Progress on the

New York Declaration on Forests

Technical Annexes

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

November 2015

www.forestdeclaration.org

CLIMATEFOCUS
EDF ENVIRONMENTAL DEFENSE FUND Finding the ways that work
FOREST TRENDS
GLOBAL ALLIANCE FOR CLEAN COOKSTOVES
GCP GLOBAL CANOPY PROGRAMME
THE SUSTAINABILITY CONSORTIUM™

An electronic copy of the full report is available at *www.forestdeclaration.org*.

Climate Focus. 2015. Progress on the New York Declaration on Forests – An Assessment Framework and Initial Report: Technical Annexes. 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. Prepared by Climate Focus, in collaboration with Environmental Defense Fund, Forest Trends, Global Alliance for Clean Cookstoves, Global Canopy Program and The Sustainability Consortium.

Contents

Description of the Goal and the Indicators

Goal 4 promotes the reduction of forest loss by supporting economically sustainable alternatives to slash-and-burn farming and unsustainable harvesting of woodfuel from natural forests. It is important to acknowledge up front that subsistence and smallholder activities are not the main contributor to deforestation in those regions where most forest loss is occurring (Boucher et al. 2011). Across tropical and subtropical countries in Africa, Asia and America, small scale and subsistence agriculture has been estimated as responsible for approximately 33% of *deforestation* (Hosonuma et al. 2012) with fuelwood and charcoal responsible for approximately 27-34% of *forest degradation* (Bailis et al. 2015).

There is no simple correlation between smallholder activities and forest loss, and therefore the relationship between poverty and forest loss is not linear. Poverty and low yielding production practices can drive forest loss in some areas by increasing the land footprint required for subsistence, but not always, and traditional rotational cultivation is not necessarily bad for forests. Conversely, increasing wealth and returns on agricultural investment can drive forest loss by increasing the financial incentive and technological capacity to deforest. Implicitly then, the focus of Goal 4 is not solely on avoiding forest loss associated with poverty, but also avoiding forest loss driven by unsustainable development pathways out of poverty.

There are no global datasets that quantify government, corporate, or civil society support for alternatives to deforestation driven by 'basic needs' hence our ability at present to monitor progress toward achievement of this goal is, overall, inadequate.

The only relevant area we have identified where an adequate relevant metric is available is the growth in distribution of 'clean' replacement cookstoves that reduce woodfuel consumption. To monitor support for reducing the role of woodfuel harvesting as a driver of forest loss we identified the following two proxy indicators:

1. Global distribution of clean cookstoves
2. Financial support for woodfuel interventions

To illustrate ways in which localized interventions are being tested to support alternatives to deforestation driven by basic needs, we also present two case studies: one from the Mai Ndombe region of Democratic Republic of Congo, and one from the state of Madre de Dios in Peru.

To indicate those countries in which subsistence and smallholder targeted interventions can have the greatest impact on forest conservation, we identify countries in which high poverty rates and low agricultural productivity correlate with higher rates of forest loss. We also present data indicating the extent to which Official Development Assistance (ODA) designed to increase agricultural productivity in developing countries, currently takes climate mitigation objectives into account.

INDICATOR 1
Global distribution of clean cookstoves

INDICATOR 2
Financial support for woodfuel interventions

Main Concepts and Definitions

Basic needs

The term 'basic needs' describes the absolute minimum resources necessary for long-term survival and physical well-being. The poverty line defines the income needed to meet basic needs (Jolly 1976). This includes food, shelter and clothing, but also education, sanitation and healthcare. We focus here on food and energy related needs, as these have the greatest impact on land use and forests.

Subsistence farming

'Subsistence farming' has been defined as "farming and associated activities which together form a livelihood strategy where the main output is consumed directly, where there are few if any purchased inputs and where only a minor proportion of output is marketed." (Barnett et al. 1997). However, as Goal 4 should also capture those self-reliant producers who supplement their incomes through selling a larger quantity of produce on local markets, we focus on both subsistence and smallholder producers. This group can be distinguished from larger and exclusively market-oriented producers.

Forest loss

As smallholder activities tend to drive forest degradation as much as deforestation, we use the term 'forest loss' to encompass both effects.

Equitable development

The concept of equity raises issues such as social inclusion, income inequality and gender. We draw attention to two fundamental points of 'equitable development' that arise in addressing poverty driven forest loss: (1) subsistence and smallholder activities are essential to meet the basic nutritional, energy and economic needs of the rural (and increasingly urban) poor, and interventions must be compatible with meeting these needs, and improving development outcomes; and (2) where activities are undertaken on land which communities have the customary right to farm and harvest, any interventions have to be conducted with the full acknowledgement of these rights, and with the support and cooperation of the rights holders.

Woodfuel

The term woodfuel is used in this report to describe both fuelwood (solid wood used for cooking and heating) and charcoal (a more energy dense material converted from fuelwood).

Key Messages

INDICATOR 1: GLOBAL DISTRIBUTION OF CLEAN COOKSTOVES

- Woodfuel interventions, in particular clean cookstove distribution, are accelerating rapidly. Although not all cookstove programs will reduce pressure on forests or reduce greenhouse gas (GHG) emissions -the primary reason for cookstove distribution is often the health benefits of reduced exposure to indoor emissions-, many will, as a large number of cookstoves are being distributed in countries where woodfuel consumption is driving forest degradation.

INDICATOR 2: FINANCIAL SUPPORT FOR WOODFUEL INTERVENTIONS

- While measuring total finance flows is not straightforward, several data sources indicate escalating sums. ODA directed to the woodfuel sector has increased from an annual average of US$3.6 million between 2006 and 2009, to US$47 million between 2010 and 2013. According to a Global Alliance for Clean Cookstoves market survey, cookstove project developers received US$273 million in financing in 2014.

Case studies on localized interventions to reduce subsistence and smallholder driven forest loss and tackle poverty

- A good case study of an intervention to reduce the forest impact of smallholder activities in a country where poverty remains a major driver of forest loss, is the coordinated effort between the main multilateral REDD+ funds to reduce forest loss in the Mai Ndombe region of the Democratic Republic of Congo.
- A good case study of an intervention to reduce the forest impact of smallholder activities in a country where subsistence and smallholder activities are a local driver, is the Tambopata-Bahuaja REDD+ Project, Madre de Dios, Peru, financed by a mix of non-governmental organizations (NGOs), impact investors and public authorities.

Information on the relationship between forest loss and subsistence/small holder activities

- High poverty rates and low agricultural productivity correlate in a number of countries with higher levels of forest loss. Smallholders in these countries should be targeted by activities under Goal 4. At the same time, in many poorer regions of middle-income countries smallholder activities are still driving forest loss.

Data Gaps and Limitations

- Member countries of the Organisation for Economic Cooperation and Development (OECD) do not currently distinguish ODA flows to subsistence or smallholder agriculture from flows to the agricultural sector in general, so it is not possible to track climate relevant international public finance in this area.

- OECD countries track ODA for 'agricultural alternative development' and 'non-agricultural alternative development', but only as relates to reducing illicit drug cultivation. It is thus not possible to track international public support for alternatives to agriculture as relates to reducing forest loss.

- Subnational data on woodfuel consumption, poverty rates and agricultural intensity is not available. This means that it is not currently possible to identify subnational regions of middle and upper-middle income countries in which poverty may correlate with localized forest loss even where it is not a major driver across the country as a whole.

- There are currently no consolidated, reliable datasets that track at the national or subnational level the numbers of agricultural workers engaged in subsistence or small scale activities, or the relative size of the smallholder 'sector', in terms of total production or value added. In consequence, we rely on proxies (poverty rates and agricultural intensity) to indicate those countries in which smallholder activities will be the most prevalent form of production, though these proxies are imperfect.

Findings

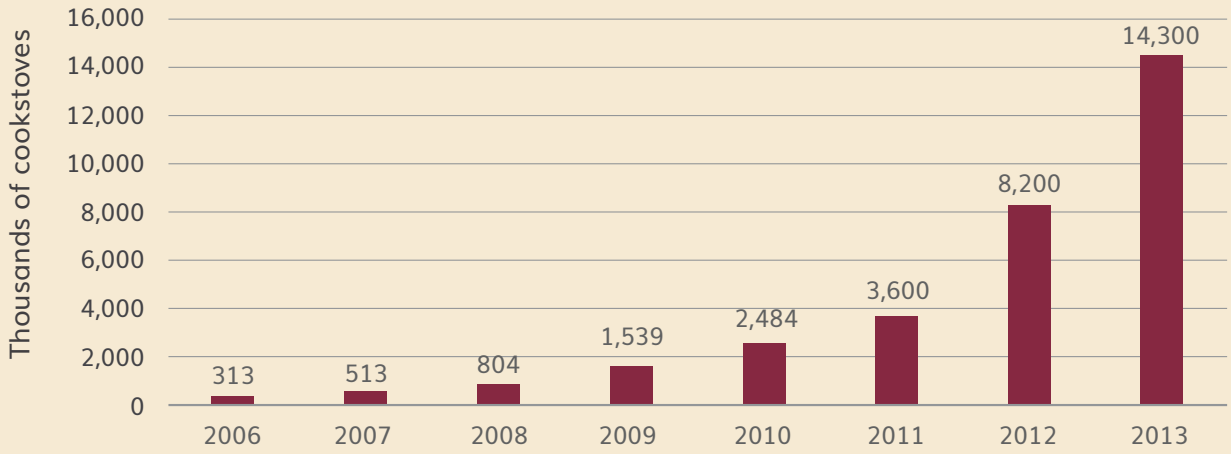
Indicator 1: Global Distribution of Clean Cookstoves

The use of woodfuel for cooking and heating is a vital source of energy for an estimated two and a half billion people in developing countries (Parker 2015). Exposure to indoor woodfuel emissions also represents a serious health hazard, and clean cookstove initiatives have developed as part of an effort to mitigate these health impacts. More recently, attention has shifted to the role of woodfuel demand as a driver of forest degradation. Approximately 275 million people live in woodfuel depletion 'hotspots' where harvesting rates are likely to cause forest loss.

Woodfuels are any type of bioenergy derived directly or indirectly from trees and shrubs grown on forest and non-forest land (FAO 2004), and include fuelwood and charcoal. Though woodfuels are used for some small-scale industrial processes, the vast majority of demand is from households using woodfuel for cooking and heating needs (FAO 2010). In many least developed countries, over 90% of households are commonly reliant on woodfuel as a main fuel source for cooking (WHO, Global Health Observatory Data Repository). Where woodfuel is harvested at a rate greater than the capacity of the source to regenerate, consumption is associated with degradation and GHG emissions. In the 1970s it was widely feared that a growing gap between woodfuel consumption and the rate of supply from forest land would lead to an energy shortfall and mass deforestation in developing countries within a few decades (Eckholm 1975). This theory proved unfounded due to a number of factors including higher regenerative capacity of forest land than initially thought, the harvesting of woodfuel by communities from non-forest areas, the availability of other fuels, and the fact that woodfuel demand decreases with scarcity (Woodwell 2002). Nevertheless, woodfuel harvesting can lead to localized forest loss, and for some countries, estimated GHG emissions from woodfuel consumption are equivalent to or even greater than reported emissions from deforestation (Parker 2015).

Although not all replacement cookstoves distributed will lead to GHG emission reductions, figures presented below indicate that replacement cookstove programs are for the most part targeting countries with higher emissions from woodfuel use. Thus, the global increasing trend in total cookstoves distributed (Figure 1) points to progress against Goal 4.

Figure 1: Estimated distribution of cookstoves worldwide reported by the Partnership for Clean Indoor Air (PCIA) and GACC partners.



Source: Climate Focus graph based on data provided by PCIA and GACC .

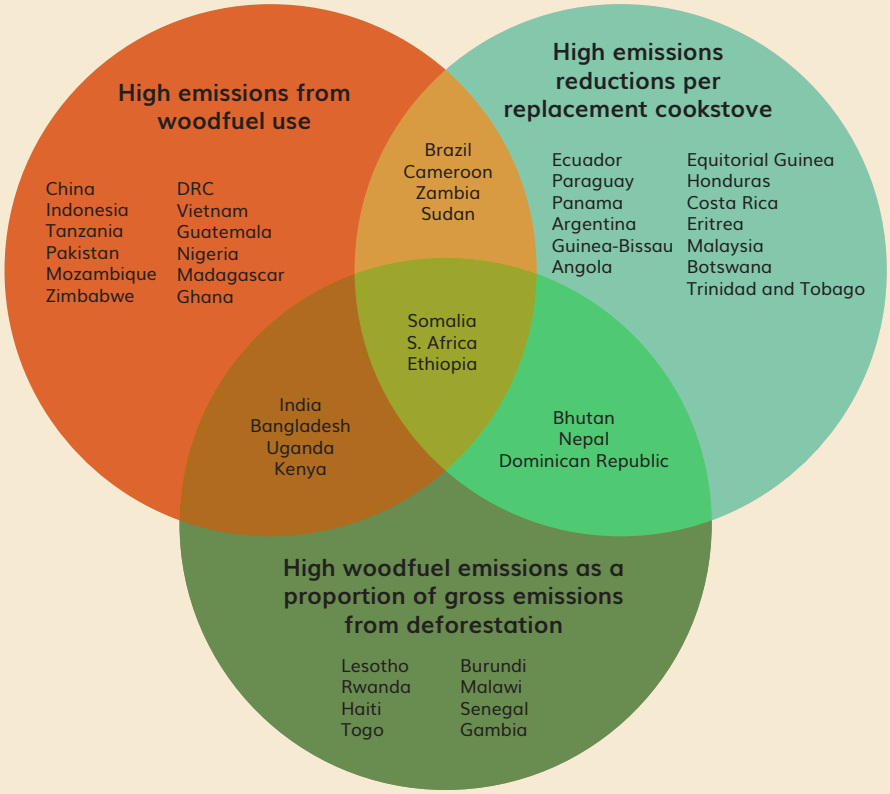
Woodfuel combustion leads to an emission where wood is harvested at a rate that is beyond the ability of the source to regenerate. The amount of woodfuel harvested above the regeneration rate is termed the 'fraction of non-renewable biomass', and the fraction of non-renewable biomass differs widely between regions depending on forest growth rates, and local woodfuel market dynamics. Only in regions with higher values of non-renewable biomass will woodfuel interventions contribute to the aims of Goal 4.

Historically, there have been great inaccuracies in estimating regional fraction of non-renewable biomass values, but methodologies are becoming increasingly sophisticated, and recently more reliable figures have been published by Bailis et al. (2015). Combining these figures with data of the UN Organisation on Food and Agriculture (FAO) and the World Health Organisation (WHO) data on household woodfuel consumption has made it possible to identify those countries in which:

- woodfuel consumption leads to higher emissions in absolute terms,
- woodfuel consumption leads to emissions that are high relative to local deforestation emissions (and hence where woodfuel harvesting is a major driver of forest loss), and those countries where interventions have a high mitigation potential.

This is helpful for guiding decision makers to determine where woodfuel interventions are most needed to lower emissions, with the caveat that there will still be great variance within countries at the subnational level. Figure 2 identifies those countries which fall into one, two or all three of these categories.

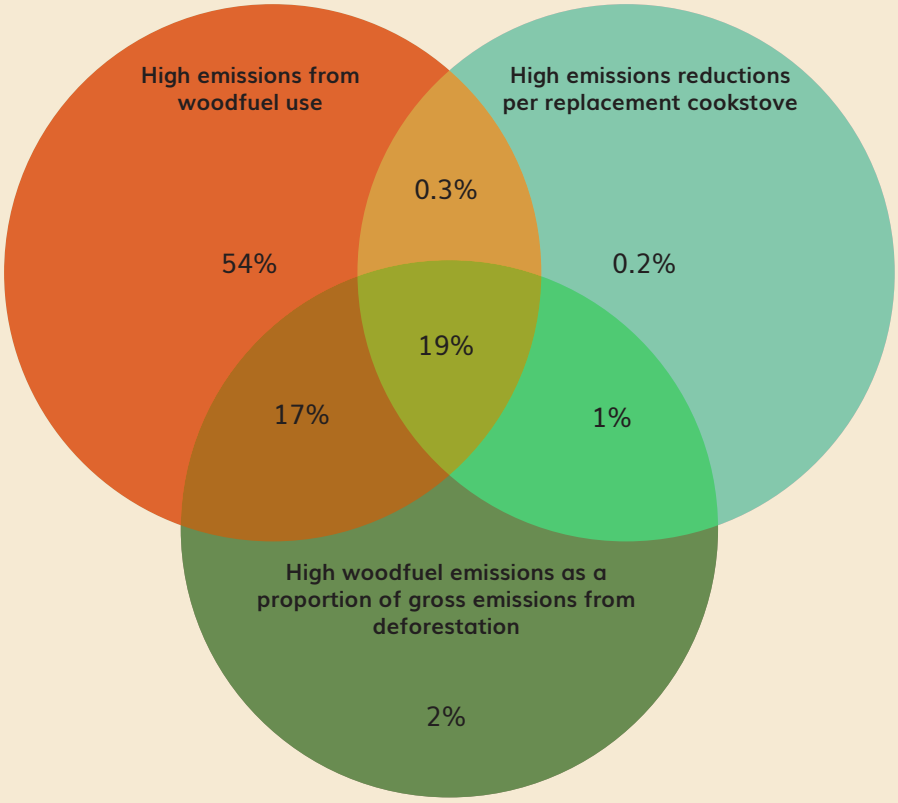
Figure 2: Countries in which to prioritize woodfuel interventions for the purpose of meeting Goal 4.



Source: Parker et al. (2015).

Woodfuel interventions can be grouped into three broad categories: fuel efficiency (e.g., distributing fuel efficient cookstoves to reduce woodfuel consumption); fuel switching: (e.g., distributing LPG or solar cookstoves to eliminate woodfuel consumption); and sustainable supply (increasing the sustainability of woodfuel supply, either through sustainable woodlot plantations, or improving the conversion efficiency of fuelwood to charcoal). Though little data is available on interventions to improve sustainability of supply, the Global Alliance for Clean Cookstoves (GACC) collates data on the distribution of replacement cookstoves by country. In 2013, an estimated 93.5% of all replacement cookstoves (13.37 million) distributed went to countries identified in Figure 2 as priority intervention countries (see Figure 3). Unsurprisingly, most went to countries with the largest populations using woodfuel, with China receiving 47% of all cookstoves distributed. Yet countries with a high mitigation potential and/or those in which woodfuel emissions are high relative to forest emissions were also targeted, with Ethiopia receiving 19% of all cookstoves distributed, followed by Kenya (7.5%) and Bangladesh (5%).

Figure 3: Of total cookstoves distributed in 2013, percentage distributed within each priority category.

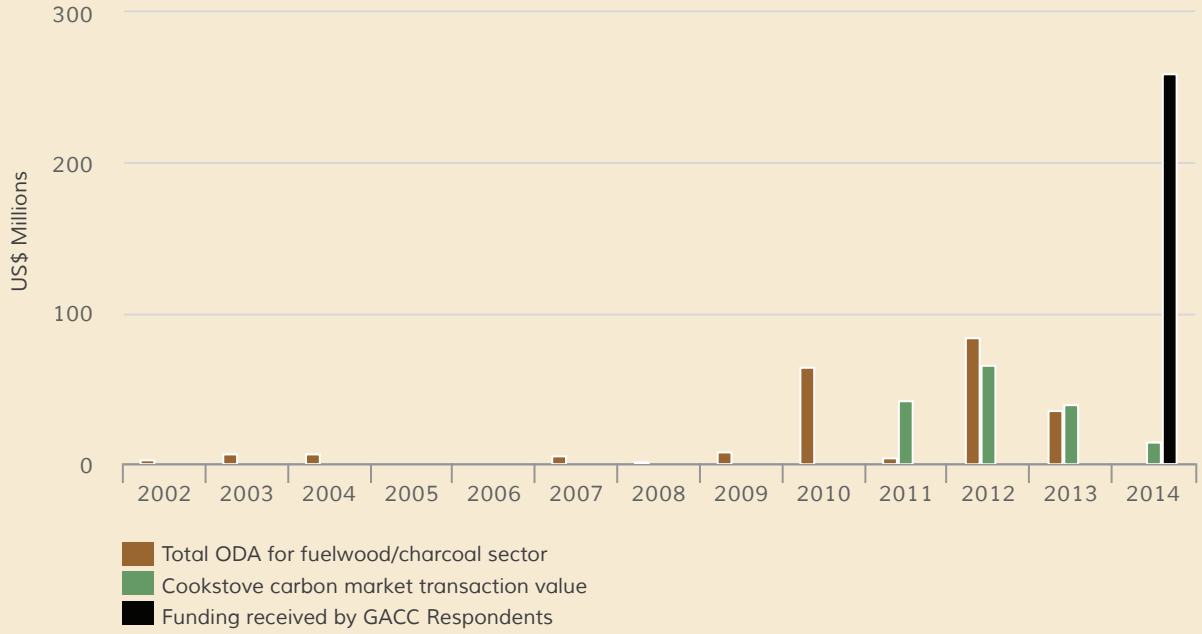


Source: Climate Focus graphic based on data provided by the Global Alliance for Clean Cookstoves 2013.

Indicator 2: Financial investments in woodfuel interventions

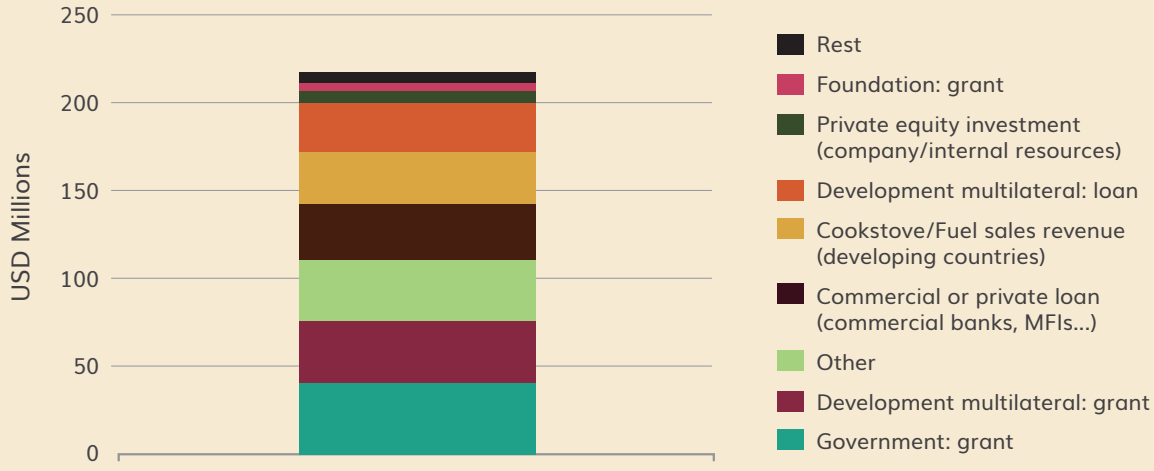
Finance for woodfuel interventions comes from a broad array of sources, including ODA, carbon markets, private commercial loans and sales revenues, and measuring total flows is not straightforward. However, a number of data sources do indicate escalating sums (Figure 4). ODA directed to the fuelwood/charcoal sector has increased from an annual average of US$ 3.6 million between 2006 and 2009, to US$47 million between 2010 and 2013. Data available from Ecosystem Marketplace indicates a ramping up of the value of carbon market transaction for cookstove projects between 2011 and 2012, with a fall back from 2013 to 2014. This is a reflection of the languishing state of carbon markets generally, but also a 50% decline in the price paid for an emission reduction credit from cookstove projects. Far higher investments however have been reported by cookstove project developers. According to a market survey conducted by GACC, cookstove project developers received approximately US$273 million in 2014. This figure includes inter alia ODA and carbon market flows (see Figure 5) but is significantly higher than figures for previous years. Though only a speculative sum at this time, the same project developers report that total funding sought in 2015 was approximately US$854 million.

Figure 4: Woodfuel intervention finance from multiple sources, 2002 to 2014, US$ millions



Source: Climate Focus graphics based on OECD DAC data, Ecosystem Marketplace data, and data provided by the Global Alliance for Clean Cookstoves 2014

Figure 5: Breakdown by source of clean cookstove total funding in 2014, as reported by GACC



Source: Climate Focus graphics based on data provided by the Global Alliance for Clean Cookstoves 2014.

Case studies on localized interventions to reduce subsistence and smallholder driven forest loss and tackle poverty

Case study 1: Tackling drivers of forest loss in Mai Ndombe, DRC

In the Mai Ndombe Province of the Democratic Republic of Congo (DRC), the main direct drivers of deforestation and forest degradation are currently slash and burn agriculture conducted largely by smallholder farmers, and charcoal production, largely to supply demand from the capital city of Kinshasa. Deforestation rates in the region are relatively high (approximately 1.26% per year from 2004 to 2014), forest loss is large in absolute terms given high forest cover levels, and population growth is expected to exacerbate existing drivers. Though forest loss from industrial plantations is currently low, studies have identified the high potential for oil palm development in the region, and its potential to encroach on high value forest (Semroc 2015) At the same time, the absolute poverty rate in Mai Ndombe is high (87.7% on less than US$1.25 per day), and investment is needed to address acute development challenges.

Thus the Mai Ndombe Province is one in which forest loss is currently associated with production practices necessary to meet the basic needs of a vulnerable population, but also one in which economic development has the potential to trigger even greater forest loss.

A number of programs are supporting DRC to address these challenges in the province. The Forest Investment Program (FIP) is currently financing the Integrated REDD+ Sub-Project, implemented by the World Bank, in the Plateau District of the Mai Ndombe Province. The Forest Carbon Partnership Facility's (FCPF) Carbon Fund, which channels results-based payments for forest emission reductions, has accepted the Emission Reduction Program in the Mai Ndombe Province into its pipeline. Complementary to these programs DRC has included an investment program for Mai Ndombe in its National REDD+ Investment Plan 2015-2020, which will be submitted for funding to the Central Africa REDD+ Initiative (CAFI). Taken together, these programs would represent an estimated US$95 million investment, to be delivered between 2015 and 2020 through a range of financial instruments including up-front grants and results-based payments.

The Mai Ndombe program is structured accorded to four 'pillars': agriculture, energy, forest and enabling activities.

Agriculture: Agricultural activities supported by the program include agroforestry and improvement of cultivation techniques, promoting the use of perennial crops (coffee, cocoa, palm oil and rubber) in the agricultural complex and the savannas, and strengthening of the downstream value chains for perennial crops. These interventions are designed to generate higher incomes for households and small farmers, and reduce the surface area cultivated under fallow slash and burn practices, thereby reducing associated deforestation.

Energy: Energy activities supported by the program include assisted natural regeneration of the savannas for charcoal production, large-scale afforestation/reforestation for charcoal production, and formalization and strengthening of the fuelwood sector. These interventions are designed to meet the increasing demand in Kinshasa for fuelwood in a way that reduces pressure on remaining forests.
Forest: Forest activities supported by the program include low-impact industrial logging, the conservation of local community forests, the issuance of conservation concessions, afforestation/reforestation

for the production of lumbar, the strengthening of forest and wildlife law enforcement, support for bringing logging operations into compliance, support for the development of community forestry, and support for the management of protected areas. These interventions are designed to meet demand for wood products in a way that reduces deforestation and degradation due to industrial and small-scale logging, and promote the conservation of forest carbon stocks through conservation measures.

Enabling activities: Enabling activities include building the capacities of decentralized government services, the development of sustainable development plans through building the capacities of communities and territorial entities, the realization of investments of collective and strategic interest (e.g. the maintenance of strategic roads and bridges), and family planning education. These interventions are designed to strengthen the institutions and the governance of natural resources in Mai-Ndombe.

Case study 2: Tambopata-Bahuaja REDD+ Project, Madre de Dios, Peru

Peru presents a very different picture to the DRC. Only 8% of the population lives on less than US$2 per day (compared to 95% in DRC), down from 25% in the year 2000. Traditionally, the main drivers of forest loss have been migratory agriculture and small scale farming, though increasingly, the main drivers are associated with economic growth, including large-scale agriculture, timber, gold mining, dams, hydrocarbon extraction and roads and infrastructure. Nonetheless, there remain areas in Peru in which small-scale agriculture remains a main driver of forest loss.

One such area is the Tambopata National Reserve and Bahuaja-Sonene National Park, a highly biodiverse region with historically low levels of deforestation. The recent completion of the South Interoceanic Highway has increased inward migration and associated threats of land-use change and informal (and often illegal) gold mining. The main driver of encroachment to the protected areas is small-scale agriculture, with farmers who have had little access to more efficient and productive inputs and modalities tending to move to new areas when their land becomes degraded.

The Tambopata-Bahuaja REDD+ Project targets this driver of deforestation by working with over 1,100 smallholder farmers to restore degraded land and produce certified 'zero-deforestation' organic and Fairtrade cocoa, alongside providing technical support for control and surveillance within the Park and Reserve and securing 4.5 million tCO2eq avoided emissions by 2020, certified to the Verified Carbon Standard and the Climate and Community and Biodiversity Standard.

This project is based on a public-private partnership between a leading Peruvian NGO AIDER (Asociación para la Investigación y el Desarrollo Integral); Althelia Ecosphere Fund, an impact investor; FONDAM (Fondo de las Americas) the Peru-US debt-for-nature swap fund for forest conservation; and the Peruvian National Parks Authority SERNANP. AIDER also works closely with the regional forest authorities of Tambopata National Reserve and Bahuaja-Sonene National Park.

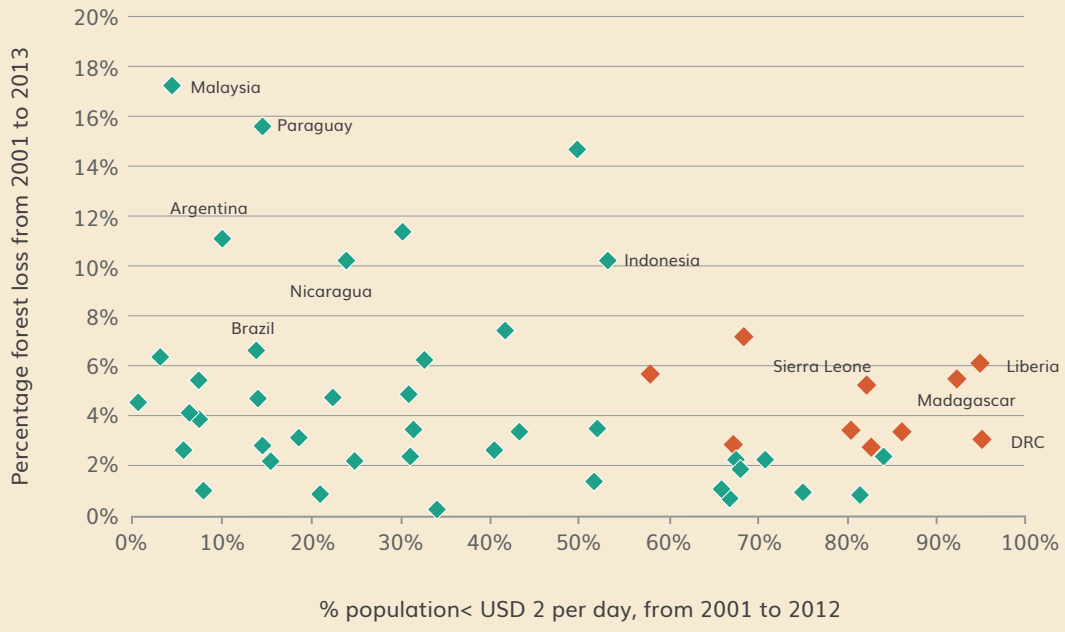
Information on the relationship between forest loss and subsistence/ small holder activities

Subsistence and smallholder activities tend to be the more significant drivers of forest loss in least developed countries, many of which are located in Sub-Saharan Africa. Research by Hosonuma et al. (2012) has highlighted the role of local and subsistence agriculture as a driver of deforestation in Africa. This is mainly due to the fact that large scale agricultural or forestry operations are typically under-represented in least developed countries, and hence smallholder activities have a proportionately larger impact on forest cover than in middle and upper-middle income countries.

Yet where subsistence and smallholder activities are responsible for a large percentage of the forest loss occurring in a country, the overall rate of forest loss may still be very low. In targeting interventions, it is important to identify not only those countries in which smallholder activities are major drivers of forest loss in relative terms, but those countries in which smallholder activities correlate with higher absolute rates of forest loss.

To approach this, we take 60 developing countries with high forest cover, and plot the percentage forest loss from 2001 to 2013, according to Global Forest Watch figures, against poverty indicators and agricultural productivity indicators, as reported by the World Bank and FAO, over the same period respectively. Results are represented in Figure 6, Figure 7 and Figure 8.

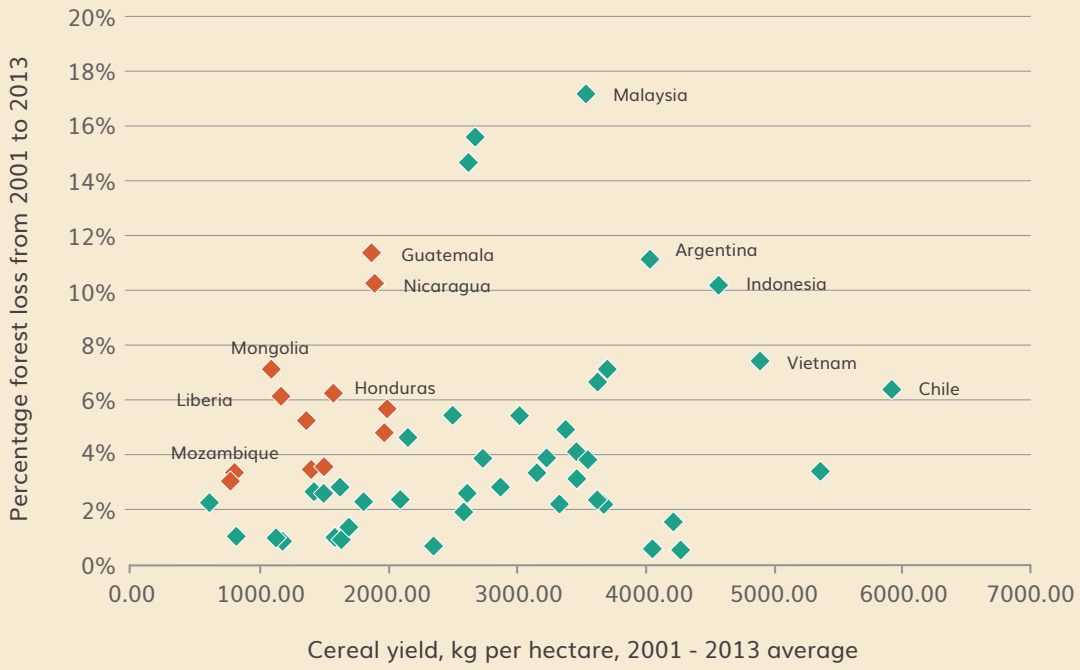
Figure 6: The relationship between forest loss (Global Forest Watch figures) and poverty (World Bank Development Indicator) in 60 developing countries with the highest forest cover



Source: Data from Global Forest Watch and World Bank Development Indicators.

Figure 6 confirms that the relationship between poverty and forest loss is complex. Although the highest forest loss rates are more often in those countries with lower poverty rates (see Malaysia, Paraguay, Argentina) there is otherwise no obvious relational pattern. Some countries with high poverty rates experience both medium to low levels of forest loss, and countries with low poverty rates experience low to high levels of forest loss. Nonetheless, it is possible to identify those countries with relatively high (>3%) rates of forest loss and high poverty rates (>60%). These countries are highlighted in red.

Figure 7: The relationship between forest loss and cereal yield in 60 developing countries with the highest forest cover



Source: Global Forest Watch and FAO.

Figure 7 displays similar characteristics to Figure 6. Although the highest rates of forest loss are confined to those developing countries with higher agricultural yields (see Chile, Vietnam, Indonesia) countries with low agricultural yields experience low to high levels of forest loss, and vice versa. As before, countries with relatively high (>3%) rates of forest loss and low cereal yield (<2000 kg/ha) are highlighted.

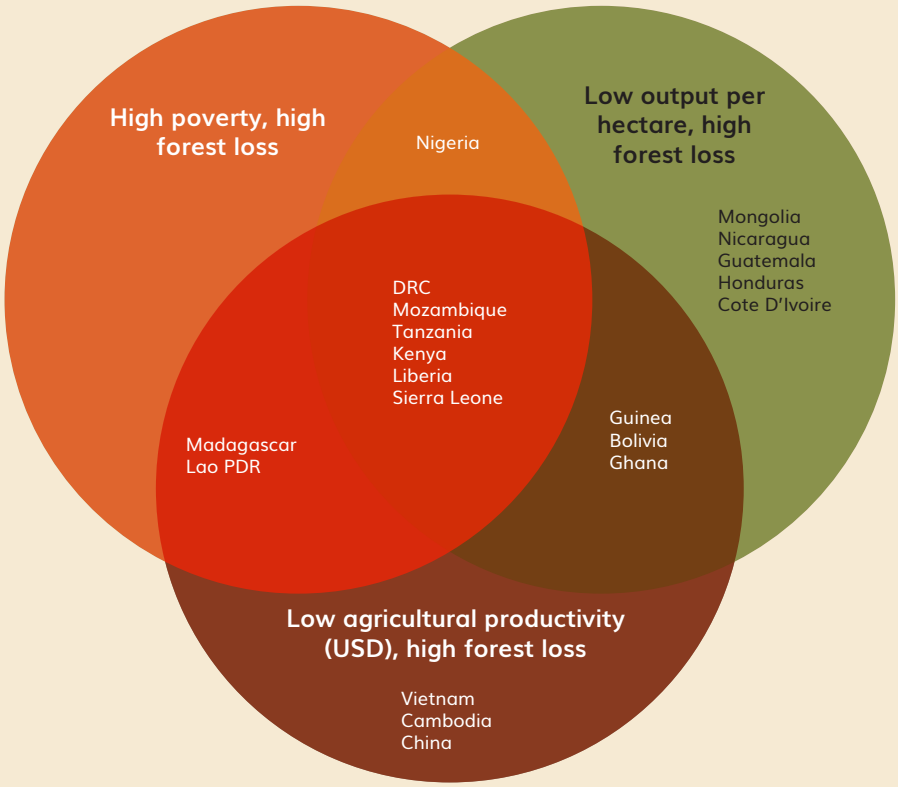
Figure 8: The relationship between forest loss and agricultural productivity (value added per worker) in 60 developing countries with the highest forest cover

Source: Global Forest Watch and World Bank Development Indicators.

Figure 8 highlights those countries in which low agricultural value added per worker (<US$800) correlates with higher rates of forest loss. Agricultural value added is measured as the economic output of the agricultural sector minus the cost of intermediate inputs. Subsistence and small-scale farms have typically low value added per worker (in US$ terms), and correlation with high forest loss is suggestive of a link between the two. However, value added should only be taken as a proxy for small-scale agriculture in conjunction with data on yield outputs. It is notable that some countries (e.g., Indonesia and China) have low value added per worker (Figure 8), but relatively high yields per hectare (Figure 7). This is suggestive more of high input, inefficient intensive agriculture (e.g., systems with overuse of chemical fertilizers), than of subsistence and small-scale farming.

Although correlation should not be confused with causation, where countries do have higher forest loss, high poverty rates and low agricultural productivity, it is likely that human activities to meet basic needs are among the major drivers of forest loss. Highlighting these correlations is helpful for policy makers to target interventions. Figure 9 indicates these countries and where there are overlaps. As expected, many, though not all, are located in sub-Saharan Africa.

Figure 9: Developing countries with high forest loss rate (>3% for 2001 to 2013), which also have high poverty rates, low yields per hectare and low productivity per worker.



Source: Climate Focus graphic based on figures above.

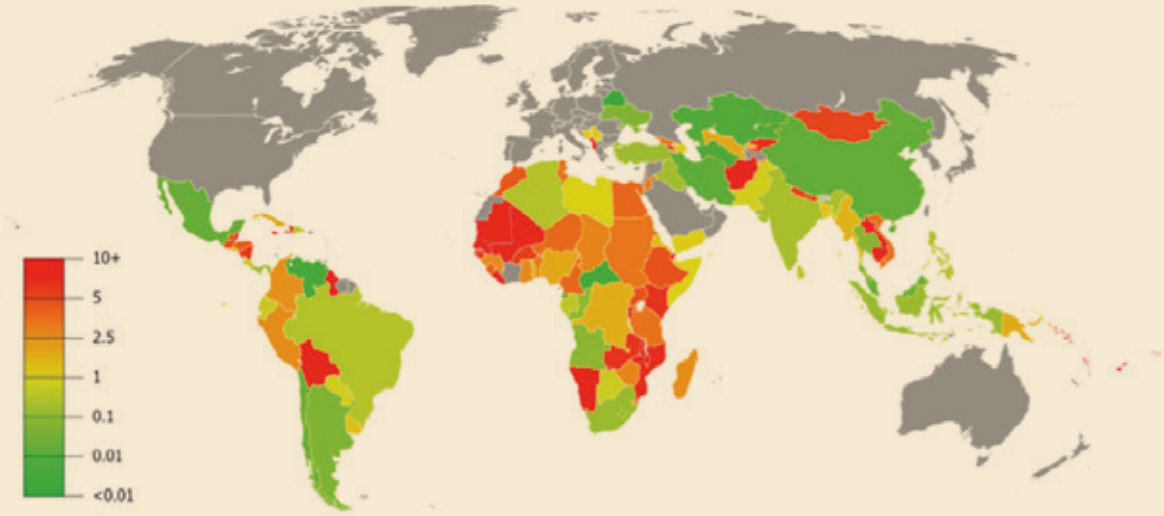
A key caveat here is that these figures only describe national trends, and there can be great variance between subnational regions in terms of forest loss, poverty rates and agricultural productivity. Hence this approach does not capture those subnational regions within middle and upper-middle income countries in which smallholder activities are a major driver of localized forest loss (and at which interventions can be usefully targeted) while being a relatively small cause of forest loss across the country as a whole. A further limitation is that historical data does not capture those countries and regions in which forest loss has been historically low, but where forest loss is projected to increase due to anticipated economic development, population growth or other changing factors.

Of course, increasing agricultural productivity to boost food security will remain a priority for policy makers in least developed countries. The challenge is to ensure that efforts to increase agricultural output and reduce poverty do not drive higher GHG emissions, particularly from increased deforestation.

A further consideration is that countries receiving the largest amount of agricultural ODA per capita tend to be least developed countries in which food security issues are more pressing than elsewhere (Figure 11). However, these tend not to be the countries which have been targeted for climate mitiga-

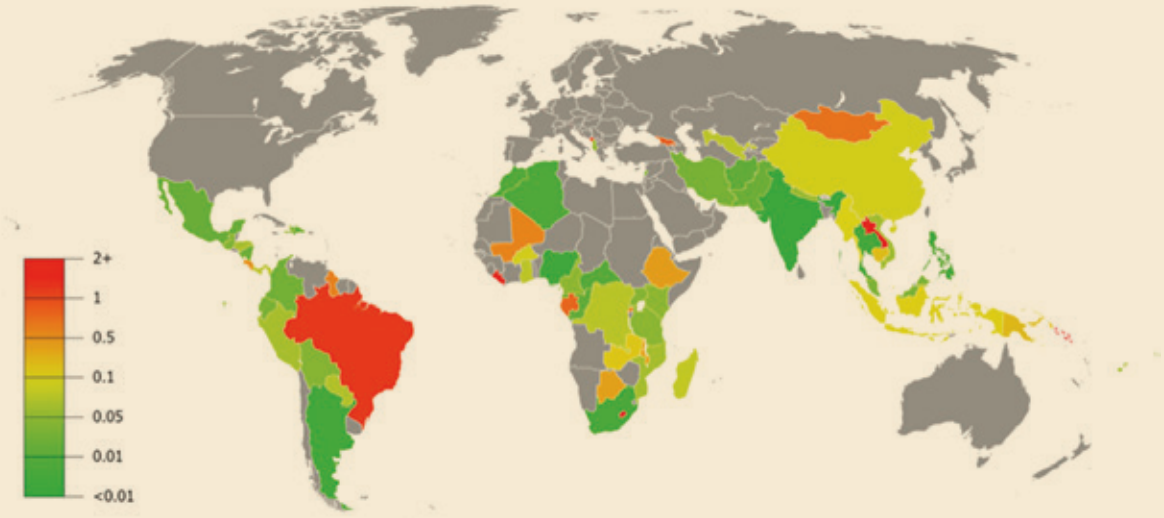
tion ODA in the forestry sector, which tends to concentrate in middle-income countries (Figure 12).[1] This indicates that efforts to increase agricultural output, and to reduce the impact of agricultural expansion on forest loss, are largely uncoordinated, and that greater effort could be taken to ensure that aid flows to meet basic needs in agricultural sector are made climate sensitive.

Figure 10: Agricultural ODA per capita in 2013, in US$.



Source: Climate Focus calculations from OECD DAC, generated using Gunn Map 2.

Figure 11: Climate mitigation forestry ODA per capita in 2013, in US$.



Source: Climate Focus calculation from OECD DAC, generated using Gunn Map 2.

Technical Annex

Selection of Indicators

Indicator 1: Global distribution of clean cookstoves

In this part we describe an intervention class to reduce small-holder and subsistence driven emissions, and present global progress in rolling out this intervention class. For this report, we highlight interventions that reduce forest loss and emissions from woodfuel consumption through the distribution of clean and fuel-efficient cookstoves. We select this issue as there is available data on both the GHG emissions associated with woodfuel consumption at the country level, and data on the distribution of cookstoves.

Indicator 2: Financial support for woodfuel interventions

This section describes financial support for woodfuel interventions including ODA targeted at the charcoal/fuelwood, carbon market financing of clean cookstoves, and other sources, such as private equity and commercial loans.

Case studies: Localized interventions to reduce subsistence and smallholder driven forest loss and tackle poverty

In this part, we select (1) a case study of a localized intervention to reduce forest loss driven by basic needs in a country where subsistence and small-holder activities are a major driver of deforestation, and (2) a case study of a localized intervention to reduce forest loss driven by basic needs in a country where small-holder and subsistence activities are not a major driver of deforestation nationally, but have localized effect on forest loss.

Countries and regions in which subsistence and smallholder interventions have greatest impact on forest loss

In this part we identify countries in which there is a correlation between poverty, low agricultural intensity and higher rates of forest loss. This is done to indicate those countries in which subsistence and small-holder activities have a role in driving forest loss, where forest loss is significant. The limitation of this approach is that it does not identify subnational regions within countries where small holder and subsistence activities are a driver of forest loss, but where small-holder agriculture is not a major driver across the country as a whole. However, localized data on poverty rates and agricultural intensity is not available to enable us to do this.

Methodology

Indicator 1:

Global cookstoves distribution figures are provided by the Global Alliance for Clean Cookstoves (GACC). Following Parker et al. (2015), we presented three criteria to guide policy makers in deciding which countries to target for woodfuel interventions: (1) countries with high total emissions from woodfuel in absolute terms; (2) countries in which woodfuel emissions are high relative to gross emissions from deforestation; and (3) countries in which households using woodfuel use large amounts of non-renewable woodfuel and hence in which emissions reductions per intervention are highest.

Countries in (1) are identified by multiplying figures for total household fuelwood and charcoal use at

the country level (as reported by UN energy statistics) by the national figures for the fraction of non-renewable biomass (fNRB) as reported by Bailis et al., (2015).

Countries in (2) are identified by comparing total emissions from woodfuel use as calculated in (1), with national emissions from deforestation, as reported by Harris et al. (2012).

Countries in (3) are identified by first, multiplying the percentage of woodfuel users in a country (as reported by WHO) by the total population, and then dividing this by the average household size of each country, in order to calculate woodfuel use per household using woodfuel. This is then multiplied by fNRB figures to calculate those countries in which households using woodfuel have the highest emissions, and hence where woodfuel interventions will have the highest mitigation potential per intervention.

To show how many clean cookstoves are being distributed in countries in each category, we took country level clean cookstove distribution data from 2013 provided by the GACC. Global distribution figures were also provided by GACC.

Indicator 2:

There is no single dataset that captures financial support for woodfuel interventions, so we present a combination of data from OECD DAC, Ecosystem Marketplace, and the GACC.

Countries and regions in which subsistence and smallholder interventions have greatest impact on forest loss

We selected 60 developing countries with the highest forest cover in 2000, according to Hansen/Global Forest Watch (GFW) data, and retrieved GFW figures for percentage forest loss for these countries between 2001 and 2013. We then plotted these figures against poverty data (percentage of the population living on less than US$2 per day) for each country where data was available, reported by the World Bank, averaged over this period. Given that we were comparing poverty rates internationally, we used an international poverty line (US$ 2) rather than a national poverty line. We selected US$ 2 rather than US$1.25, as the latter is a marker of absolute poverty, and we wanted to capture poverty beyond this threshold. We highlighted those countries in which a higher rate of deforestation (>3% over this period) correlated with higher rates of poverty (>60%) to indicate those countries in which activities associated with poverty are likely linked to significant forest loss.

We then plotted the Hansen/GFW data for forest loss against an agricultural yield measure (cereal yield in kilograms per hectare) for each country where data was available, reported by the World Bank from FAO data over this period. Though there are multiple indicators of agricultural intensity or productivity (for example, agriculture value added per worker in US$) though we felt that low output per hectare was the best proxy for a high prevalence of subsistence and small-holder production. As above, we highlighted those countries in which a higher rate of deforestation correlated with low agricultural intensity (<2000 kg per hectare).

To present the percentage of ODA in the agricultural and forestry sector that has climate mitigation as a principal or significant objective, we subtracted ODA commitments for which the relevant Rio Marker had been checked, from total ODA commitments to these sectors.

World maps were generated using Gunn Map 2 Global Chart Tool, available at *http://lert.co.nz/map/*

The color scale was adjusted to best visualize the data spread between countries.

Data Sources

Indicator 1:

Cookstove distribution figures, both national and global, are compiled by GACC based on voluntary surveys from GACC members—a group that is growing rapidly—and provide the best estimates on the state of clean cookstove programs (GACC 2012, GACC 2013). These data continue previous tracking of cookstoves that was conducted by the Partnership for Clean Indoor Air (PCIA), which merged with the GACC in 2012. (PCIA 2012). Figures on total funding received by cookstove developers, and future funding sought, are also based on voluntary surveys.

UN Energy Statistics on household fuelwood and charcoal consumption are provided by the UN Statistics Division and sourced from the UN Energy Statistics Database.

fNRB values are provided by Bailis et al. (2015), who calculate fNRB using a WISDOM model (Woodfuel Integrated Supply/Demand Overview Mapping) using geo-referenced global data and national/sub-national statistics. The authors created a range of national and sub-national fNRB values of woodfuel harvesting for 90 countries according to two scenarios: (1) by-products of land cover change (i.e. wood becomes available due to deforestation) are not used for woodfuel; and (2) by-products of land cover change generated in accessible regions are used as woodfuel.

The percentage of the populations reliant on woodfuel was taken from the World Health Organization (WHO) Global Health Observatory Data Repository, AIR 26: Population using charcoal as main cooking fuel, AIR27: Population using wood as main cooking fuel.

Emissions from deforestation have been taken from a study by Harris et al. (2012) using remote sensing of gross forest loss, taking into account maps of above ground biomass based on satellite observations calibrated with ground studies.

Indicator 2:

ODA data on financing committed by donors for the fuelwood/charcoal sector is retrieved from OECD Query Wizard for International Development Statistic (QWIDS).

Ecosystem Marketplace data on transactions for clean cookstove projects is based on a global annual survey sent to hundreds of carbon project developers and offset retailers active in the market, and measures "transacted" offsets. A limitation of this data is that it does not disaggregate the primary market (where market participants buy carbon credits from project developers, or host jurisdictions) from the secondary market (the resale of credits between market participants), whereas for the purposes of Goal 4, only primary market data (that is, money flowing to project developers) is of relevance.

Figures on total funding received by cookstove developers for 2014, and future funding sought, are based on GACC voluntary surveys as described for Indicator 1.

Localized interventions to reduce subsistence and smallholder driven forest loss and tackle poverty

The Mai Ndombe case study was based on project documents for interventions financed by the Forest Investment Partnership, the Forest Carbon Partnership Facility, and the BioCarbon Fund, and a World Bank funding proposal to the Green Climate Fund, provided by the World Bank.

The Peru case study was based on information provided by Althelia Ecosphere, an impact investor involved with this project.

Countries and regions in which subsistence and smallholder interventions have greatest impact on forest loss

See Technical Annex to Goal 1 for a description of GFW data. We took figures for a 30% canopy cover threshold. Poverty data was taken from the World Bank, Development Research Group. The data is based on primary household survey data obtained from government statistical agencies and World Bank country departments. The population below $2 a day is the percentage of the population living on less than $2.00 a day at 2005 purchasing power parity. Agricultural intensity data describes cereal yield, measured as kilograms per hectare of harvested land, and includes wheat, rice, maize, barley, oats, rye, millet, sorghum, buckwheat, and mixed grains, and is reported by the World Bank from FAO data.

Data on Official Development Assistance commitments to the agricultural sector and forestry sector in 2013 was taken from OECD Creditor Reporting System (CRS). Data on Official Development Assistance commitments to the agricultural and forestry sector in 2013 for which climate mitigation was a principal or significant objective was taken from OECD Stat, Aid activities targeting Global Environmental Objectives.

Bibliography

AIDESEP and FPP. (2015). Revealing the hidden - Indigenous perspectives on deforestation in the Peruvian Amazon. The causes and the solution. Authored by Valqui, M., Feather, C. and Espinosa Llanos, R. Edited by: AIDESEP (Inter Ethnic Association for the Development of the Peruvian Amazon) and FPP (Forest Peoples Programme).

Ameha, A, Larsen, H.O., Lemenih, M. (2014). Participatory forest management in Ethiopia: learning from pilot projects. Environmental management, Vol. 53(4), 838-854.

Bailis, R., Drigo, R., Ghilardi, A., & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5, 266-272.

Barnett, A. (1997). AIDS Briefs: Subsistence Agriculture (USAID Health and Human Resources Analysis and Research for Africa Project).

Bhattarai. (2001), Trees Outside Forests: The Woodfuel Production Context (2001) Retrieved from http://www.fao.org/docrep/012/y4374e/y4374e00.pdf.

BioCarbon Fund. (2014). Proposal for an Integrated Proposal for the Mai Ndombe.

Birner R., Resnick D. (2010). The Political Economy of Policies for Smallholder Agriculture. World Development, 38(10): 1442-1452.

Defries, R.S., T. Rudel, M. Uriarte, and M. Hansen, 2010. Deforestation driven by urban population growth and agricultural trade in the twenty-first century. Nature Geoscience, 3: 178-181.

GACC. (2012). Results Report. GACC. Retrieved from http://cleancookstoves.org/resources_files/results-report-2012.pdf.

GACC. (2013). Results Report. GACC. Retrieved from http://cleancookstoves.org/binary-data/RESOURCE/file/000/000/285-1.pdf; and PCIA. January 2012. PCIA BULLETIN–2010 Results Reporting Supplement. http://www.pciaonline.org/files/PCIA-Bulletin-2010-Results.pdf.

GACC. (2014.) Phase I Report (2010-2014). Retrieved from http://cleancookstoves.org/binary-data/RESOURCE/file/000/000/283-1.pdf.

Eckholm, E. (1975). The Other Energy Crisis: Firewood, Worldwatch Institute.

ESMAP. (2015). The State of the Global Clean and Improved Cooking Sector. Technical report 007/15. Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/21878/96499.pdf

FAO. (2004). Unified bioenergy terminology. Retrieved from www.fao.org/DOCREP/007/j4504E/j4504e00.htm.

FAO. (2010). Forestry Paper, Criteria And Indicators For Sustainable Woodfuels. Retrieved from http://www.fao.org/docrep/012/i1673e/i1673e00.pdf.

Forest Carbon Partnership Facility, Carbon Fund, Emission Reductions Program Idea Note (ER PIN) for the DRC, Mai Ndombe REDD+ ER Program

Forest Carbon Partnership Facility, Carbon Fund, Emission Reductions Program Document (ERPD) for the DRC, Mai Ndombe REDD+ ER Program

Forest Investment Program. (2011). Investment Plan: Democratic Republic Of Congo. FIP/SC.6/4.

Forest 500. (2015). Jurisdictions. Caquetá. Retrieved from http://forest500.org/caqueta.

GRAIN. (2014). Hungry for land: small farmers feed the world with less than a quarter of all farmland. Retrieved from https://www.grain.org/article/entries/4929-hungry-for-land-small-farmers-feed-the-world-with-less-than-a-quarter-of-all-farmland.

Hansen/GFW. (2013). Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A., Tyukavina, A., Thau, D., Stehman,S. V., Goetz, S. J., Loveland, T. R., Kommareddy, A., Egorov, A., Chini, L., Justice, C. O. and Townshend, J. R. G. (2013). Hansen/UMD/ Google/USGS/NASA Tree Cover Loss and Gain Area. University of Maryland, Google, USGS, and NASA. Retrieved from www. globalforestwatch.org

Jolly, R. (1976). The World Employment Conference: The Enthronement of Basic Needs. Development Policy Review, A9(2), 31–44.

Harris, N. L., Brown, S., Hagen, S.C., Saatchi, S.S.,Petrova, S., Salas, W., Hansen, M.C., Potapov, P.V., Lotsch, A. (2012). Baseline map of carbon emissions from deforestation in tropical regions. Science, 336(6088), 1573-1576.

Hosonuma, N., Herold, M., De Sy, V., De Fries, R. S., Brockhaus, M., Verchot, L., Angelsen, A., Romijin, E. (2012). An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7(4), 1-12.

Lininger, K.(2011). Chapter 9: Small-scale farming and shifting cultivation. In Boucher D., Elias P., Liniger K., May-Tobin C., Roquemore S. , and Saxon E. (Eds.). 2011. The Root of the Problem, What's Driving Tropical Deforestation Today. Washington, DC: Union of Concerned Scientists.

Morton, J.F. (2007). The impact of climate change on smallholder and subsistence agriculture. Proceedings of the National Academy of Sciences of the USA, 104(50), 19680–19685.

Streck, C. and Zurek, M. (2013). Addressing Agricultural Drivers of Deforestation: Opportunities for Catalytic Donor Intervention. For the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Parker, C., Keenlyside, P., Galt, H., Haupt, F., Varns, T. (2015). Linkages between cookstoves and REDD+. A report for the Global Alliance for Clean Cookstoves. Washington, DC: Climate Focus.

PCIA. (2012). PCIA BULLETIN–2010 Results Reporting Supplement. Retrieved from http://www.pciaonline.org/files/PCIA-Bulletin-2010-Results.pdf.

Semroc, B.; Thomas, M.; Ward, J. & Buchanan, J. (2015). Incentivizing No-Deforestation Palm Oil Production in Liberia and the Democratic Republic of Congo.

Tesfaye, Y., Roos, A., Campbell, B.M., Bohlin, F. (2010). Forest Incomes and Poverty Alleviation Under Participatory Forest Management in the Bale Highlands. Southern Ethiopia. International Forestry Review, 12(1), 66-77.

Union of Concerned Scientists (UCS). (2011). Boucher, D., Elias, P., Lininger, K., May-Tobn, C., Roquemore, S., Saxon, E. The Root of the Problem: What is driving tropical deforestation today? Union of Concerned Scientists. Cambridge MA.

Wang, Y., Bailis, R., and Hyman, J. (2015). Carbon for clean energy: A review of household energy interventions under the carbon markets. Working Paper. Yale School of Forestry and Environmental Studies.

Woodwell, J. (2002). Fuelwood and Land Use in West Africa: Understanding the Past to Prepare for the Future, International Resources Group. Retrieved from http://allafrica.com/download/resource/main/main/idatcs/00010332:a739c5b513e4898f7cf7b-8657682b11c.pdf.

World Bank. (2015). World Development Indicators, 2001 to 2013. Retrieved from http://data.worldbank.org/indicator.

World Health Organization (WHO). (2012). Global Health Observatory Data Repository. AIR 26: Population using charcoal as main cooking fuel, AIR27: Population using wood as main cooking fuel.

Endnotes

[1] Though there are some exceptions to this. Laos, Cambodia, Guyana and Costa Rica receive relatively high per capita levels of both agricultural ODA and forestry mitigation ODA.

www.forestdeclaration.org