

Topic 7: Forest

This topic focuses economic values of forestry. Forest does not only provide values from economic activities, but it is also important in providing ecosystem services, in particular a host to biodiversity and a store of carbon.

Deforestation Problem: Natural forests are being converted to other land uses (or deforestation) too rapidly which may cause damages to the world's environment and ecosystems. In addition to deforestation, fragmentation and the disturbance of vegetation also causes a wide spread of forest degradation.

Deforestation and forest degradation

“Deforestation and forest degradation are the biggest threats to forests worldwide. Deforestation occurs when forests are converted to non-forest uses, such as agriculture and road construction. Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature. Over half of the tropical forests worldwide have been destroyed since the 1960s, and every second, more than one hectare of tropical forests is destroyed or drastically degraded.

Why is it important?

Source of Biodiversity:

- Over 80% of the world's terrestrial biodiversity can be found in forests - from pine trees in the boreal North to the rainforests in the tropics. **The degradation and loss of forests threaten the survival of many species and reduce the ability of forests to provide essential services** such as clean air and water, healthy soils for agriculture, and climate regulation.

Support Sustainable livelihoods:

- Healthy forests **support the livelihoods of 1.6 billion people globally, one billion of whom are among the world's poorest.** Deforestation and forest degradation have real and tangible impacts on the lives of these vulnerable communities.

Role on climate mitigation and adaptation

- The world's forests **absorb 2.4 billion tonnes of carbon dioxide (CO₂) per year**, one-third of the annual CO₂ released from burning fossil fuels.
- Forest destruction emits further carbon into the atmosphere, with 4.3–5.5 GtCO₂eq/yr generated annually, largely from deforestation and forest degradation. Protecting and restoring this vast carbon sink is essential for mitigating climate change.
- Forests also play a crucial role in climate change adaptation efforts. They act as a food safety net during climate shocks, reduce risks from disasters like coastal flooding, and help regulate water flows and microclimates. Improving the health of these forest ecosystems and introducing sustainable management practices increase the resilience of human and natural systems to the impacts of climate change.”

Source: [IUCN \(2021\)](#)

Economic explanations of deforestation

A **market price failure** (excluding a wide range of forest benefits) could be a source of excessively depletion of forests from economic points of views. Without government intervention, deforestation may exceed its social optimal level in many countries.

Private benefits of deforestation = timber market value, commodity market value, etc. (not include benefits of forests for ecosystems).

Benefits of forests (or the values of conserving forestry)

- 1) **Local benefits:** Home to people, forest products such as timber and other wood products as well as non-timber forest products (NTFP) such as fruits, fibre and medicines for consumption or trade.
- 2) **National benefits:** Ecosystem functions such as the regulation of flows of surface and groundwater, the protection of soils through reduced erosion and nutrient recycling.
- 3) **Global benefits:** Greenhouse gas emissions (forest absorb emissions while deforestation emits more CO₂) and biodiversity store (species, a gene base that contains medicinal properties, etc.)

The estimated values of forests are therefore important to help inform the decision making towards the opportunity costs for deforestation and the benefit values for forest conservation programs. Understanding the determinants of the value of forests can help to identify policy interventions in global forest conservation efforts.

The economic values of global forest ecosystems

What drives the economic values of global forest ecosystem services?

- Evidence supports the significance of country-specific factors, such as GDP per-capita, in determining the value of forest ecosystem services. This can be attributed to direct use of extractive products such as timber and non-extractive activities such as recreation value which have higher values in higher-income countries.
- The significance of the aggregated values of ecosystems, rather than valuing marginal changes in specific individual ecosystem services. This is important illustration of the trade-offs between industrial and multifunctional forest management. The valuation of multiples of ecosystem services could help to justify the importance of conservation mechanisms such as Payments for ecosystems services (PES) schemes, especially in developing countries where forests significantly contribute to sustaining community livelihoods.

Source: Taye et al. (2021). The economic values of global forest ecosystem services: A meta-analysis.

International policies for forest conservation:

- The Global Environmental Facility (GEF): Provide funds to address global environmental issues. Most of projects receiving the funds focus directly or indirectly on natural forest protection.
- UN-REDD program: the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD) in developing countries, established in 2008, provide funds to developing countries to prepare projects that reduced GHG emissions from deforestation. In 2010, the extension was made to REDD+ agreement to include multiple benefits of reduced forestation, ecosystem services, and biodiversity protection, in addition to GHG emission reduction (about 30 million U.S. dollars funding for investments in conserving forestry in developing countries)

National policies to reduce deforestation:

- Policies to reduce negative effects of market and government failure. Government policies can sometimes make deforestation worse such as subsidies for agricultural outputs such as palm oil that increase deforestation.
- Eliminate market failure by placing taxes on deforestation
- Establish effective property rights over forest land
- Create conservation areas
- Ban or regulate forest clearance in sensitive areas.

Reference:

- [HSW] – Hanley, N., Shogren, J. and White, B., Introduction to Environmental Economics 2013 (2nd edition), Oxford University Press, Chapter 10.
- Taye et al. (2021). The economic values of global forest ecosystem services: A meta-analysis. Ecological Economics, 189.
- ICUN (2021). Issues Brief: Deforestation and forest degradation. International Union for Conservation of Nature (IUCN). Retrieved at <https://www.iucn.org/resources/issues-briefs/deforestation-and-forest-degradation>