



ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY
OFFICE OF GRADUATE STUDIES

**Factors Affecting People's Participation in Participatory Forest Management:
The Case of Hora Forest of Agarfa Woreda, Bale Zone of Oromia Regional State,
Ethiopia**

A Thesis

Submitted to the Department of Applied Biology

School of Applied Natural Sciences

**In Partial Fulfillment of the Requirements for the Degree of Masters of Science in
Biology**

By

Shewalem Tesfaye Kebede

Adama, Ethiopia

November, 2017

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APPROVAL OF BOARD OF EXAMINERS

We, the undersigned, members of the Board of Examiners of the final open defense by **Shewalem Tesfaye Kebede** have read and evaluated his thesis entitled “**Factors Affecting People’s Participation in Participatory Forest Management: The Case of Hora Forest of Agarfa District, Bale Zone of Oromia Regional State**” and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirement of the Degree of Masters of Science in Biology.

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DECLARATION

I hereby declare that this M.Sc. Thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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This is to certify that the thesis entitled “**Factors Affecting People’s Participation in Participatory Forest Management: The Case of Hora Forest of Agarfa District, Bale Zone of Oromia Regional State**” submitted in fulfillment of the requirements for the degree of Master of Science in Biology, the Graduate program of program of Applied Biology, and has been carried out by Shewalem Tesfaye, **Id.No** GSU/0411/06, under my supervision. Therefore, I recommend that the student has fulfilled the requirements and hence hereby he can submit the thesis to the department.

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ACKNOWLEDGEMENTS

First of all I would like to thank my advisor, Dr. Daniel Getahun, for his support and guidance to successfully complete this study. I also thank Agricultural and Rural Development Office and Forest and Wild Life Protection Office of Agarfa district for providing essential data which were crucial for carrying out the study.

My sincere thanks further goes to Adama Science and Technology University (ASTU) for financial support. I also thank Department of Biology for facilitating the process course study and the thesis work.

Finally, I am thankful to my brother Zelalem and my family for their help and encouragement to complete this study.

Table of Contents

Content	Page
ACKNOWLEDGEMENTS	i
List of Tables	iv
List of Figure.....	v
Appendices.....	vi
Acronyms	vii
Abstract.....	viii
1. INTRODUCTION	1
1.1 Background of the study	1
1.2. Statement of the Problem.....	4
1.3 Objectives of the study.....	4
1.3.1. General objective	4
1.3.2. Specific objectives	4
1.4. Research questions	4
1.5. Scope of the study.....	5
1.6. Limitation of the Study.....	5
2. LITERATURE REVIEW	6
2.1. Deforestation	6
2.2. Causes of Deforestation	6
2.3. Effects of Deforestation	8
2.4. Ways of Mitigating Deforestation	9
2.5. Sustainable practices of forest management and use.....	10
2.6. Participatory forest management	11
3. MATERIALS AND METHODS	14
3.1. Description of the study area	14
3.2. Research design.....	16
3.2.1. Data sources and methods of data collection	16
3.2.2. Sampling techniques and sample size	16
3.2.3. Data Analysis	17

4.1 Demographic characteristics of respondents	18
4.2 Respondents attitude towards participatory forest management	20
4.3 Benefits which the community gets from the forest	21
4.4 Compensation made for benefits obtained from the forest	21
4.5 Level of participation.....	22
4.6 Major factors that can enhance community participation in participatory forest management.	22
4.7 Major factors that can affect community participation in participatory forest management.....	23
5. DISCUSSION.....	25
6. CONCLUSION AND RECOMMENDATIONS	28
6.1 Conclusion	28
6.2 Recommendations	29
7. REFERENCES	30
APPENDICES	34

List of Tables

Table	Page
Table 1: Gender, Age and Participation Status of Respondents.....	18
Table 2: Educational level of respondents and their participation in PFM	19
Table 3: Respondents major occupation and living duration in the study area	20
Table 4: Attitude of respondents on PFM	20
Table 5 : Roles played by the community in PFM of Hora forest	21
Table 6: Benefits the community get from Hora forest.....	21
Table 7: Level of participation of respondent	22
Table 8: Source of information on deforestation.....	23
Table 9: Percentages of respondents on effect of deforestation	23
Table 10: Factors that affect communities' participation in PFM.....	24

List of Figure

Figure	Page
Figure 1: Map of the Study area	15

Appendices

Appendices	Page
Appendix A	34
Appendix B.....	39
Appendix C.....	44
Appendix D	45

Acronyms

AWARDO	Agarfa Woreda Agricultural and Rural Development Office
BERSMP	Bale Eco Region Sustainable Program
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GTZ	German Technical Cooperation
IFFN	International Forest Fire News
IPPC	Inter-Governmental Panel on Climate Change
NGOs	Non -Governmental Organizations
PFM	Participatory Forest Management
REDD	Reducing Emissions from Deforestation and Forest Degradation
SLMP	Sustainable Land Management Program
SOS	Save Our Soul
SPSS	Statistical Package for Social Scientists
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
WBI	Woody Biomass Inventory
WBISPP	Woody Biomass Inventory and Strategic Planning Project
WHO	World Health Organization

Abstract

Research on factors affecting people's participation in participatory forest management was carried out from October 2016 to August 2017 in Agarfa district, Bale zone, Oromia regional state. A Participatory Forest Management (PFM) project run by Farm Africa and SOS Sahel Ethiopia in Bale Zone is operational since 2006. Galema Hebenno and Mekonna Chefe Participatory forest management was established in 2014. Although, there was establishment of PFM, it doesn't address or solve the problem of deforestation. Thus, deforestation problem is continuing across Hora forest. The objective of this study was to investigate the factors that affect people's participation in participatory forest management of Hora forest of Galema Hebeno and Mokonna Chefe kebeles of Agarfa district. The PFM associations of these two kebeles were at first stage of participatory forest management. Institutional influences limited the participatory forest management activities in Hora Forest. Data were collected from 90 Household respondents as well as from focus group discussion of different groups and secondary data. Data were analyzed by SPSS. The study result showed that the attitude of community towards PFM was positive. The study has shown that there are different factors that affect local people's participations in forest management during the first stage of PFM. The factors that affect participation in PFM were reluctance to take measure on illegal users, lack of awareness, poverty, lack of follow up and lack of commitment. The Galema Hebenno and Mekonna Chefe PFM has weak achievements. In order to achieve this community based forest management institutional actors have to devolve their responsibilities. Stakeholders and other concerned bodies should work together to manage this natural forest to use it in sustainable ways.

Key words: Deforestation, Forest management, Sustainable, participatory

1. INTRODUCTION

1.1 Background of the study

The world's forests provide a great service and benefits to our ecosystems. Forest provides foundations for life on earth through ecological functions by regulating climate, water, and soil resources and by serving as habitats for plants and animals. (SCBD, 2001). Forests also help to maintain conditions that make life possible, from regional hydrological cycles to global climate changes. Yet, despite these benefits, forests continue to be poorly managed and indiscriminately felled. Continuous and unsustainable exploitation of this meet socio-economic need has led to deforestation, destruction of wildlife habitats as well as resource degradation and depletion (Bryant *et al.*, 1997).

Whether it is private or public property, forest is the nationally and globally mutual treasure. World forests cover 30% of the total land area (FAO, 2005; UNEP, 2007). By 2005, deforestation rate was about 13 million hectares per year. This includes 6 million of primary/frontier forests. Frontier forests are defined as “forests where there are no clearly visible indications of human activity and where ecological processes are not significantly disturbed” (UNEP, 2007).

Ethiopia loses about 141,000 hectares of natural forest each year due to firewood collection, conversion to farmland, overgrazing, and use of forest wood for building material. Ethiopia faces a difficult future, because the agricultural sector, which forms the backbone of the economy, is totally dependent on forest resources. The proportion of lost forest cover is almost the same with the size of the Sweden. The major reason behind degradation of forests is human interference (such as expansion of agricultural land, grazing, firewood) and poverty (Bedru, 2007). In 1941 Emperor Haile Selassie declared a law to privatize land and limit access to forest land. This proclamation was in operation until the (1975) Derg regime coming to power. In 1975, the Derg regime came into power with a new proclamation, nationalizing lands and putting administration of land under highly centralized system. The new rule, which is a proclamation on regulation, by Derg resulted into open access to the resource. The proclamations in the two regimes did not save the country forest resources from degradation as majority of the lost forests were destroyed in this period. In 1991, the fall of the Derg regime further devastated the forest. This is because the new government, Ethiopian People's Revolutionary Democratic Front, was not able to control the country until 1993 except in

Tigray region. Hence, during this period, nobody oversaw managing the natural resources of the country and this situation further devastated the natural forests. In 1994, the new government issued a new proclamation, which was unimplemented because of the subsequent decentralization program (Bedru Beker, 2007; Gebremdhin Alemayehu, 2008).

Ethiopia is a landlocked and predominantly agrarian country. Agriculture, including forestry, accounts for 54% of the Gross Domestic Product (GDP), employs 85% of the population, accounts for about 90% of the export and supplies over 90% of the raw materials for the agro-industries (Mo FED, 2006). Ethiopia owns diverse vegetation resources that include high forests, woodlands, bush lands, plantations, and trees outside forests. Each of these vegetation resources variously contributes to the production. Protection and conservation functions, and play significant role in the national and local economy. There are six key economic roles that forest resources play in Ethiopia: (i) foreign currency earnings, mainly from export of non-wood forest products; (ii) import Substitution for energy; (iii) contribution to the GDP; (iv) employment generation; v) livelihood support for millions of citizens, and vi) provision of environmental services that support other sectors, particularly agriculture, construction, and energy. At local level forests and trees provide food, medicine, energy, fodder, farm implement and construction materials. Upon conversion, forestlands have been offering fertile croplands to sustain crop production. When protected forests are used as rangelands, act as biological measures to conserve soil and water and provide watershed protection. Studies show that 90% of the energy used in Ethiopia originates from biomass, and nearly 80% of human and 90% of livestock populations in Ethiopia depend on traditional herbal medicine for primary health care (WHO, 2002).FAO (2002) estimated that Ethiopia's fuel wood consumption amounts to 84 million m³ per year. Ethiopia's forest cover was 15.11million hectares in 1990 and declined to 12.2 million hectares in 2010 which resulted in a loss of 2.65% of forest to deforestation. Between 1990 and 2010, Ethiopia lost on average about 140,900 ha or 0.93% per year and totally between 1990 and 2010, Ethiopia lost 8.6% or around 2,818,000 hectares of its forest covers (FAO, 2010).

Deforestation is a form of environmental degradation which involves the conversion of forest to bare land; the degradation that reduces forest quality in terms of the density and structure of the trees: the ecological services supplied, the biomass of plants and animals, the species diversity and the genetic diversity (FAO, 2007). Participatory forest management is a forest management system that was

introduced as a complementary mechanism which safeguards forests, while respecting traditional users and including them in the process. The designs, names, and ideas of PFM (Participatory forest management) are as various as the number of implementers all over the world. However, the general and common component is the focus on community participation in forest management. This includes agreeing with government institutions or landowners on management plans and the sharing of responsibilities, costs and benefits between a given community and landowners. It is most often introduced by external factors, such as Non-Governmental Organizations (NGOs) or government organs. PFM is recommended to contribute to improved food security and poverty reduction (PFM WG, 2010).

Nevertheless, PFM has often been criticized for not offering communities with enough revenue to get out of poverty, as it is usually designed with the main purpose of protecting forests. The social benefits of a successful PFM implementation include not only revenue sharing, but also the building of an effective and just local governance as well as democratization. In the process of introduction and implementation, the relations between several stakeholders improve as they must agree on common outputs. Social interactions that are important for effective PFM implementation are: empowerment; involvement; negotiation and collective decision making (Kelbessa and De Stoop, 2007).

Accordingly, in 2007 the Oromia Forest Supervising Agency was established to coordinate the establishment of eight forest enterprises across the region. These enterprises are mainly aimed at capturing and merging the effort of community based forest management and government owned projects (FARM/SOS, 2008). International NGOs like the German Technical Cooperation (GTZ) and FARM Africa implement the community based forest programs in the region in collaboration with the national regional government. GTZ is the first international NGO to implement this program in the region (Adaba-Dodola area in Bale zone) in the late 1990s. The FARM/SOS Participatory Forest Management (PFM) program has been operational in Ethiopia since 2002 in the forest of Bonga, Chilimo, Borana and Bale (Alemtsehay Jima, 2010). The outcome of this program has turned out to be a success in some of the projects and a failure in others (FARM/SOS, 2008).

The aim of this study was to identify factors affecting people's participation in PFM Galema Hebeno and Mekonna Chefe peasant associations of Agarfa District in Bale Zone, Oromia Regional State.

1.2. Statement of the Problem

In 1995 alone 32,000 hectares of forestland was converted to agricultural land in the Oromia regional state. The loss between 2000 and 2010 is estimated to be more than 8.7%. It is further estimated that between 1990 and 2020, the region could lose 27% of its high forest resources from agricultural expansion (Oromia State Forest Enterprise Supervising Agency, 2007).

According to Dudley (2009) the average annual deforestation rate from 2001 to 2009 in Bale eco-regions was 3.44%, which ranges from 1 to 8%. In related manner, according to preliminary study of REDD+ project of 2014 between 2000 and 2011, Bale Mountain ecoregion project area experienced annual deforestation which ranges from 1.1% to 6.6%, depending on the forest type and agricultural frontier expansion and the entire eco region have an average rate of 3.7%.

From field observation in Hora forest of Galema Hebeno and Mokonna Chefe kebeles of Agarfa district there is high rate of deforestation and its associated effects (socio-economic and environmental impacts) have becoming a threaten issues.

1.3 Objectives of the study

1.3.1. General objective

The general objective of this study was to investigate the factors that affect participatory forest management of Hora forest of Galema Hebeno and Mokonna Chefe kebeles of Agarfa district.

1.3.2. Specific objectives

1. To explore the attitude of the community surrounding the forest towards PFM
2. To explore the activities of members of Galema Hebeno and Mekonna Chefe participatory forest management.
3. To identify the major challenges that affect community participatory forest management activity in the study area.

1.4. Research questions

The finding of the study tries to answer the following research questions

1. What is the willingness of Galema Hebeno and Mokonna Chefe PFM members towards participatory forest management?
2. What are the roles of participatory forest management practiced in the study area?
3. What are the major factors that enhance community participation to implement PFM in Hora forest?
4. What are the major factors that can affect community participation in PFM in Hora forest?
5. What are the benefits of community from Hora forest?

1.5. Scope of the study

The study was delimited to Hora forest of Galema Hebeno and Mokonna Chefe kebeles of Agarfa district, Bale zone, Oromia Regional state, Ethiopia. The study was carried to identify factors that develop and affect people's participation in participatory forest management in the study area.

1.6. Limitation of the Study

In this study, it was difficult to get basic information easily during data gathering, because, some of the respondents didn't give value for questionnaire and some of them have been in the tight work. Some were not willing to fill and return on time. The lack of internet access and transportation was another major challenging problem that encountered the investigator.

2. LITERATURE REVIEW

2.1. Deforestation

Deforestation is a global environmental problem and has been defined by different bodies. Deforestation is the felling and clearing of forest cover or tree plantations for the purpose of agricultural, industrial or urban uses. It is the removal of trees without sufficient reforestation and usually results in a significant loss of biodiversity (FAO, 2007). In related manner, deforestation is considered as the permanent destruction of forests to make the land available for other uses. The Inter-Governmental Panel on Climate Change (2000) defines deforestation as the conversion of forest land to non-forest land. Deforestation considered as the clearance or destruction of any amount of forest cover or woodlands. It is the complete long-term removal or loss of forest cover (Angelsen *et al.*, 1999).

A recent Forest Resources Assessment estimated that the global forest cover is 30% of total land area of the world. The leading forest-rich countries are the Russian Federation, Brazil, Canada, the United States of America and China which account for more than half of the entire forest area of World. Some countries of the world have no forest at all and 54 countries have forest less than 10 percent of the total land area. Accordingly, deforestation is the conversion of forests to non-forest areas. The report indicated that there are signs of decreasing in several countries but continues at a high rate in others. Around 13 million hectares of world forest were converted to other uses or lost through natural causes each year in the last decade compared to 16 million hectares per year in the 1990s (FAO, 2010).

2.2. Causes of Deforestation

Forests are cut down for many reasons, but most of them are related to livelihood activities such as agricultural expansion and fire wood collection. To fulfill the overgrowing demand for food products and for livestock production, farmers deforest the forest by cutting down trees and by burning them. Agricultural land expansion is the source of deforestation. Shifting agriculture which also called slash and burn agriculture is the clearing of forested land for growing the crops until the soil is exhausted of nutrients and/or the site is overtaken by weeds and then moving on to clear more forest. It is being considered as the main agent of deforestation (Ross, 1996).

Wood based industries like paper, match-sticks, furniture, and others need a substantial amount of wood supply. Wood is used as fuel both directly and indirectly, therefore, trees are chopped for supplies. Firewood and charcoal are examples of wood being used as fuel. Some of these industries thrive on illegal wood cutting and felling of trees. Large amount of forest of Ethiopia is being wasted through agricultural purposes or wasted through unimproved logging and charcoal production (Chomitz *et al.*, 2007).

According to (Bishaw Badage, 2003), increment of population have pressure on the land and have resulted in extensive forest clearing for agricultural use, overgrazing, and exploitation of existing forests for fuel wood, fodder, and construction materials. In the same way, as population in cities and towns increases; cities and towns require land to establish the infrastructures necessary to support growing population and are done by clearing the forests (Mather, 1991). According to (Kaimowitz *et al.*, 1998) tropical forests are areas in which infra-structure developments for oil exploitation, logging concessions or hydropower dam construction is carried out. The construction of roads, railways, bridges, and airports opens up the land to development and brings increasing numbers of people to the forest frontier. In order to gain access to forest, the constructions of roads are undertaken; here trees are chopped to create roads. Overpopulation also need more land to establish housing and settlements.

Together with population increase, there has been a widespread falling of timber and forest clearance for the purpose of fuel. According to (FAO, 2007) almost half of the total wood forest product is consumed as fuel wood and the rest half are consumed in industrial and other constructional purposes. In the same manner, (UNFCCC, 2001), indicated that traditional biomass fuel such as woody biomass, agricultural residue; charcoal and dung are the dominant energy sources of Ethiopia which result in disappearance of the forest.

Many trees are lost each year due to forest fires in various portions of the world. This happens due to extreme warm summers and milder winters. Fires, whether caused by man or nature results in huge loss of forest cover. Deforestation due to forest fire is caused by both natural phenomenon and deliberate human action. Forest fire destroys hundreds of thousands of hectares of forest land each year. The largest forest fire in Ethiopia occurred in 2000 in the Bale and Borana Zones which destroyed over 150,000 hectares of natural forests and coffee stands, wild and domestic animals,

traditional beehives, harvested coffee and maize, local houses and traditional grain storage facilities (IFFN, 2000).

In general, Ethiopian Biodiversity and tropical forests assessment (2008) classified forest in to direct and indirect causes. The direct causes are the use of forest for production charcoal and timber. The indirect causes are the lack of management capacity and population pressures. Although there is deforestation all over the world, the rate, extent and purposes of deforestation vary from country to country, particularly between developed and developing countries.

2.3. Effects of Deforestation

Deforestation contributes to global warming by increasing atmospheric concentrations of greenhouse gases, by increasing the concentration of carbon dioxide in the atmosphere (Pinker, 1980). Tropical deforestation is responsible for the emission of roughly two billion tons of carbon dioxide to the atmosphere per year (Houghton, 2005)

The global water cycle is affected by deforestation (Bruijnzeel, 2000). Trees extract groundwater through their roots and release it into the atmosphere. When part of a forest is removed, the trees no longer evaporate away this water, resulting in a much drier climate. Deforestation reduces the content of water in the soil and groundwater as well as atmospheric moisture.

Forests serve as store houses of biodiversity but deforestation, fragmentation and degradation destroys the biodiversity as a whole and habitat for migratory species including the endangered species. When forest cover is removed, wildlife is deprived of habitat and becomes more vulnerable to risk and hence, deforestation puts at risk a majority of the Earth's biodiversity (Myers and Mittermeier, 2000).

The impacts of deforestation are complex and widespread. Not only result in reduces forest communities but also have contributions to national economic growth. More critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country (Acheampong and Marfo, 2011). Many people rely directly on forests, through small-scale agriculture, hunting and gathering, and harvesting forest products and medicinal uses. Forest communities often have to travel further distances into the forest to access products that sustain their food security and socio economic well-being (Bosu *et al.*, 2010).

Deforestation reduces soil cohesion, so that erosion, run off, flooding and landslides will occur. Soil erosion can lead to silt entering the lakes, streams, and other water sources. This can decrease local water quality; contributing to poor health in the local population. These factors can have adverse effects on local economies. Increased flooding, lack of quality water, and inability to produce their own food causes many locals migrate to cities that lack infrastructure for them. Or, they work on plantations, worsening the deforestation problem and subjected to inhuman working conditions (Van Noordwijk *et al.*, 2006).

2.4. Ways of Mitigating Deforestation

Ways of mitigating deforestation go hand in hand with improving the welfare of cultivators at the forest frontier. This means all forest frontier forest parts should be communally involved in planning, management and profit sharing. Much of the world's tropical forest are state owned but community participation in forest ownership and management needs to be encouraged with restrictions on extraction and conversion (Chomitz K. *et al.*, 2007).

Moreover, effective implementation mitigation strategies require active stakeholder participation, development of management plans, monitoring and enforcement. The major ways of mitigating deforestation are:-

Family Planning and increase incomes: Family planning and increasing incomes contributes for reducing deforestation in the developing countries. Reduction of population number, generating alternative incomes and increments of literacy rates will reduce pressure on the remaining forests for new human settlement and land use change. In Ethiopia, Population growth continues from earlier time up to present. As human numbers increased, the population carrying capacity of the environment decreased. High population growth rates provoke demand for resources and the rate at which these resources are exploited (National Population Policy of Ethiopia, 1993).Improvements to reduce the growth of population and an appropriate population policy aimed at reducing fertility have to be emphasized (Markos, 1990).

Afforestation and Reforestation: Plantation has a curative and protective value for the country. To restore or regain the land carefully planned and efficiently administered afforestation and reforestation is necessary. (Girma, 1988) as cited by (Sumit *et al.*, 2012) shows that "The most important measure to restore the disturbed rural ecology is the implementation of afforestation and

reforestation on a scale large enough to cope with the problems of soil erosion and water wastage". Successful implementation of afforestation and reforestation needs effective participation of pressure groups in the community or involves existing local groups, nurseries in villages, planting and protecting multipurpose trees, different areas and support by different means (Postel and Heise, 1988). Reducing emissions from deforestation and forest degradation: Chomitz K. *et al.*, 2007 stated that different international organizations including the United Nations and the World Bank begun to develop programs to curb deforestation mainly through Reducing Emissions from Deforestation and Forest Degradation (REDD) which use direct monetary or other incentives to encourage developing countries to limit and/or roll back deforestation.

Increase investment in research and education: Training and education of stakeholder's helps the people to understand how to prevent and reduce environmental effects associated with deforestation and forestry activities and take measures when possible. Research on the other hand helps to understand the problem, its cause and ways of mitigating the problem. Research helps to understand ways to generate funds and how an investment encourages the strategies. It helps to know the gap of knowledge and information in community about forests and forestry and helps to see the complexity of interacting ecological, economic, social, cultural and political factors involved (Sumit *et al.*, 2012).

2.5. Sustainable practices of forest management and use

Sustainable management practices can ensure that productive or multipurpose forests continue to store carbon and maintain their capacity to provide other goods and services for the benefit of current and future generations. Management practices need to be actively planned, tailored to each specific ecosystem and evolving situations, to avoid overexploitation and forest degradation. Forest management plans and practices will also need to be adapted to modifications caused by climate change, both gradual and abrupt. Adaptive forest management will be essential to address arising challenges and reduce forest vulnerability. Adaptation measures might include, for example, selection of pest resistant or drought tolerant varieties; use of stocks from a range of provenances, under planting of genotypes of species adapted to expected new climate conditions, or assisted natural regeneration of functional species. The measures need to be adapted to forest condition (primary, secondary, degraded) and the specific site (FAO, 2010).

2.6. Participatory forest management

According to Deressa Shime, (2014), there are various definitions given to participatory forest management among different scholars. Hobley, (2005), expressed the term participatory Forest Management (PFM) was used as an umbrella term to include shared forest management, joint forest managements, collaborative forest management and community forestry, Community based forest management. According to Weinberg (2010) Participatory Forest Management (PFM) is a mechanism to protect forests and enhance the livelihoods of communities who use and benefit from them in the process. PFM is used as a broad term to describe systems in which communities (forest users) and government services work together to define rights of forest use, to develop ways of sharing management responsibilities, and to agree how to divide forest benefits. PFM refers to the legal empowerment of local communities to manage forest resources for, in the first instance, their sustained livelihoods, and in the second instance, conservation values (Zelalem Temesgen, 2005). Borrini-Feyerabend, G. (2000) defines PFM as a ‘situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources’. Participatory approaches to natural resource management encompass ideas about the desirability of citizens actively engaging in the institutions, policies and discourses that shape their access to resources. Through participation in collective resource management it is claimed that people can re-negotiate norms, challenge inequalities, claim their rights and extend their access (Cleaver, 2007).

Empowering Civil Society for Participatory Forest Management in East Africa (2009) defines participatory forest management as Participatory forest management is a term understood to refer to all forest management approaches where all stakeholders actively take part in forest management to attain sustainable forest management. Participatory Forest Management is about working together (collective action). It calls for respecting each other as equal partners or stakeholders doing work for the same purpose. Participatory forest management includes many forms of partnership. The first one is collaborative forest management in which the community cooperate with the government. The second one is joint forest management in which the community lead agency and the community take over the duty of conservation of forest (Lawrence, A. and Green, K. 2008). FARM/SOS, (2008:34) defines participatory forest management as “a system in which the communities (forest users and managers) and government services (forest department) work together to define rights of

forest resource use, identify and develop forest resource responsibilities, and agree on how forest benefits will be shared.” For this study, PFM is operationalized to mean the definition given by FARM/SOS.

The main objectives of the program (PFM in Bale) are sustainable management of resource and improving the livelihoods of the community. To attain these objectives the PFM approach passes through three stages. The first is investigation stage. There are three main activities in this stage: set up of forest management group, participatory assessment of forest resource and finally the assessment of forest based livelihood potentials. The second stage is negotiation. The community forest management group and the government (the Bale forest enterprise in this case) reached an agreement on the forest management planning. The last stage is implementation, where the forest management plan is put into operation (Zelalem *et al.*, 2007).

Farm Africa pioneered the introduction of PFM in Ethiopia in the mid -1990s in partnership with local NGO SOS Sahel Ethiopia and along with other agencies such as the German development agency GIZ (then GTZ). The approach was born from a workshop in 1994 designed to raise awareness of deteriorating forest conditions and share experiences from Southeast Asia where involving local communities in forest management was being rolled out with some success. In the same year, Farm Africa and SOS Sahel organized a study tour to India for Ethiopian government forestry experts to witness the success of government/community partnerships on the ground. Farm Africa/SoS Sahel in 1995 launched Ethiopia’s first pilot project by in Chilimo and Bonga. A Participatory Forest Management project run by Farm Africa and SOS Sahel Ethiopia in Bale region is operational since 2006 (Alemtsehay Jima,2010). Subsequently, several other organizations began pilots of their own. These trials demonstrated the potential of the approach in diverse forest types and socio-economic settings and served as basis for scaling up and policy recognition. The Oromia Regional State became the first to officially recognize PFM in 2000, by forging formal agreements with communities. The pilot phase demonstrated how PFM projects could be implemented successfully and showed the potential of the approach for positive impacts on forest conditions and rural livelihoods. Trust in communities’ accountability and ability to manage forests grew and broad recognition and acceptance of the approach increased systematically at all levels of government. Since 2000, other development partners joined the initiative, and the geographical coverage of forest area under PFM increased substantially. Today PFM is formally recognized in forest proclamations

of Ethiopia's Federal Government and several regional states. The approach has expanded significantly. Our own data suggests that nearly 40% of the country's forest resources are now under some form of PFM, although Weinberg (2010) is more cautious. The government is committed to taking the approach to scale and, through the Ministry of Agriculture (MoA), is currently implementing two large PFM projects. Farm Africa PFM Project, supported by EU, covers 254,000 hectares of forest in four regional states. GIZ is integrating PFM into the government's Sustainable Land Management Program (SLMP) through a program called PFM-SLM, working in forests in and adjacent to water shades in three regional states. The formal harmonization of the approach across actors and programs in the evolution of PFM in Ethiopia.

3. MATERIALS AND METHODS

3.1. Description of the study area

Hora forest is found in the Oromia Regional State of Ethiopia of Bale Zone, Agarfa district. Agarfa district is found at a distance of 31 km from Zonal city, Bale Robe, and 463 km. from Addis Ababa. Agarfa is the capital town of the district. The study area is found at about 12 km. from Agarfa town (Fig.1). Agarfa district falls between Latitude 7°21'12''N and Longitude 39° 54'22''E. It is located around the border of Arsi zone following the rugged and broken terrain of Wabe Gorge. It is found in the extreme Northwestern Corner of the zone, which is bounded by Shirka district of Arsi zone in the North, West Arsi zone of Adaba district in southwest, Dinsho district in south, Sinana district in southeast and Gasera district in Northeast. The total area of the district is 1,343 km² (134,300 ha) which ranked the 15th largest districts among the 18 zonal district. Presently the forest coverage of the district is declined due to clearing of trees for the expansion of farmland, fuel woods, construction purposes and the like. Of the total area of the district, about 5725.71 hectares is covered by vegetation of which 2339 hectare (40.8%) are natural vegetation (AWARDO, 2016).

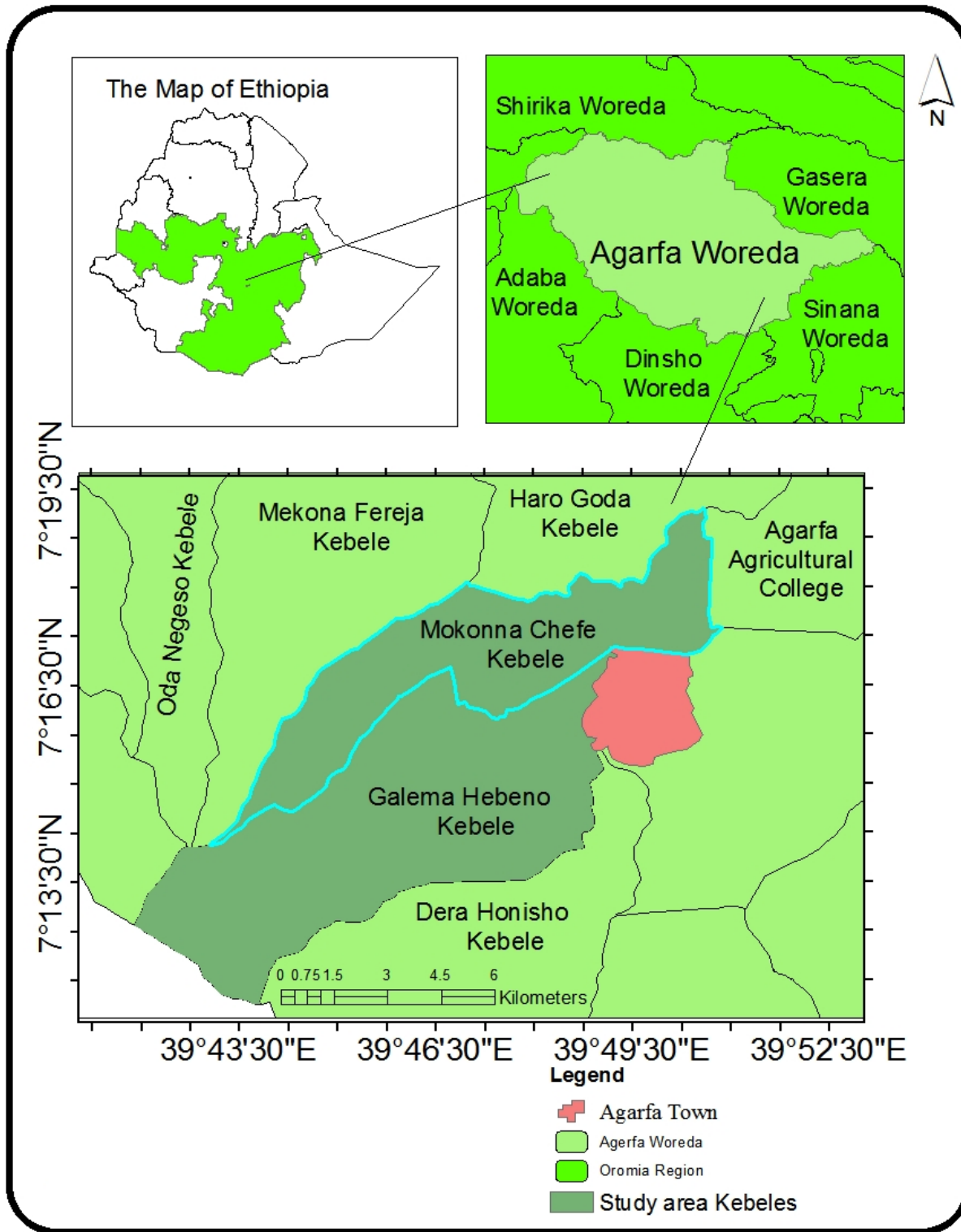


Figure 1: Map of the Study area

Source: Ethio GIS

3.2. Research design

The study was employed qualitative research approach. Thus, the qualitative research approach was employed in order to quantify results

3.2.1. Data sources and methods of data collection

Both primary and secondary data were used to collect information. The primary data sources include sample respondents, key informants and focus group discussion. Data collection instruments include questionnaire, interview and focus group discussion. The secondary data were collected from different unpublished sources such as, annual reports, and written documents of Agarfa district Agriculture and Rural Development office.

3.2.2. Sampling techniques and sample size

To study the factors which affect participatory forest management in Galema Hebeno and Mokonna Chefe of Agarfa district focus group discussion, semi-structured questionnaires and interviews with key informants were used. Agarfa district has six kebele administrations in which participatory forest management activity was practiced. Galema Hebeno and Mokonna Chefe kebele administrations were selected purposely based on the problems existing in the area. The number of households in two kebele administrations were 768 male households, 162 female households and totally 930 households. Sample size was determined based on Slovin`s (1960) formula.

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

Where: n = sample size

N = size of the target population

e = margins of error (alpha level) = 0.10

Therefore, the desired sample is;

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

$$930/1+930 (0.10)^2= 90.29$$

The minimum estimated sample 90.29

From 930 households 761 males, 120 females and total of 881 households participate on PFM activity. From these participants' 59 males, 11 females and a total of 70 households and 7 males, 13 females from who did not participate in PFM, and in total 90 households were selected as a sample. Two focus group discussions were conducted with 10 local kebele authorities from two kebeles, 4 elders, 2 developmental agents and 3 agricultural experts at each kebele of Agarfa district. The respondents from the members of PFM participants

were selected by simple random sampling technique from their list and participants from non PFM members and focus discussion members were selected purposely. Data collectors who have good experiences on data collection, especially in related study areas were trained to assist the researcher in collecting the data. The data were collected in Afan Oromo language and then interpreted to English before analysis.

3.2.3. Data Analysis

The study was employed using qualitative analysis techniques. Upon the completion of the data collection, the data were coded, edited, and entered into the statistical package SPSS version 20.0 and were analyzed using descriptive statistics. Frequencies, percentages and results were presented using tables.

4. RESULTS

4.1 Demographic characteristics of respondents

The total numbers of informants incorporated in this study were males 66, females 24 and totally 90 members and non-members of respondents were taken. All the respondents were from the rural area of Agarfa district.

Table 1 presents the demographic characteristics of households in the study area by their participation status in participatory forest management (PFM). From 90 respondents 77.8% (n= 70), males 59, females 11 were members of PFM and 22.2 % (20), males 7, females 13 were not members. About 73.3% (66) of the respondents were males and 26.7% (24) were females.

With regard to age variation about 81.1% (73) of the respondents were aged over 40 years and the rest 18.9% (17) of the respondents were below 40 years. About 84.3% (59) of male respondents reported that have participation in PFM whereas 15.7% (11) of female respondents said that have participation in PFM (Table 1). Even though all the age group contributed a lot in participating in PFM, those who were aged over 40 took the largest lion share (Table 1).

Table 1: Gender, Age and Participation Status of Respondents

Category	Total No of respondents		Members of PFM		Nonmembers of PFM	
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)
Gender						
Male	66	73.3	59	84.3	7	35
Female	24	26.7	11	15.7	13	65
Total	90	100	70	100	20	100
Age						
21 – 30	3	3.3	2	2.9	1	5
31 – 40	14	15.6	12	17.1	2	10
41 – 50	32	35.6	22	31.4	9	45
51 – 60	29	32.2	24	34.3	6	30
Above 60	12	13.3	10	14.3	2	10
Total	90	100	70	100	20	100

Around 79% (71) of the respondents education level were below grade 5 and 21.1% (19) of the respondents were educated between grade 5 and grade 12 (Table 2). With regard to participants of PFM 77.1 %(54) were educated below grade 5.

Table 2: Educational level of respondents and their participation in PFM

Education level	Total No number of respondents		Members of PFM		Nonmembers of PFM	
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)
Have not attended school	30	33.33	23	32.9	6	30
Read and write	21	23.33	16	22.8	4	20
Grade 1-4	20	22.22	15	21.4	7	35
Grade 5-8	7	7.8	7	10	0	0
Grade 9-10	4	4.44	3	4.3	1	5
Grade 11-12	8	8.9	6	8.6	2	10
Higher Education	0	0	0	0	0	0
Total	90	100	70	100	20	100

From the whole respondents 82.2% (74) have been living in the area for more than ten years and 17.8% (16) of the respondents have been living for less than ten years (Table 3).

About 90 % (81) respondent's occupation were mixed farming and 10% (9) of the respondent's livelihood were laborers and petty trading or small business (Table 3).

Table 3: Respondents major occupation and living duration in the study area

Characteristics of respondents		Number of respondents	Percent (%)
How long did you live here?	1-5 years	6	6.7
	6-10 years	10	11.1
	11-15 years	19	21.1
	Above 16 years	55	61.1
Total		90	100
Major occupation of the house holds	Crop farming only	0	0
	Livestock only	0	0
	Mixed farming	81	90
	Petty Trading	9	10
Total		90	100

4.2 Respondents attitude towards participatory forest management

The attitude of respondents towards PFM is shown in Table 4. About 40% (36) of the respondents mentioned that PFM is very important. Those who replied it is somewhat important were 60% (54). No one replied it is not important.

Table 4: **Attitude of respondents on PFM**

Respondents' attitude towards PFM	Number of respondents	Percent
It is very important	36	40
It is somewhat important	54	60
It is not important	0	0.0
Total	90	100

As it is shown in the Table 5 to identify the roles played by the community in PFM participate in decision making 43.33% (39), few of the respondents participated in nursery, plating tree seedling, awareness creation and protection of existing trees.

Table 5 : Roles played by the community in PFM of Hora forest

Roles played by community	Number of respondents	Percent (%)
Awareness creation	13	14.44
Decision making	39	43.33
Nursery	18	20
Plantation of tree	11	12.22
Protection of existing tree	9	10
Total	90	100

4.3 Benefits which the community gets from the forest

There are many factors that can be taken as reasons to participate in forest management activity. As it has been shown in Table 6 all of the respondents have got benefit from Hora forest. The respondents listed physical benefits they have got from the forest like fire wood, agricultural tools, house and fence construction materials, and medicine and honey production. It is possible to see all the 67.16% (90) sample respondents use fire wood. The second type of benefits 17.91% (24) respondents replied agricultural tools.

Table 6: Benefits the community get from Hora forest

Benefits	Number of respondents	Percent (%)
Fire wood	90	67.16
Building materials	5	3.73
Agricultural tools	24	17.91
Honey production	9	6.72
Medicinal plants	6	4.48
Total	134	100

4.4 Compensation made for benefits obtained from the forest

According to the survey result whether they made payment for the benefit they get or not, all of them replied that they did not made payment. Discussion with participants of the study area

explained that their PFM was in first stage. Their PFM did not start to operate normally as the in accordance with its objectives.

4.5 Level of participation

Table 7 presents the level of participation in decision making about forest management issues. Majority of them that is 55.6% (50) participation was well. About 44.4% (40) participation was not satisfactory.

Table 7: Level of participation of respondent

Participation in decision making about forest management	Number of respondents	Percent (%)
Always	12	13.33
Usually	18	20
Often	20	22.22
Few times	21	23.33
Not at all	19	21.11
Total	90	100

4.6 Major factors that can enhance community participation in participatory forest management.

With regarding knowing effects of deforestation 100% or all members of PFM and non-members of participatory forest management have knowledge about direct and indirect use of forest and the effect of deforestation. The results of question asked about the information source and participation of participatory forest management indicated that developmental agents 51.1% (46), play a great role in conveying information about direct and indirect use of forest by all respondents. Next to developmental agents media 37.8% (34), play a great role in transmitting information about forest direct and indirect use (Table8). Agricultural experts have low access to transmit information since they are institutional actors there is absence of day to day communication. The respondents were asked

whether they know effects of deforestation. They indicated that climate change 50% (45), wild life migration 30% (27) and soil erosion are some of the effects of deforestation (Table 9).

Table 8: Source of information on deforestation

Source of information on deforestation effect	Count	Percent (%)
Development Agent	46	51.1
Agricultural Expert	10	11.1
Media	34	37.8
Total	90	100

Table 9: Percentages of respondents on effect of deforestation

Effects of deforestation	Count	Percent (%)
Climate change	45	50
Soil erosion	18	20
Wild life migration	27	30
Total	90	100

4.7 Major factors that can affect community participation in participatory forest management

When I made discussion with FGDs one person explained that he has a fear to Hora forest the fate of Lajo Birbirsa natural forest by now which already changed into agricultural farm land in neighboring Adaba District. In addition to this from discussion result the status of Hora forest is decreasing due to affecting factors (Table 10).

The respondents listed factors affecting community participation in participatory forest management in the study area. The following major factors that are poverty, lack of awareness, lack of institutional actors follow up, lack of incentive, lack of commitment and reluctant to take measure on illegal users.

Table 10: Factors that affect communities' participation in PFM

Factors affecting participation	Number of respondents	Percent
Reluctant to take measures on illegals	9	10
Lack of awareness	18	20
Lack of commitment	14	15.6
Lack of institutional follow up	13	14.4
Lack of incentives	12	13.3
Poverty	24	26.7
Total	90	100

5. DISCUSSION

The result of this study showed that there was positive attitude towards participation in participatory forest management. The reason for positive attitudes are the devolution of power to manage forest which creates the sense of ownership and awareness given at the establishment of PFM.

The study indicated that the two kebeles Participatory Forest Management were in the first stage of Participatory Forest Management. Since the initial stage activities are limited due to the institutional actors influence (NGOs, Agricultural and Rural Development Office, Cooperative promotion and Development Office). Similarly, Alemtsehay Jima (2010) indicated that the participatory forest management has three stages. The first stage is investigation stage. There are three main activities in this stage: set up of forest management group, participatory assessment of forest resource and finally the assessment of forest based livelihood potentials. The second stage is negotiation. The community forest management group and the government reached an agreement on the forest management planning. The last stage is implementation, where the forest management plan is put into operation. The investigative stages takes a lot of time to implement.

According to this study concerning participation the result showed the need to enhance female participation. Because when we compare non participatory members, female numbers exceeds male nonmembers. On the other hand in the study area respondents have listed out the main activities of participants. Even though, their participatory forest management was at the investigative stage they participate in activities they negotiate to do. These are collection of forest products such as fire wood, agricultural tool /equipment/, construction materials, honey production and medicinal plants. From these activities response with high percent was fire wood collection. In similar study Alemtsehay Jima (2010) reported that fire wood collection created by the demand of firewood in the nearby markets highly influences community decision whether or not to sell firewood. The use of forest resources in Goba district is regulated by open access. The resources are highly exploited due to the high market demand for firewood in the nearby markets. The same thing is true for the study area that the demand of fire wood is high due to nearby market demand of district town, another two towns and surrounding kebeles. In the long term this activity would have effect on potential of forest unless another energy sources of access supplied.

As mentioned previously the influence of institutional actors result in Galema Hebeno and Mekonna Chefe PFM association were not functional successfully from those activities have listed out by respondents activities like protection, voluntary nursery development and planting tree were performed in small percentages . So these will affect the aim of PFM to protect forest in sustainable condition. According to Himberg (2009) reveals that voluntary tree planting and nursery activities were also among activities mentioned in participatory forest management in Kenya.

In the study area, PFM members were accessed information and knowledge on deforestation. More information was accessed from development agents since they have day to day contact of community more than potential stakeholders. This shows the gap between PFM association and district experts, cooperative promotion and development office, agricultural and rural development office, forest and natural resource management office and other stakeholders. As the result of relationship gap among potential stakeholders and PFM association and surrounding community created lack of awareness that leads activities going on in disturbing forest sustainability which have a great impact on climate change. Teferi Degeti, (2003), reveals that understanding the importance of forest and the effect of destruction are the major factor that encouraged to participate in PFM. Next to development agent many respondents have got information from media .This indicates the role of media in natural resource management. Besides practical measures that has been taken by government educating peoples through media has to be the great concern for the future to create more understanding on the issue.

Factors that can be affect the participation in participatory forest management could be different in different participatory forest management applied areas. Many scholars' of our country and foreigners study about challenges of participatory forest management. The study result shows the major factors that can enhance participation in PFM, if awareness creation present, illegal collector of forest products are exposed and be in front of law, follow up from concerned body accessed, income initiation and training given to them enhance their participation. According to Teferi Degeti, (2003) besides the owner ship right the most engine in initiating people to forest management are the benefit they have granted, awareness of people to the advantage of the existing forest and disadvantage of its destruction. On the other hand, if all these are satisfied but if they are not accountable to the resource by the law, many problems will come to rise. They themselves could use

the forest unwisely. Unless these illegals exposed and became in front of law other members will demotivated.

According to (Himer *et al.*, 2009), increased education on conservation issue and growing awareness among the factors that enhance participation in participatory forest management in his research conducted the case of Taita Hills, Kenya

In the study area, factors like reluctant to take measures on illegal forest product collectors, lack of awareness, lack of commitment, lack of follow up, lack of incentives and poverty are among the major factors that affect participation in PFM. Similarly, Deressa Shime, (2014) reveals that poverty often pushed members to focus on short term benefit rather than long term ones which would have been generated from community forest management. (Habtemariam *et al.*, 2009) have also reported similar finding in his study around Chilmo forest. Similar study conducted in South East Asia depicted that poverty cause's high forest dependent community member (Oliver Springate & Blaikie, 2007).

In this study another finding is lack of commitment for what they agree to perform in their decision making process. According to Deressa Shime, (2014) the members livelihood dependency (such as for income) on forest affect their levels of commitment in participating to implement participatory forest management activities. According to the FDRE Forest Proclamation No. 542/2007 income generation from natural forest is prohibited. In addition to this law, Oromia regional state forest proclamation no 72/2003 stated that any person who committed the act of damaging legally protected trees such as *Junipers procera*, *Podocarpus falcatus*, *Olea europaea*, *Hagenia abyssinica* shall be penalized with five to fifteen years of arrest. But in the study area, reluctant to take measures on illegal forest product collectors seen widely in community and unwilling to expose these illegal cutters.

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Participatory Forest Management has been adopted as an alternative approach since 1970s in the world. The objectives of PFM were reducing forest degradation on one hand and improving the living condition of the society in and around the forests on the other. The study has shown that there are different factors that affect local people's participations in forest management during the first stage of PFM, there was no or little involvement in participatory forest management activities. So Galema Hebenno and Mekonna Chefe PFM has weak achievement. In order to achieve this community based forest management institutional actors, have to devolve their responsibilities. According to this study the district cooperative promotion office, agricultural and rural development office, district level forest enterprise and NGOs as a whole have different roles which did not implement.

The environment and ecology of Bale zone is more or less related to Arsi zone and favorable to produce Eucalyptus tree. At present time it is widely used for building material and house hold equipment making in Bale zone and imported from Arsi zone. This indicates insufficient production of Eucalyptus tree in Bale zone.

FARM/ SOS: reported threats to the Bale region area are growing rapidly. Different measures have been taken but as the result no improvement in stopping illegal cutting of high value trees. Different scholars tries to give curative ideas. The result is not satisfactory. Hora forest is natural forest. Till now it is not managed as a park or reserved area. The government planned to protect this natural forest through PFM. Establishment by itself without fast immediate reaction of institutional actors does nothing to do.

6.2 Recommendations

Based on the finding of the study, the following recommendations were forwarded.

- For stakeholders increased productivity of community that live in surrounding could decrease the livelihood relying on forest products.
- Local communities should be encouraged on working substitute of forest products such as planting Eucalyptus tree to reduce the burden on forest.
- The Agarfa district administration have to look another dimension. That is to carry out resource assessment such as sand and stone which are used for building houses. Facilitating the transport system to be accessible in a feasible cost to stop forest use for building purpose, product like pole (kench).
- It is better to bring change in using alternative sources of energy. Using local innovative methods like bio gas and wood saving stove.
- Training in terms of sustainable natural resource management should be given to enhance local communities to scale up forest management practice. Therefore it is better government and other stockholders should give further attention.
- The Agarfa district should increase follow up to PFM for effectiveness of sustainable forest management.

7. REFERENCES

- Alemtsehay Jima, (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
- Angelsen. A. and Kaimowitz, D. (1999) Theories and evidence from Tanzania. *Environment and Development Economics* **4**: 313-31.
- Acheampong, E. and Marfo, E (2011). “*The impact of tree tenure and access on chainsaw millin in Ghana.*” Ghana Journal of Forestry Ashanti Region, Vol. **27**: 68-86.
- AWARDO (2016) Agarfa Woreda Agricultural and Rural Development Office Annual Report
- Bedru Beker (2007) Economic valuation and management of common-pool resources: the case of Enclosures in the highlands of Tigray, Northern Ethiopia, PhD dissertation. Leuven
- Bruijnzeel, L. A. (2000). *Hydrological functions of tropical forests: not seeing the soils for the trees Agriculture, Ecosystems and Environment.*
- Bishaw Badege (2003). Deforestation and Land Degradation in the Ethiopian Highlands: A Strategy for Physical Recovery. *Northeast African Studies* **8**:7–25.
- Borri Feyerabend, G. (2000).Co management of natural resource: Organizing, negotiating and learning by doing. Yaoundé, Cameroon
- Bruijnzeel, L. A. (2000). *Hydrological functions of tropical forests: not seeing the soils for the trees. Agriculture, Ecosystems and Environment***1**:.1-18.
- Bryant,L.& Bailey,R.L. (1997). *Third World Political Ecology*. Routledge: London
- Chakravarty, Ghos, Suresh,A.,Dey N., and GopalShukla (2012).*Deforestation: Causes, Effects and Control Strategies*, Global Perspectives on Sustainable
- Chomitz K., Buys.P, Luca.G., Thomas.T. And Wertz Kanounnikoff, S. (2007). *Agricultural expansion, poverty reduction and environment in the tropical forests*. World Bank Policy Research Report. World Bank, Washington DC.
- Cleaver, F. (2007). Understanding agency in collective action. *Journal of human development*, **8**: 223-44

- Deressa Shime, (2014) Practices and Challenge to Participatory Forest Management in Ethiopia: The Case of Chilimo-Gaji Participatory Forest Management, West Shewa Zone, Oromiya National Regional State
- FAO (2005). *State of the World's Forests* .Food and Agriculture Organization of the United Nations, Rome.
- FAO (2007). *Paying farmers for environmental services* .Food and Agriculture Organization of the United Nations, Rome.
- FAO (2010), *Managing forests for climate change*. (www.fao.org/forestry/fgr)(accessed October 15, 2016).
- FAO (2010). *Global Forest Resources Assessment Country Report*, Ethiopia. Forestry Department of Food and Agriculture Organization of the United Nations, Rome.
- FAO (2007) 1980-2005, FAO Forestry Paper 153. Rome: Forest Resources Division, FAO. The Food and Agriculture Organization of the United Nations. 77
- FARM / SOS, (2008). The Key Steps in Establishing Participatory Management.
- FARM Africa and SOS Sahel. (2008). Bale Eco-Region Sustainable Management program (BERSMP): Annual report.
- FARM Africa and SOS Sahel (2008). *Bale Eco-Region Sustainable Management Program (BERSMP): Annual report* .Forest Management: A field manual to guide practitioners in Ethiopia. (Best practices No. 1). Ethiopia: Addis Ababa. P 28.
- Houghton (2005) Carbon emissions from land use and land cover change. Bio geo sciences, **9**, 5125–5142. Indiana University (2014).The Trustees of Indiana University, India.
- IFFN (2000).Ethiopia Fire Special. The Ethiopia Fire Emergency. *IFFN* No.22.http://www.fire.uni-freiburg.de/iffn/country/et/et_1.htm (accessed October 15, 2016).
- Gebremdhin Alemayehu (2008). Determinants of Success of Participatory Forest Management (PFM) The case of WAJIB approach in Ethiopia. MSc thesis, University of Mekelle, Ethiopia,

- Himberg, Nina, Loice Omoro, Petri Pellikka & Olavi Luukkanen (2009). The benefits and constraints of participation in forest management. The case of Taita Hills, Kenya. *Fennia* 187: 1, pp. 61–76. Helsinki. ISSN 0015-0010.
- Hobley, M. (2005). Building state–people relationships in forestry: Forest Policy and Environment Program. Overseas Development Institute, UK
- Kainowitz, D., Angelsen, A., (1998). Economic Models of Tropical Deforestation: A Review. Center for International Forestry Research, Bogor, Indonesia, p. 139.
- Kelbessa Ensermu and De Stoop, C. (eds.) Participatory forest management (PFM), Biodiversity and livelihoods in Africa. Proceedings of the International Conference, 19-21 March 2007. FARM Africa/SOS Sahel, Addis, Ethiopia. 54-61 pp.
- Kirkby John, Phil O'Keefe and Loyd Timberlake (1995). *The Earth scans Reader in Sustainable Development*. Earth scans publications Ltd, London.
- Lawrence, A. and Green, K. (2008). Research and participatory management: comparing the 86 priorities of resource users and development professionals. Website:
- Markos. 1990. *Demographic Responses to Ecological Degradation and Food Insecurity: Drought Prone Areas in Northern Ethiopia*. PDOD Publications, Amsterdam.
- (Mather A.S (1995). Global trends in forest resources. *Geography*, 77: 1-15.
- Ministry of Finance and Economic Development (MOFED), (2006). *Building on Progress. A Plan for Accelerated and Sustained Development to End Poverty (PASDEP)*. (2005/06-2009/10). Volume 1: Main Text. Addis Ababa, Ethiopia
- Myers, N. and Mittermeier, R. A. (2000). Biodiversity hotspots for conservation priorities. *Nature* **403**: 853-854
- Nkrumah, E.E., Bando, P.K. (2010). Assessment of coping and adaptation strategies to the effects of Climate change in the Offinso North and South districts.
- Pinker, (1980). The albedo of a tropical evergreen forest. *Quarterly Journal of the Royal Meteorological Society*, **106**, pp. 551–8.
- Postel, S. and Heise, L. (1988): Reforesting the earth, World watch Paper No. **83**.
- Ross (1996). *Conditionality and logging reform in the tropics*. In: Institutions for Environmental Aid: Problems and Prospects. MIT Press, Cambridge Massachusetts.

- SCBD, (2001) Secretariat of the Convention on Biological Diversity. *The Value of Forest Ecosystems*. Montreal, (CBD Technical Series no. 4).
- Solvin (1960) Sample Size Determination Formulae. *Https; // prudencexd. Weebly.com* (Accessed December18, 2016)
- UNEP (2007). *BillionTreecampaignwebsite*. [http://www.unep.org/billiontreecampaign/Fat Figures/Q and A/index.asp](http://www.unep.org/billiontreecampaign/Fat%20Figures/QandA/index.asp)
- UNFCCC (2001). *Global financial crisis endangering forest worldwide*. Website: <http://www.google.com.et/> (accessed October 15, 2016)
- Van Noordwijk, M.; Agus, F.; Verbist, B.; Hairiah, K. and Tomich, T. P. 2006. Managing watershed services in Eco agriculture land scape. In: *The State of the Art of Eco agriculture*, eds. McNeely, J. A. and Scherr, S. J. Island Press, Washington DC. Washington, D.C.: World watch Institute.
- Weinberg, E. (2010). *Participatory Forest Management in Ethiopia, Practices and Experiences*. FAO Sub Regional Office for Eastern Africa. Addis Ababa
- WHO (2002). *Traditional medicine strategy 2002-2005*. WHO/EDM/TRM/ 2002, Geneva. Woody Biomass Inventory and Strategic Planning Project (WBISPP). A National Strategic Plan for the Biomass Energy Sector: Final Report; Ministry of Agriculture and Rural Development: Addis Ababa, Ethiopia, 2005; p. 201.
- Zelalem Temesgen, Irwin,B., Jordan,G., Mckee,J.(2007) Forest use them or lose them an argument for promoting forest based livelihood rather than alternative non-forest based livelihood within PFM program. *Proceedings of international conference* 89
- Zelalem Temesgen. (2005). *An introduction to Chilimo Participatory Forest Management Project*: Addis Ababa, Ethiopia

APPENDICES

Appendix A

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF APPLIED NATURAL SCIENCE

DEPARTMENT OF BIOLOGY

Questionnaire filled by PFM participants /Non PFM participants

The objective of the questionnaire is designed for gathering information from the grass root participants regarding factors developing and affecting people's participation in participatory forest management the case of Hora forest of Agarfa district, Bale zone. Your information is critically important for this research output as well as future forest management. 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!

Direction for enumerator: put ✓ in the box provided for close ended questions and write responses on the space provided for open ended questions.

I. Personal Information

1. Age

A. 21-30 ☐

B. 31- 40 ☐

C. 41- 50 ☐

D. 51- 60 ☐

E. Above 61 ☐

2. Sex A. Male ☐ B. Female ☐

3. Educational background:

A. Have not attended school ☐

B. Read and write only ☐

C. Grade 1-4 ☐

D. Grade 5-8 ☐

- E. Grade 9-10 ☐
- F. Grade 11-12 ☐
- G. Higher education ☐

4. For how long did you live here?

- A. 1-5 years ☐
- B. 6-10 years ☐
- C. 11- 15 years ☐
- D. Above 16 years ☐

5. Major occupation of households

- A. Crop farm ☐
- B. Livestock ☐
- C. Mixed farming ☐
- D. Others (Specify) _____

II. Participation

6. Do you participate in participatory forest management activities?

- A. Yes ☐
- B. No ☐

7. If your answer to question 6 above is yes, list those activities in which you participate.

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____

8. Do you get any benefit from the forest?

- A. Yes ☐
- B. No ☐

9. If your answer to question 8 above is yes, list those benefits you get from the forest?

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____

10. Do you make payment for the benefit you get from the forest?

A. Yes ☐

B. No ☐

11. Do the benefit you expect initiates you to participate in participatory forest management

A. Strongly ☐

B. Slightly ☐

C. Nothing ☐

12. How do you evaluate your participation in collective action in forest management?

A. Very actively ☐

B. Actively ☐

C. Less actively ☐

D. Not involved ☐

13. Do you participate in decision making about the forest?

A. Yes ☐

B. No ☐

14. How often do you participate in decision making?

A. Always ☐

B. Usually ☐

C. Often ☐

D. Few times ☐

III. Attitude towards participation in PFM

15 What is your attitude towards PFM in conserving forest?

A. It is very important ☐

B. It is somewhat important ☐

C. It is not important ☐

16. If your answer to question 15 above is option A, what could be the reasons?

A. _____

B. _____

C. _____

D. _____

E. _____

IV. Factors enhancing and affecting the participation of people in PFM.

17. Have you ever been informed about direct and indirect forest use?

A. Yes ☐

B. No ☐

18. If your answer to question 17 above is yes, who informed you?

A. _____

B. _____

C. _____

D. _____

E. _____

19. Do you have any knowledge about the effect of deforestation?

A. Yes ☐

B. No ☐

20. If your answer to question 19 above is yes, what are they?

A. _____

B. _____

C. _____

D. _____

E. _____

21. How do you get these knowledge's?

A. _____

B. _____

C. _____

D. _____

E. _____

22. What are the major factors that enhance your participation in forest management?

A. _____

B. _____

C. _____

D. _____

E. _____

23. What are the major factors that affect your participation in forest management?

A. _____

B. _____

C. _____

D. _____

E. _____

Appendix B

YUUNIVARSITII SAAYINSII FI TEEKNOOLOOJII ADAAMAA

KOOLLEJJII BARNOOTA SAAYINSII UUMAMAATTI

MUUMMEE BARNOOTA BAAYOOLLOOJII

Bar-gaaffii: Hirmaattota Kunuunsa Bosonaa Hirmaachisaatiin guuttamu ykn Hirmaattota Kunuunsa Bosonaa hirmaachisaa hin taaneen guuttamu.

Kaayyoon bargaaffii kanaa odeeffannoo hirmaattota bu`uuraa irraa mata duree qorannoo: **‘Factors developing and affecting people`s participation in participatory forest management: the case of Hora forest of Agarfa District, Bale Zone,’** jedhuuf funaanuuf kan qophaa`ee/bocameedha.

Odeeffannoon kee bu`aa qorannoo kanaatiif fi kunuunsa Bosonaa gara fuula duraatiif murteessaa fi bay`ee faayidaa olaanaa kan qabuudha. Wanti siif raggaasisuu barbaadu , odeeffannoon ati kennitu dhimma qorannoo Barnootaaf qofa kan ooluu fi Maqaa nama kamiituu osoo hin eeramin kan qaacca`u waan ta`eef, namni odeeffannoo kenne kamiyyuu miidhaa kamiifuu kan hin saaxilamneedha.Odeeffannoon qulqulluu naaf kennituuf dursii dinqisiifachaa hirmaannaa keessaniif guddaa galatoomaa siin jedha.

Kallattii:Gaaffilee cufaa filannoo waliin dhiyaataniif ` ☒ `saanduqa keessatti kaa`aa, Gaaffilee banaa ykn deebii barreeffamaa barbaadaniif iddoo deebiif kenname irratti deebii keessan guutaa/barreessaa.

Kutaa I. Odeeffannoo Dhuunfaa

1. Umrii

- A. 21-30 ☐
- B. 31- 40 ☐
- C. 41- 50 ☐
- D. 51- 60 ☐
- E. 61 oli ☐

2. Saala : Dhiira ☐ , Dubara ☐

3. Ragaa Barnootaa

- A. Barumsa inumaa hin baranne ☐
- B. Dubbisuu fi barreessuu qofa danda`a ☐
- C. Hanga kutaa 1-4 baradhe ☐
- D. Hanga kutaa 5-8 baradhe ☐
- E. Hanga kutaa 9-10 baradhe ☐
- F. Hanga kutaa 11-12 baradhe ☐
- G. Hanga Barnoota Olaanaa baradhe ☐

4. Yeroo hangamiif naannoo kana jiraatte?

- A. Waggaa 1-5 ☐
- B. Waggaa 6-10 ☐
- C. Waggaa 11-15 ☐
- D. Waggaa 16 oli ☐

5. Hojiin ijoon maatii keetii maali?

- A. Hojii Qonnaa ☐
- B. Horsiisa Loonii ☐
- C. Qonna Qindaa`aa(makaa) ☐
- D. Kan biroo ☐ yoo jiraate yaa ibsamu_____

Kutaa II. Hirmaannaa

6. Gochaalee kunuunsa bosonaa hirmaachisaa keessatti hirmaattee beektaa?

- A. Eeyyeeni ☐
- B. Lakki ☐

7. Gaaffii 6^{ffaa} armaan oli irratti deebiin kee `Eeyyeeni` yoo ta`e ,gochaalee irratti hirmaatte tarreessi mee.

A. _____

B. _____

C. _____

D. _____

E. _____

8. Faayidaan Bosona irraa argattu jiraa?

A. Eeyyeeni ☐

B. Lakki ☐

9. Gaaffii 8^{ffaa} armaan olii irratti deebiin kee, `Eeyyeeni` yoo ta`e, faayidaan bosonaa irraa argatte maal maal fa`i?

A. _____

B. _____

C. _____

D. _____

E. _____

10. Kaffaltiin faayidaa kunuunsa bosonaa irraa argatte jiraa?

A. Eeyyeeni ☐

B. Lakki ☐

11. Faayidaan argatte kuni kunuunsa bosonaa hirmaachisaa irratti akka hirmaaattu si kakaaseeraa?

A. Sirritti na cimse ☐

B. Hama tokko ☐

C. Homaayyuu na kakaasne ☐

12. Bosona kunuunsuu hirmaachisaa keessatti hirmaannaa kee akkamitti madaalta?

A. Baay`ee si`ataa ☐

B. Si`ataa ☐

C. Xiqqoo si`ataa ☐

D. Sirumaa hin hirmaanne ☐

13. Dhimma bosonaatiif murtee dabarsuu keessatti hirmaattee beektaa?

A. Eeyyeeni ☐

B. Lakki ☐

14. Yeroo hammamiif murtee dabarsuu keessatti hirmaatte?

A. yeroo hundumaa ☐

B. Yeroo baay`ee ☐

C. Darbee darbee ☐

D. yeroo muraasa ☐

Kutaa III. Ilaalcha gama Kunuunsa Bosonaa Hirmaachisaa(KBH) tiin jiru.

15. Eegumsaa fi kunuunsa Bosonaa hirmaachisaa taasifamu irratti yaadni kee maal fakkaata?

A. Faayidaa olaanaa qaba ☐

B. Hama tokko ni fayyada ☐

C. Faayidaa hin qabu ☐

16. Gaaffii 15^{ffaa} irratti filannoon kee ‘A’ yoo ta`e, sababoonni ta`uu danda`an maal fa`i?

A. _____

B. _____

C. _____

D. _____

E. _____

Kutaa IV. Kunuunsa Bosonaa Hirmaachisaa irratti Wantoota Hirmaannaa

Ummataa cimsuu fi miidhuu danda`an

17. Kanaan dura dhimma faayidaa bosonaa kallattii fi al-kallattii irratti hubannoon ati argatte ykn odeeffannoon ati argatte jiraa?

A. Eeyyeeni ☐

B. Lakki ☐

18. Gaaffii lakk. 17^{ffaa} irratti deebiin kee “Eeyyeni” yoo ta`e, eenyutu hubannoo kana siif laate?

A. _____

B. _____

C. _____

D. _____

E. _____

19. Bosona ciruu ykn barbadeessuun miidhaa inni fidu irratti hubannoo wayii qabdaa?

A. Eeyyeeni ☐

B. Lakki ☐

20. Gaaffii 19^{ffaa} irratti deebiin kee “Eeyyeeni” yoo ta’e, miidhaaleen kunniin maal maal fa’i?

A. _____

B. _____

C. _____

D. _____

E. _____

21. Hubannoo kana akkamittii argatte?

A. _____

B. _____

C. _____

D. _____

E. _____

22. Dhimmoonni ijoon hirmaannaa kee Kunuunsa Bosonaa Hirmaachisaa irratti guddisuu/cimsuu danda’an maal maal fa’i?

A. _____

B. _____

C. _____

D. _____

E. _____

23. Dhimmoonni hirmaanaa kee Kunuunsa Bosonaa Hirmaachisaa(KBH) irratti gadi-buusuu ykn miidhuu danda’an hoo maal maal fa’i?

A. _____

B. _____

C. _____

D. _____

E. _____

Galatoomaa!!

Appendix C

**ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY
SCHOOL OF APPLIED NATURAL SCIENCE**

DEPARTMENT OF BIOLOGY

INTERVIEW OF FOCUS GROUP DISCUSSION

FGD CATEGORY

A. Elders

B. Experts

C. Development agents

D. Administrators

- 1) Does the participatory forest management approaches create a great sense of accountability to the forest users?
- 2) Does the participatory forest management ensure empowerment of individual people?
- 3) Does PFM approach serve as a vehicle for sustainable forest management?
- 4) What is your performance in participation compared to others?
- 5) Any other suggestion about the forest management, management committee of the forest group and PFM in general?

Appendix D

YUUNIVARSITII SAAYINSII FI TEEKNOOLOOJII ADAAMAA

KOOLLEJJII BARNOOTA SAAYINSII UUMAMAATTI

MUUMMEE BARNOOTA BAAYOOLLOOJII

GAAFILEE MARI GAREE XIIYEEFANNAA

AKAAKU GAREE XIIYEEFANNAA

A. Jaarsoolee

B. Ogeessota

C. Hojjeetaa misoomaa

D. Bulchinsa garee kunuunsa bosonnaa

- 1) Kunuunsa bosonaa hirmachisan itti fayadamtoota bosonaatiif itti gaafatuumaa hamlee gaarii ni dhuumaa?
- 2) Kunuunsa bosonaa hirmachisan ummata hundaaf angoo itti fayadamuumaa bosonaa ni mirkaneesa?
- 3) Kunuunsa bosonaa hirmachisan eegumsaa bosonaa yeeroo dheeraf ni fayadaa?
- 4) Gaheen hirmanaa keessan eegumsa bosona irratti namoota biratiin yeeroo madalamu mal fakkata?
- 5) Kunuunsa bosona, garee kununsa bosonaa fi kunuunsa bosonaa hirmachiisa irratti yaada dabalataa yoo qabatan ibsaa.