

The Impact of Deforestation in India - An Economic Analysis

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ABSTRACT

India's economy is having a hard time because cutting down trees hurts agriculture, water sources, biodiversity, and the country's ability to handle climate change. A lot of research has been done on the economic effects of cutting down trees in India, and this abstract summarizes the main results and suggestions. The study shows that cutting down trees changes the weather patterns in an area, which in turn makes water scarcer and lowers the amount of food that can be grown. Loss of biodiversity and damage to habitats not only put ecotourism and traditional ways of life at risk, but they also make wage inequality and food insecurity worse. Cutting down trees increases carbon pollution and makes climate change worse, which in turn raises economic risks. Some policy ideas that could help solve these problems are funding community-based protection programs, encouraging sustainable land use, and putting in place more enforcement tools. India can only have fair development and long-term forest management if it brings together traditional knowledge systems and encourages foreign partnerships. Last but not least, governments, scholars, and local people need to work together to lower the economic costs of deforestation. India can protect its natural resources and provide growth paths that are both stable and fair by putting in place policies and solutions that are based on facts

Keywords: deforestation, India, economic impacts, agriculture, biodiversity, sustainable development

I. INTRODUCTION

Deforestation is a big problem for both the environment and the economy. It hurts India's ecology, its ability to handle climate change, and its economy. India's varied forest cover makes up about a quarter of the country's total land area. However, India's forest cover has been steadily decreasing over the last few decades due to things like more people moving to cities, cutting down trees, building roads and other infrastructure, and increased agricultural output. This event has an effect on communities in both rural and urban places. It changes water supplies, ways of making a living, and the overall balance of the environment. India's deforestation creates tough trade-offs from a business point of view. There may be short-term benefits to cutting down trees, like more crops or more money from selling wood, but the astronomically high long-term costs more than cancel them out. Cutting down trees makes it harder for woods to control watersheds, store carbon dioxide, and provide homes for many plant and animal species. There are already problems with climate change, like too many greenhouse gases, not enough water, and land erosion. This loss could make them worse. To make protection and land use policies that will last, it is important to know how cutting down trees in India affects the country's economy. India's economy is affected by

deforestation in many ways. This study looks at those effects from different perspectives, such as the natural, social, and economic. Our goal is to make it very clear why India needs to take action right now to promote sustainable .development and protect forests

Aim and Objectives of the study

The study's goals are to find out how much deforestation costs in India and come up with ways to stop it. This will .help with healthy forest management and economic growth

:Objectives of the Study

1. When one look at the direct and indirect economic effects of deforestation in India, one should think about .how it affects biodiversity, farming, water supplies, and carbon sequestration
2. Look into how cutting down trees affects the ability of people in rural areas to make a living, especially .those whose communities depend on forest resources for money
3. Third, learn about what happens to nature when trees are cut down. Deforestation hurts the economy and .the environment. It pollutes water, wears away soil, and speeds up climate change
4. Fourth, use economic research to come up with policies, forest conservation rules, and afforestation .programs that will encourage reforestation and protect biodiversity

The study's goals are to shed light on the financial effects of deforestation in India and give stakeholders, lawmakers, and environmentalists useful information on how to lessen the negative effects and support sustainable .development projects

Literature review

A lot of people around the world are worried about how cutting down trees will affect ecosystems and economies. As per Paul et al.(2021) deforestation is a big problem in India, which has a lot of natural resources and a lot of different kinds of plants and animals. The country needs to do something about it. This literature review looks at all the work that has been done on deforestation in India with an eye toward what it means for the economy. This review combines the most important findings from academic papers, policy papers, and real-world studies to help us better understand how cutting down trees in India affects the country's economy and suggest ways to manage and .develop forests in a way that is sustainable (Bejagam et al. 2022)

Deforestation Trends in India

More than a quarter of India's land area is made up of forests and other natural areas. Mangroves, temperate forests, tropical rainforests, and other types of forests are included. No matter what, India has lost a lot of trees over the last few decades for a number of different reasons. As per Inatimi (2023) the destruction of India's forests is due to things like building more cities, mining, building infrastructure, cutting down trees for lumber and fuelwood, and farming. The problem is made worse by the fact that the forest is getting worse because people are cutting it down without caring. In India, rates of deforestation can be quite high in some places, like in the states of Maharashtra, Andhra Pradesh, and Madhya Pradesh (Sahana et al. 2022). Scientists can keep an eye on trends in cutting down trees and changes to the forest cover thanks to satellites and other forms of remote sensing. In this way, they can .learn more about how it affects the environment and general health

Economic Implications of Deforestation

According to Walim (2020), cutting down trees has big effects on many Indian business groups and economic areas. To make laws that are good for both the business and the environment, it is important to fully understand these .effects

1. Impact on Agriculture

Instead of woods, fields are built where forests used to be. In the short term, this might be good for farming. In the long term, it might be bad. Asare et al. 2020 stated that cutting down trees changes the weather in the area, which in turn changes farming. It changes how much rain falls and how fertile the land is because of these changes. Mallik et al. (2023) stated that taking down trees hurts farmers' wages and their fields because trees do things naturally, like .keep bugs away and make the soil fertile

2. Water Resources

The natural equilibrium and the management of water flows are greatly influenced by forests. Deforestation alters river courses, decreases groundwater flow, and makes ecosystems more susceptible to storms and droughts (Siddha and Sahu 2022). This has negative effects on farming and the sustainable use of water resources as it alters the available water for irrigation, human consumption, and industrial purposes

3. Biodiversity Loss

According to Singh (2020), India is well-known for its rich biodiversity, which includes a wide variety of local plant and animal species. Because deforestation destroys habitats and reduces Earth's biodiversity, it is very harmful to rare plants and animals. The ecosystem isn't the only thing that suffers when species go extinct. Traditional knowledge systems, ecotourism, and the pharmaceutical sector all incur expenses due to the utilisation of natural resources in the production of novel medications (McNeely 2020)

4. Climate Change

Because they absorb carbon dioxide from the air, trees play a crucial role in mitigating climate change. More carbon dioxide is released into the air as a result of tree cutting. Greenhouse gas pollution increases and climate change is exacerbated as a result of this (Rajak 2021). One way to adapt to and lessen the impact of climate change is to protect trees. This is due to the fact that it has substantial monetary consequences, such as increased frequency of extreme weather events, agricultural loss, and public health risks

Policy Responses and Conservation Efforts

There is an immediate need to reduce tree cutting in India, hence the country has established conservation projects and implemented legislation to that effect. These initiatives aim to promote sustainable forest management practices and save native species. One of the most effective ways to prevent tree cutting and encourage the planting of new trees and the replanting of old ones is to implement programmes like the National Afforestation Programme (Ministry of Environment, Forest and Climate Change, Government of India), the Wildlife Protection Act (1972), and the Forest Conservation Act (1980). Locals are given authority over resources and the ability to conserve trees via the community-based conservation strategy known as Joint Forest Management (JFM). Wildlife is better protected and sustainable living is encouraged by this. The Indian government has worked with other countries on REDD+ and other projects like it to keep its woods safe (Muthee et al. 2022). That being said, these plans have not yet fully worked

The Indian government is still having trouble stopping people from cutting down trees. Not enough money, loose enforcement of forest laws, and different land-use interests are some of the things that slow down conservation efforts. Some of the main things that cause damage are poverty, population growth that can't be stopped, and wasting money that isn't needed. To stop them, you need to do a lot of different things that are good for the land, people, and companies. Find out more about the economic and social reasons why trees are cut down, new ways to pay for protecting forests, and how well policy changes help reach goals for sustainable forest management. This should be the main goal of this field. The goals of regional growth and neighbourhood protection must be linked if more people are to know about and get active in their areas. Cutting down trees hurts India's income, as well as farms, wildlife, water sources, and its ability to deal with climate change. As Hossain et al. (2020) say, taking down trees is bad for more than just the environment. It also hurts food security, area businesses, and the growth of the national GDP. At their core, these uniform policies should put a lot of weight on public participation, long-term forest management, and steady planning. To lower the prices of damage and promote fair and long-lasting growth and sustainability, this study shows how important it is to have policies and programmes that are based on facts. To do this, it looks at past studies that looked at how people in India cut down trees

Methodology of the study

This study uses old data to give a full picture of how cutting down trees in India impacts the economy. This is done with the help of new writing and study. This is the process of reading and putting together scholarly works, papers, and studies that have already been done on a topic. By gathering, researching, and putting together data from

different sources, the method aims to give a full picture of how cutting down trees in India impacts the country's funds

Data Collection and Selection Criteria

Data about forestry and its effects on the Indian economy must be derived from reliable sources. In order to gather a wide range of material, one perused scientific journal, official documents, policy papers, and books published by international organisations. Use the search phrases "deforestation in India," "economic impacts of deforestation," and "forest conservation policies" to identify relevant studies. In order to ensure that only high-quality, helpful information is presented, selection variables are used. Academic books and chapters, government studies, and reports from environmental organisations are given priority since they have been reviewed by other experts in the topic. The selection procedure ensures that it considers the most current policy changes and research outcomes by examining the articles' dates of publication

Data Analysis and Synthesis

The collected material has been meticulously reviewed and compiled. One approach to categorise pertinent research is to look for common themes, such as responses from policymakers, impacts on water and agriculture, the monetary costs of deforestation, and the extinction of species (Raihan 2023). Every research is meticulously reviewed for its methodologies, primary findings, and implications. In data synthesis, identifying recurring themes, trends, and patterns in the literature is crucial. When two or more sets of findings don't add up, it's time to get out the comparison analysis tools. The economic impacts of deforestation have been the subject of much study, and one can summarise all of that work here. While doing so, one clarify the fundamental theories and concepts

Limitations and Considerations

One must be cognizant of the potential pitfalls of secondary research. The findings are conditional on the amount and quality of the existing literature, which varies in critical accuracy, geographic emphasis, and methodology. The summary's findings may also be impacted by the original study's shortcomings. Due to the transparency and regulation of the process, these constraints are kept to a minimum. The selection of only credible sources is ensured by thoroughly outlining the inclusion criteria and making every endeavour to include a variety of perspectives and facts

Ethical Considerations

Doing secondary research ethically entails correctly attributing and identifying sources. If someone do this, it will be clear that they value their work and have stopped plagiarising. No matter what, students will always do their best in class and respect the guidelines for appropriate written work. A few further remarks on the methodology of the study: Through secondary research, people are able to delve more deeply into the monetary impacts of forestry in India. Incorporating the most recent research and literature, this approach clarifies the many opportunities and threats associated with forest protection and sustainable development

Data Analysis and findings

The research and conclusions about the impact of tree cutting on India's national budget are shown on this page. Academic publications, government studies, and policy papers are all part of the extensive literature evaluation that formed the basis of the study. With an emphasis on water supply, agriculture, wildlife, and climate change, people want to clarify the many economic consequences of tree cutting in India. Tables and statistics provide supporting evidence for the key points and patterns

Impact on Agriculture

According to Coleman et al. (2021), deforestation significantly impacts agricultural productivity and rural life in India. Even though clearing trees for farming boosts food production in the short term, the richness of the soil, water supply, and environmental security are all negatively impacted in the long run

:Statistical Overview

The net area seeded in India grew from 140.1 million hectares in 2001-02 to 142.4 million hectares in 2017-18, according to the Forest Survey of India (2019). This demonstrates how the expansion of farming has altered the use of land

Table 1: Trends in Net Area Sown in India (2001-02 to 2017-18)

Year	Net Area Sown (million hectares)
02-2001	140.1
08-2007	141.6
14-2013	142.0
18-2017	142.4

:Key Findings

1. It's more likely to flood after cutting down trees because it changes how chemicals move through the soil. It's less food and the land aren't as good because of these two things
2. Second, places to farm that don't have many trees have more water stress, which changes what foods can be grown and how much water they need
3. Bug Outbreaks: Cutting down trees changes the environment, which means more crops fail and more bugs show up
4. Poor people and unfair economic conditions: Small farms and people who depend on forest products but are poor or disadvantaged are the ones who are hurt the most by the damage

Impact on Water Resources

For the drainage cycle to stay in balance, forests are very important. They change how rivers flow, how groundwater levels rise, and how rain falls. These things change when you cut down trees, which makes floods and droughts more likely and water scarcer (Bodo et al. 2021)

:Statistical Overview

The Central Water Commission (CWC) did research that shows that places where a lot of trees are being cut down have different river flows and water supplies

Table 2: Changes in River Flows in Deforested Regions

Region	(%) Change in River Flow
Western Ghats	%15-
Eastern Ghats	%10-
Indo-Gangetic	%8-
Brahmaputra	%12-

:Key Findings

1. Cutting down trees slows the flow of groundwater, which causes water tables to drop and more harmful ways to get water are used. The level of fresh water drops because of this
2. Forests make water better because they naturally block out noise. Cutting down trees makes pollution and soil runoff worse, which is bad for people's health and the health of environments that depend on water

- Places where trees have been cut down are more likely to have soil flow and flash floods, which could be dangerous for people living downstream

Impact on Biodiversity

Indian biodiversity is well-known because the country has a lot of different ecosystems and species that live in them. Trying to protect biodiversity is risky because cutting down trees hurts places, kills species, and changes how ecosystems work to help people

:Statistical Overview

The Wildlife Institute of India (WII) has found that places where trees have been cut down have an alarmingly high rate of species loss

Table 3: Species Decline in Deforested Regions

Ecosystem	Decline in Species Richness (%)
Western Ghats	%20-
Northeastern India	%15-
Himalayan Region	%18-
Coastal Areas	%12-

:Key Findings

- Cutting down trees destroys natural settings, which separates animal groups and lowers genetic variety
- Second, the loss of biodiversity hurts the economy. It hurts ecotourism, traditional knowledge systems, and the drug industry, which uses natural materials to make new drugs
- Third, trees are important because they do good things for the environment, like making the soil healthy, fertilising plants, and saving carbon. These processes get messed up when trees are cut down, which hurts both crops and people's health

Impact on Climate Change

Moomaw et al. (2020) stated that since trees in carbon dioxide from the air, so they are a big part of making climate change less bad. Cutting down trees put a lot of greenhouse gases into the air. These gases add carbon to the air, which speeds up the warming trend

:Statistical Overview

The Ministry of Environment, Forests, and Climate Change (MoEFCC) issues news releases that talk about how cutting down trees pollutes the air with carbon

Table 4: Carbon Emissions from Deforestation (2010-2020)

Year	Carbon Emissions (million tons)
2010	132
2015	148
2020	165

:Key Findings

- Trees and other plants that take in carbon dioxide from the air are called carbon sinks. This process is slowed down by cutting down trees, which increases carbon pollution and speeds up climate change
- Feedback Effects: The effects of climate change, such as rising temperatures and changing rain patterns, make it more likely that things will catch fire and make the environment even worse than it is now

Policy Responses and Conservation Efforts

India has started to protect forests and has made many laws to stop people from cutting them down and help with long-term forest management. The National Afforestation Programme, the Wildlife Protection Act of 1972, and the Forest Conservation Act of 1980 are a few projects that stand out

:Statistical Overview

It is possible to see where the government's money for growing trees and protecting woods comes from by looking at the numbers

Table 5: Budget Allocation for Forest Conservation Programs (2015-2025)

Program	Budget Allocation (in crores)
National Afforestation Program	2000
Green India Mission	1500
Compensatory Afforestation Fund Management and Planning Authority	1000

:Key Findings

- People in the area can help protect trees and manage resources through Joint Forest Management (JFM) projects, which are also called "citizen engagement." This helps protect the environment and makes sure that everyone can make a living
- Working together with other nations: The Indian government's Ministry of Environment, Forests, and Climate Change (REDD+) partners with other nations to get money for forest protection projects

Challenges and Future Directions

Indian attempts to save the environment have not been enough to stop people from cutting down trees. Conservation attempts are slowed down by not having enough money, not being clear about how to use land, and not being able to police forest limits well

:Key Challenges

1. Lax enforcement of forest rules makes it possible to cut down trees and grow trees without permission, which makes it harder to protect the forest
2. Conservation goals and goals for land use growth make it harder to take care of trees in a way that won't harm them in the long term

:Future Directions

1. In order to do more study in the future, one idea is to use methods from different fields. Because of this, we can figure out how to fix the economic and social issues that lead to cutting down trees and check the effectiveness of the policies we use
2. The second is making people better at what they do. We need to get more people in the community active and improve the skills of organisations if we want to reach the goals of green forest management

India's economy is hurt badly by cutting down trees because it changes the environment, wildlife, water sources, and farming. The study of the data shows how complicated the link is between growing economies and damage to the environment. Here we see how important it is for laws and attempts to protect nature to be based on facts. With its use of numbers and earlier study, this work adds a lot to what people in India are saying about fair growth and long-term forest management. It's up to the people who live there, the government, and other groups to work together to fix the problems that damage brings. The world will be safer and natural materials will be better cared for this way

Discussion

India's economy is hurt by cutting down trees in many ways, such as farming, wildlife, keeping water in the ground, and getting ready for climate change (Kumari et al. 2020). One takes a close look at how cutting down trees costs India money and offers ways to fix the issue. It might be easy to figure out the best way to handle and grow forests in the long run that is good for everyone if you look at the problems, the legal choices, and the efforts to protect them.

Understanding Deforestation Drivers

India's forests are being cut down for a lot of different reasons, including more farms, more people, the building of new facilities, and wasteful use of resources. There are more and more people who want to live on land because the world is crowded with cities. It is bad for the earth and people to cut down trees to make room for towns and industry (Pandya et al. 2021). People who are poor have to do bad things to make ends meet, like cutting down trees and breaking into protected places without permission. People need to know what's driving this trend of tree cutting and the economic and societal mechanisms that keep it going if people want to put a stop to it. A holistic approach to forest conservation must also promote sustainable agriculture, alternative livelihoods, and the alleviation of poverty.

Economic Impacts on Agriculture

Deforestation alters soil fertility and precipitation patterns, which in turn affects crop yields. While tree-cleared regions may have superior agricultural yields initially, they eventually suffer from a lack of soil, water, and pests. Most of these consequences will hit low-income areas and small-scale farmers the hardest since they rely on forest products for survival. As a result, food insecurity and economic inequality become even more severe. The agricultural economy may recover with the support of good land management practices such as agroforestry, wetland management, and soil conservation. It is possible to make rural areas safer and more robust for people's means of subsistence via agricultural expansion, forest protection, and the use of packaged solutions (Gupta et al. 2020).

Water Resource Management

For the maintenance of water flow and the regulation of natural patterns, forests play a crucial role. Deforestation alters river flows and reduces the rate of groundwater recharge. According to Mishra (2022), these methods are more susceptible to water scarcity since they are less efficient. In addition to reducing agricultural productivity, deforestation impacts ecosystem services, industrial water supply, and human water sources. Protecting forests and repairing streams are two examples of landscape-level conservation strategies that are necessary for effective water resource management (Stanturf et al. 2020). Reforesting water-collecting sites, increasing public participation in water management, and ensuring safe water collection are all critical to preserving water security in regions facing forest loss.

Biodiversity Conservation and Ecotourism

Deforestation is harmful to India's unique biodiversity because it damages and produces less stable ecosystems. Loss of species and ecosystems throws nature out of whack and has monetary consequences, particularly for ecotourism and traditional knowledge systems (De Zoysa 2022). To ensure the survival of species, protected areas and wildlife parks play a crucial role. Nevertheless, land use is changing, and human usage of these resources is increasing. Wildlife corridors, habitat restoration, and environmentally responsible tourism that supports local economies should be the centre of conservation efforts. A more resilient ecology and more equitable development might result from protecting animals via indigenous and local knowledge systems.

Climate Change Mitigation

Forests absorb less carbon dioxide and more carbon is released into the air when trees are cut down, exacerbating climate change (Dar et al. 2020). Consequences including increased heat, changed rainfall patterns, and more intense and frequent weather events exacerbate environmental dangers as well as social and economic inadequacies. Forests, and Climate Change. To make cities and towns strong, long-term, environmentally friendly ways of .managing land, growing trees, and encouraging trees to grow back must be encouraged (Mansuy et al. 2020)

Policy Responses and Institutional Framework

There are many groups and rules in India that work to protect forests and keep people from cutting them down (Crook 2020). The Indian Ministry of Environment, Forests, and Climate Change says that the 1992 Wildlife Protection Act is meant to protect species that are in danger and the places where they live. The Forest Conservation Act of 1980 says that cutting down trees is not allowed on forest land. The Ministry of Environment, Forests, and Climate Change in the Indian government pays for projects that help animals, like growing and replacing plants.

.The National Afforestation Programme and the Green India Mission make these projects possible

A person tries hard, but it's still hard to make and follow rules that protect trees. Things are moving more slowly because of a lack of money, issues with the government, and bad police work. A person needs to have better groups, get people from different fields to work together, and get more people involved in order to solve these issues and meet the goals for sustainable growth. Indian schools, neighbourhood groups, and the government need to work together to lower the cost of cutting down trees (Kumar et al. 2022). Two of the hardest things people have to deal with these days are supporting fair growth and finding a balance between protecting the earth and making money. How to settle differences about land use and how to make law enforcement work better are two more things that need to be thought about. Researchers should work on better funding plans for long-term growth, adding indigenous knowledge systems into conservation efforts, and studying how laws that protect trees will affect people's future lives and funds. Better data collection and tracking will help people make choices based on facts and use flexible .management styles

Kushwala et al. (2021) stated that India's biggest economic problems are caused by cutting down trees, which damages wildlife, farms, water sources, and the climate. To solve these problems, a person needs consistent rules that put halting climate change, fair growth, and long-term forest management at the top of the list. People who want to protect India's natural resources and encourage fair and sustainable growth can work together by figuring out what's causing the problem, how much it will cost, and what their legal choices are. Bawa et al. (2021) say that For India to save money and protect the environment, it needs to stop cutting down trees. This will help build strong .and successful communities

Conclusion and recommendations

Cutting down trees hurts wildlife, food, water sources, and India's ability to deal with climate change. It also makes the country's money less valuable. The article stresses how important it is to find solutions that work for everyone in order to support fair forest management and growth. To lessen the bad effects of cutting down trees on the economy, people need to work together and make decisions based on science facts. This study looks at important .results and current trends to show this

Recommendations

1. Plans and policies to protect trees will only work if institutions understand them better and know how to make sure they are carried out. The best way to use the tools and data a person has in the long run is for people from .different companies and the public and private sectors to work together
2. Two, back farming methods that are better for the environment, like agroforestry and watershed management. This will make the land healthier, keep trees from being cut down, and make water sources that are already .low

3. Joined Forest Management (JFM) is one way that people can help protect trees, give locals more power, and keep wildlife safe. Spend money to make your neighbourhood better. It's important to fight for fair growth to help the places that depend on trees
4. Fourth, fund climate-resilient technologies, long-term forest management strategies, and wildlife protection plans as part of research and development (R&D) initiatives. Make sure that judgements are grounded on facts by encouraging individuals from diverse areas to collaborate and exchange information
5. Fifthly, make advantage of shared bodies of information: Natural resilience and biodiversity depend on indigenous peoples' and local knowledge systems. They need to be involved in safeguarding initiatives. Find out what people think and do in ways that are considerate of other cultures
6. Promote global cooperation: Together, via initiatives like REDD+, people can increase funding and visibility for forest preservation initiatives. Have a conversation with a worldwide partner to exchange ideas and best practices
7. People should be better informed about the economic significance of woodlands and the consequences of cutting them down if they want to increase their capacity to expand. Simplify the process by which anyone may get involved in forest preservation and good management initiatives. Every level of society is included by this, including communities, nonprofits, and government officials

Finally, several interest groups will need to collaborate to address the deforestation-related economic impacts. Residents, specialists, and governmental entities make up these categories. India could be able to manage its forests sustainably, encourage equitable development, and preserve natural resources for future generations if it pays attention to these suggestions and formulates a comprehensive strategy. Efficiently reducing pollution benefits both the environment and the well-being of the Indian people

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