Policybriefs

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REDD Strategies for High Carbon Rural Development

CARBON-RICH agroforestry systems can help poor farmers benefit from global carbon markets and enhance the effectiveness of strategies to reduce emissions from deforestation

Photo: H. Mulizar

Key Observations

1. Important drivers of deforestation in areas of mixed agriculture - forest land use

More dynamic change occurs in mixed forest-agriculture mosaics and forest margins in tropical landscapes than in forest cores. Mosaic areas are subject to competing interests and multiple direct and indirect pressures. These pressures are shaped by a variety of policies and institutions, often extending well beyond the forest sector.

2. Multiple pathways of change determine carbon and livelihoods

Change in forest-agriculture mosaics in tropical countries can take many different pathways. These change trajectories are characterized by different types of forest and tree cover, quantities of carbon, economic returns, and environmental outcomes. In many areas, the adoption of high-carbon land uses is a growing trend.

3. Intermediate land uses can contribute to REDD objectives

Agroforestry systems that are intermediate between natural forests and intensive foodcrop systems can conserve and sequester high amounts of carbon and generate moderate to high income for farmers compared to other land uses. In addition, some of these systems support relatively high biodiversity and watershed functions, additional environmental benefits.

Implications

REDD is unlikely to succeed in achieving significant reductions in emissions from deforestation unless it explicitly **includes trees in the forest frontier and agriculture-forest mosaics**

Effective REDD strategies must be based on sound understanding of the **drivers and trajectories of land use change and the potential impact of alternative development pathways**

Coherent **multi-sectoral approaches** are needed to act on the most important drivers of deforestation and support the development of tree-based farming systems and enterprises.

High-carbon land use options may need **specific financial incentives** to successfully meet carbon sequestration, biodiversity and poverty alleviation goals

Large areas of the humid tropics are like mosaics, combining features of forests and agriculture and housing hundreds of millions of people. Land uses that store high quantities of carbon, such as agroforestry and other tree-based systems, make up a large part of those mosaic areas. Yet current discussions on reducing emissions from deforestation and degradation (REDD) within the UNFCCC do not adequately address these land uses as part of a potential mitigation strategy. This policy brief highlights evidence showing the potential of such land uses for storing carbon, stabilizing forest resources and generating income. Policies and strategies that harness this potential can contribute to high carbon rural development in the humid tropics.

Swidden in Papua, Indonesia

Cocoa Agroforests in Cameroon

The arguments in this policy brief are based on an evidence base highlighting the following:

1. Markets, suitability for farming and tenure security, which predominantly shape pressures on forests are distinguishable in three kinds of landscapes: forest –agriculture mosaic lands with well defined tenure, frontier and disputed areas, and core forest areas (Chomitz, 2007). The effectiveness of REDD in reducing emissions due to deforestation depends upon tree and forest management in all three areas (Van Noordwijk et al. 2007). REDD-related interventions are likely to have greatest effect in the forest-agriculture mosaic lands and disputed forest areas where population densities are highest and where most conversions, reforestation, afforestation and management take place.

2. Mosaiclands and forest edges cover large areas and are home to large numbers of people who depend on these landscapes for their livelihoods. These areas are crucially important for the success of REDD, individually and for their potential spillovers into forest core areas. **(Table 1)**

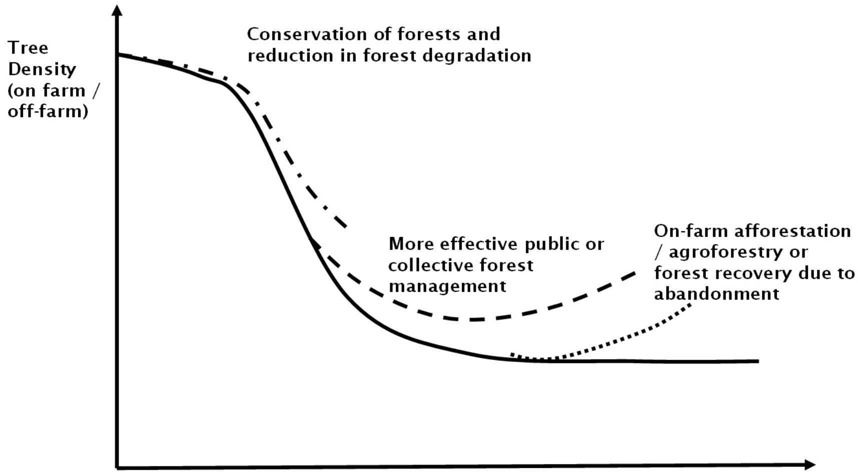
Table 1: Global distribution of forest type and population dependence

Forest type	Area (thousands of square km)	Population (millions)
Mosaiclands	6213	526.3
Forest edges	8089	358.6
Forest core	8160	108.7

Source: Summarized from Chomitz, (2007)

3. Land use transitions can assume multiple pathways, with varied impact on forest cover (hence carbon), income and population characteristics (Lambin and Geist, 2001). Examples of such trajectories include intensification with deforestation, intensification with reforestation, abandonment with regrowth, abandonment, and irreversible degradation (Chomitz, 2007.). Different combinations of market and policy pressures can underlie forest transitions of forest cover reduction, stabilization, and ultimate increase (eg Xu et al., 2007). **(Figure 1)**

Figure 1: Multiple pathways of land-use transitions



Source: Authors after Rudel et al 2005 and Chomitz 2007.

4. There is evidence that intermediary land uses have high potential for carbon sequestration (Verchot et al, 2007)

5. Long-term studies across the tropical forest margins show that intermediary land uses (agroforestry and tree-based systems) enable moderate profits while sequestering or maintaining high carbon and holding relatively high biodiversity (Palm et al., 2005, **Figure 2**). ASB policy brief 9 explores the potential for agroforestry systems to provide hydrologic services (Swallow et. al 2008).

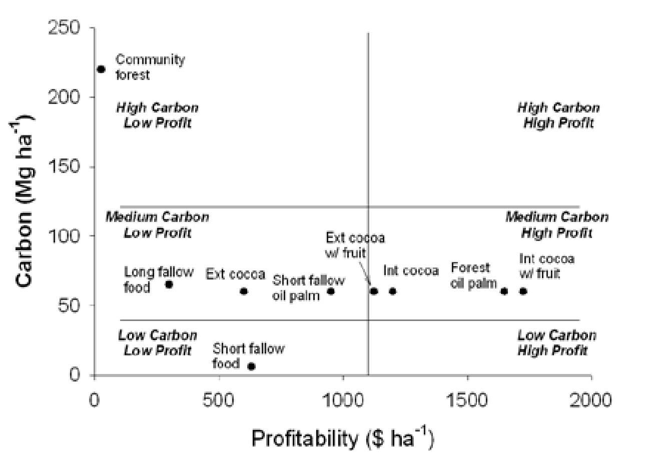


Figure 2: Carbon storage and private profitability of different systems in the humid forests of Cameroon (Palm et al., 2005).

Case Studies: dynamic intermediate systems across the tropics

Cocoa Agroforests in West and Central Africa

Cocoa has been the leading agricultural export of West and Central Africa over the last century. It is currently cultivated on over 5 million ha, most of which were once part of the West African Guinea Forest (Ruf & Schroth, 2004 in Gockowski & Sonwa, 2008). Cocoa continues to expand into the Western Region of Ghana and the Bas Sasssabdra region of Cote d'Ivoire (Gockowski & Sonwa, 2008). About 200,000 ha of cocoa agroforests have been left as degraded forest in Cameroon.

These cocoa systems range from no-shade mono-specific systems to complex cocoa-timber-medicinal agroforestry systems. No-shade systems are found mostly in the lower guinea forest systems in Liberia, Cote d'Ivoire and Nigeria, while the more complex systems are found mainly in Cameroon and the Congo Basin countries. Complex systems have biodiversity values nearly equivalent to secondary forests (Sonwa 2004, Gockowski et al., 2006, Sonwa et al., 2007) with non-cocoa revenue accounting for 23% of total revenue. There is evidence that the main drivers of cocoa plantation expansion in Cameroon are economic boom and bust cycles, international cocoa prices, and labour availability.

Intensifying low-shade cocoa systems would improve shade to about 30% and optimize yield. However, when tree cover is increased beyond 30%, as in multi-storey cocoa systems that promote biodiversity, yield decreases, and so other benefits are needed to offset the cost of increased shade. For these systems to be economically viable to farmers, they must generate income comparable to low shade systems. By sequestering carbon as well as optimizing production, a 30% shade system generates new and additional carbon credits that would not be generated under a low-shade system. Financial incentives might be devised to account for the carbon and biodiversity benefits of higher shade systems. But input, organizational and marketing challenges abound.

Evolving swiddens in South East Asia

Swidden systems have been the starting point for agriculture across the sub humid tropics, including most of Southeast Asia (SEA). 'Swidden' or shifting cultivation refers to lands cleared from woody vegetation for temporary production of local staple crops for food or other uses. Uhlig et al., (1994) (in Padoch et al., 2007) estimated that about 15-20 million people in Myanmar, Thailand, Sarawak and Sabah depended on swidden in the 1980s, cultivating an area of between 5.5 to 6 million hectares.

There is growing consensus that swiddens have been evolving rapidly in many parts of SEA, though data on its extent and evolution are still inconsistent. Fallow periods of about 13 years between rice crops have been reduced to 3-5 year herbaceous fallows and permanent farms. Conversion from swidden fields into cash crop plantations and reforested land also occurs. For example, rubber plantations began in the 1960s and by 1998 occupied more than 136,000 ha of land in SEA (Guo et al. 2002 in Padoch et al. 2007).

Recent analysis in Indonesia by the ASB partnership (van Noordwijk et al, 2008) suggests a strong regional differentiation within the country, with major parts of Java moving out of shifting cultivation and into permanent cropping before 1900, and the province of Papua still mostly relying on swiddens. Swiddens usually occur in landscapes with high forest cover and low population density.

An important shift in the dynamics of swidden systems occurs if trees in the fallow vegetation gain major economic importance. This has happened in the case of the development of rubber, oil palm and mixed fruit-tree agroforests. In Sumatra, smallholder oil palm production is an emerging economic commodity, while in Kalimantan, companies are making deals with local communities to establish oil palm monoculture systems.

The perpetual changes in swidden systems in SEA are driven by market responses, population dynamics and government policies. Regional authorities have largely outlawed swiddens and encouraged former swidden farmers to adopt permanent agricultural practices instead. Any eventual REDD policy would only add to the complex web of policies that impact these changing systems. It is therefore vital to understand the potential impact of REDD on the function and evolution of the whole swidden system.

Changing landscapes in Northern Thailand

Deforestation in Thailand rapidly increased at the beginning of the economic boom of the 1960s. National forest cover decreased by half from 1960 to 1998 due to agricultural expansion and the drive to increase agricultural exports for foreign exchange. In Northern Thailand, the proportion of farmland increased from 11% to 27% in the same period, largely through an expansion of traditional agriculture within forests. Traditional agriculture is high-carbon: mostly complex agroforests of jungle tea embedded in hill evergreen forests (also know as miang). Though variations exist among ethnic groups, the trend has been towards gradual transformations of miang by substituting fruit trees and seed crops for many of the forest and tea trees. There has also been active reforestation by government and communities, such as in the context of the Sam Mun Project, where the Forest Department was able to reforest 4,855ha in the area. A further 60,000 additional hectares were regenerated by villagers through mutual agreement in a land use planning process in which communities were given mandate to control access, use, fires and other factors.

In many ways, evolution of forest and agroforestry systems in northern Thailand over the last 20 years appears to be a good example of a high-carbon development pathway. However, there are concerns that villagers lose access to the natural products from the forest fallow fields during the intermediate stages where swidden systems shift to more permanent forest cover. Little is known about the environmental costs and benefits of changes in the traditional systems and landscapes in Northern Thailand and indeed what policy options might better optimize benefits. Further analysis of the Thailand case could very instructive for the future development of REDD (Summarized from Suraswadi et al., 2005)

Exploring the implications

REDD cannot succeed unless it includes trees in agricultural landscapes. Plantation forestry, plantation tree crop systems, agroforestry, agriculture and pastoral systems are the main alternatives to native forests in the humid tropics, with very distinct configurations prevailing in different tropical regions.

Effective REDD strategies must be based on sound understanding of the drivers and trajectories of land use change and the potential impact of alternative development pathways. In order to design effective, efficient and equitable policy incentives, REDD policy instruments need to address the most relevant drivers in each country and location.

Multi-sectoral approaches are needed to reduce deforestation while meeting other development objectives. Current REDD approaches at national and sub-national level often rely on single or selected ministries and so are likely to be disjointed and ineffective.

Location-specific policy approaches are needed to enhance the role of high-carbon land uses. Agroforestry systems vary considerably across regions, having different potential for success,, local technological know-how or practices, and land tenure arrangements. These specificities can potentially enhance or inhibit the impacts of carbon finance.

Specific financial incentives could help high-carbon options to succeed, and meet the multiple objectives of carbon, biodiversity and poverty alleviation. Most high-carbon and high-profit systems take 3-5 years to recoup initial investments compared to other food crop systems. Such long waiting periods can be prohibitive for small scale farmers, thus representing the same kind of up front financial requirements that inhibited the development of Clean Development Mechanism projects. Investments might also be required to support the development of alternative income generating activities if and when high-carbon systems are adopted in a REDD strategy.

The ASB Partnership for the Tropical Forest Margins is working to raise productivity and income of rural households in the humid tropics without increasing deforestation or undermining essential environmental services. ASB is a consortium of over 90 international and national-level partners with an ecoregional focus on the forest-agriculture margins in the humid tropics, with benchmark sites in the western Amazon basin of Brazil and Peru, the Congo Basin forest in Cameroon, southern Philippines, northern Thailand, and the island of Sumatra in Indonesia.

This document distils the key lessons from 15 years of research along tropical forest margins by the ASB Partnership and from the Sustainable Tree Crop Programme (STCP). The ASB Policybriefs series aims to deliver relevant, concise reading to key people whose decisions will make a difference to poverty reduction and environmental protection in the humid tropics.

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