

WOODFUEL DEMAND, DEFORESTATION, AND FOREST DEGRADATION

When identifying the drivers of deforestation and forest degradation, the media and some researchers often turn a blameful eye towards woodfuel harvesting and charcoal production. While it's true that these activities have detrimental impacts, the evidence shows that the link between deforestation and woodfuel demand have likely been overstated. A common misconception feeding this narrative is that woodfuels are harvested only from forests. In fact, research shows that woodfuel is actually collected from many types of land, not simply from what is traditionally consider a "forest", and people use trees for many reasons besides making firewood or charcoal. To accurately assess the true impact of woodfuel demand on the environment and climate, methodologies must account for the complex ways in which people interact with forests.

The first step: *clearly defining deforestation and forest degradation.*

Defining deforestation and forest degradation

To understand the environmental impact, we start by considering *deforestation* and *forest degradation* as separate processes. Definitions developed by the UN FAO:

- **deforestation** is the "long-term or permanent loss of forest cover and implies transformation into another land use," whereas
- **forest degradation** is the "long-term reduction of the overall potential supply of benefits from the forest, which includes carbon, wood, biodiversity and other goods and services".¹

In short, *deforestation* can be thought of as the permanent reduction in the **quantity of forested land**; whereas, *forest degradation* can be considered the **quality decline in forests** or wood resources.

People and forest resources

In many places around the world local communities sustainably manage forested land. In fact, woodfuel harvesting is often a vital part of local economies and agroforestry systems. When environmental degradation does occur, there are often multiple human-caused and environmental factors at play, which can be difficult to assess without a thorough understanding of the local context. In some areas, trees cleared one year may recover by natural regeneration. Recovery might be helped by good rainfall, or slowed by extended drought. Regrowth might be slowed by herders setting fires to encourage grass growth, or even prevented altogether by farmers planting crops where the trees once stood. Advances in geospatial technology and the development of the Modelling Woodfuel Savings Scenarios (MoFuSS) methodology has helped us to form a more comprehensive understanding of the state of forests.²

❖ What is the environmental impact of woodfuel demand?

¹ From UNFAO (2007), "Definitional issues related to reducing emissions from deforestation in developing countries", available at: <http://www.fao.org/docrep/009/j9345e/j9345e00.htm>.

² Link to MoFuSS, Wisdom, etc.

The evidence indicates that woodfuel demand and charcoal production can contribute to *forest degradation* when wood is harvested more rapidly than the landscape can recover. Global estimates indicate that about 30% of woodfuel harvesting is unsustainable.³

When it comes to deforestation, land cover and land use change from forest to non-forest can be visibly detected by remote sensing, but is rarely driven by woodfuel demand.⁴ Charcoal production and woodfuel harvesting may, in some cases, serve as *facilitators* of deforestation, rather than the direct cause. For example, during agriculture expansion a farmer might pay charcoal producers to clear the land and to produce charcoal from the cleared wood to offset the cost of land-clearing. In this case, the charcoal production *facilitated* the conversion of land to non-forest land, but the cause of the deforestation was agriculture expansion.

❖ **What is the impact of forest degradation on the environment and climate?**

While not a complete loss of forest cover, forest degradation still has detrimental effects for environment and climate. Degraded lands lead to losses in biodiversity, erosion control, and storm flow regulation (flood protection). If not addressed, forest degradation can lead to desertification.

Forest degradation is also a major contributor to climate change; in 74 tropical countries, the amount of carbon released as a result of forest degradation was found to be equivalent to 4.3 percent of total global emissions and almost five times greater than the emissions from global aviation.⁵

❖ **What are the climate impacts of charcoal production?**

Even when woodfuel is sustainably harvested, the process of producing charcoal often involves the use of highly inefficient kilns that release harmful climate pollutants into the atmosphere. Black carbon (BC) and carbon monoxide (CO) are released in large quantities and are the most significant climate pollutants emitted during the charcoal production process.

Black carbon is the second largest contributor to global warming. As black carbon is released, it warms the Earth by absorbing sunlight, and increases the pace of ice and glacier melting as it deposits onto ice and snow. Though it is categorized as a 'short-lived' climate pollutant (SLCP) because it only stays in the atmosphere for several days to a week, its negative impacts are both fast-acting and extensive. CO is a climate forcer and contributes to ground-level (or tropospheric) ozone. High concentrations of ground-level ozone can be harmful to people, animals, crops, and other materials.⁶

Further reading:

Bailis, R., et al., The Carbon Footprint of Traditional Woodfuels. *Nature Climate Change*, 2015. 5: p. 266-272.

Drigo, R. "WISDOM Case Studies". 2017; Available at: www.wisdomprojects.net/global/cs.asp.

Geist, H.J. and E.F. Lambin, Proximate Causes and Underlying Driving Forces of Tropical Deforestation. *BioScience*, 2002. 52(2): p. 143-151.

³ Bailis et al 2015

⁴ Ghilardi et al. (2018)

⁵ <https://www.winrock.org/forest-degradation-major-source-of-greenhouse-gas-emissions-overlooked/>

⁶ https://www3.epa.gov/region1/airquality/oz_prob.htm

Ghilardi, A., et al., Spatiotemporal modeling of fuelwood environmental impacts: towards an improved accounting of non-renewable biomass. *Env. Modelling & Software*, 2016. 82: p. 241-254.

Hosonuma, N., et al., An assessment of deforestation and forest degradation drivers in developing countries. *Environmental Research Letters*, 2012. 7(4): p. 044009.

Masera, O.R., et al., Environmental Burden of Traditional Bioenergy Use. *Annual Review of Environment and Resources*, 2015. 40(1): p. 121-150.

Schoene D, et al. Definitional issues related to reducing emissions from deforestation in developing countries. In: *Forests and Climate Change Working Paper*, 2007. Rome: UN FAO: p. 22.



Degradation vs. Deforestation

Source: Winrock International / winrock.org