Обзор / Review

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Review on drivers of deforestation and associated socio-economic and ecological impacts

ABSTRACT

Relevance. Forests play a vital role in maintaining ecological balance and providing habitats, oxygen, and carbon sinks. However, deforestation resulting from mining, logging, infrastructure development, climate change, and agriculture is leading to their depletion.

This paper aims to investigate the underlying factors driving deforestation and their socioeconomic and ecological consequences.

Results and Discussion. Deforestation has resulted in the loss of 10 million hectares of global forest cover annually, with direct drivers including fires, logging, and converting forests to agricultural land. Indirect drivers encompass political elections, military conflicts, population density, and corruption. Economic growth, road expansion, and politics have exacerbated the pressure on forests, resulting in biodiversity loss. Deforestation is predicted to continue at a rate of 10 million hectares annually until 2025. To mitigate this issue, measures such as reducing emissions from deforestation, promoting sustainable forest management, and enhancing protected area management can be implemented. Furthermore, legal action should be pursued to address the issue of deforestation.

KEYWORDS:

Agriculture, Deforestation, Diversity, Population

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Обзор факторов обезлесения и связанных с ним социально-экономических и экологических последствий

РЕЗЮМЕ

Актуальность. Леса играют жизненно важную роль в поддержании экологического баланса и обеспечении среды обитания, кислорода и поглотителей углерода. Однако вырубка лесов в результате добычи полезных ископаемых, лесозаготовок, развития инфраструктуры, изменения климата и сельского хозяйства приводит к их истощению.

Целью данной статьи является исследование основных факторов, способствующих вырубке лесов, а также их социально-экономических и экологических последствий.

Результаты. Вырубка лесов привела к потере 10 млн га мирового лесного покрова ежегодно, причем прямые причины включают пожары, вырубку и преобразование лесов в сельскохозяйственные угодья. Косвенные факторы включают политические выборы, военные конфликты, плотность населения и коррупцию. Экономический рост, расширение дорог и политика усугубили нагрузку на леса, что привело к потере биоразнообразия. По прогнозам, вырубка лесов будет продолжаться со скоростью 10 млн га в год до 2025 года. Чтобы смягчить эту проблему, можно принять такие меры, как сокращение выбросов в результате вырубки лесов, содействие устойчивому управлению лесами и улучшение управления охраняемыми территориями. Кроме того, необходимо предпринять юридические действия для решения проблемы вырубки лесов.

КЛЮЧЕВЫЕ СЛОВА:

сельское хозяйство, обезлесение, разнообразие, население

1. Introduction

Forests are essential for preserving ecological equilibrium because they act as carbon sinks, habitat providers, and suppliers of oxygen. Even though forests are extremely important, they are disappearing more and more due to logging, mining, infrastructure, and forest degradation brought on by wildfires, agriculture, commercial plantations, and diseases that affect trees [1,2]. According to estimates, tropical forests were losing trees at a pace equivalent to about thirty soccer fields every minute in 2020 and Amazon has lost 17% of its forests in the last 50 years as a result of human activity. Indonesia has lost 85% of its forests as a result of oil extraction and pulp and palm plantations, Ivory Coast has lost 26% of its forests in the last 18 years as a result of cocoa cultivation[3], and Ethiopia has seen a decline in forest cover from 15.11 million hectares in 1990 to 12.2 Mha in 2010 as a result of agricultural expansion [4].

Deforestation has therefore been quickly growing worldwide, with the loss of tropical forests alone accounting for more than 90% of all deforestation between 2000 and 2018 [5]. It is difficult for the biota to survive and carry out its ecological functions in these human-modified environments since the majority of the surviving areas of tropical forests are becoming smaller, more degraded, and isolated from one another due to anthropogenic factors [6]. Despite these difficulties, still trees provide a variety of food varieties that enhance and complement those found in agriculture, wood fuel for cooking, as well as an extensive array of traditional remedies and sanitary goods. Additionally, it increases soil fertility, water percolation, and shed provision, all of which enhance land production [7].

Deforestation, however, is both a serious long-term environmental issue facing the globe today and one of the most dangerous global development concerns. Many times, the forest is portrayed as a stock resource, a free good, and the land is openly convertible to other uses without considering the effects on its ability to provide environmental amenities. As a result, different forest ecosystems have been degraded into ones that are less diverse and stable[8]. Furthermore, the effects of deforestation on society and the economy have transformed wooded areas and are major contributors to the loss of biodiversity and global environmental change. People have had and continue to have a significant impact on the purpose of harvesting timber, forests are cut down, degraded, and split, and then used for agriculture, building roads, and man caused fires [9]. Deforestation alters local ecosystems, including the microclimate, soil, and the ecology of fauna and flora with disease vectors. It is one of the primary causes of newly emerging and reemerging diseases in this century [10].

Deforestation is caused by human activities such as road construction, agricultural expansion, logging, mining, and hydropower development [11]. Because of these actions, the ecology has deteriorated, endangering both present and future life. The removal of forests puts at danger for species survival, our standard of living, the stability of the climate, and the important functions that biological diversity provides [12]. In addition, as a result of economic, social, and agricultural endeavors undertaken in the name of development, deforestation disrupts the forest's natural ecology [13]. Additionally, it impacts economic activity and jeopardizes the way of life and cultural integrity of those who depend on forests by reducing the availability of forest products and contributing to erosion, desertification, drought, and flooding [14]. In particular, forests constitute an important resource base for economic development in many developing nations. Given that many forests have higher levels of biodiversity than other ecosystems, forest ecosystems are essential to global biodiversity.

Forests are inherently linked to human health and economics, but they are constantly in danger of being disturbed or converted to new uses. The intimate connections that people have with forests, especially the traditional ones, are further threatened by climate change, which has an impact on all parties that rely on forests for their ongoing benefits [15,16]. In the past ten years, there have been numerous focused initiatives to use earth observation data to properly predict deforestation and forest degradation over time, supporting nations in meeting their climate targets and commitments while safeguarding their natural resources. To meet these objectives, a clear understanding of the causes and drivers of deforestation, its trend as well as the socio-economic and ecological impacts is essential.

1.2. Objective

- To review the drivers of deforestation and associated socioeconomic and ecological impacts.

2. Literature review

2.1. Definition of forest

According to its dictionary meaning, "forest" refers to a dense growth of trees and bushes that covers a wide area. Still, it's not simple to define a forest. According to a recent study on various definitions of forests [17], there are currently more than 800 definitions in use worldwide. Below is a list of five Forest definitions adopted by major international organizations.

The first one is by the United Nations Food and Agriculture Organization [18], forest is a land with an area of more than 0.5 ha and a tree crown cover of more than 10%. When mature in their natural habitat, the trees ought to be able to grow to a minimum height of 5 meters.

The second one is by United Nations Framework Convention on Climate Change [19], A forest is defined as a minimum of 0.05–1.0 ha of land with more than 10–30 percent tree crown cover (or comparable stocking level) and trees that can grow to a minimum height of 2–5 m when fully matured in their natural habitat.

2.2. Forest ecosystem service

Numerous advantages, or "ecosystem services," are offered by forests. These include habitat for native species [20], the provision of food and water [21], carbon sequestration and storage[22], and the reduction of climate-related hazards like flooding and landslides [23, 24]. The UN Framework Convention on Climate Change (UNFCCC) "Paris Agreement" [25], the "UN Sustainable Development Goals" (SDGs), and the Convention on Biological Diversity (CBD) have all adopted goals or targets related to forest conservation in recognition of the value of forests and their numerous benefits [5]. Humans benefit from ecosystems through ecosystem services. The world's ecosystems' functional value was first quantified in 1997 by Costanza and associates. The Millennium Ecosystem Assessment System was published by the UN in 2005 (MESA) [26].

Ecosystem services can be divided into four groups based on the unique advantages they offer to both humans and the

environment: regulating, sustaining, providing, and cultural services. For human societies to survive and flourish, forest ecosystems provide essential material reserves [27].

Previous research has demonstrated that forest ecosystems serve human societies with a multitude of ecosystem services, but they also have a significant impact on sustaining ecological communities and preserving the biosphere's general stability. It is commonly known that forests are the primary producers of ecosystem services [28]. According to [29], some national classifications take into account up to 100 distinct forest services, such as the production of food; the regulation of water; the sequestration of carbon; the preservation of biodiversity; the retention of nutrients; the regulation of climate; and traditional values.

Ecosystem services, however, are under threat due to urbanization, climate change, and agricultural expansion. Due to these difficulties and the world's continuously expanding population, there is a lack of food security [30]. Economic growth and the extension of agricultural surfaces are two more factors that cause a forest to change. According to [4] about 30.74% of the planet's surface is thought to be covered by forests worldwide. In tropical nations, there was a net deforestation of 7 million hectares annually between 2000 and 2010, whereas there was a net growth in agricultural land of 6 million hectares annually. Deforestation thus represents a global issue since it results in the loss of ecological services provided by trees.

3. Deforestation

Deforestation is the process of permanently removing trees from the ground to create an area for other land use [31]. The primary motivations behind deforestation are to guarantee a enough amount of land for farming, building, habitation, and industrial or manufacturing uses. Deforestation can result from a variety of natural sources in addition to human activity [32]. For instance, huge tracts of land covered in forests can quickly be destroyed by natural fires. Forests are essential to both human survival and nature conservation. People won't have access to natural herbs for medicinal purposes without forests, and all animal species' habitats will be lost in forests. Additionally, forest cover makes sure that the sun's damaging rays do not affect the earth's surface and that the air that humans breathe is filtered [32].

The world's forest cover has been progressively declining over the past few years due to urbanization. Where there once were large forests, there are now large towns and cities. According to predictions from the Food and Agricultural Organization, at least 68% of people on Earth will reside in urban areas by the year 2050 [33]. Due to the incapacity of the existing metropolitan centers to accommodate all of these people, towns and cities are growing. Towns cannot grow without destroying the surrounding natural environment, including forests and other vital resources like rivers.

The land area of Earth, which is more than 4 billion hectares, is covered in forests. 93% of the world's forests are natural, with the remaining 7% being plantations. Ten million hectares of the world's forests are lost annually. The destruction of tropical rainforests by agriculture is estimated to be around 80 percent. 15% of carbon emissions are primarily caused by deforestation. In many regions of the world, deforestation is regarded as a serious issue when it comes to halting climate change and protecting biodiversity. An alarming number of trees are being taken down in some countries. The

Table 1. Percentage of World Forests (% in different countries) Source: [18]

Country	Percentage of world forests (%)
Russian Federation	20
Brazil	12
Canada	9
United States of America	8
China	5
Australia	3
Democratic Republic of Congo	3
Indonesia	2
Peru	2
India	2
The rest of the world	34

table below illustrates how deforestation has led to a concentration of forests in a select few countries across the rest of the world;

According to the research by the World Wildlife Fund, between 2010 and 2030, nearly 420 million acres of forest cover would be lost if the current trend of deforestation is not stopped with strategic and long-term solutions [34]. Additional regions considered vulnerable to the escalation of forest degradation include the Atlantic Forest, Congo, Borneo, Cerrado, Congo, Basin, Eastern Africa, and Eastern Australia [34]. Sumatra, the Greater Mekong region, and the Papua Guinea regions are among the other regions that are highly vulnerable to losing huge tracts of land that were formerly covered in forests. Since they are home to some of the most endangered species worldwide, like the rhino, the duck billed platypus, the saola, and the Gharial, the aforementioned countries have some of the most important ecological and climate sensitive forest regions in the world [35].

The issues associated with deforestation have lost 10% of Africa's forest cover, according to [18]. Due in large part to the continent's massive deforestation problem, the Sub-Saharan Desert is beginning to encroach into Africa. Deforestation affects human rights, society, the environment, and human rights in Africa. The removal of forests takes away a vital source of income for rural African communities. The forest is a source of food, shelter, and medicine for impoverished rural communities. Ten percent of Ghana's and Cameroon's economies are forest-based. The main cause of deforestation in Africa, especially in the Central African Republic, has been identified as logging operations. To provide raw materials for furniture and other uses, trees are cut down carelessly. The corporations that engage in logging around the continent and the nation use labor-intensive techniques and efficient machinery to remove trees and any vegetation that may have been present on the ground. Mining operations have contributed to the issue of deforestation, particularly in the Congo Basin and Central Africa [18].

3.1. Drivers of Deforestation

To alter current patterns in forest activities toward a more climate and biodiversity-friendly outcome, policies and strategies aimed at addressing the drivers of deforestation must be taken into account. A mechanism for reducing emissions from deforestation and forest degradation, improving forest carbon stocks, and promoting sustainable management and conservation of forests (REDD+) in developing nations is being developed by parties to the United Nations Framework Convention on Climate Change [36]. The topic of categorizing national

drivers and activities producing forest carbon change for REDD+ monitoring and implementation has gained increasing attention in the REDD+ debate, in addition to the debate over policy incentives and methods for measuring, reporting, and verification (MRV) [36]. Unindustrialized nations have been urged by the UNFCCC discussions [19, 36] to identify forestry activities and land use, particularly those that are linked to the causes of deforestation and forest degradation, and to assess how they might help mitigate climate change. Comprehending the extent of forest degradation is essential for formulating suitable regulations, as well as for creating national REDD+ strategy and implementation plans (Boucher, 2011, Rudorff et al., 2011). Forecasts of anticipated growths, like those needed to establish forest reference levels [37], must be grounded in an understanding of the underlying causes of specific drivers and may need to be taken into specific consideration for processes involving deforestation and degradation [38].

Therefore, to support national REDD+ activities, state documents about the types and relative significance of drivers of deforestation and degradation are becoming almost as relevant as the vital national data on changes in forest area and the corresponding changes in forest carbon stocks. Despite their importance, quantifiable national-level data on the causes and actions that start deforestation and forest degradation are typically lacking. For many developing countries, it is impossible to determine the exact percentage of emissions or deforestation that is produced by a certain driver. In the past, most scientific study has been based on local scale or regional to global assessments [39, 2, 40].

Deforestation includes several elements embracing not only environmental aspects but also demographic, socio-economic, and political dimensions. By creating a classification system for the variables linked to deforestation, scholars have attempted to comprehend its complexity. These variables are typically divided into two categories: the underlying/indirect causes and the proximate/direct causes, which are discussed below.

3.1.1. Direct Drivers of Deforestation

Anthropogenic and natural activities that have a direct impact on forests and are therefore proximate sources of change are known as proximate drivers of deforestation. These activities arise from the interaction of multiple underlying forces in the social, political, technological, economic, and cultural domains [31]. There are various categories into which proximate drivers can be divided. The main drivers of deforestation are fires, commercial logging [41, 2], subsistence logging [42, 2], conversion of forests to agricultural areas [3], and oil palm plantations [43]. Although it has been shown that the primary cause of deforestation in the tropics is agricultural expansion [44] , causes vary from place to place and alter over time [43, 40].

3.1.2. Indirect Drivers of Deforestation

A variety of institutional, cultural, technological, and economic elements interact differently to cause indirect causes of deforestation [39]. There is strong evidence that the presence of specific enabling conditions leads to an increase in deforestation. For instance, there has been a correlation between increased rates of deforestation and corruption, in which officials trade away public commodities (such as land, forests, or policies) to privatize advantages [45, 46, 47]. A nation's GDP may also be significant, as nations with lower GDPs tend to have higher rates of deforestation. High-GDP countries are less likely to rely on logging, yet deforestation is probably linked to the economic growth of low-GDP nations [48]. Additionally, nations with higher populations tend to have higher rates of deforestation [49]. It's interesting to note that free media is also linked to reduced deforestation, which may mitigate the impacts of corruption by making politicians fearful of a public scandal when they privatize public goods [50, 51]. While there is growing evidence that other social factors (e.g., armed conflicts, illegal crop production, and elections) may drive deforestation trends in the tropics, they have received less research attention [52, 53, 54].

Economic growth and associated pressures on natural resources make up the majority of the broad categories of global indirect deforestation drivers. The global GDP grew from approximately $16 trillion in 1970 to $47 trillion in 2005. Possible contributing causes include changes in socioculture, technology, economics, and population growth. This method served as a helpful indirect way to study the deforestation situation in Southeast Asia [55]. The fundamental factors that drive the proximate causes through socioeconomic processes appear to be the underlying causes operating at the macro level [56].

4. Pressure

Rising worldwide demand for minerals, energy, food, forest products, crops, and tourism are some of the economic factors contributing to the increased pressure on forests [57, 58, 59, 60] , extending roads and other infrastructure related to energy, communications, and transportation [57, 61]. The

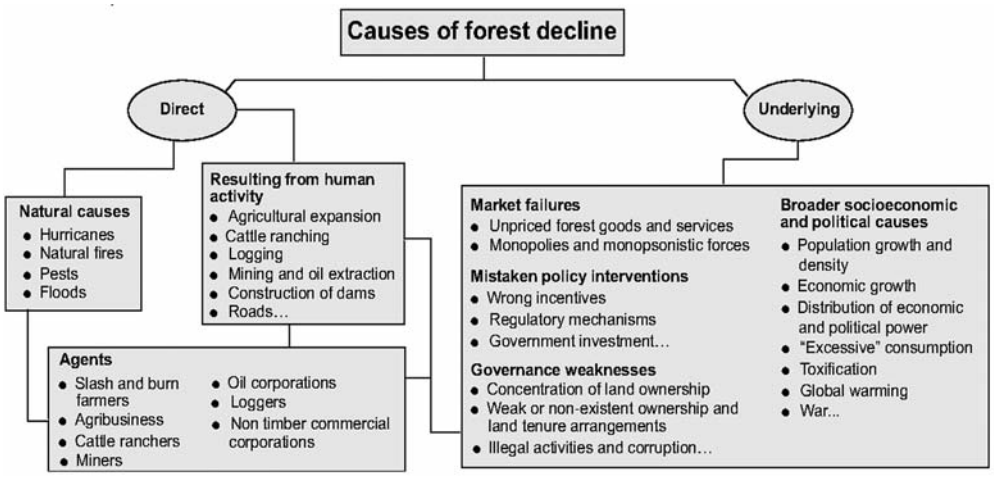

Figure 1. Causes of Deforestation

other is political pressure, which includes the desire of politicians to revive national economies by extending agricultural and extractive industries to new areas and the increased political clout of elite groups associated with these industries [62, 63, 64].

Increased demand for government budget cuts for green initiatives and regulations [65, 66, 67]. Increased organized crime activity in forested areas, to engage in unlawful mining, growing and transporting illicit crops, and money-laundering from criminal activity [68, 69] moreover, technological advancements in agriculture, mining, and gas production that enable companies to reach new markets and utilize their natural resources [70, 71]. Demographic factors associated with native inhabitants' constant migration to forested places [72, 73]. Factors such as climate change and forest fragmentation increase the risk of forest fires [1].

5. Impact of Deforestation

There are fast ecological changes occurring in many emerging nations, such as deforestation and changing farming methods [74]. Because of their impact on vector survival and reproduction, these ecological changes could have a major impact on the spread of diseases carried by vectors [75]. The two biggest environmental changes occurring in rural parts of Southeast Asia, including China and Myanmar, are deforestation and cash crop cultivation [76]. Illegal logging, agricultural clearing, and land development for housing and hydroelectric projects have resulted in the loss of many forests. Deforestation has altered the ecosystem significantly, which may have an impact on the ecology of malaria vectors.

Developing nations are particularly concerned about deforestation because of its detrimental effects, which include a decrease in biodiversity and an increase in the greenhouse effect [77]. The most enduring, dependable, practical, and extensively utilized raw material is plant life, which is essential for the production of oxygen and the capture of greenhouse gases [78]. Approximately 3.9 billion hectares, or 30% of the planet's geographical area, is covered in forests. It was expected that the original forest cover was around six billion hectares [79]. Every day, between 50 and 100 animal and plant species are lost as a result of deforestation. Despite their great value to humanity, especially in the field of medicine, several of these species are currently in danger of going extinct [78].

5.1. Impact of Deforestation on Socioeconomic

Deforestation's social and economic effects have led to the alteration of wooded areas and are one of the main causes of biodiversity loss and global environmental change. People continue to have a significant influence. Road building, the harvesting of timber products, agriculture, human-caused fires, and many more factors eliminate, degrade, and fragment forests. The attempt to exploit and control the forest has been a recurring topic in the evolution of the planet, in the lives of many people, in numerous places, and typically in the spheres of international, national, state, and local government/communities [9]. Additionally, it disrupts economic activity, jeopardizes the way of life and cultural integrity of those whose livelihoods depend on forests, and results in siltation, erosion, desertification, drought, and flooding [14].

The production of lumber and other forest products is one way that forests support the global economy. A variety of value-added contributions, such as beauty and recreation, can be made to the forest in addition to direct employment in forestry facilities. Every year, the loss of tropical forest cover might cost the US economy roughly 45 billion dollars [80]. When a forest is destroyed, the direct sources of economic gain are eliminated, and any prospective profit from the resources the forest provides such as water, soil, and biodiversity is also eliminated. Additionally, the loss of forests raises the likelihood of flooding, human-wildlife conflict, and rising carbon dioxide concentrations, among other negative externalities [81].

5.2. Impact of Deforestation on Ecology

Deforestation causes biodiversity to deteriorate. The loss of forest cover has disrupted the ecosystem and decreased biodiversity. In addition to providing a home for wildlife and aiding in the conservation of biodiversity, forests also promote medical protection. As forest biotopes are a valuable source of novel medications, destruction can irreversibly erase genetic variants, such as those that cause crop resistance [82]. Since tropical rain forests are the most diverse ecosystems on Earth and contain around 80% of all known species, the loss of significant forest cover has left the environment degraded and biodiversity decreased [5].

Because forests, particularly those found in tropical regions, act as repositories of biodiversity, their destruction through deforestation, fragmentation, and degradation threatens both the habitat of migratory species, including some that are endangered and some of which are still unclassified. Approximately two-thirds of all known species are found in tropical forests, which also house 65% of the 10,000 threatened species worldwide [83]. Preservation of the biodiversity in forested regions is similar to preserving a type of capital until further studies can determine the relative significance of various plant and animal species [84]. The World Health Organization estimates that almost 80% of people on the planet receive their primary medical treatment from traditional medicine, at least in part. The loss of biodiversity and the resulting significant shifts in the forest cover could bring about unanticipated, and irreversible consequences. These include the possibility that local climate change and feedback effects could turn rainforests into savannas, as well as the possibility that new illnesses will arise as a result of greater animal-human contact brought on by the growing bushmeat trade [84].

5.3. State(s)

The state forests are severely degraded and deforested due to the combined effects of direct and indirect human activity and natural climate variables. These elements have led to the loss and depletion of ecosystem services and forest biodiversity. Globally Deforestation decreased from 16 million hectares per year in the 1990s to an expected 10 million hectares per year between 2015 and 2020. Since 1990, the global primary forest area has shrunk by more than 80 million hectares. Ten million hectares of forest were lost annually between 2015 and 2020, representing a 35.48% drop from 1990 to 2010 and a 16.67% decline from 2010 to 2015. Every minute, 2,400 trees are taken down. In 2020, there were 25.8 million hectares of forest gone, which is twice as much as there was in 2001. Deforestation causes the extinction of 50,000 species annually. 25% of chemicals used in Western pharmaceuticals and medications come from rainforests. The rainforest provides 25% of the medications used to treat can-

cer. Seventy-five percent of tropical rainforests are unable to recover from drought and wildfires in the right way.

According to trend modeling, the average annual deforestation in Africa will remain between 3.4-4.4 million hectares between 1990 and 2025, and then it will somewhat slow down between 2.5-3.8 million hectares between 2025 and 2050. Ghana's forest resources are almost completely lost due to extensive deforestation and forest degradation [85]. To meet the growing need for food due to population growth, shifting cultivators destroy forests to make way for annual or permanent crops [86, 87]. Other actions include the complete removal of the forest. Logging techniques that are profitable lower forest stocks [88, 89]. According to [90], overexploitation, unsustainable resource extraction, and illegal mining have resulted in significant habitat and biodiversity loss in the forest reserve's shelterbelt. Additionally, the extraction of forest resources has caused habitat destruction and depletion of flora and fauna.

6. Response to Reduce Deforestation

Improving the well-being of cultivators along the forest boundary must go hand in hand with strategies for decreasing deforestation. Since these will vary by place and evolve throughout time, there are no universal answers or approaches. All strategies require goodwill and collaboration. The creation of management plans, stakeholder participation, enforcement, and monitoring are all crucial components of effective implementation [91]. The policies ought to recognize the vital roles that the federal, state, and local governments play, while also enabling the private sector and civil society to actively contribute to reducing deforestation often in conjunction with the government. Here are the tactics that are revealed:

Reducing Emissions from Deforestation and Forest Degradation: International organizations, such as the World Bank and the United Nations, have started to implement programs aimed at reducing deforestation, primarily by lowering emissions from deforestation and forest degradation. These programs use direct financial incentives or other forms of reward to persuade less developed nations to reduce deforestation. A lot of effort is being put into developing instruments to track how well-developed nations are adhering to the REDDS standards [91].

Increasing the Management Standard of Protected Areas: A vital component of any effort to preserve biodiversity is the designation of protected areas [92]. However, protected areas by themselves are insufficient to preserve biodiversity. Alongside and as a component of a broader strategy to conserve biodiversity, they must be taken into account. 10% of the total forest area is widely thought to be the minimum amount of forest that needs to be preserved. According to reports, 12.4% of the world's forests are found inside protected zones.

Increasing Forest Permanent Reserved Area for Timber Production: The absence of forests set aside expressly for the production of lumber is the biggest obstacle to sustainable forest management. According to [93], only roughly 6% of forests in developing nations were managed, compared to 89% of forests in industrialized nations. It would be possible to meet the demand for timber sustainably and create buffer zones to combine the protected areas if 20% could be put aside this would result in the formation of one of the biggest and most important conservation estates in the world [94].

Increasing and Maintaining Forest Value: The true value of forests can be increased in a variety of ways. In addition to making investments to increase the forest's sustainable output, governments can impose reasonable rates on forest rent. Forests provide environmental services, but those who benefit from them must pay for those services [91]. Systems to collect fees for environmental services such as carbon sequestration, biodiversity conservation, and ecotourism have been developed with some degree of success. Incorporating the participatory method of management with these collection systems can help further realize this goal by guaranteeing equitable rights and ownership in resource and benefit sharing, which will improve the livelihood of the rural poor society who are, the primary stakeholders in conservation and management.

Promotion of Sustainable Forest Management: Ecologically, commercially, and socially sustainable forest management is necessary to promote it. To achieve ecological sustainability, the forest's natural assets must not be diminished and, if at all feasible, should be enhanced. However, environmental facility management on its own cannot be sustained in an economic or social sense. It won't occur until the developing countries have advanced to a point of prosperity and development where they can bear the associated expenses. If not, the developed world needs to be ready to cover all expenses [91,95].

Reinforce Government and Nongovernment Institutions and Policies: For the rate of deforestation to decline, a strong and stable administration is essential. Believed that if the governments of the nations that are deforesting were committed to stopping it, half of the current tropical deforestation could be stopped [95]. NGOs have made a significant contribution to conservation management. Tenure and management rights in forests are usually always limited. Reserved state ownership and management are possible, provided that sustainable timber exploitation is permitted. The majority of tropical forests in the world are now held by states, but restrictions on extraction and conversion must be placed in place to encourage community involvement in forest ownership and management [91]. It is necessary to find a way to balance development with conservation by bringing local and indigenous inhabitants closer into the decision-making process.

7. Conclusion and Recommendation

7.1. Conclusion

One of the most significant and long-term environmental problems the world is currently confronting is deforestation, which poses a threat to global development. In addition to being one of the major causes of global environmental change and the loss of biodiversity, the economic and social effects of deforestation have sparked the transformation of forested areas. Human influence has persisted and is still very strong. To effectively target interventions and inform policies related to forest management and conservation, it is imperative to comprehend the processes involved in deforestation. Strong community institutions and political will are the foundation of community-based forest management, which can further address this. Numerous human endeavors, including the development of agriculture, logging, transmigration, building of roads, mining, and hydroelectric projects, are responsible for deforestation.

All life depends on the vast array of services provided by forest ecosystems, which are beneficial to humans. Deforestation is caused by several variables that include socioeconomic, political, and demographic elements in addition to environmental ones. Urgent effort is required to address new climate change challenges and further explore and safeguard the local woods' economic value. This is especially true for new initiatives implemented as part of REDD+ initiatives, where broad forest governance and public involvement are linked to ensure the livelihood advantages of those whose livelihoods depend on forests. The world's vital forest ecosystems and customary ways of life will be preserved by these revived activities.

7.2. Recommendations

- Legal action against unlawful users should be taken to address the deforestation issues.
- To mitigate deforestation, promote tree planting. Additionally, it is preferable to disseminate information on forestry through formal and informal education stakeholders.
- Prioritizing the identification of alternative energy sources through the use of creative, locally developed techniques like wood-saving stoves and biogas.
- Create several mechanisms for sustainably managing forests in collaboration with the local community and various stakeholders, such as CBFM, COM, and PFM.
- Provide incentives to the community in a different way, as through REDD+, to lessen the strain on the forest.

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