

BRIEF ACTIONABLE RESEARCH AGENDA ON:

Forestry

EfD

Environment for Development

FUNDED BY:



■ ■ Forests offer the potential for implementing nature-based solutions that provide simultaneously economic, social, and environmental benefits. Forests and Land-use are part of a larger initiative to identify the most promising research issues to support an actionable low-carbon transition in the Global South.

Aim: To identify climate solutions that are based on forestry and agriculture, and to assess their costs and benefits, including impacts on social welfare, income, poverty status, water quality, biodiversity, rainfall, and societal and gender equity.

Background: In most sectors of the economy, short-run increases in output involve increased use of fossil fuels and translate directly into increased greenhouse gas (GHG) emissions. This is less clear in the forestry sector. Underpinning the climatic impacts of land use and forest use is the carbon cycle: carbon is stored in trees as they grow, and released as they burn or decay. Selective logging that maintains the integrity of forests should therefore have limited effects on carbon in the atmosphere. In modern rotational forestry, trees are planted, harvested, and replanted; this cycle absorbs atmospheric carbon, provided that the timber is put to long-term use rather than burned.

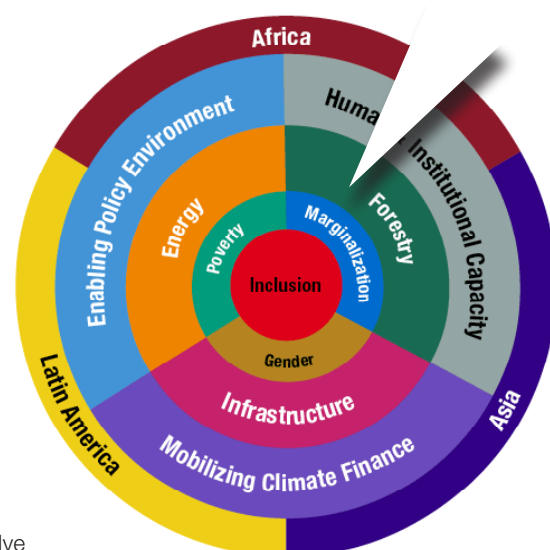
In contrast, clear-cutting that converts forest into farmland or other uses increases levels of atmospheric carbon.

Most of the developing world's vulnerable forests lie in high-rainfall tropical areas. Within these areas, population densities (and therefore pressure to convert forest lands to agriculture) vary considerably. These are also the areas in which the rural poor appear most vulnerable to extreme weather events caused by climate change.

In Asia, forestry and agriculture contribute a small proportion of greenhouse gas emissions (compared with other regions) because of high levels of industrialization in some Asian countries. However, both forestry and agriculture are essential to Asian economies.

Globally, Latin America – in particular, the Amazon – has the highest rates of deforestation. Land use is the largest source of carbon emissions in Latin America, and the region has the highest per-capita emissions of carbon from land use. In addition, methane emissions from agriculture are a particular concern in Latin America's cattle-grazing areas, because a given amount of methane has a much greater effect on global warming than the same amount of carbon.

In Africa, because of relatively low levels of industrialization, agriculture and forestry account for the largest share of the region's carbon emissions. Small-scale, rain-fed,



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Integrated solutions will require actions to help farmers get more productivity from land that is already cleared



subsistence agriculture supports a large proportion of Africa's population. Arable farmland is in short supply, and the population of Africa is growing. On one hand, forest conservation can provide benefits to farmers, in terms of improved soil health, water purification, flood control, and habitat for crop pollinators. On the other hand, if policies are adopted to prevent the clearing of forests for farmland, the burden of such policies may be borne by the rural poor.

Rural communities also need construction timber and firewood. In that respect, village woodlots (a form of rapid rotation forestry) also provide direct benefits to the rural poor. This can particularly benefit women and children, who typically spend many hours a day collecting firewood, which takes away time that women could spend earning money, and time that children could spend in school. Because of the need for both farmland and forests, integrated solutions will require actions to help farmers get more productivity from land that is already cleared.

The competing uses for rural land are increasingly a challenge for women. Young men tend to migrate to cities in search of jobs. Those left in subsistence agriculture tend to be women, as well as children and the elderly. These rural women are in particular need of support to overcome their unequal access to the resources needed for farming, including land, cash, and credit.

Opportunities for high impact research.

The need for research into forestry, land use, and atmospheric carbon can be seen in the number of commonly cited but apparently contradictory comments on forestry and greenhouse gas emissions. On one hand, an International Panel on Climate Change study states that "An estimated 23% of total anthropogenic greenhouse gas (GHG) emissions during 2007-2016 derive from agriculture, forestry and other land use." Yet, another researcher argues that "forests are responsible for much of the carbon removal by terrestrial ecosystems, which together remove 29% of annual CO₂ emissions." This apparent contradiction arises because land use both generates atmospheric carbon and absorbs it. It is the net contribution that matters. For example, pristine old growth forests maintain a carbon balance. While their conversion to cropping and livestock will increase GHG levels, a conversion to rapid rotational forestry should decrease them. There are large research gaps regarding the net contribution of land use policies in individual countries.

Whether land uses provide net storage or emissions of carbon is a crucial issue for governments committed to meeting their Nationally Determined Contributions (NDC) in terms of the Paris Agreement and drafting appropriate long-term Low Emissions Development Strategies (LEDS). It is also one of the major challenges for researchers, since it determines the viability of popular tools such as REDD+. REDD+ is a UN initiative that compensates developing countries for reducing net emissions by avoiding deforestation, reducing forest degradation, and promoting reforestation. National policies such as REDD+ should be



Images: unsplash

informed by detailed local studies.

REDD+ is an example of nature-based solutions, which are becoming increasingly popular as a tool in the transition to a low-carbon economy. In developing such policies, research is needed to avoid unintended consequences, particularly for low-income rural communities, women, and children. In addition, researchers should investigate the implications of land use policies for migration rates, and the best means to mitigate their effects on women, children, and the elderly when they are left behind.

The existing literature provides little certainty regarding the outcomes of inter-related policies such as REDD+, sales of carbon credits, timber and fuelwood, and the extension of property rights (communal versus private) in forest areas. Investigation is also warranted into the benefits that can accompany improved forestry management. Well-managed forests promote biodiversity, which can lead to “bio-prospecting” for commercially valuable products, including pharmaceuticals. Research is needed to evaluate the costs to local communities, in terms of forgone farming income and reduced access to the natural resources that are needed for their livelihoods, and to determine how to use profits from forestry to compensate communities for their losses.

Deforestation has been having profound external effects, not only via GHGs, but also through its effects on flooding and silt loads in rivers. Projects such as the \$1.5 billion promised at the Conference of Parties (COP26) to protect and restore the Congo Basin forests, and a range of World Bank funded emissions reduction agreements, face two key constraints: the difficulty of measuring carbon captured through land use measures, and the political instability observed in many of Africa’s heavily forested areas. Both provide clear opportunities for policy relevant research.

The clearest research opportunity has been provided by China’s ‘Sloping Land Conversion’ - the developing world’s largest ecological restoration project (budgeted at \$69 billion). This project was expected to increase China’s national forest area by 10-20% and to decrease its area under cultivation by 10%. The project’s costs – in terms of farming income forgone by local residents – merit study. It is likely to offer important lessons for other countries with growing rural populations in high rainfall tropical areas, especially where local mountainous forests are under threat.

While forests are conventionally valued for marketed products such as timber, payments are also being made to compensate forested regions for providing environmental services, including carbon storage. In order to assess the value and replicability of such payment schemes, their outcomes will need to be carefully monitored over time.

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