GOAL 4: Support alternatives to deforestation driven by basic needs (such as subsistence farming and reliance on fuel wood for energy) in ways that alleviate poverty and promote sustainable and equitable development

Key Messages

- Data and information around activities that fill basic human needs yet drive deforestation – beyond woodfuel and cookstove use – remain limited, but individual case studies highlight the potential of alternatives in addressing deforestation and promoting sustainable development.
- Despite declining financial support, the number of cookstoves and fuels distributed in developing countries nearly doubled between 2015 and 2016 reaching more than 84 million by the end of 2016. The impact of clean or efficient cookstoves on deforestation rates remains unclear because a significant number of cookstoves are also distributed in countries with net afforestation and lower rates of unsustainable woodfuel extraction, such as India and China.
- The mitigation potential of woodfuel interventions is difficult to quantify and has been debated, with some arguing that woodfuel harvesting has less severe impacts on forests than initially expected.

OVERVIEW OF GOAL AND INDICATORS

Goal 4 aims to reduce deforestation driven by basic human needs and calls for the support of alternatives to unsustainable subsistence farming and woodfuel use for energy.

Basic needs as a driver of deforestation

Information linking basic needs activities to deforestation is limited and variable across regions, making it difficult to understand their overall impact on forests.[1] Through a literature review and background research, we identified several types of basic needs activities that may drive deforestation.

The impact of poverty on deforestation can be significant at the local level, in particular where forests are already scarce and suffer from degradation. Subsistence agriculture and woodfuel collection can involve a variety of practices, only some of which have a negative impact on forests. Four are described below.

- **Swidden or "shifting" agriculture** refers to traditional practices that clear forest land for short-term cultivation before moving on and allowing forests to regenerate. Such

practices are still common in remote forests all over the tropics.[2] Their effect on forests depends on how much time fallow areas are given for regeneration and what type of clearing techniques are used. Burning, for example, disturbs the forest more than other techniques. Though forest clearing causes an initial carbon loss, it can create stable mosaics of forest landscapes when managed well (e.g., as in certain areas of Peru[3]). However, growing populations can pressure swidden agriculture to expand to the point that it threatens forests. For example, in the Democratic Republic of Congo, the population is growing at an annual rate of three percent, requiring 32,000 additional hectares of forest for agriculture every year.[4] In some regions stable crop rotation systems have also been threatened through intensification or encroachment by other actors.

- **The migration into forests of subsistence farmers** seeking land and income is generally associated with deforestation. Landless farmers in the Amazon often move to the forest frontier to claim land through cattle farming and sometimes to take part in land speculation (e.g., in Peru,[5] Ecuador,[6] Colombia,[7]and Brazil).[8] In Colombia, for example, cattle are used as a means to claim ownership over land where the deforestation is actually driven by land clearance for illicit crops (e.g., cocoa).
- **Permanent subsistence farming** in or near forests has mixed impacts on forest quality, depending on the farming practices. Encroachment by livestock, for example, can drive forest degradation in some locations (e.g., East Africa).[9] The expansion of smallholder farmland, driven by population growth and pressure from commercial agriculture, can also lead to forest clearance.
- **Woodfuel collection** is a driver of forest degradation. However, it rarely leads to land-cover change.[10]Over half the wood harvested worldwide is used as fuel, of which 27 to 34 percent is estimated to be harvested unsustainably.[11] In some regions, woodfuel is collected from dead branches and trees, often outside the forest, thus causing limited degradation.[12], [13] The effect can be severe, though, in areas with rapidly growing populations (e.g., as a result of population displacement)[14] and environmental changes (e.g., droughts and desertification). Wood harvested for charcoal production, conversely, may facilitate deforestation because it requires cutting trees. Because charcoal production is a highly profitable activity, its local effects on forests can be significant (e.g., around major Sub-Saharan cities like Kinshasa[15] and Dar El Salaam[16]).

Several factors that are mostly beyond the control of the farmers or forest users can motivate encroachment into forests, both for woodfuel collection and for farming:[17]

- Poverty and lack of alternative sources of food, fuel, or income
- Pressure on land and resources, such as from commercial agriculture and growing populations
- Lack of access to property or user rights for forest products and agricultural land
- Lack of forest management models that allow for sustainable and collective use
- Growing demand for charcoal (and woodfuel) from urban populations that still rely on traditional sources of fuel
- Problems of governance, such as the lack of regulations for sustainable use, land-use planning, or clear tenure rights

Reducing deforestation and forest degradation driven by basic needs

The public and private sectors and civil society have adopted strategies that could provide more sustainable alternatives, often in the context of development and livelihoods initiatives. Some examples are described below.

- Support for agricultural development can increase the productivity and financial viability of farms, reducing the incentive for people to move into forested land. Traditional support measures for smallholder farmers include extension trainings, subsidized inputs like seeds and fertilizer, improved access to finance, and support to develop local markets and value chains. Newer and more comprehensive approaches include agroforestry, conservation agriculture, diversification of crops, and organic farming.
- Unsustainable harvesting of woodfuel can be reduced by increasing the supply of sustainable woodfuel and charcoal (e.g., through community-based natural resource management, participatory forest management, or plantations), by offering alternative sources of cooking and heating energy (e.g., electrification, solar energy, biogas, ethanol), or by improving the efficiency of combustion in cooking technologies (e.g., clean cookstoves).
- Improvements in forest governance are essential for addressing underlying factors that motivate smallholder farmers to move into forests. They include investments in land-use planning and zoning and measures to improve the security of land tenure and the collective use of forests. Detailed information on progress toward improvements in forest governance are covered under our assessment of Goal 10.

In many cases, such interventions are implemented for objectives other than sustainable forest use and protection, such as food security, health, or rural development. Many interventions offer the potential for environmental or socioeconomic benefits. Cookstoves, for example, can reduce indoor pollution from open fires and reduce the time and effort spent on collecting firewood; increased farm income and stability can improve food security and alleviate poverty. The impacts on forests, however, are not always straightforward. The expansion of electric grids into forest-risk areas, for example, can improve energy access and thus reduce woodfuel use. Yet, it can also attract migration and settlements, increasing the risk for new forest loss.

Assessing progress

It remains challenging to identify indicators of progress for Goal 4. As in previous years, the only type of support we are able to measure and clearly link to forest goals is the distribution of clean or efficient cookstoves, which can reduce unsustainable woodfuel consumption for cooking and heating (Table 1). Efforts underway to address alternatives to deforestation-driven basic needs beyond the energy sector, such as subsistence farming, are described in the Case Studies section, below.

Table 1: Criteria and indicators to track Goal 4

CRITERIA	INDICATOR
1. Global distribution of clean and/or efficient cookstoves and fuels	1.1 Number of cookstoves and fuels distributed
2. Financial support for woodfuel interventions	2.1 Funds spent in support of woodfuel interventions (USD)

In 2019, the NYDF Assessment Partners plan to conduct an in-depth assessment of progress on Goals 3 and 4. This includes a revision of the assessment framework that will expand and build on the categories of basic needs activities as drivers of deforestation and alternatives to deforestation driven by basic needs activities.

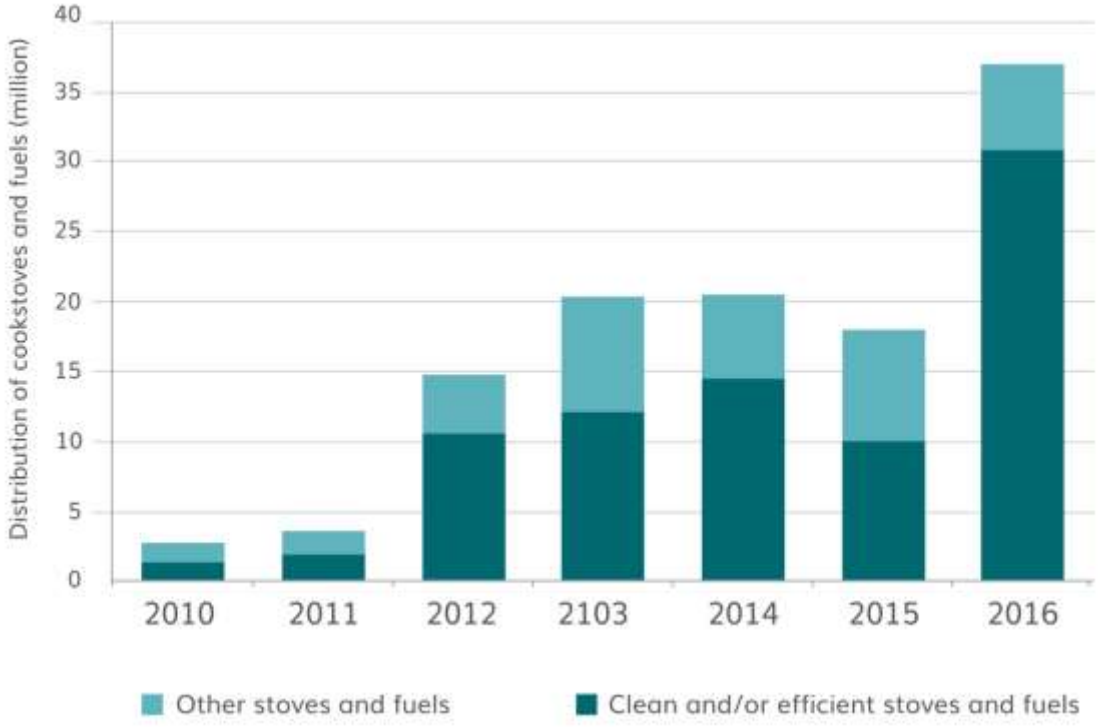
FINDINGS

Criterion 1: Global distribution of clean and/or efficient cookstoves and fuels

Indicator 1.1: Number of cookstoves and fuels distributed

The number of clean cooking and heating appliances and fuels distributed in developing countries grew at a faster pace in 2016 than in previous years. The number of cookstoves and fuels distributed in developing countries nearly doubled between 2015 and 2016 and reached more than 84 million by the end of 2016 (Figure 1). This may be partly because of large-scale national programs, such as India's Pradhan Mantri Ujjwala Yojana program.[18], [19] However, inconsistencies in reporting make it difficult to draw conclusions about trends. In 2016, the large majority (84 percent or 31 million) of cookstoves and fuels distributed met clean and/or efficient standards[20] set by the Global Alliance for Clean Cookstoves (the Alliance).[21]

Figure 1. Cookstoves and fuels distributed 2010–16, in millions of "household equivalents"



Source: Climate Focus graph based on data provided by the Global Alliance for Clean Cookstoves and the Alliance *2017 progress report: driving demand, delivering impact*. Aggregated trends from Alliance partners who have reported consistently were used to estimate distribution trends in the sector. The definitions of clean and efficient are aligned with the interim performance guidelines in the ISO International Workshop Agreement. For this figure, stoves and fuels that meet Tier 2 for efficiency are considered efficient and those that meet Tier 3 for indoor emissions are considered clean for health.

Note: For "household equivalents," units vary by fuel. For example, for LPG in India they are measured by connections (first stove and first tank). In other places, it could be by volume or weight (depending on the fuel type). The Global Alliance for Clean Cookstoves takes those volumes and makes conservative estimates of how many households can be served in a year, and those numbers are reported as "household equivalents." Fuel consumption varies by geography, fuel type, and stove efficiency. 2015 numbers were slightly reduced due to correction.

Some evidence shows that the mitigation potential of woodfuel interventions has been overestimated.[22]Damage linked to woodfuel extraction often occurs in conjunction with other major drivers of deforestation (e.g., livestock production, agricultural expansion, development of transportation networks), making it challenging to separate the impact of woodfuel harvesting. Despite an increasing number of clean or efficient cookstoves and alternative fuels being distributed globally, large proportions are also distributed in countries like India and China where woodfuel is not a major driver of deforestation, but the positive health and social impacts continue to drive increases in uptake.[23] Given the lack of global research, however, regional studies from these areas are still valuable in demonstrating the positive benefits of clean and/or efficient cookstoves and alternative fuels for forests. One study found that biogas promotion in India resulted in reduced pressure on forests, with an aggregate emissions reduction of 6.7 million metric tons of carbon dioxide equivalent and national woodfuel displacement of 7.2 million metric tons between 2001 and 2011.[24] Another study found that positive forest changes, such as higher biomass and regeneration in areas with unsustainable harvesting, can occur in areas where biogas units are regularly used and well-maintained – even 10 years later.[25]

Criterion 2: Financial support for woodfuel interventions

Indicator 2.1: Funds spent in support of woodfuel interventions

Despite an increase of woodfuel interventions, funds for such interventions continued to decline in 2016 with almost no new commitments of official development assistance for the woodfuel and charcoal sector and a decrease in carbon market transactions and sector funding tracked by the Alliance. The recent revisions of the Clean Development Mechanism methodology for energy efficiency measures of cookstoves and a fall in carbon pricing may explain the decrease in carbon market transactions.

Figure 2. Funds supporting cookstoves and fuels and the woodfuel and charcoal sector, in million USD

Source: Compiled by Climate Focus based on the following sources: for ODA, Organization for Economic Cooperation and Development (OECD). (2018). Official development assistance data. For carbon market transactions, Hamrick, K. & Gallant, M. (2017). *Unlocking potential: state of the voluntary carbon markets 2017*. Washington, D.C.: Forest Trends. For clean cooking sector funding, from the Alliance and other investors and donors, including debt, equity, and grant.

Note: ODA = Official development assistance

CASE STUDIES

Case studies of global and local initiatives indicate growing support to address deforestation and enhance livelihoods through promoting sustainable activities, such as improved land and forest management and agricultural intensification and diversification, to support basic needs.

The Cocoa and Forests Initiative and Frameworks for Action

The majority of the world's cocoa is produced by 1.6 to 2 million smallholders that depend on the crop for their livelihoods and income.[26] At the household level, this is nearly a quarter of the population in the two largest cocoa-producing countries: Ghana and Côte d'Ivoire. As cocoa production has expanded, so has forest loss. Since 2000, Ghana and Côte d'Ivoire have lost 11 percent and 14 percent of their forest cover, respectively.[27]

In March 2017, a group of 12 cocoa and chocolate companies, along with civil society organizations, announced creation of the Cocoa & Forests Initiative, a public-private partnership to end deforestation and forest degradation in the global cocoa supply chain.[28] While the Initiative's focus is on commodity-based deforestation, it acknowledges that smallholder cocoa farmers are often engaged in noncommercial, subsistence farming as well. Cocoa farmers in Côte d'Ivoire earn approximately one USD per day, which they complement with subsistence farming.[29] Companies in the initiative and the governments of Ghana and Côte d'Ivoire have developed country-specific frameworks for action to implement their commitments. The frameworks focus on ensuring sustainable livelihoods and social inclusion for all cocoa farmers while promoting forest protection and restoration. Specific actions include promoting sustainable intensification and livelihood diversification through techniques such as mixed agroforestry and food crops production, to ensure that farmers' basic needs are met without relying on new forest incursions.[30] Companies also intend to promote community-based forest management systems and payments for environmental services, acknowledging that these models of forest governance can be effective at ensuring sustainable livelihoods while maintaining forests' critical climate, soil, and water-regulating functions. The initiative intends to replicate the framework's model in other cocoa-producing countries.[31] Some participating companies have launched development projects in tandem with the frameworks that could have large impacts on forest protection and livelihoods. For example, the commodity-sourcing company Touton is spearheading a landscape governance project in western Ghana that is expected to provide 60,000 cocoa farmers with farm-level technical support and incentives for environmental protection.[32]

Forest & Farm Facility

The Forest & Farm Facility is a partnership between the Food and Agriculture Organization of the United Nations, the International Institute for Environment and Development, the International Union for Conservation of Nature, and AgriCord that supports producer organizations across the forestry and agricultural sectors, engaging them at a landscape scale.[33] The 947 forest and farm producer organizations (made up of smallholders, rural women's groups, local communities, and indigenous peoples' institutions) that the facility supported in its 2012-17 phase I represent more than 30 million forest and farm producers across 10 countries.[34] The facility supported these groups in increasing their technical and business capacities. Achievements included securing land tenure, developing new enterprises, implementing integrated land management plans, influencing and designing policies, sharing knowledge, increasing community and individual resilience to climatic change, and opening up new opportunities for marginalized members.[35]

Addressing deforestation through income diversification in Alto Mayo, Peru

A sustainable landscape is a place where people steward natural capital alongside sustainable production systems at a scale that encompasses multiple levels of governance and a wide range of uses of essential natural capital to enhance long-term human well-being in a changing world. Conservation International has been applying a sustainable landscape approach (SLA) in key geographies for 10 years. SLA is an integrated approach implemented through partnerships to address the multiple – and, at times, competing – goals of conservation and economic development to benefit human well-being.

In the 780,000-hectare Alto Mayo watershed landscape in Peru (home to 220,000 inhabitants), SLA strategies to address deforestation and degradation have strengthened management capacity of the Alto Mayo Protected Area by increasing patrols and enforcement; promoting sustainable production of coffee by providing technical assistance; implementing sustainable financial mechanisms, including REDD+ and conservation agreements; and supporting the development of green economies with the establishment of a public-private investment platform; among other strategies.[36] These strategies led to several key outcomes from 2008-16, including 5.65 metric tons of avoided carbon emissions,[37] an increase in coffee productivity from 900 kilograms per hectare to 24,600 kilograms per hectare for producers participating in the initiative, and a 134 percent increase in income with a 74.6 percent decrease in greenhouse gas emissions for rice producers who joined diversified rice and shrimp farms. These successes are tracked and monitored through Conservation International's Landscape Assessment Framework.[38]

Community forestry in Guatemala's Maya Biosphere Reserve

Community forest management has proven to be effective at decreasing forest loss while maintaining livelihoods in Guatemala's Maya Biosphere Reserve (MBR).[39] While subsistence farming is not a major driver of deforestation in the region,[40] the successes of the project may provide lessons and best practices that can be applied to similar initiatives in more at-risk regions.

The MBR was established in 1990 within the Selva Maya forest, the largest broadleaf tropical forest in Mesoamerica, and is managed by the National Council of Protective Areas (CONAP), a government agency. Since communities collectively negotiated to create resource access through community-based concessions in 1995, deforestation rates have been lower in the MBR than the rest of the country. The overall rate of deforestation in the MBR from 2000-13 was 1.2 percent, less than Guatemala's average of 1.4 percent for roughly the same period. As of 2015, nine communities and two private corporations have concessions in the MBR. Each concession holder is required to achieve and maintain Forest Stewardship Council certification within three years of being granted use rights, the costs of which are covered by donor support. The Asociación de Comunidades Forestales de Petén, the umbrella organization of the communities managing the concessions, has created an organization specifically to support member communities to maintain and refine their forest businesses.

Building community capacity for sustainable agriculture, forest management, and ecosystem conservation in the Brazilian Amazon

In the Brazilian Amazon, traditional communities often live within large forest territories designated as protected areas that are threatened by deforestation and biodiversity loss and face barriers to sustainably delivering agriculture and forest products. Cleared areas designated for rural settlements are commonly managed under degrading agricultural and livestock practices, which lead to further deforestation and greenhouse gas emissions.

The Florestas de Valor project, developed by the Brazilian socioenvironmental nongovernmental organization (NGO) Imaflora, promotes sustainable agriculture, forest management, and ecosystem conservation, as well as consolidation of fair-trade partnerships for forest conservation. The project aims to build the capacity of traditional communities in three major territories in the Brazilian Amazon (Calha Norte, Terra do Meio, and São Félix do Xingu), which comprise more than 40 million hectares of protected rainforest, about 10 percent of the Brazilian Amazon. The first phase of the Florestas de Valor project (2013-16), sponsored by Petrobras Socioambiental, implemented agroforestry and silvopastoral systems, promoted alternative agriculture practices, and provided the means for regenerating riparian zones. The project has also facilitated partnerships among traditional communities and industry engaged more than 7,000 people, increased community income and, ultimately, contributed to the conservation of Amazon rainforest. In its next phase (until 2020), the Florestas de Valor project will expand the implementation of sustainable agriculture systems over the region, strengthen and expand trading partnerships, and build community capacity to access and influence public policies. The project will also implement a system to measure and monitor impacts of its interventions in reducing deforestation and greenhouse gas emissions.

Improving agricultural practices and livelihoods in the Yucatán

The Yucatán Peninsula – home to the largest remaining tropical rainforests in the Americas after the Amazon[41] – loses over 80 thousand hectares of forest due to subsistence farming every year.[42] The majority (80 percent) of the peninsula's vegetation has been deforested or degraded. *Milpa*, a pre-Hispanic intercropping system that integrates maize, beans, and squash, contributes to roughly 16 percent of deforestation in the area.[43] The land is traditionally cleared using the slash and burn method, which dries the soil to the extent that farmers must migrate and clear new land for cultivation every two to three years. *Milpa* produces more than just crops for these farmers; slash and burn methods also provide game and timber.

A growing number of initiatives in this region address deforestation driven by subsistence farming. The International Maize and Wheat Improvement Center is working with farming communities in Mexico's Yucatán Peninsula to increase crop yields and farmers' income through sustainable solutions. The Nature Conservancy's (TNC's) Yucatán Peninsula Sustainable Rural Development Initiative is also working to change crop production, including the *milpa* production system. TNC is collaborating with 47 communities, 700 producers, at least 14 municipalities, and three state governments, as well as a variety of NGO's and academic institutions.[44] By shifting farming toward sustainable agriculture that incorporates the forest landscape instead of clearing it, the TNC has seen a 400 percent productivity increase across its projects.

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