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Impact Assessment of Forest Degradation on Peoples Livelihood: The Case of Harena Buluq Woreda Bale Eco Region, Southeast Ethiopia

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Abstract

In developing countries like Ethiopia, forest degradation, characterized by the decline in forest cover and diminished capacity to provide essential goods and services, presents significant environmental, social, and economic challenges. The purpose of this study is to assess the effects of forest degradation on the way of life for the people living in the southeast Ethiopian woreda of Harena Buluq. Examining how forest degradation affects local livelihoods with a particular emphasis on livelihood strategies and the degree of reliance on forest resources is the main goal. In order to obtain qualitative insights, data was gathered by means of a combination of secondary sources and key informant interviews, which were complemented by on-site observations of the consequences of forest degradation. After gathering, the data was examined and shown. The findings underscore the multifaceted impact of forest degradation on the socio-economic fabric of communities in Harena Buluq, highlighting the urgent need for targeted interventions to mitigate its adverse effects and promote sustainable livelihood practices.

Keywords: Degraded forest, Vegetation; Forest resources, livelihood Strategies.

Introduction

Since forests protect watersheds, create jobs, and guarantee food security, they help people all across the world have access to stable and sufficient food supply (FAO, 2005). Although this number might not accurately reflect the total financial turnover of the industry, the yearly fuelwood harvest, estimated at 109 million cubic meters with a value of around USD 420 million, highlights the substantial economic contribution of forests (Mulugeta,

2008). Studies from Ethiopia's Dendi area show that additional revenue streams from fuelwood, fodder, honey, and building materials greatly boost household earnings; on average, these resources contribute 39% to annual household incomes (Getachew et al., 2007).

Despite their critical importance, forests around the world are degrading at alarming rates, which presents significant environmental, social, and economic concerns, especially for developing countries. Based on estimates from 2000, there are over 800 million hectares of degraded forest and forest land spread over 77 tropical nations, with about 500 million hectares of damaged main and secondary forests ITTO (2002). Degradation of forests affects ecological services that are essential to ecosystem functioning as well as human livelihoods and greenhouse gas emissions.

For example, deforestation alone accounted for one third of the reduction in forest stock between 1990 and 2005 in Indonesia, whereas degradation in the Brazilian Amazon accounts for 20% of total emissions (Asner et al., 2005; Marklund & Schoene, 2006). According to Lambin et al. (2003), the yearly rate of forest degradation in Africa is almost half that of annual deforestation.

There are serious environmental, social, and economic issues associated with forest degradation, particularly in developing nations where it results in a decline in the production of non-timber forest products (NTFPs) and timber. This decrease affects the economic value that comes from forests as well as the ability of the forest to offer basic resources. According to ITTO (2002), soil erosion, climate change, and declining water quality all contribute to productivity losses and changes to the structural and functional integrity of forests.

Food security is impacted by forest degradation, especially for people who depend on forest resources for both subsistence and revenue. Research by Reddy and Chakravarty, (1999); Arnold and Townson, (1998); Townson, (1995) and FAO, (1989) highlight the

importance of forest products in guaranteeing food security, particularly for populations experiencing food insecurity in developing nations. These problems are made worse by fuel wood scarcity, which is a direct result of forest degradation. It affects around 3 billion people worldwide and causes a "fuelwood famine" for about 100 million people (FAO, 2005). Decreased fuel supplies disproportionately impact women, who frequently handle the task of gathering fuelwood. They also make food preparation more difficult, possibly lowering nutritional intake and raising the risk of food-borne infections. Food security may be further jeopardized if women are less involved in domestic and agricultural tasks due to the longer time spent gathering scarce resources. As noted by (Tengberg et al., 1998). In addition, the loss of nutrient-rich topsoil is a result of forest degradation, which also causes notable drops in agricultural productivity.

Despite these complex issues, little is known about the precise effects of forest degradation on local livelihoods in the Bale Zone, notably in the Harena Buluq Woreda and the Harena forest. In order to evaluate the consequences of forest degradation on local communities' livelihoods. Wu et al., (2018). Community education about the effects of forest degradation is essential, given its substantial implications on ecological services and human lives. In order to ensure both short- and long-term benefits, this understanding can encourage community involvement in the conservation and sustainable management of forest resources. This study intends to close this information vacuum by collecting data from communities living in several villages within the Kebeles.

Material and Methods

Method of data collection

During data collection, we were first in contact with both district administration office and natural resource management experts of the office of the district and used various data collection tools, including secondary data collection, key informant interviews to collect

mainly qualitative information, and observation of the impacts of forest degradation on the letter collected through key informant interviews, questionnaires, and secondary data sources.

Key informant interview

Those with knowledge of the effects of forest degradation on Harena Buluq Woreda's local livelihood in the current context, as well as the status of change and the main effects on the resource were identified as key informants. It appears that you are unsure of how to describe more succinctly and clearly how many interviews were conducted during a guided tour and for how long people have lived in a certain location. We sought out residents who had been a regular resident of the neighbourhood for a significant amount of time between ten and fifteen years and who were willing to participate in interviews. Throughout the guided tour, we made random contacts with them.

The range of years and the number of interviews. Who are willing to be questioned, who have lived in the area continuously for a significant amount of time, and who have more years. We asked as many random questions as we could to each person we encountered throughout the guided tour; five to seven people were questioned by name before we could complete our task.

During the guiding tour, we asked individual people randomly as much as possible; five up to seven were carried out by asking their name before carrying out our objective. Based on your interactions and observations throughout the guided tour, you might elaborate on each of these factors to provide more details about the ages, cultures, and jobs of the important informants. Here's how you could go into more detail:
Ages: the roughly chronological ages of each major informant. This can shed light on how various age groups view the effects of forest degradation on local livelihoods and how different generations view the issue. The main informants represented a wide range of life experiences and viewpoints on environmental changes, with ages ranging from the late 30s to

the early 60s. Culture: Each informant's cultural upbringing. This covers cultural identity, customs, and behaviours that may affect how they see the deterioration of forests. Members of the Amhara and Oromo communities were among the informants, each contributing unique cultural.

Secondary sources

These would include information from the natural resource office, other stakeholder offices, and revised versions of different written documents.

Socioeconomic and Demographic Features of the Respondents

Age structure

The age of the respondents in the study shows that different members of the community, from young to older, were represented in this study. Among them, 42.5% were 31–40 years old, 31 % were 20–30 years old, and those above 50 years old shared 26.5% of the respondents. The majority of the household respondents' age (37.5%) was between 31 and 40 years old. This helps us get good information about changes in forest status in the past and present.

Education level of the respondents

In our study area, the population was categorized into different education levels, and for the study, they were grouped into two broad categories: illiterates and literates.

In the study area, many respondents involved in our survey were illiterate, with 70% of respondents and only 30% being literate.

Data analysis

The data were analysed by extracting information from society. The qualitative and quantitative data that was collected and analysed the qualitative data would be collected through key informant interviews that were narrated and summarized. The quantitative data obtained through a formal survey was analysed. The methodology would be a questionnaire

for the assessment of the impacts of forest degradation on the economy of the community as an individual da Fonseca *et al* (2007). Therefore, the study used graphs and tables to summarize in discussion part.

Results and Discussion

Livelihood strategy

There are different livelihood strategies in the kebele. These livelihood strategies include crop production, livestock production, business, forest production, and other different activities (Table 1).

Table 1. Source of income or livelihood strategy

Source of income	Frequency	Percent (%)
Crop	25	62.5
Forest	8	20
Livestock	3	5
Business	2	5
Other	3	7.5
Total	40	100

The different livelihood strategies of the 62.5% of households primarily depend on crop production, or their livelihood strategy or source of income is crop production. Next to crop production, about 20% of households depend on plantations and natural forest products, either directly or indirectly. On the other hand, about 10% of households depend on livestock and business, and 7.5% of households depend on other income sources .figure 1

These indicate that most farmers do not depend on forest products because of forest degradation or the absence of natural forest in the woreda. This forest degradation makes society dependent only on crop production. But this decreased as the fertility of the soil

decreased from time to time due to continuous plowing of their lands and low crop production from their farms. Forest-dependent woreda is lower when compared with agricultural-dependent. Forest loss is primarily caused by agricultural expansion (FAO, 2020).

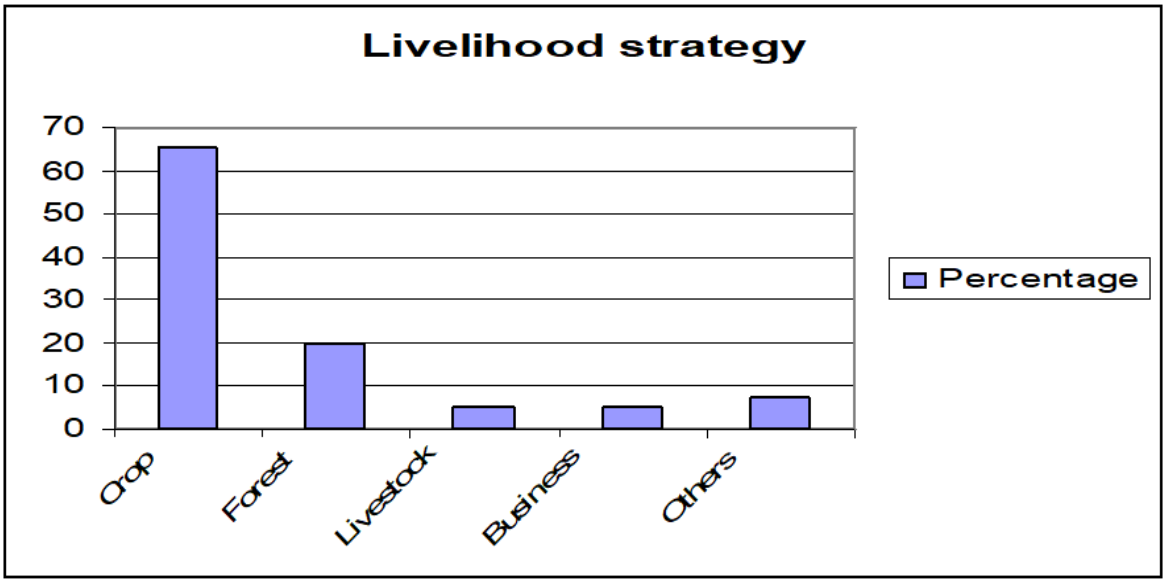

Figure 1. Livelihood strategy

Major forest products and extent of forest dependent

There are different forest products obtained from forests. This forest product includes coffee, timber, firewood, chat, honey products, and other indirect benefits (Table 2).

Table 2. Major forest products

Types of benefit	Before deforestation		After deforestation	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Coffee	7	17.5	10	25
Firewood	9	22.5	5	12.5

Timber	7	17.5	0	0
Chat	2	5	15	37.5
Honey	10	25	4	10
Other	5	12.5	6	15
Total	40	100	40	100

The major forest products generating cash income reported by households include firewood, poles, timber, wood splits, charcoal, logs, tree branches, wooden tools, coffee, chat, honey, and medicinal plants. However, 87.5% and 85% of total house hold depended on firewood, honey, chat, timber, and coffee before and after forest degradation, respectively. About 12.5% and 15% of house hold were depending on other forest benefits before and after forest degradation, respectively. However, the forest products obtained from the forest before and after forest degradation are very different. The forest products obtained after forest degradation are much smaller than before forest degradation, especially the products from natural forests. The percentage of forest benefits the community gets from the forest, as indicated in the above table or chart is more or less similar because the community used other coping mechanisms to obtain forest benefits by planting chat and coffee on their own farm land. In terms of relative dependency which play a crucial role before forest degradation for all households. After the forest has been degraded, relative dependency has been changed to other types of forest products, chat and coffee. Other secondary multi-purpose forest benefits not listed are food for house hold consumption, fodder for livestock, fertilizers for agricultural productivity, medicine, shade for livestock and shade loving crop and farm

forest; for humans, wind break fencing, water regulation, and protection are among the forest benefits identified during focus group discussion. The loss of forest resources can lead to diminished income- and food-generating capacity for forest-dependent communities Figure 2.

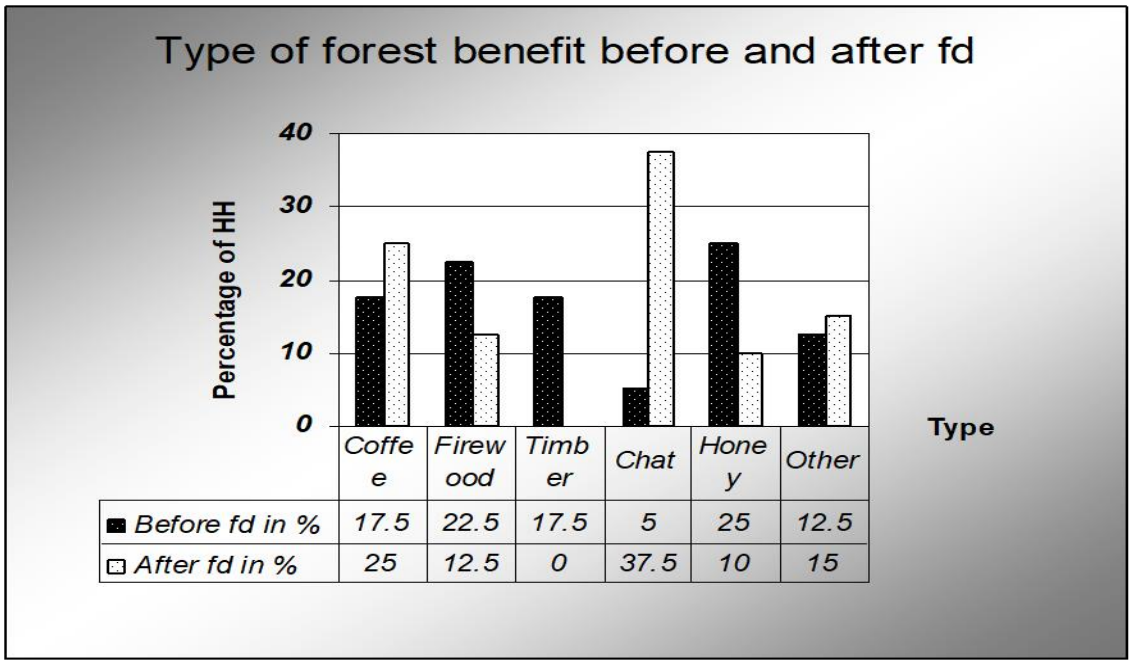

Figure 2. Types of forest benefits before and after forest degradation

Change of other natural resources after forest degradation and its impacts

Status of soil fertility

Forest degradation changes the status of soil fertility at the site where it takes place. The soil in the area where no forest exists is easily susceptible to both water and wind erosion agents.

Table 3. Fertility of soil.

Level of soil fertility	**Before deforestation**		**After deforestation**	
	Frequency	**Percent (%)**	**frequency**	**Percent (%)**
High	25	62.5%	5	12.5%
Medium	13	32.5%	15	37.5%
Low	2	5%	20	50%

Total	40	100%	40	100%

As indicated in table above, 50% of the households said the fertility of the soil in the woreda is low after forest degradation, and only 12.5% of the respondents said soil fertility is high after forest degradation. Land without forests is not very fertile due to different water and wind erosions that make the fertility of the soil decline. These show that the degradation of forests has more impacts on the fertility of the soil and has other adverse impacts on agricultural production and the biological processes of microorganisms in the soil. Forest degradation also causes higher rates of soil erosion and siltation of waterways, the loss of species and genetic diversity, and an increase in carbon emissions, which contribute to global warming (Kaimowitz *et a l.*, 1998).

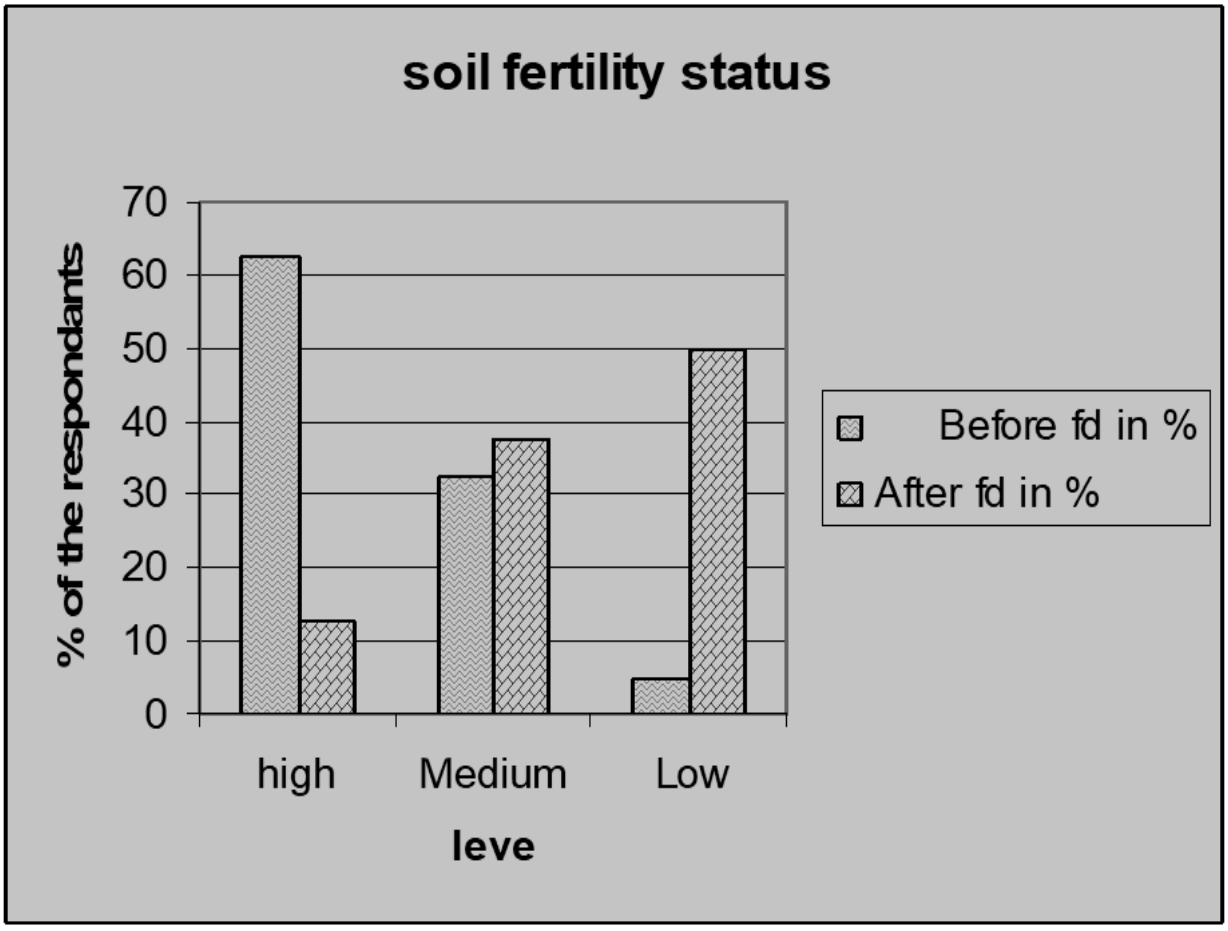

Figure 3. Soil fertility status

Reduction of agricultural production

Agricultural reduction is one of the major impacts of forest degradation on local livelihoods. During forest degradation, agricultural production is minimized from time to time.

Due to the reduction in soil fertility, 95% of respondents told us that agricultural production decreased after forests had been degraded. Only 5% of respondents told us that their production was no longer affected before and after forest degradation.

This indicates that forest degradation has major impacts on agricultural production through the reduction of soil fertility and also affects agricultural production by diverting the normal rain season of the area due to climate change. These create poverty for the local livelihood due to a lack of crop production. Forest degradation also influences food security through its impact on supplies of fuel wood, which is a major source of income for many poor households (Townson, 1995).

Total crop production in quintal per hectare in year

The production of crops is different before and after forest degradation of one hectare in one year. This is due to changes in soil fertility and climate change in the area because of forest degradation.

Table 4. Total crop production in quintals per hectare per year

Crop production in k/g per year	Before deforestation		After deforestation	
	Freq	Percent (%)	Freq	Percent (%)
5-10	5	12.5	25	62.5%
11-15	14	35	10	25%
16-20	18	45	4	10%
>20	3	7.5	1	2.5%

Total	40	100%	40	100%

As indicated in the table above, 62.5% of the households obtain a total crop production of only 5–10 k/g per hectare after forest degradation. However, 45% of the household farmers obtain 16–20 k/g before forests have been degraded. Agricultural production declines with forest degradation, and this loss of forest resources can also lead to diminished income and food-generating capacity for forest-dependent communities. Forest degradation also influences food security through its impact on supplies of fuel wood and other forest products, which are a source of income for most local communities table 4.

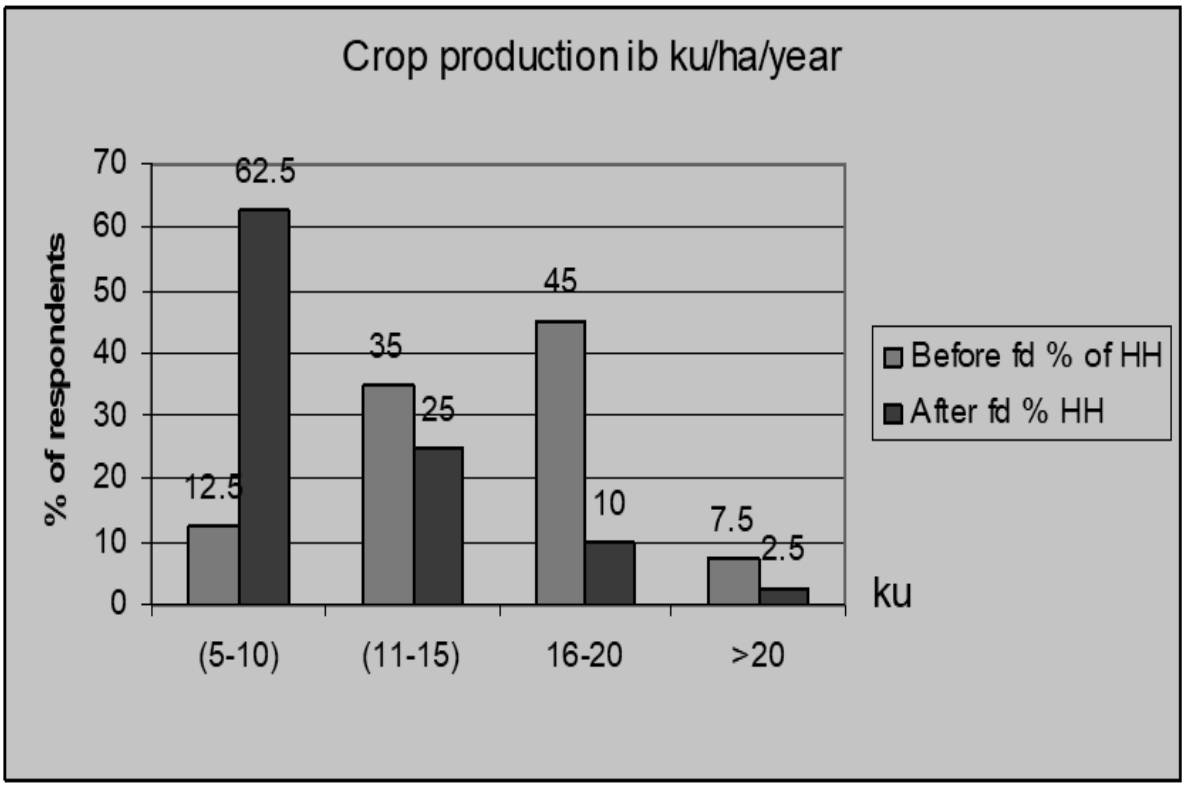

Figure 4: Reduction of agricultural production after forest degradation in quintals per hectare per year (Crop production in quintals per hectare per year on X-axis)

Water status

Forest degradation affects the quantity and quality of water bodies. Out of many houses, 87.5% of the respondents tell us forest degradation has decreased water status. Forest degradation decreased water status due to soil erosion in the water body because of

vegetation loss. Forest degradation degrades the water status from its original size or quantity and also affects the quality of the water, which has adverse effects on the local community and their livestock and on other biodiversity that exists in the water body as habitat. Forest degradation, which involves the loss of ground cover, exposes soil to rainfall and can result in increased erosion leading to sedimentation of waterways, which may have a negative impact on downstream irrigation, fishery, and dam operations (Chomitz and Kumari, 1996).

Conclusion

This study emphasizes how important forests are to providing populations all around the world with necessities like food, money, and watershed protection. But, particularly in developing nations, the alarming rate of forest destruction presents substantial environmental, social, and economic challenges. According to our research, the destruction of primary and secondary forests has a significant impact on how local populations can support themselves.

Beyond the acute loss of forest resources, the effects of forest degradation are extensive. According to the study, soil fertility has significantly decreased, which has increased erosion susceptibility. In addition, this degradation has caused a notable decline in agricultural output, which has had a negative impact on the regional economy and food security. The changing water status brought on by forest degradation also emphasizes how interrelated ecosystems are and how far-reaching the effects of environmental change may be.

7. Recommendations

Based on these conclusions, we make the following suggestions for overcoming the difficulties caused by forest degradation:

1. The production of jobs and empowerment;

Governmental entities, non-governmental organizations, donor organizations, and

corporate bodies should step up their efforts to empower and create jobs for the male residents of forest communities. This proactive method seeks to lessen the stress on trees brought on by excessive exploitation.

2. A campaign for family planning and education

In forest communities, public awareness initiatives that emphasize birth control options and school enrolment should be strategically put into place. Sustainable forest management can be enhanced by lowering the rate of unwanted pregnancies and making sure kids spend less time harvesting forest resources.

3. Cooperative forest management techniques

Effective advocacy and the development of participatory forest management techniques are crucial. To guarantee that these choices for a living are implemented without compromising the ecology of the forest, communities should be actively involved in decision-making processes concerning hunting and the cultivation of tree products. Promoting the use of afforestation systems can improve sustainability initiatives even more by encouraging the development and regrowth of forest cover, which is crucial for biodiversity and ecosystem services. Communities can more effectively campaign for policies that strike a balance between economic requirements and environmental conservation, guaranteeing a peaceful cohabitation with nature for present and future generations, by combining participatory forest management techniques with effective lobbying. To guarantee that these sources of income are maintained, communities should actively participate in decision-making processes pertaining to hunting and the cultivation of tree crops.

In summary, the study underlines the necessity of a thorough and team-based strategy to combat forest degradation. Implementing these suggestions will help stakeholders manage forests sustainably, protecting their natural integrity while enhancing local residents' quality of life. This strategy supports the main objective of promoting environmental

protection for immediate advantages and long-term resilience.

Conflict of interest

No potential conflict of interest

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