest users participation in PFM; evidence from Raya Alamata community forest. Thus, this chapter presents the summary of the findings and conclusions of the study and possible recommendations are forwarded based on the results and discussions.

5.1 Conclusion

In this finding all respondents felt that forest is degraded and recognized this as a problem due to different causes like illegal cutting of fuel wood, Over-grazing, agricultural expansion, natural drought and urbanization. This misuse of resources is not only adversely affecting on resources depletion but also had negative impact on participation of the community as well as resultant conflict among users and non users. Though people's involvement in various forest practices like illegal cutting of tree, fuel wood collection and harvesting other forest products etc. in the studied villages were significantly reduced compared to earlier time, but still the practice is going on due to weak legal action on illegal users and lack of alternative energy sources. In addition to the above factors grazing is also common problem in the studied villages though the regional government of Tigray had proposed policies, strategies rules and regulations for participatory forest management as well as the 2005 zero grazing policy. Reason for grazing was the existence of large livestock population and awareness problem regarding to zero grazing.

Attitude is understood to be an important predecessor of individual behavior in relation to natural resources management or conservation; thus, the findings show that majority of the forest users have positive attitude towards PFM approach. Some of the major factors that develop such feeling are, it creates a sense of belongingness, it reduces deforestation, there is increment of forest regeneration, and encourage the right to use the forest product. Though most forest users appreciated PFM practices due to the above challenges and shortage of seed, low level of rain fall and poor management etc, the degree of high level of participation is not as expected and adversely affects on the potential forest in the study area.

The results show that forest conservation will be effective and sustained if the community are actively participated. There are factors that influence on active participation of the people. These factors may enhance or inhibit the participation of the users. Among enhancing factors local institutions are seen as initiator/enhancing factors. Because all users respect the rule and regulations of the endogenous institution, since the rule is formulated by themselves with its pivotal role in natural resources conflict resolution. The study proved that, the users have a good knowledge and skill of resource management practices and thus they used their knowledge for the better management of their available local resources based on their local culture, tradition, customs, norms and age-old values. The cultural value had great relevance in forest conservation by protecting forests from unnecessary damage and sustainable use of forest resource transferring to the next generation. Species preservation, care of plantation, grazing rotation, and seasonal tree cutting for rehabilitation were found to be sacred among forest dwellers in the study area this all influenced positively on their participation. In this study training was also encourage the participation of the users. Because it aware modern way of conservation with integrating local knowledge how planting and protecting the regenerating trees. Generally in addition to the above factors fair benefit distribution of forest and forest product was also increase the level of participation in forest management in the study area.

In contrast there are factors that impede the participation of the forest users in this study. Community forests that are geographically located in the plain are vulnerable to farmland expansion following large ground water emerged since few years. In line with this the size and potential forest has rapidly in decreasing rate. This affects on the participation residents because they have not confidence and reduce sense of belongingness about future use of the resources. Another obstacle for active participation was lack of skills related to effective management of the program, day-to-day decision-making and resolve internal conflicts. Disincentive, lack of upgrading technical staff and lack of experience sharing also results the staff members become demotivated and turnover for searching better job. Finally forest resource use under conflict situation is also not only damage the bio-physical resource base itself but also harm community interests and willingness in participation this also one undermine problem for active participation of the community in the study area.

Forest user's participation in community forest management in the study area was determined by demographic, economic and bio-physical factors. Though age and level of education are statistically not significant the descriptive result indicated that, aged and illiterate people were better participant than the younger and educated ones. This was due to majority of youths both literate and illiterate are landless and engaged in off farm activities like small business, trade, hiring governmental and nongovernmental organization this was losing their active participation. The other determinant factor of participation in this study was gender. The econometric result indicated that women's share of active participation was very low compare to their counter parts. This was due to women's productive and reproductive tasks like childcare, fetching water, cooking food; travel long distance market and farming constrain their participation. household family size also influence on the Participation of forest users the result indicated that as family size increases the number of active participants also increases but as the number of family size reduce the undo is true. The major reason was, large family members have a greater demand for forest products such as firewood, cutting grass and other activities due to their larger household sizes, free labore and time. The counter parts of small family size are unable to actively participate easily due to work load or lack of free labore specially during harvesting time. In addition to the demographic factors the biophysical factor influence on forest user's participation in the study area. For instance distance of homestead from the forest affect family decision whether to participate actively or less actively. The result revealed that as distance home from the forest increased, the number of community members participating actively in forest conservation decreased. As distance home from forest decrease the reverse is true. This was due to a number of factors like those forest users their resident far from the forest exposed to transportation cost, time delay, information problems what happen in the forest as well as reduce their access benefit from the forest compare to their counter parts users live near to the forest. The other major expected determinant factor was the place where the community forest is located geographically. Community forest located near to Steep Mountain was not vulnerable to agricultural expansion. Moreover, Community forest that increase in respondent's income has also encourage the participation users in this study.

5.2 Recommendations

Based on the results of this study, the following recommendations are made:

- The result indicates that illegal cutting of wood and uncontrolled grazing are major problems of forest destruction. To overcome such problems, legal actions should be taken on illegal users and public awareness strategy should be grounded in credible, up-to-date and based on relevant information in order to change public attitudes and behaviors; heavy extension efforts are needed to highlight people's awareness about the causes of forest depletion, to reduce forest degradation and encourage tree planting. Moreover, Forestry-related information is better to promote through the formal and non-formal education sectors.

- The gap between demand and supply for fuel wood is increasing with time. It is better to bring significant change in forest resources degradation through identifying alternative sources of energy under top priority. Using local innovative methods like bio gas and wood saving stove /ማገዶ ቆጣቢ ምድጃ etc.

- To protect agricultural expansion in the forest area, there should be strong effort for the enforcement and realization of forest policy, rule and regulation that protect the forest from damage. Moreover, exotic species should not be planted intermixed with the indigenous woody species; rather they should be encouraged to be planted on the outer border of the indigenous plant species or in unproductive area.

- A forestry research programme should be prepared and focus on providing data, information and guidelines for efficient forest management practices and conservation strategies, providing new resilience and adaptive species of plants to the environment, reforestation planning and development, agro forestry practices and social/participatory forestry initiatives. Incentives should be provided to encourage investment in forestry development and conservation as well as to encourage the participation of the community. Recruiting professional staff at appropriate time and appropriate place, key messages, promotional vehicles and potential sponsors should be identified.

- The results from the logistic regression showed that, in the study area, women are in shade of male and much influenced by the work load and other cultural influence, which restricted women in many participatory activities in general and participatory forest management in particular. Therefore, there should give chance as well as opportunity to make decision themselves.

- Another result from the logistic regression was, in the area which has high potential forest and a benefit derived from forest encourages the participation of households. Therefore, for the better achievement of PFM programme, and to ensure sustaining forest life in the long run, it needs to encourage community participation in nursery activities and plantation of community forestry and individual household tree plantation, particularly outside the forest. At a household and community level, they need to establish their own woodlots at convenient places for easy access, which can reduce the deforestation pressure on natural forest. Moreover, Promotion of people's participation in forest management should require concentrated efforts from the government, non-governmental organizations, academic institutions and the business sectors.

- Finally, identifying the attractive factors of forest users participation is paramount, in order to strengthen and support the interest of local residents. Since without the interest of users sustainable forest management is unthinkable, rather forest depletion, instability and conflict are continued. The assurance of property right must clearly answer the question of ownership right on forest and forest products. In general, participatory forest management strategy will be a feasible measure that could restructure the problem of forest destruction and it is believed to be successful if it is based on the interest, willingness and context of the forest users.

References

ACES (1993). Activities for the Changing Earth System; funded by a grant from the national science foundation and with the support of the Ohio state university

Adhikar, U. (2011). Women In Forest Management: thesis on A Case Study of Dharapani Women Community Forest Bharatpokhari Vdc, Kaski, Nepal, School of Development and Social Engineering, Faculty of Humanities and Social Sciences pokhara University

Africa, F.A.R.M- and SOS Sehal Ethiopia (2002). Mid –Term Review of Bale Mountain Eco-Region Sustainable Management Programme. Full report

Africa, F.A.R.M. (2000). Assessment of timber Extraction Rate in the Chilimo Forest. FARM Africa, Addis Ababa, Ethiopia.

Agrawal, A and Gibson, C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation; Yale University, New Haven CT, USA and Indiana University, Bloomington, USA; *World Development Vol. 27, No. 4, pp. 629±649*

Agrawal, A. (2001). Common Property Institution and Sustainable Governance of Resources. *World developmentvol.29.No.10,pp 1649-1672, 2001 published by Elsevier science Ltd.*

Agrawal, A. and Angelsen, A. (2009). Why are we seeing 'REDD'? An analysis of the international debate on reducing emissions from deforestation and degradation in developing countries. Analyses. Institut du développement durable et des relations international, Paris. 28p.

Agrawal, A. and Chhatre, A. (2006). Explaining Success on the Commons: Community Forest Governance in the Indian Himalaya. *World Development Vol. 34, No. 1, pp. 149–166.*

Ahmed, E. and Mbwambo, J. (2004). Does Decentralization have a Positive Impact on the use of Natural Resources? Term paper for the interdisciplinary course, international doctoral studies program at ZEF and Participatory Development; Aalborg University Development and International Relations.

Alemtsehay, J. (2010).Determinating Factors for a Successful Establishment of Participatory Forest Management: A Comparative Study of Goba and Dello Districts, Ethiopia; MA thesis the University of Agder, Kristiansand, Norway

Bedru. B. (2007). Economic valuation and management of common-pool resources: the case of enclosures in the highlands of Tigray, Northern Ethiopia. Doctoral dissertation.

Behera, B. and Engel, S. (2006). Who forms local institutions? Levels of household participation

Bhattacharya, H. and Innes, R. (2006). Is There a Nexus between Poverty and Environment in Rural India? Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Long Beach, California-2006.

Boucher, D. Elias, P. Lininger, K. Tobin, C. Roquemore, S. and Saxon, E.(2011). The Root of the Problem what Driving Tropical Deforestation Today? Union of Concerned Scientist Citizen and Scientist for Environmental Solution pubs@ucsusa.org or call (617) 547-5552.

Chhetri, k. (2005). Community Forestry Program in the Hills of Nepal: Determinants of User Participation and Household Dependency Department of International Environment and Development Studies (Noragric) Norwegian University of Life Sciences (UMB); A Thesis Submitted in Partial Fulfilment of the Requirement for the Degree of Master of Science in Management of Natural Resources and Sustainable Agriculture

Coulibaly, P. Lingani, M. Tigabu, P. Savadogo, P. C. Oden, and J. M. Ouadba,(2009). "Determinants of access to forest products in southern Burkina Faso," *Forest Policy and Economics*, vol. 11, no. 7, pp. 516–524

Dangi, R. (2009). Econometric Analysis of the Causes of the Deforestation in Nepal a thesis presented to the faculty of the College of Arts and Sciences of Ohio University In partial fulfillment of the requirements for the degree Master of Science

Dasgupta, N. (2004). Implicit in group favoritism, out group favoritism, and their behavioral manifestations. *Social Justice Research, 17,* 143-169.

Dolisca,F. D. R. Carter, J. M. McDaniel, D. A. Shannon, and C. M. Jolly,(2006). "Factors influencing farmers' participation in forestry management programs: a case study from Haiti," *Forest Ecology and Management*, vol. 236, no. 2-3, pp. 324–331

Douglas Sheil, D. and Kishi, M.(2006) Forests and Human Health Assessing the Evidence CIFOR, ocatinal paper No. 45 Web site: http://www.cifor.cgiar.org

Drexhage, J. and Murphy, D.(2012). Sustainable Development: From Brundtland to Rio Background Paper prepared for consideration by the High Level Panel on Global Sustainability at its first meeting, 19 September 2010 September 2010 United Nations Headquarters, New York.

Dungun, J. and Heights, D. (2008). Malaysia Sustainable Community Forest Management in Sabah; United Nations Development Program (UNDP), Malaysia. © UNDP. Vol. number 50490 Kualaumpur, Malaysia. Www.undp.org.

Economic and Social Survey of Asia and the Pacific (2003). Environment-Poverty Nexus *Revised: Linkages and Policy Options No IV*.

Edward, D. and Mejos, A. (2007). Against Alienation: Karol Wojtyla's Theory of Participation *Forestry Briefing Number 4, May 200371-85 KRITIKĒ Volume One Number One (JUNE 2007) 71-85*

Eighth African Development Forum (ADF-VIII) (2012). Governing and Harnessing Natural Resources for Africa's Development Addis Ababa, Ethiopia Forest Resources Issues Paper 4 African Union, African Development Bank, Economic Commission for Africa Addis Ababa, Ethiopia 23-25 October 2012

FAO (2003). Participatory Development: Guidelines on Beneficiary Participation in Agricultural and Rural Development for the Rural Institutions Participation Service, Rural Development Division Food and Agriculture Organization of the United Nations Rome Italy (2nd edition)

FAO (2005). Economic and Social Significance of Forests For Africa's Sustainable Development Accra, Ghana Volume25, Issue 2nature-faune@fao.org http://www.fao.org/africa/publications/nature-and-faune-magazine

FAO (2008). Forests are much more than timber and much more than carbon "A narrow focus on The role of forests as carbon sinks at the expense of the other forest values would be unsustainable." Strategic framework for forests and climate change. Working with countries to tackle climate change through sustainable forest management Collaborative Partnership on Forests, 2008.

FAO (2010). Policy on Indigenous and Tribal Peoples; Working Paper-10 ISBN 978-92-5-106689-8Rome, 2011

FAO(2011).Tropical Deforestation: Causes, Consequences and Some Land Use Alternatives2Rondônia,BrazilUNEPFeb52007.http://na.unep.net/digital_atlas2/webatlas.php?id=29 09/02/2011

FAO/UN (2010). Progress towards Sustainable Forest Management; Global Forest Resources Assessment main report FAO-forestry paper -163.

FAO/UN (2010). Successes and Challenges in Ecological Agriculture: Experiences from Tigray, Ethiopia

FAO/United Nation (2000). Conflict and Natural Resource Management, volume, 1

Gebregziabher, G. and Gebrehiwot, H. (2011) Challenges, Opportunities and Available Good Practices related to Zero Grazing in Tigray and Hararghe, Ethiopia. DCG Report No. 66

Gebremdhin, A. (2008). Determinats of Success of Participatory Forest Management (PFM) The case of WAJIB approach in Ethiopia. MSc dissertation submitted to Institutes for Environmental decision

Gebremedhin, Y. (2004). Thesis on Community Participation and Sustainable Soil and Water Conservation Management the Case of Zala-Daget Project: Dogu'a Tembien Woreda –Tigray Highlands

Geist, H. and Lambin, E. (2001) What Drives Tropical Deforestation? A Meta-Analysis of Proximate and Underlying Causes of Deforestation based on Sub national case study evidence LUCC Report Series No. 4 CIACO Louvain-la-Neuve © LUCC International Project Office

Gobeze, T Bekele, M. Lemenih, M. and Kassa, H. (*2009).* Participatory forest management and its impacts on livelihoods and forest status: the case of Bonga forest in Ethiopia; *International Forestry Review Vol.11(3),*

IGES (2012). Greening governanace in Asia-Pacific White Paper IV. Institute for Global Environmental Strategies (IGES) 2108-11 Kamiyamaguchi, Hayama, Kanagawa, 240-0115, Japan International Livestock Research Institute.

Isager, L. Theilade, I. and Thomson, L. (2004). people's participation in forest conservation: considerations and case studies university of aarhus, hoejbjerg, denmark danida forest seed centre, humlebaek, denmark &csiro forestry and forest products, kingston, australia. ISSN 1908-7330 Article

Jehan, S. and Umana, A. (2003). The Environment-poverty Nexus Development Policy Journal in India's Joint Forest Management program. Paper prepared for presentation at the Annual Meetings of the International Society for New Institutional Economics (ISNIE), Barcelona, September 22-24

Kanel.k and Ram Dahal. G. (2008). Community Forestry Policy and Its Economic Implications: An Experience From Nepal International *Journal of Social Forestry, 2008, 1(1):50-60.*

Karkee, K. (2004). Effects of Deforestation on Tree Diversity and Livelihoods of Local Community: A Case Study from Nepal A thesis submitted to the Lund University International Master's Programme in Environmental Science Lund, Sweden

Kishore.S, and Krishanu.D. (2010). Status of Joint Forest Management in India: Socio-Economic Determinants of Forest Participation in A Dynamic Optimization *Setting International Journal of Social Forestry (IJSF, 2010, 3(2):81-100*

Kobbail, k. (2011). Local People Attitudes towards Community Forestry Practices:A Case Study of Kosti Province-Central Sudan MA thesis Department of Social Forestry, College of Forestry and Range Science.

Kothari, CR. (2004). Research methodology, methods and techniques,second revised edition on. Newdelhi, new age international (p) Ltd.

Kreager, P. (2009). Darwin, lotka and Malthus two concept of population demographic research; *http://www.demographic research .org/volume/ vol 21/ 16/*

Kugonza. A. Buyinza, M., Byakagaba, P. (2009). Linking local communities livelihood and forest conservation in Masindi district, North western Uganda. *Research Journal of Applied Science 4(1): 10-16.*

Kuhlman, T. and Farrington, J. (2010). What is Sustainability? Agricultural Economics Research Institute, Wageningen University The Hague, The Netherlands Institute for Rural

Research, Geography and Environment, University of Aberdeen, Elphinstone Road, Aberdeen AB24 3UF, Scotland, UK.

Lise, W.(2000). Factors influencing people's participation in forest management in India. Institute for En6ironmental Studies, Vrije Uni6ersiteit Amsterdam, De Boelelaan 1115, 1081 HV Amsterdam, The Netherlands Received 14 June 1999; received in revised form 28 January 2000; accepted 23 March 2000 *Ecological Economics 34 (2000) 379–392*

Luchia, T. (2010). Analysis of Relevance and Effectiveness of FTC-based Training: The Case of Alamata Woreda, Southern Tigray, Ethiopia; M.Sc Thesis Haramaya University

Marquette, C. (1997). Turning but not Toppling Malthus: Boserupian Theory on Population and the Environment Relationships Chr. Michelsen Institute Development Studies and Human Rights Bergen Norway

Maskey. V, Tesfa G. Gebremedhin and Timothy J. Dalton. (2003) A Survey Analysis of Participation in a Community Forest Management in Nepal Research Paper 2003-8 Selected paper for presentation at the Northeastern Agricultural Resource Economics Association, Portsmouth, New Hampshire, June 8-10, 2003.

Mastewal, Y. (2010). How Informal Institutions Strengthen Sustainable Management of Common Pool Resources in Tigray, Ethiopia? A Thesis Doctoral dissertation Submitted in Partial Fulfillment of the Requirements in Agricultural Sciences University of Natural Resources and Applied Life Sciences, Vienna Centre for Development Research

Million, B. (2011). Forest Plantations and Woodlots in Ethiopia. A platform for stakeholders in African forestry, volume one issued 12, 2012

MoFED (2013). Growth and Transformation Plan, 2010/11-2014/15, Volume I: Main Text. Ministry of Finance and Economic Development, FDRE, Addis Ababa. Nexus Revisited: Linkages and Policy Options

Mogaka. H, Simons.G, Turpie.J,Emerton.L and Karanja.F. (2001). Economic Aspects of Community Involvement In Sustainable Forest Management In Eastern And Southern Africa IUCN, Te world conservation union Eastern Africa Regional Office.

Musyoki, J. Mugwe, J. Mutundu,K. and Muchiri, M.(2013). Determinants of Household Decision to Join Community Forest Associations: A Case Study of Kenya; SRN

Forestry research Article Volume 2013 (2013), Article ID 902325, 10 pages; http://dx.doi.org/10.1155/2013/902325

Ogada, M. (2012). Forest Management Decentralization in Kenya: Effects on Household Farm Forestry Decisions in Kakamega; International Livestock Research Institute, Selected paper prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguacu, Brazil, 2012.

Osumba, P.(2006) Pay Back Anticipation: A Driving Force In Communities Participation In Forest Management Paper Presented At The 13th Biennial Conference Of International Association For The Study Of The Commons (Iasc) In Hyderabad, India (10-14 January 2011)

PASDEP (2006). Ethiopia: Building on progress. A plan for accelerated and sustained development to end poverty. Ministry of Finance and Economic Development. Volume II Policy Matrix

Poteete, A., and Ostrom, E. (2003). In Pursuit Of Comparable Concepts and Data about Collective action. Cambridge: Cambridge University Press.

Putz, F. (1994). Approaches to Sustainable Forest Management working paper no. 4

Rahman, A. (2000). General Problems of Environmental Overcrowding, from which both Women and Men may suffer, link closely with Women's specific freedom from the constant bearing and rearing of Children that Plagues the lives of Young Women in many Societies in the Developing World. Oxford University Press, New Delhi, 2000, p. 195.

REST (2004). Dry Land Coordination Group Forum. Work Shop on Proposed Management Plan/Strategy of Area Enclosures

Richards, M. Davies, J. and Yaronn, G. (2007) 'Economic Stakeholder Analysis' for Participatory Forest Management center for Environment Education Sustainable Development: An Introduction Internship Series, Volume-I:

Shibru. T. (2007). Environment and Natural Resources as a Core Asset in Wealth Creation, Poverty Reduction, and Sustainable Development in Ethiopia, international development research center Available at http:// www.aideffectiveness.org/Country-Ethiopia.html. Accessed: 15/3/2013 10:15

Sikor, T. and Quang Tan, N. (2011). Realizing forest rights in Vietnam; addressing issues in community forest management; International development university of east Angela. Humboldt University, Berlin, Junior Research Group on Postsocialist Land Relations, Luisenstr. 56, 10117 Berlin, Germany Received 27 June 2005; accepted 30 June 2005Forest Policy and Economics 8 (2006) 339– 349

Sinha, H.(nd) Forest and People: Understanding the Institutional Governance, Social Identity, and People's Participation in Indian Forest Management Address for correspondence: Xavier Institute of Social Service, Vol. - 7, Purulia Road, Ranchi - 834 001, Jharkhand, India.

Terefe, D. (2003). Factors Affecting People's Participation in Participatory Forest Management: The case of IFMP Adaba-Dodola in Bale zone of Oromia Region; MA Thesis Addis Ababa University School of Graduate studies Regional and Local Development Studies (RLDS)

Tewodros.W.(2008). Factors Affecting the Knowledge, Attitude And Practice Of Forest Dependent Manja Community Towards Forest Conservation In Kaffa Zone, SNNPE, MA Thesis Addis Ababa University School of Graduate studies Regional and Local Development Studies (RLDS)

Thoai, T. And Rañola, R. (2010). Decision Making by Upland Farmers on Forest Management in the Northwest Mountainous Region of Vietnam; *J. Issaas Vol. 16, No. 1:68-82*

Tirhas, M. (2009). Understanding local forest management institutions and their roles in conserving woody species biodiversity; case study of Alamata Woreda Southern Tigray Northern Ethiopia. MA Thesis Mekelle University.

Tola, G.(2005). Prospects of Sustainable Natural Resource Management and Livelihood development in wondo genet area, southern Ethiopia. MA Thesis Addis Ababa university school of graduate studies regional and local development studies

UNDESA (2011). National Capacity for the Integration of Sustainable Development Principles into Development Strategies in Countries Emerging from Conflict; Developing National Sustainable Development Strategies in Post-Conflict Countries – Working Draft

UNDP (2012). Ethiopia, United Nations Conference on Sustainable Development (Rio+20) National Report of Ethiopia Federal Democratic Republic of Ethiopia Environmental Protection Authority

USDA/WB (1999). Sustainable Forest Management: The Role of the Forest Service, Northeastern Area and State Forestry Agencies

Wily, L. (2002). Forest Management and Democracy in East and Southern Africa: Lessons from Tanzania Political Economist Independent land tenure & community forest management adviser Draft Received Submitting papers to the *Gatekeeper Series no. 95*

Winberg, E. (2010). Participatory Forest Management in Ethiopia, practices and Experiences Forestry Volunteer Food and Agriculture Organization Sub Regional Office for Eastern Africa (SFE), Addis Ababa. Food and Agriculture Organization Sub Regional Office for Eastern Africa (SFE), Addis Ababa, June 2010

Wojtylas, k. (2003). Against Alienation: Theory of Participation

Wood, L. (2008). Community-Based Natural Resource Management: Case Studies from Community Forest Management Projects in Ghana, Mexico, and United States of America NRES 523- International Resource Management *Spring World Development Vol29, No. 10, PP.1649-1672.*

Yemiru, T. (2011). Participatory Forest Management for Sustainable Livelihoods in the Bale Mountains, Southern Ethiopia Faculty of Forestry Department of Forest Products Uppsala Doctoral Thesis Swedish University of Agricultural Sciences

Zewdu, E.Yitebitu, M. and Sisay, N. (2010). Ethiopian Forest Resources: Current Status and Future Management Options in View of Access to Carbon Finances Prepared for the Ethiopian Climate Research and Networking and the United Nations Development Programme (UNDP)

Zocher, A. (2010). Sustainable Development: An Introduction Role of Governments in Conservation of Forest Genetic Resources Forest Seed Centre Guidelines & Technical Notes No. 62A

Appendix 1

Mekelle University

College of Business and Economics

Department of Management

Post Graduate Program in Development Studies

Household Survey Questionnaire to Be Responded by Farm Households

Introduction:

This questionnaire is prepared by a post graduate student (development studies) in Mekelle University for partial fulfillment of master degree. The aim of this questionnaire is to collect data about "factors affecting forest user's participation in PFM: evidence from Alamata community forest, Tigray, Ethiopia". The information you provide is believed to have a great value for the success of this research. I confirm you that all data will be used for academic purpose and will be analyzed anonymously and you are not exposed to any harm because of the information you give. I highly appreciate in advance to your kind cooperation in providing the necessary information.

Thank you!

General instruction:

1. Please choose appropriately represents your response from the multiple choices

   Boxes
2. To the open-ended questions, please write your response on the space provided.

Part one personal and Physical factor

1. Tabia-------- **2.** Age ------ **3.** Gender -------

4. Level of Education…....

5. Family size---------

6. Distance home from market in hours ----------

7. Distance home from the forest in hours----------

2. Part two Factors of forest depletion.

8. What do you think currently about deforestation in your locality?

1) Deforestation going on

2) There is some deforestation

3) There is no deforestation at all

9. What do you think are the major causes of deforestation in the area?

1) Illegal cutting of wood 2) Over-grazing
3) Urbanization 4) Agricultural expansion

5) Natural drought 6) if others----------

10. What is the major source of animal feed for the livestock of this household?

1) Communal grazing 2) Household own grazing land

3) Cut and carry grass or fodder plants from communal forests.

4) Crop residue 5) Other (Specify)……

11. If your answer For **Q**. No **8** is option No.**1**, what intervention measures should undertake to tackle this problem?

1) Encourage forest management through community participation

2) Encourage forest management through control by the state

3) Encourage forest management through participation of other stakeholders

12. If your answer for **Q.** No **8** is "there is no deforestation", do you feel that it hinders your participation? If yes why? ----------

13. Do you have any knowledge about the cause of deforestation?

1) Yes 2) No

14. If ***yes*** what are these?----------

15. How do you know?

1) Formal learning in school 2) Information from mass media

3) Informal learning trough training 4) others, (Specify)…….

16. If your answer for **Q**. **13** is **yes**, what is its impact from your experience?

1) It has strong positive impact on participation.

2) It has less positive impact on participation

17. What are your main sources of fuel for cooking?

1) Firewood 2) Charcoal

3) Agricultural residues 4) Liquefied petroleum gas

5) Electricity

Part three push and pull factors of community participation in PFM

3.1 People's Perception towards PFM

18. Where do you actively participate?

1) Descion making 2) Plantation 3) Protection of regenerating trees (finance funding for forest guards) 4) Others (specify)…….

19. Who is providing seedlings for plantation? (Arrange them in order)

1) Government 2) Individuals 3) NGOs

4) Other stakeholders 5) Others (specify) ------

20. Do you agree PFM as significant in conserving forest?

1) Strongly agree 2) agree 3) disagree 4) strongly disagree

21. If your answer for **Q.20** is options **1 and 2** what could be the reasons?

1) It gives Authority (power) to the community
2) It create feeling a sense of belongingness
3) It reduce deforestation
4) There is increment of forest regeneration
5) Encourage the right to use the forest product
6) Others (Specify)…….

22. Who should manage the forest reserves? (Please rank them in order of importance)

1) All stakeholders
2) Government and all users of the community forest
3) Immediate users at local level
4) Community and NGO's partnership
5) Indigenous institutions
6) Other (Specify) …….

23. Do you believe that the current land tenure in Ethiopia has a link (any relation) with forest management?

1) Yes 2) No

24. If your answer for **Q. NO 23** is yes, how do you rate the degree of its effect on your participation?

1) Strongly enhance 2) Slightly enhance

3) Strongly hinder 4) slightly hinder

25. Do you think that the participatory forest management has shortcomings?

1) Yes 2) No

26. If **yes** to **Q. No 25**, what are the major shortcomings? ----------
---

27. If **No** for **Q. No 25**, what is your reason as PFM has no shortcomings? ----------
---

28. What was the level of forest stock around your living area before the introduction of the new PFM/ decentralized the power to community management?

1) Low dense 2) Highly dense 3) Remaining the same

29. What is the status of forest stock around your living area after the introduction of the new PFM/ decentralized the power to community management?

1) Decreasing 2) Increasing 3) Remaining the same

30. If your answer for **Q. No 28 and 29** is 1 or 2, what are the major reasons? ----------
---

31. Have you reduced cutting tree after the introduction of the new PFM?

1) Yes 2) No

32. If yes for **Q**.**30** why? ----------

33. If No for Q.**30** why? ----------

34. Have you ever been aware about forest use? 1) Yes 2) No

35. If your answer for **Q.34** is **yes** does this initiate you to participate actively?

1) Strongly 2) slightly 3) no effect

36. Do have benefits from Community forest management?

1) Yes 2) No

37. If your answer for **Q.36** is **yes** do these initiate you to participate in forest management?

1) Strongly 2) Slightly 3) Nothing

38. After you become a participant what is your responsibility? (Put them in rank of order)

1) Reduce cutting tree 2) Limit farm land expansion

3) Limit using forest for grazing livestock 4) others, (Specify)…….

39. What is the interest of the community in your village looks like on the issue of forest management?----------
---

3.2. Institutional factors

40. Are there local institutions in your locality to manage forest?

1) Yes 2) No

41. If **Yes** for **Q. No 40**, what is their effect in participation of the people?

1) They are initiators 2) They are inhibitors 3) Nothing

42. What is the cultural value or belief of the community towards the forest?

1) Protecting forest from unnecessary damage

2) Sustainable use of forest resource

3) Using as much as needed for personal consumption

4) There is no relation with forest

43 . Do this existing cultural value has any impact on your participation?

1) Yes, it encourages 2) Yes; it discourages 3) No impact

44. How is the degree of enforcement of rules and regulations of an association?

1) Very high 2) high 3) low

45. How is the support of local administration in association rules and regulations enforcement?

1) Very high 2) high 3) low

46. If your answer for **Q. No 45** is **yes,** it encourages state the relationship between the value and participation----------

3.3. Economic factors

47. What is your main source of income and household activities?

No	Activities	Tick
1	Crop production	
2	Livestock production	
3	Fuel wood selling	
4	other off farm activities	

48. How is the benefit distribution of PFM?

1) Very fair 2) fair 3) unfair

49. What are the criteria for benefit sharing in PFM? ----------
---

50. Is the livelihood of your family income depends on forest and forest product?

1) Fully 2) Partially 3) No

51. If your answer for **Q. 50** is option **1** or **2,** do this depend on forest had initiated to participate in forest management?

1) Strongly 2) Slightly 3) No effect

52. What is the income distribution within the group you belong to looks like?

1) Significant differences 2) Slight differences 3) Fair distribution

53. Do you believe that the income difference causes participation differences?

1) Yes 2) No

54. If your answer for **Q.43** is **yes,** answer the following

1) That higher income group participates actively than that lower income group

2) Those lower income group participate actively than those higher income groups

3) Those medium income group participate actively than those lower and higher incomes

55. What are the major factors that enhance yours participation in forest management?

Please list down by priorities ----------
---

56. What are the major factors that hinder your participation in forest management Please list down by priorities? ----------
---

Appendix 2

QUESTIONS FOR THE VILLAGE INTERVIEW FOCUS GROUP DISCUSSION

CHECKLIST FOR INTERVIEW

1) Does the participatory forest management approaches create a great sense of accountability to the forest users?

2) Does the participatory forest management ensured empowerment of individual people?

3) Does PFM approach serve as a vehicle for sustainable forest management?

4) What is your decision power in discussion?

5) Do you think that your decision-making power affect participation level?

6) What is your performance in participation compared to others?

7) How is the local institution arranged to manage the communal forest?

8) What kind of new technology distribute to the community to reduce biodiversity loss?

9) How do you see potential forest before and after the introduction PFM?

CHECKLIST FOR THE FOCUSED GROUP DISCUSSION

1) Local Community forest management, gender and empowerments.

2) The status of the community forest and local livelihood before and after the PFM.

3) Community forest and disturbance activities i.e. wild fire, encroachment and shifting cultivation etc.

4) Threats to community forest management and local livelihoods.

5) The status of tree species diversities in community forest, regeneration, rehabilitation.

6) Possible interventions to enhance community forest and improve local livelihoods.

Appendix 3

መቐለ ዩኒቨርስቲ

የ ቢዝነስ ና ኢኮኖሚክስ ኮሌጅ

የ ማና ጅመን ት ዲፓር ት መን ት

የ ዲቨ ሎ ፕ መን ት ስ ተዲ ስ ድ ህ ረ ምረ ቃ ት /ክ ፍ ል

<u>መግ ቢ ያ :-</u> ይ ህ መ ጠ ይ ቅ በ መ ቐ ለ ዩ ኒ ቨ ር ስ ቲ በ ደ ቨ ለ ፕ መ ን ት ስ ተ ዲ ስ ት /ክ ፍ ል ለ ማ ስ ተ ር ስ ድ ግ ሪ ማ ሟ ያ የ ተ ዘ ጋ ጀ ነ ዉ። የ መ ጠ ይ ቁ ዋ ና አ ላ ማ -በ አ ላ ማ ጣ ወ ረ ዳ ማ ህ በ ረ ሰ ብ ለ አ ሳ ታ ፊ የ ደ ን እ ን ክ ብ ካ ቤ ሊ ያ ነ ሳ ሱ ና ሊ ያ ዳ ክ ሙ የ ሚ ች ሉ ምክ ን ያ ቶ ች ለ ማ ጥ ና ት እ ን ዲ ያ ስ ች ል ከ ህ ብ ረ ተ ሰ ቡ መ ረ ጃ ለ መ ሰ ብ ሰ ብ የ ተ ዘ ጋ ጀ ነ ዉ። እ ር ስ ዎ ለ ነ ዚ ህ ጥ ያ ቄ ዎ ች የ ሚ ሰ ጡ ት ት ክ ክ ለ ኛ ምላ ሽ ለ ጥ ና ቱ ከ ፍ ተ ኛ ጠ ቀ ሜ ታ አ ላ ቸ ዉ። የ ሚ ሰ ጧ ቸ ዉ ምላ ሽ ሁ ሉ ሚ ስ ጥ ራ ቸ ዉ በ ሚ ገ ባ የ ሚ ጠ ብ ቁ ና ቸ ው። በ ዚ ህ መ ጠ ይ ቅ ላ ይ ስ ም ዎ ን ማ ስ ፈ ር አ ይ ጠ በ ቅ ብ ዎ ት ም። ለ መ ጠ ይ ቁ ለ ሚ ሰ ጡ ት ት ክ ክ ለ ኛ መ ረ ጃ በ ሙ ሉ በ ቅ ድ ሚ ያ ከ ል ብ አ መ ሰ ግ ና ለ ሁ።

<u>መ መ ሪ ያ</u> 1. አ ማ ራ ጮ ች በ ቀ ረ ቡ በ ት ጥ ያ ቄ አ ን ተ ን (ች ን) በ ሚ መ ለ ከ ት ጉ ዳ ይ ላ ይ ምረ ጥ ምረ ጭ

2. ዝ ር ዝ ር መ ል ስ ለ ሚ ያ ስ ፈ ል ጋ ቸ ዉ ጥ ያ ቄ ዎ ች በ ቀ ረ በ ዉ ክ ፍ ት ቦ ታ ላ ይ መ ል ሰ ዎ ን ያ ስ ቀ ም ጡ።

ክ ፍ ል አ ን ድ :- አ ጠ ቃ ላ ይ የ ግ ለ ሰ ቡ መ ረ ጃ

1.ጣ ብ ያ _____ 2. ዕ ድ ሜ ___ 3. ፆ ታ ___

4. የ ት ም ህ ር ት ደ ረ ጃ .....

5. የ ቤ ተ ሰ ብ ብ ዛ ት _____
6. ከ ቤ ት እ ስ ከ ገ በ ያ ያ ለ ው ር ቀ ት በ ሰ ዓ ት --------
7. ከ ቤ ት እ ስ ከ ጫ ካ (ደ ን) ያ ለ ው ር ቀ ት በ ሰ ዓ ት ---------

ክ ፍ ል 2: የ ደ ን መ ው ደ ም ምክ ን ያ ቶ ች

8. በ አ ሁ ኑ ጊ ዜ በ አ ከ ባ ቢ ሁ ስ ላ ለ ው ደ ን ምን ይ ላ ሉ ?

ሀ) ደ ን በ መ ው ደ ም ላ ይ ነ ው ያ ለ ው ለ) ት ን ሽ ም ቢ ሆ ን የ ደ ን መ ው ደ ም ይ ታ ያ ል

ሐ) ም ን ም የ ደ ን ው ድ መ ት የ ለ ም

9. በአከባቢሁ ላለውደን ውድመት ዋናውምክንያት ምንድነውብለው ያስባሉ?

ሀ)የተፈጥሮ ድርቅ ለ)የከተማመስፋፋት

ሐ)ህገ-ወጥ የሆነ የደን ጭፍጨፋ

መ)የግብርና መስፋፋትን ተከትሎ የሚመጣ የደን ጭፍጨፋ

ረ)የግጦሽ መሬትን ከመጠን በላይ መጠቀም

10. የእርስዎ የከብቶቻችሁ መኖ ምንጭ ምንድን ነው?

ሀ)የጋራ የሆነ የግጦሽ መሬት

ለ)የራሴ/የግሌ/የግጦሽ መሬት

ሐ)ሳርን በማጨድና በመሸከም

መ)ጭድና ሌሎች የምርት ቅሪቶች

ሠ)ሌሎች ካሉ እባክዎን ይዘርዝሯቸው።

_____

_____

11. የተራ ቁጥር 8መልስዎ "ሀ"ከሆነ፤ ችግሩን ለመፍታት መወሰድ ያለባቸው መፍትሄዎች ምን ምን ናቸው?

ሀ)የደንን ጥበቃና እንክብካቤ በህዝቡ ተሳትፎ አማካኝነት ማበረታታት

ለ)የደንን ጥበቃና እንክብካቤ በመንግስት ቁጥጥር ብቻ ማበረታታት

ሐ)የደንን ጥበቃና እንክብካቤ በሌሎች አጋር ተሳታፊዎች ማበረታታት

12. የተራ ቁጥር 8መልስዎ "ሐ"ከሆነ፤ የእርስዎን ተሳትፎን ያግደዋል ብለው ያስባሉን?መልስዎ "አዎ"ከሆነ እባክዎን ምክንያትዎን ይዘርዝሩልን።

_____

_____

13. ስለ የደን መውደም ምክንያቶች እውቀትና ግንዛቤ አለዎትን?

ሀ)አዎ ለ)የለኝም

14. የተራ ቁጥር 13መልስዎ "አዎ"ከሆነ፤ እባክዎን ምክንያቶቹን ይዘርዝሩልን።

15. እውቀቱንና ግንዛቤውን የት (እንዴት) አገኙት?

ሀ) በመደበኛ ትምህርት ስለተማርኩት

ለ) በሚዲያ ሲነገር ስለሰማሁ

ሐ) በኢመደበኛ ትምህርት በስልጠና አማካኝነት ስላገኘሁት

መ) ሌላ ምንጭ ካልዎት እባክዎ ይፃፉልን

16. የተራ ቁጥር 13 መልስዎ "አዎ" ከሆነ ፤ ይህ ዕውቀት ላንቱ

ሀ) ጥሩ/ጎ በዝ ተሳተፊ እንድትሆኑ አስተዋፅኦ አድርጓል

ለ) ጥሩ/ጎ በዝ ተሳታፊ እንዳትሆኑ መሰናክል ሆኗል

17. እርስዎ በቤትሁ ውስጥ ምግብን ለማብሰል የምትጠቀሙበት ነዳጅ ምንጭ ምንድነው?

ሀ) ማገዶ እንጨት ለ) ከሰል

ለ) የግብርና ምርቶች ቅሪት ሐ) ፈሳሽ ነዳጆች

ረ) ኤሌትሪክ

<u>ክፍል 3: ህብረተሰቡን ሊያነሳሱ ወይ ሊያዳክሙየ ሚችሉ ምክንያቶች</u>

<u>3.1 ህብረተሰቡ ለአሳታፊ የደን እንክብካቤ ያለውአመለካከት</u>

18. እርስዎ የትነው በደንብ የሚሳተፉት? (እባክዎን በቅደምተከተል ያስቀመጡ)

ሀ) ዉሳኔ መወሰን ለ) ችግኝ ተከላ

ሐ) አዲስ የሚበቅሉ ተክሎችን መንከባከብና መከላከል

ረ) ሌሎች ላይ ከሆነ እባክዎን ያብራሩልን

19. ተክሎችን ለመትከል ሲፈልጉ የተክሉን ዘር ወይም ፍል ማነው የሚሰጥዎ (እባክዎን በቅደምተከተል ያስቀመጡት)

ሀ) መንግስት ለ) ግለሰቦች ሐ) መንግስታዊ ያልሆኑ ድርጅቶች

መ) ሌሎች አገር ድርጅቶች ረ) ሌሎች ከሆኑ እባክዎ ይፃፉልን

20. ህብረተሰቡን አሳታፊ የሆነ የደን እንክብካቤ ደኖችን በመንከባከብና ለረዥም ጊዜ እንዲኖሩ በማድረግ ላይ ያለውን አስተዋፅኦ እርስዎ እንዴት ያዩታል?

ሀ) በጥሩ ሁኔታ ለ) በከፊል ሐ) በመጥፎ መ) በጣም መጥፎ

21. የተራ ቁጥር 20 መልስዎ "ሀ" ና "ለ" ከሆነ :- ምክንያቱ ምን ይሆን?

ሀ) ለህብረተሰቡ ስልጣንን ወይም ሐይልን ስለሚሰጥ

ለ) የኔነትንና የይመለከተኛል ወኔንና ስሜትን ስለሚፈጥር

ሐ) የደኖችን መፍረስና /መመናመን / ስለሚቀንስ

መ) አዲስ የሚያድጉ ተክሎችን ቁጥር ስለሚጨምር

ረ) የደን ውጤቶችን የመጠቀም መብታችንን ስለሚያበረታታልን

ሠ) ሌሎች ምክንያቶች ካሉ እባክዎን ይፃፉልን

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22. ደንንና የደንን ውጤቶች ማን መጠበቅ አለበት ብለው ያስባሉ/ያምናሉ (እባክዎን በቅደም ተከተል ያስቀምጡልን)

ሀ) ሁሉም ተሳታፊዎች

ለ) መንግስትና ሁሉም የደኑ ተጠቃሚዎች

ሐ) የደኑ የቅርብ ተጠቃሚዎችና ተገልጋዮች

መ) ህብረተሰቡና መንግስታዊ ያልሆኑ ድርጅቶች

ረ) ሐገር በቀል የሆኑ ተkሞች

ሠ) ሌሎች መሆን ካለባቸው እባክዎን ይፃፉልን '

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23. በዚህ ሰዓት ያለውየኢትዮጵያ የመሬት ይዞታና አስተዳደር ከደን ጥበቃና እንክብካቤ ጋር ግንኙነት አለውብለውያምናሉ?

ሀ) አዎ ለ) አላምንም

24. የተራቁጥር 13 መልስዎ "አዎ" ከሆነ፤ የመሬት ይዞታው በእርስዎ ተሳትፎ ላይ ያለውን ተፅዕኖ እንዴት ያዩታል?

ሀ) በደንብ ያበረታታል ለ) በመጠኑም ቢሆን ያበረታታል

ሐ) በደንብ (በከባዱ) ያዳክማል መ) በመጠኑም ቢሆን ያዳክማል

25. ህብረተሰቡን ያሳተፈ የደን እንክብካቤ የራሱ የሆነ ችግር አለውብለውያምናሉን?

ሀ) አዎ ለ) አላስብም

26. የተራቁጥር 25 መልስዎ "አዎ" ከሆነ፤ ዋናዋና ችግሮች ናቸው የሞትሏቸውምን ምን ናቸው?_____

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27. የ ተ ራ ቁ ጥ ር 22 መ ል ስ ዎ "አ ላ ስ ብ ም" ከ ሆ ነ ሷ ፤ ህ ብ ረ ተ ሰ ቡ ን አ ሳ ታ ፊ የ ሆ ነ የ ደ ን እ ን ክ ብ ካ ቤ የ ራ ሱ የ ሆ ነ ች ግ ር የ ለ በ ት ም ል ት ሉ ያ ስ ቻ ሏ ች ሁ ም ክ ን ያ ቶ ች ም ን ም ን ና ቸ ው?

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28. ህ ብ ረ ተ ሰ ቡ ን አ ሳ ታ ፊ የ ሆ ነ የ ደ ን እ ን ክ ብ ካ ቤ በ እ ር ስ ዎ አ ካ ባ ቢ ከ መ ጀ መ ሩ በ ፊ ት የ ነ በ ረ ው የ ደ ን ሽ ፋ ን ም ን ይ መ ስ ል ነ በ ር ?

ሀ) ት ን ሽ ሽ ፋ ን ለ) ጥ ቅ ጥ ቅ ያ ለ ሽ ፋ ን ሐ) ም ን ም ለ ው ጥ የ ለ ም

29. ህ ብ ረ ተ ሰ ቡ ን አ ሳ ታ ፊ የ ሆ ነ የ ደ ን እ ን ክ ብ ካ ቤ በ እ ር ስ ዎ አ ከ ባ ቢ ከ ጀ መ ረ ሀ ሃ ላ ያ ለ ው ን የ ደ ን ሽ ፋ ን እ ን ዴ ት ያ ዩ ታ ል ?

ሀ) በ መ ቀ ነ ስ ላ ይ ነ ው ለ) በ መ ጨ መ ር ላ ይ ነ ው

ሐ) ም ን ም ለ ው ጥ የ ለ ም

30. የ ተ ራ ቁ ጥ ር 28 እ ና 29 መ ል ስ ዎ "ሀ" ወ ይ ም "ለ" ከ ሆ ነ ፤ ዋ ና ዋ ና ም ክ ን ያ ቱ ም ን ም ን ና ቸ ው?_____

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31. ህ ብ ረ ተ ሰ ቡ ን አ ሳ ታ ፊ የ ሆ ነ የ ደ ን እ ን ክ ብ ካ ቤ ከ ጀ መ ረ በ ሃ ላ እ ር ስ ዎ ዛ ፍ ን ወ ይ ም ደ ን ን መ ጨ ፍ ጨ ፍ ዎ ን ቀ ን ሰ ዋ ል ን ?

ሀ) አ ዎ ለ) አ ል ቀ ነ ስ ኩ ም

32. የ ተ ራ ቁ ጥ ር 31 መ ል ስ ዎ "አ ዎ" ከ ሆ ነ ፤ እ ን ዴ ት ሊ ቀ ን ሱ ቻ ሉ ? እ ባ ክ ዎ ን ም ክ ን ያ ቶ ች ሁ ን ይ ፃ ፉ ል ን '

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33. የ ተ ራ ቁ ጥ ር 31 መ ል ስ ዎ "አ ል ቀ ነ ስ ኩ ም" ከ ሆ ነ ፤ ለ ም ን ይ ሆ ን ያ ል ቀ ነ ሱ ት ? እ ባ ክ ዎ ን ም ክ ን ያ ቶ ች ሁ ን ይ ፃ ፉ ል ን '

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34. ለ መ ሆ ኑ ስ ለ ደ ን ጥ ቅ ም ግ ን ዛ ቤ ና እ ው ቀ ት አ ለ ሁ ?

ሀ) አ ዎ ለ) የ ለ ኝ ም

35. የ ተ ራ ቁ ጥ ር 34 መ ል ስ ዎ "አ ዎ" ከ ሆ ነ ፤ ግ ን ዛ ቤ ው የ ር ስ ዎ ተ ሳ ት ፎ ላ ይ ም ን ተ ፅ እ ኖ አ ለ ዉ ? ሀ) በ ጣ ም ተ ሳ ታ ፊ እ ን ድ ሆ ን ረ ድ ቶ ኛ ል

ለ) ም ን ም ተ ጠ ፅ ዕ ኖ የ ለ ዉ ም

ሐ) ሌ ላ ካ ለ ዎ ት _____

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36. ህ ብ ረ ተ ሰ ቡ ን አ ሳ ታ ፊ ከ ሆ ነ የ ደ ን እ ን ክ ብ ካ ቤ ያ ገ ኙ ት ጥ ቅ ም አ ለ ን ?

ሀ) አዎ ለ)የለኝም

37. የተራ ቁጥር 36 መልስዎ ''አዎ" ከሆነ፤ ያገኙት ጥቅም ለወደፊቱ በደን እንክብካቤ ላይ እንዲሳተፉ ያበረታታሁ ይሆን ?

ሀ) በደንብ ለ) በመጠኑ ሐ) ምንም አያበረታታም

38. ህብረተሰቡን አሳታፊ የሆነ የደን እንክብካቤ ተሳታፊ ከሆኑ በሃላ የእርስዎ ሃላፊነት ምንድነው?እባክዎን በቅደም ተከተል ያስቀምጡልን '

ሀ) የዛፎችን ጭፍጨፋ መቀነስ

ለ) የእርሻ መሬቶች መስፋፋት ላይ ገደብ ማድረግ

ሐ) የግጦሽ መሬት አጠቃቀም ላይ ገደብ ማድረግ

መ) ሌሎች ካሉ እባክዎን ይዘርዝሩልን

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39. የአካባቢሁ ህብረተሰብ ደንን በመጠበቅ ላይ ያለውፍላጎት ምን ይመስላል ?

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3.2 ተቀማዊ ምክንያቶች

40. አከባቢያችሁ ላይ ደንን ለመጠበቅ የተቀቀሙተቀሞች አሉን ?

ሀ) አዎ ለ)የሉም

41. የተራ ቁጥር 40 መልስዎ ''አዎ" ከሆነ፤ ተቀሞቹ ህብረተሰቡን በማሳተፍ ላይ ያላቸውሚና ምን ይመስላል ?

ሀ) አበረታች ናቸው ለ) መስናከል /እንቅፋት /ናቸው

ሐ) ምንም ግንኙነት የላቸውም

42. ህብረተሰቡ ለደን ያለውባህላዊ እሴት ወይም እምነት ምንድን ነው?

ሀ) ደንን ከ አላስፈላጊ ጥቃት መከላከል

ለ) ደንንና የደንን ውጤት በአግባቡ መጠቀም

ሐ) ደንን በተቻለ መጠን ለግል ጥቅም ማዋል

መ) ከ ደን ጋር ምንም ዓይነት ግንኙነት የላቸውም

43. በአሁኑ ሰአት ያለውባህላዊ እሴት እና እምነት በእርስዎ ተሳትፎ ላይ ተፅዕኖ አለውን ?

አዎ ያበረታታል ለ) አዎ አያበረታታም

ሐ) ምንም ተፅዕኖ የለውም

44. ያካባቢያችሁ ህግ ና ደንብ እንዴት ይተገበራል

ሀ) እጅግ በጣም ለ)በጣም ሐ) ዝቅተኛ

መ) በጣም ዝቅተኛ

45. ያካባቢያችሁ አስተዳዳሪዎች ህግና ደንብ እንዴት ያስፈፅማሉ

ሀ) እጅግ በጣም ለ) በጣም ሐ) ዝቅተኛ

መ) በጣም ዝቅተኛ

46. የተራ ቁጥር 33 መልስዎ "አዎ" ከሆነ እባክዎን ያለውን የባህላዊ እሴትና የተሳትፎን ግንኙነት ያብራሩልን'

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3.3 ኢኮኖሚያዊ ምክንያቶች

47. የእርስዎ ዋና የገቢ ምንጭ ምንድነው?

ተራ ቁጥር	የምርት ዓይነት	ምልክት ያድርጉ
1	የሰብል ምርት	
2	የእንስሳ እርባታ	
3	በማገዶ እንጨት ሽያጭ	
4	ሌሎች ከግብርና ውጭ የሆኑ የገቢ ምንጭ	

48. ህብረተሰቡ ደንና የደን ዉጤቶች እንዴት ይከፋፈላል

ሀ) በጣም ተገቢ በሆነ ሁኔታ ለ) ተገቢ በሆነ ሁኔታ ሐ) ተገቢ ባልሆነ ሁኔታ

49. ተገቢ የሆነ ደንና የደን ዉጤቶች ከፍፍል እንዴት ይለካል

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50. የእርስዎና የቤተሰብዎ የገቢ ምንጭ በደንና በደን ውጤቶች መሰረት ያደረገ ነውን?

ሀ) ሙሉ በሙሉ ለ) በከፊል ሐ) ምንም መሰረት ያደረገ አይደለም

51. የተራ ቁጥር 50 መልስዎ "ሀ" ወይም "ለ" ከሆነ፤ ደንን በመጠበቅና በመንከባከብ ላይ ለመሳተፍ ያበረታታልን?

ሀ) በ ደ ን ብ ለ) በ ከ ፊ ል ሐ) ምን ም ኣ ያ በ ረ ታ ታ ም

52. እ ር ስ ዎ ባ ሉ በ ት አ ከ ባ ቢ ባ ለ ው ህ ብ ረ ተ ሰ ብ መ ካ ከ ል ያ ለ ው የ ገ ቢ ል ዩ ነ ት ምን ይ መ ስ ላ ል ?

ሀ) ል ዩ ነ ቱ በ ጣ ም የ ሰ ፋ ነ ው

ለ) በ ከ ፊ ል ም ቢ ሆ ን ል ዩ ነ ቱ አ ለ

ሐ) አ ን ድ ዓ ይ ነ ት /ተ መ ሳ ሳ ይ / ነ ው

53. በ ህ ብ ረ ተ ሰ ቡ መ ካ ከ ል የ ሚ ፈ ጠ ር የ ገ ቢ ል ዩ ነ ት በ ተ ሳ ት ፎ ላ ይ የ ሚ ያ መ ጣ ው ል ዩ ነ ት አ ለ ብ ለ ው ያ ምና ሉ ን ?

ሀ) አ ዎ ለ)ኣ ላ ምን ም

54. የ ተ ራ ቁ ጥ ር 53 መ ል ስ ዎ ''አ ዎ " ከ ሆ ነ ፤ እ ባ ክ ዎ ን የ ሚ ከ ተ ሉ ት ን ጥ ያ ቄ ዎ ች ይ መ ል ሱ ል ን ።

ሀ) ከ ፍ ተ ኛ ገ ቢ ያ ላ ቸ ው ሰ ዎ ች ዝ ቅ ተ ኛ ገ ቢ ካ ላ ቸ ው ሰ ዎ ች ይ ል ቅ በ ደ ን ብ ይ ሳ ተ ፋ ሉ ።

ለ) ዝ ቅ ተ ኛ ገ ቢ ያ ላ ቸ ው ሰ ዎ ች ከ ፍ ተ ኛ ገ ቢ ካ ላ ቸ ው ሰ ዎ ች ይ ል ቅ በ ደ ን ብ ይ ሳ ተ ፋ ሉ ።

ሐ) መ ካ ከ ለ ኛ ገ ቢ ያ ላ ቸ ው ሰ ዎ ች ከ ፍ ተ ኛ ና ዝ ቅ ተ ኛ ገ ቢ ካ ላ ቸ ው ሰ ዎ ች ይ ል ቅ በ ደ ን ብ ይ ሳ ተ ፋ ሉ ።

55. በ ደ ን ጥ በ ቃ ና እ ን ክ ብ ካ ቤ ላ ይ የ እ ር ስ ዎ ን ተ ሳ ት ፎ ለ ያ በ ረ ታ ቱ የ ሚ ች ሉ ምክ ን ያ ቶ ች ምን ምን ና ቸ ው?እ ባ ክ ዎ ን ከ ዋ ና ዎ ን ከ ዋ ና ው ምክ ን ያ ት ጀ ም ረ ው በ ቅ ደ ም ተ ከ ተ ል ያ ስ ቀ ም ጡ ል ን ።

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56. በ ደ ን ጥ በ ቃ ና እ ን ክ ብ ካ ቤ ላ ይ የ እ ር ስ ዎ ን ተ ሳ ት ፎ ሊ ያ ደ ክ ሙ ወ ይ ም ሊ ቀ ን ሱ የ ሚ ች ሉ ምክ ን ያ ቶ ች ምን ምን ና ቸ ው?እ ባ ክ ዎ ን ከ ዋ ና ው ምክ ን ያ ት ጀ ም ረ ው በ ቅ ደ ም ተ ከ ተ ል ያ ስ ቀ ም ጡ ል ን ። _____

ለ ቃለ መጠይቅ የተዘጋጁ ጥያቄዎች

1. ህብረተሰቡን አሳታፊ የሆነ የደን ጥበቃና እንክብካቤ በደን ተጠቃሚዎች ላይ የኔነትን ስሜት ይፈጠር ይሆን?
2. ህአየ የደን ጥና እየግለሰቦችን የበላይነት ያረጋግጥ ይሆን?
3. ህአየ የደን ጥናእ ደንን በአግባቡ ለመጠበቅ ያስችል ይሆን?
4. በውይይት ላይ የእርስዎ የወሳኝነት ስልጣን ምን ይመስላል?
5. የእርስዎ የወሳኝነት ስልጣን የተሳታፊነትሁን መጠን ይወስነዋል ብለውያስባሉ?
6. የእርስዎ ብቃት ከሌሎች አንፃር እንዴት ታዩታላችሁ?
7. የጋራ ደን ጥበቃ ላይ የወጡየአካባቢውባህላዊ ሕጎች እንዴት ነው የተዋቀሩት?
8. የአከባቢውደን እንዳይመናመን ምን ዓይነት አዲስ ቴክኖሎጂ ተለምዷል

9. በ አለፉት ሶስት የመንግስት ስርዓቶች የመሬትና የ ደን ይዞታ ምን ይመስል ነበር?

ለ ቡድን ውይይት የተዘጋጁ የ መወያያ ጥያቄዎች

1. ህብረተሰቡን አሳታፊ የሆነ የደን ጥበቃና እንክብካቤ ከ ስርዓተ - ፆታና ከሴቶች መበረታታት አንፃር እንዴት ታዩታላችሁ?ያበረታታል (ያሳትፋል)ወይስ አያበረታታም(አያሳትፍም)?
2. ህብረተሰቡን አሳታፊ ከሆነ የደን እንክብካቤና ጥባቃ ከመጀመሩ በፊትም ሆነ ሃላ አከባቢያችሁላይ የሚገኘው የደን ሽፋን ምን ይመስላል?ጨመረ ወይስ ቀነሰ?
3. ማህበረሰቡን አሳታፊ የሆነ የደን ሽፋን ና የሚያጋጥሙት መሰናክሎች ለምሳሌ ሰደድ እሳትና አስተራረስን ማቀያየር እንዴት ታዩታላችሁ?
4. የ ማህበረሰቡን ደንና የኑሮ ሁኔታን የ ሚያሰናክሉ መሰናክሎች ምን ምን ናቸው ብላችሁ ታምናላችሁ?
5. የ ተክሎችን (ዛፎችን)የ ዘር ብዛትና አዲስ የ ሚበቅሉ የ ተክል ዓይነቶች እንዲሁም ተክሎችን እንደገና ከማገገም አንፃር ማህበረሰቡን አሳታፊ የሆኑን ደንን እንዴት ያዩታል?
6. የ ማህበረሰቡን ደንና የ ተክሎችን የ ዘር ብዛት መጠን ለ መጨመር እንዲሁም የ ማህበረሰቡን የ ኑሮ ሁኔታ ለ ማሻሻል ያስችል ዘንድ መወሰድ አለባቸው ብላችሁ የ ምትገምቷቸውና የ ምታምኑባቸው እርምጃዎች ምን ምን ናቸው?

Appendix 4 Diagnosis tests

```
. vif
```

Variable	VIF	1/VIF
age	1.49	0.671937
fam_size	1.33	0.749904
educ	1.32	0.758829
dis_mkt	1.27	0.786270
dist_forest	1.24	0.804762
location	1.15	0.872115
levl_ecobe~t	1.07	0.934706
gender	1.02	0.977209
Mean VIF	1.24	

```
. pwcorr part_status age gender fam_size educ levl_ecobenfit dist_forest dis_mkt location
```

	part_s~s	age	gender	fam_size	educ	levl_e~t	dist_f~t
part_status	1.0000						
age	0.1949	1.0000					
gender	-0.1518	-0.0642	1.0000				
fam_size	0.3322	0.4688	-0.0513	1.0000			
educ	-0.0087	-0.3318	0.0100	-0.1106	1.0000		
levl_ecobe~t	-0.2796	-0.0945	-0.0199	-0.0365	0.0726	1.0000	
dist_forest	-0.4168	-0.0119	0.0980	-0.1554	-0.1297	0.1566	1.0000
dis_mkt	-0.0209	0.0052	-0.0540	-0.0176	-0.3457	0.1071	0.2841
location	0.0593	-0.0878	0.0346	-0.0180	-0.1052	-0.0661	0.2798

	dis_mkt	location
dis_mkt	1.0000	
location	0.2044	1.0000

```
. swilk r
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
r	157	0.99389	0.740	-0.686	0.75353

```
. ovtest

Ramsey RESET test using powers of the fitted values of part_status
       Ho:  model has no omitted variables
                 F(3, 145) =      2.59
                  Prob > F =      0.0554
```

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of part_status

         chi2(1)      =    6.20
         Prob > chi2  =   0.0128
```