International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Assessment of Forest Degradation and Conservation Practices: The Case of Gog District, Gambella Regional State, Ethiopia

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Abstract: ***Deforestation and land degradation in Ethiopia however are impairing the capacity of forests and the land's contribution to food security and provide other benefits such as fuel wood and food. This study was conducted to assess the forest degradation and conservation practices: in the case of Gog district, Ethiopia. In this study, both qualitative and quantitative approaches were employed. A total of four villages were selected for this study from 22 villages of the district. A descriptive survey research design was used. Accordingly, 100 households were selected as sample respondents for this study. The data was collected from both primary and secondary sources. Due to the effects of resettles population existing in the study area the natural vegetation covers particularly the forest, woodland and grassland are dwindling at an alarming rate over the past three decades. The resettles use the woodland product for firewood and charcoal, for construction, and for preparing their farming tools. The major cause of forest degradation was a rapid expansion of farmland following resettlement, investors, excessive cutting of trees for firewood and construction, forest fire, and conversation of woodland to open up crop fields. The major conservation effort used by resettles in the study area was planting trees. But, it is not comparable with the fast rate of deforestation, and also the major suggested solutions that were used to minimize forest degradation in the study area were planting trees, providing environmental education, searching for another alternative source of energy, and setting strong laws and follow up.***

Keywords: Forest Degradation, Environmental impacts, Deforestation and Conservation Practices

1. Introduction

Forests provide economic, socio - cultural and ecological values. Livelihoods of hundreds of millions of people worldwide have been engaged on forest products either directly or indirectly (FAO, 2006). Forests have a vital safety role in time of needs. Forest degradation is a widespread global concern and an important contemporary issue for several United Nations (UN) organizations and conventions. Forest degradation is broadly defined as a reduction in the capacity of a forest to produce ecosystem services such as carbon storage and wood products as a result of anthropogenic and environmental changes (IPCC, 2003). Small holder peasant agriculture in some areas including forests is the dominant economic sector accounting for about 45% of GDP, 85% of exports and 80% of total employment. Forest and the benefits that they provide in the form of wood, food, income and watershed protection plays a critical role in enabling people to secure stable and adequate food supply. It is an established fact that forests play a key role in maintaining a balanced eco - system in countries like Ethiopia where the majority of the people are living in rural area, forest means everything. It could be said that no forest - no life (Demele, 2001: 31).

Deforestation and land degradation in Ethiopia however are impairing the capacity of forests and the land's contribution to food security and provide other benefits such as fuel wood and food (FAO, 2003). Ethiopian are facing rapid deforestation and degradation of land clearing for agricultural use, over grazing and exploitation of existing forest for fuel wood and construction materials. Degradation of forest resources is an important concern that is perceived in many different ways. Forest degradation can be a serious environmental, social and economic problem with the potential to adversely affect millions of people who depend on forest goods and services. Given the contribution of forests to sustainable development and their role in human well - being, the state of the forests is important to all of us (FAO, 2011). Forest degradation is a serious problem environmentally, socially and economically particularly in developing countries. It is estimated that as much as 850 million hectares of forests and forest lands are degraded. Yet, it is difficult to quantify the scale of the problem as at national and regional levels forest degradation is perceived differently by the various stakeholders who have different objectives (Anteneh et al., 2013).

These natural environmental resources is facing challenge that limits its usefulness of ecosystem goods and services essential to support the livelihood of rural farmers in most countries of the world in general and Ethiopia in particular. This challenge has substantial impacts on the economic and social wellbeing of local resources users, giving rise to growing prevalence of poverty and food security. Understanding the root cause, the complexities of the problems, and devising sustainable solutions necessitates the participation and commitment of the vulnerable local resources users who are often the primary targets of the economic and social problem (Nowak, 2010).

Ethiopia has faced a number of environmental problems such as severe soil erosion, land degradation, deforestation, expanding desertification, drought, flood and decline of bio diversity to name but few. In tropical regions, deforestation

and forest degradation are progressive process that are advancing at alarming rates resulting in the conversion of forest land in to a mosaic of mature forest fragments, pasture, and degraded habitats (Laurence, 1999). Forest degradation is a more subtle process; it may involve opening of the canopy, modification of the vertical structure or change of other attributes.

Gog District contain (*Olangat* forest), which is one of the national forest priority areas of Ethiopia and one of the remnant manatee forests with diverse of flora and fauna, however this resource are with a more serious anthropogenic factors and conservation problem this resource are depleting. The forest in the study area (*Olangat* Forest) despite its economical, hydrological and biological importance both nationally and globally, the district are under serious threat due to unsustainable use of this natural resource. Like in many other parts of the country, the problem of forest degradation is a very serious environmental problem in the Gog District. A decade ago, the area was covered with rich natural and indigenous vegetation. But, ruthless pressure put on forests by anthropogenic activities are the existence of these forest cover lands. The depletion of forest resources was mainly due to use of forest products for household use purpose and income generation.

Human society and the global economy are linked with forests. More than 1 billion people depend on forests ecosystem for their livelihoods (Secretariat of the convention on Biological Diversity, 2010). Forest ecosystems play a critical role in stabilizing the climate: providing water, food, wood products, and vital medicines, and supporting much of the world's biodiversity. According to the FAO (2015), the global forest area fell by 129 million hectares (3.1 percent) during the period 1990 –2015, to just under 4 billion hectares. As stated by Hosonuma *et al*. (2012), timber extraction and logging account for more than 70% of total degradation in Latin America and Asia. Fuel wood collection and charcoal production are the main degradation drivers for the African continent, and of small to moderate importance in Asia and Latin America. Uncontrolled fires are more prominent in Latin America. In terms of absolute net forest area change over the period 2000–2010, the largest driver remains commercial agriculture, with the largest deforested area located in Latin America. In Africa and Asia, subsistence and commercial agriculture contribute roughly equally to forest area change.

Therefore, this study was conducted to find out extent the forest degradation and conservation practices, to assess the contribution of forest resources to the household income and the role of collective action for sustainable uses of forest resources, and so that it would help to forward solution for enhancing community participation in forest and strategies. Moreover, the researcher was motivated to evaluate the problems with their causes.

2. Research Methodology

2.1 Description of the Study Area

Gog district is one of the largest five districts of Anywaa zone in Gambella regional state, Ethiopia. Geographically, it lies 7°34'59.99"N and 34° 14' 60.00" E. The total area of the district covers about 361324.42 hectares. The elevation of the district varies from 414m. above sea level in the Western and central parts to 2223m above sea level in the North - eastern and South - eastern parts.

2.2 Research Design and sampling

For the purpose of this study, the descriptive survey research design was used, also qualitative and quantitative research approaches were employed. Four villages were selected from the district for this study on the basis of agro - ecological zones. The sample villages in the district are Gog - Dipach, Gog - Janjor, Athathy, and Thata total households were 1600. Out of these 100 households were selected as respondents for this study. The study used both primary and secondary sources of data.
Questionnaires, Interviews, Focus group discussions, and Observation was used as instruments of data collection.

3. Results and Discussion

3.1 Perception of Forest users on community forests

The table.1. Results show that perception of the community toward the distribution of forest resources, which varied not significantly different reported (39.9%) overall in study area tested by the method of one sample T - test. But varied significantly different between Gog Dipach (51.6%), Athathy (50.0%) village since the distribution of forest were reported higher compared to Thatha village which reported (21.4%) and Gog Janjor (36.8%) village that indicated low distribution of forest resources. Regarded the distribution of forest resources contributed by group leadership and forest conservation in Gog Janjor and Thatha village reported to focus on, whereas Thatha and Athathy villages were unaware in engagement of group leadership and forest conservation practices in their locality.

Table 1: Perception of forest user toward distribution of forest resource in study area

Name of villages						
Forest users perception	Dipach	Janjor	Athathy	Thatha	Overall mean	Sig.
	Percent	Percent	Percent	Percent	Percent	
Distribution of resources	51.6	36.8	50.0	21.4	39.9	ns
Group leadership	_	21.1	_	21.4	10.6	ns
Conservation of forest	12.9	42.1	_	42.9	24.5	ns
Forest rules	22.6	_	31.8	_	13.6	ns
Penalties	12.9	_	18.2	14.3	11.4	ns

Ns = mean no significant different test One - Sample Test results

According to Amogne Asfaw, (2013). In the past, large forests were managed as crown property by emperors and kings basically as sources of fuel wood, and timber for the royal households. Such forests were protected and encroachment was forbidden (perhaps it may be for the peasants). In this study with regard to rules and right of involvement to forest product resource, there were no vast rules organized, unless ordered from the head of land culturally in Anywaa community on the forest in maintaining and replantation activities. Their opinion was to let the community aware of burning up the forest to avoid environmental degradation and also climate change respectively. The other indicator also reported that there was little operational awareness on the forest regarding protection by not cutting down the trees throughout a year since the forest can control soil erosion.

This result showed that the forest users' perception of community forests was found to be largely negative. Since there was no rule organized and the penalties were done with regard to those who tried to cut the tree or burned down the forest for the personal case mostly in Gog Janjor and Thatha village. In addition, the distribution of forest resources was reported as low on the forest available in their locality due to the lack of provision of forest resources for reforestation in the study area respectively. This result is different from that reported by (Keshaun Gashu & Omer Aminu, 2019): who indicated that many of the respondents either strongly agreed or agreed that PFM gives authority to the communities (82%), creates a feeling of accountability, reduced deforestation and gives right to use the forest resources.

3.2 Forest resource degradation and Conservation Practices

Table 1. Shows the forest resource degradation and conservation practice, so the overall majority of respondents reported that (64.0%) plantation of seedlings were the major important activities they practice in their locality whereas nursery development (26.0%) and that of protection of the trees existed further, were reported (10.0%) lowered followed up in Gog district respectively.

Table 2: Forest degradation and conservation practices

Name of villages					
Activities	Dipach	Janjor	Athathy	Thatha	Overall mean
	Percent	Percent	Percent	Percent	Percent
Nursery development	25.8	31.6	27.3	21.4	26.0
Plantation of seedling	67.7	63.2	63.6	60.7	64.0
Protection of existing trees	6.5	5.3	9.1	17.9	10.0

Source: Field survey, 2020

As reported during focus group discussion, they indicated that most resident of Gog district exercise shifting cultivation where they highly depend on clearing the forest resources so in such case forest degradation is increasing year to year out due to unwise investment being practice in study area. This unwise investment had turned forest land into farmland and loses forest regulation policy.

3.3 Forest Degradation and Related Environmental Problem

Table 3, it shows the lack of good management (27%) by cutting down the forest for harvesting which means farm replacement (26.0%) such practical still the community are doing it, so these were the major problem that the community faced. The other most serious problem was carelessness (26.0%) (The lack of putting ward into action), the low contribution of the community, and the lack of implementation of forest activity in table 3.

Table 3: Forest degradation related environmental problems in Gog district

Gog district		
Variables	Frequency	Percent
Lack of good management	27	27.0
Careless (putting ward into action)	26	26.0
Foreign investment	26	26.0
Farm replacement	21	21.0
Total	100	100.0

Similarly from that reported by Amogne Asfaw, (2013) in Ethiopia's forest resource conservation systems historical perspective, the major problem was due to resettlement programs undertaken by the Ethiopian government, and expansion of foreign investment has also been cited as a major challenge for the remaining forest resources of the country. In addition now a day the same problem had happen done by the community was by not dependent on one farm harvested due to the difficulty of removing or clearing the grass in the previous garden harvested that why they done in this order to have another garden or farmland, these were the reason why forest had minimized.

Although the district administration provide services on forests still were inadequate. This results in line with that reported according to the Federal Democratic Republic of Ethiopia - Land degradation neutrality national report (2014) that despite the different efforts being made to minimize the expansion of land degradation in the country, it still continues to be a big problem as a result of different inappropriate practices coupled with the impacts of global climate change. So to effectively avoid forest degradation provision and communication are the most important in order to let the community know about the benefit of forests mostly to be supported by the Government or any institution. In addition, it is better to convince the community by providing education about the importance of forests and also creating awareness by making strong laws.

3.4 Forest management and conservation activity

As indicated in table 4. The stage of participant of the community on forest management activities such; as planning, monitoring or evaluation and implementation. One of the most important function of forest management are the maintaining and enhancing the health and vitality of forest ecosystem, advancing socio economic function and condition of forest.

Table 4: Forest conservation activities in Gog village

Name of villages						
Activities		Dipach	Janjor	Athathy	Thatha	**Overall mean**
		Percent	Percent	Percent	Percent	
Stage of participant	planning	25.8	31.6	27.3	21.4	26.0
	monitoring and evaluation	67.7	63.2	63.6	60.7	64.0
	implementation	6.5	5.3	9.1	17.9	10.0
Aspect of forest conservation	contribution of labor	77.4	84.2	81.8	60.7	75.0
	contribution in money /kind	12.9	5.3	9.1	14.3	11.0
	providing information	6.5	10.5	9.1	25.0	13.0
	others	3.2	_	_	_	1.0
Responsibility in decision making	government bodies	67.7	57.9	77.3	78.6	71.0
	Ngo	32.3	42.1	22.7	21.4	29.0

Table.4 Showed the forest conservation activities in the case of the stage of participation, aspect of forest management, and the responsibility in decision making in the study area respectively. The community had many contributions to forest conservation, development, and management. The community was involved actively in the contribution of labor (75.0%) and monitoring and evaluation (64.0%) as reported by the overall majority of respondents in all these villages. Whereas planning, implementation, the contribution of money, and provision of information were the minor activities that they didn't follow up mostly. As reported by the majority of respondents regarded the responsibility in decision - making on forest management or conservation overall in each village indicated that were government bodies (71.0%) that had major decisions on forest available in their locality. Whereas the non - governmental organization reported (29.0%) to have little decision on forest conservation in the study area respectively. Mostly Athathy reported (77.3%) and Thatha (78.6%) that the government bodies had higher responsibility in decision making on forest conservation practice, compared to these two villages which reported (67.7%) in Gog Dipach and (57.9%) in Gog Janjor but they were better supported by the non - governmental organization then these villages mostly supported by the local government bodies in study area respectively. This finding was in line with that reported by Keshaun Gashu & Omer Aminu (2019), that there are local level government interventions in forest management activities within the Gondar Zuria district including nursery development, plantation of seedlings, and protection of existing trees and forest areas. In addition that more than half of the respondents (56%) stated that they actively participate in the planting of trees either for individual or communal purposes.

Generally, this result showed that the forest conservation of the site was affected by many factors. Economic status, lack of alternative energy sources, shortage of funds, and lack of interest were among the many factors that affected forest conservation on site. It may be the poor economic status of the community that enforced them to penetrate into the forest for illegal cutting. This illegal cutting in turn leads the forest resource to deforestation. The lack of alternative energy sources was also the second major problem identified by the representative respondent for declining of forest resources since there were no alternative energy sources the more dependent on the forest was inevitable. Shortage of funds also limited the community their access to alternative energy sources as they could not afford them. Those factors are directly or indirectly affected the effective conservation of forests on sustainable bases. In the study area, the lack of economic status of the community was the major factor that affect the forest conservation program in the study area.

3.5 Benefits of forest conservation for the society

These results showed that forest is very important for the community since the availability of forest can make rain available and make harvesting easy because the drought occurrence can cease or be minimized.

Table 5: Benefits obtained from participating planting tree in Gog district

Indicator	Benefits	N=100	Percent	Ranked by respondent
Wood	fuel wood	38.0	38.0	1st
	timber	24	24.0	2nd
	charcoal	16	16.0	3rd
	fodder	14	14.0	4th
	food and medicine	8	8.0	5th

N = the overall total number of respondents in the study area

Table 5. Ranked the benefit they obtain from forest available in their locality, firewood was ranked first followed by timber as the second - ranked for building their house. In this case, the community indicated that firewood was their major important reason since they can obtain its easily because of their low income levels due to the unavailability of modern cooking methods like electricity, charcoal, and leach improved stoves. Similar to that reported by (FAO, 2014). The majority of leasehold forest dependence on obtaining firewood, timber and leaf litter had also increased significantly as about 73%, 50% and 83% of the sample project area households reported high dependency on leasehold forest as a source of firewood, timber and leaf litter at present impacts of leasehold forestry on livelihoods and forest management depend on community for other forest related products. But these which ranked as the fourth and the fifth choices such as fodder and other used for medicine values they indicated that they obtained low activities, since they had only a few domestic animals raring and also the used of traditional medicine were practice a long ago that now a day were practice by some few individual respectively. Generally, when compared to other place the benefit obtained from forest productivity in Gog district were very low for some constraints such as lack of good management on the forest from the community and cutting down the tree without replacement as reported by the elderly in study area respectively.

3.6 Contribution of Government and non - government organizations

Table 6. Bellowed showed the contribution of government and non - governmental organization in the study area, regarded the various activities shown in the table below. As indicated by the overall reported (55.0%) that they get expert assistance from agricultural officer in their locality. But a few villages which did not get assistance it because they were a far most from Gog district which was reported (45.0%) by minority of respondent respectively. This results in line with that reported by, (Nicasius Achu, 2011), that the failure by the governments of the countries of the central Africa sub - region to document pygmies' indigenous knowledge is perhaps a major setback for local forest conservation methods. Most of what they practicing is not documented and the sub - region runs the risk of losing this important traditional measures are not put in place to document it.

Table 6: Contribution of government organization and nongovernment organization

Name of villages						
Activities		Dipach	Janjor	Athathy	Thatha	Overall
		Percent	Percent	Percent	Percent	Percent
Expert assistance from agricultural	yes	54.8	52.6	68.2	46.4	55.0
	no	45.2	47.4	31.8	53.6	45.0
Responsibility of local government	planning and management	38.7	47.4	31.8	39.3	39.0
	mobilization	51.6	47.4	63.6	60.7	56.0
	providing legal written agreement	6.5	_	_	_	2.0
	providing seedling	3.2	5.3	4.5	_	3.0
Nongovernmental activities	providing fund	29.0	36.8	22.7	17.9	26.0
	providing seedling	22.6	15.8	9.1	28.6	20.0
	initiating planning and management	19.4	26.3	27.3	21.4	23.0
	providing training	6.5	10.5	9.1	17.9	11.0
	preparing plantation site	19.4	10.5	22.7	14.3	17.0
	consultation	3.2	36.8	9.1	17.9	3.0

Source survey result (2020)

The table 6. Showed that the overall respondents that planning and management and mobilization that the local government have higher responsibility on various activities. With regarded to provision of legal written agreement and seedling by the local government was reported by overall of respondent that were very low. The contribution of non - government organization were reported to be better on providing fund (26.0%), providing seedling (20.0%) and initiating planning and management (23.0%). Whereas preparation of plantation site were reported (17.0%) that the non - governmental organization have little contribution on various activities such as provision of training (11.0%) and consultation (3.0%) on the forest existed in study area.

As reported in study area they indicated responsibility was started from household up to government bodies in contribution of plantation of forest activity supported by local project available such as Natural Resources Development and Environmental Protection (NRDEP) in Gambella region respectively. In addition they figured out that there were some project name red plus that had provided them with banana stick or seedling contributed last two year ago.

3.7 The level and extent of participation in forest management

The table.7. Bellowed the case of meeting on forest management as well as accessibility of land outside resident and the used of land, the overall majority of respondents reported (63%) that they attend meeting on forest sometime in all these villages. Whereas minority of respondent indicated (21%) that they do always had conversation on forest available in their locality reason since there were no any law been done before for protection of forest available in the study area. As reported by informant during focus group discussion in study area they indicated that the community had many contributions to forest conservation, development and management. The community involved actively in seedling production, forest seedling plantation and water and soil conservation activities. In each year, the community planted different species of seedling. However, the survival rate was less than twice the survival rate of the seedling. It was observed an increasing number of plantation activities for environmental rehabilitation and restoration. In contrary, the survival rates of the seedling were low due to many reasons like lack of skill planting, shortage of rain fall, lack management activities.

Table 7: The level and extent of participation on forest management activities in study area

Name of villages						
Activities		Dipach	Janjor	Athathy	Thatha	Overall (100)
		Percent	Percent	Percent	Percent	Percent
Discussing on forest management	always	19.4	15.8	18.2	28.6	21.0
	sometime	58.1	68.4	59.1	67.9	63.0
	not attend	22.6	15.8	22.7	3.6	16.0
Accessibility of land outside resident	yes	71.0	73.7	95.5	82.1	80.0
	no	29.0	26.3	4.5	17.9	20.0
Used of land	greening	12.9	21.1	18.2	21.4	18.0

	crop	71.0	73.7	72.7	75.0	73.0
	grazing	3.2	5.3	_	_	2.0
	other	12.9	_	9.1	3.6	7.0

Source: survey result (2020)

In addition with regard to the accessibility of land outside resident the overall majority of the respondents reported (80%) that they have land outside the residence that were kept for different farming activities but those whom have no other land were reported (20%) as the minimum respectively. The table.7. Indicated that the majority of respondent (73.0%) were used for crop production followed by plantation or for greening purposes (18.0%) in all these villages. Whereas the use of land for grazing and other activities were found to the minor extent of participation on forest management. The other most important that the community practice in their locality were when they want to clear the grass available near to their farm site, they can informed themselves to avoid individual up of burning without permission since these crop that were planted by other can be destroyed.

During focus group discussion they indicated that the forest is habitat for many plant and animal species maintaining and enhancing the health and vitality of forest ecosystem, advancing socio economic function and condition of forest, in such case most stake holder participated by replacing the trees which has been cut by other during harvesting when tried make a new garden farm for crop production in their locality respectively. Done by planting tree in place which was already distracted by the farmer.

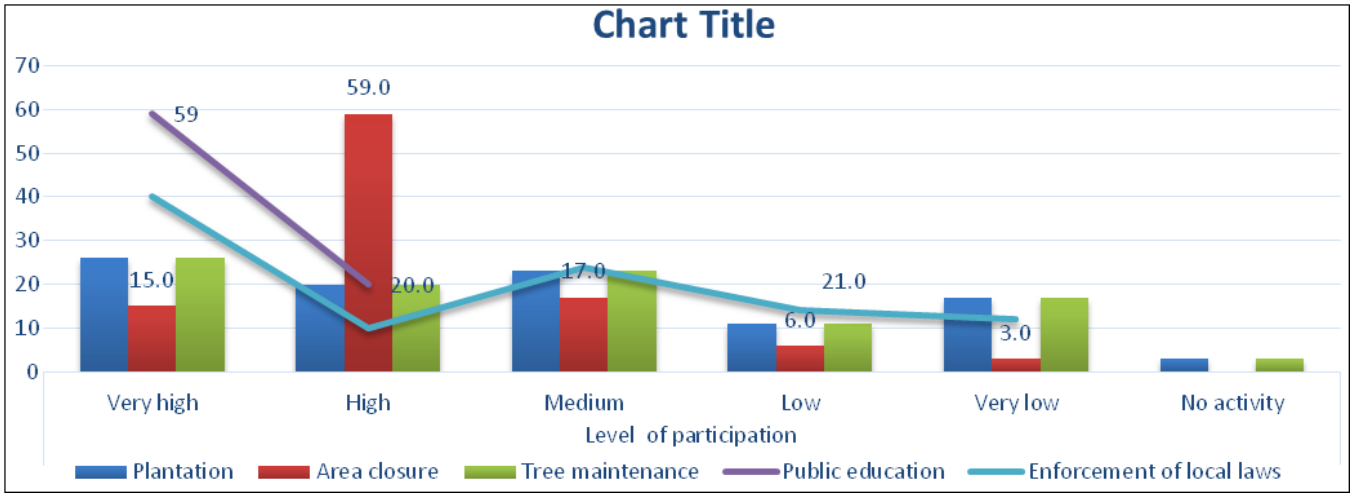

Figure 1: Local community participating in rural forestry

The figure.1. Showed that the role of local community participation in rural forest management area closure and tree maintenance were higher in case of level in participant as reported by majority of respondents in Gog district. Whereas plantation, the enforcement of local laws and provision of public education in the community were the minor and low as shown in the figured above respectively. This result is different from that reported by Susanna Morrison (2016) that participatory forestry management projects exhibit the most balanced goals as compared to other interventions in the sector. World Bank support for participatory forestry management has yielded positive livelihood benefits, such as the generation of employment, increased incomes, and diversification of revenue streams.

3.8 Determinants of Forest conservation practices

Table 8. Shows that the factor of forest conservation practice reported by the majority of respondent in Athathy (45.5%) and Gog Dipach (32.3%) that the shortage of fund and lack of interest were the major factor compared to Janjor (31.6%) and Thatha (25.0%) villages that indicated that the economic status and the lack of alternative energy resource were the most determinant in their locality respectively.

Table 8: Determinants of forest conservation practice in study area

Forest users perception	Name of villages				Overall mean
	Dipach	Janjor	Athathy	Thatha	
	Percent	Percent	Percent	Percent	Percent
Economic status	29.0	31.6	22.7	25.0	27.0
Shortage of fund	32.3		45.5	21.4	26.0
Lack of interest	32.3	5.3	31.8	28.6	26.0
Alternative energy resource	6.5	63.2	- -	25.0	21.0

Source: Field survey result (2020)

Respondents replied that economic status is the main determinant for forest conservation (27.0%). Following that shortage of fund (26.0%) and Lack of interest for forest conservation. (26.0%) as indicator shown in Gog district respectively.

This result showed that the forest conservation of the site was affected by many factors. Economic status, lack of alternative energy source, shortage of fund and luck of interest were among the many factors that affected forest conservation on site shown in table 8. This finding was similar with that reported by Kassahun Gashu, (2019) that the low awareness and training on the other hand, residence

- market distance were major determinant. During focus group discussion they indicated that, were due to poor economic status of the community enforced them to penetrate in to the forest for illegal cutting. This illegal cutting in turn leads the forest resource to deforestation. Shortage of fund also limited the community their access to alternative energy sources as they could not afford it. The lack of alternative energy source and economic status was also the major problem identified by the representative respondent for declining of forest resource due to there were no alternative energy sources more dependent on the forest was inevitable. Those factors are directly or indirectly affected effective conservation of forest on sustainable bases.

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