ASB Partnership for the Tropical Forest Margins

Policybriefs 26

Agroforestry in REDD+: Opportunities and Challenges

Agroforestry and other tree-based systems (wood lots, afforestation) can contribute to Reducing Emissions from Deforestation and Forest Degradation (REDD+) in two ways: 1) as part of REDD+ under certain forest definitions; and / or 2) as part of a strategy for achieving REDD+ in landscapes. In the context of REDD+, agroforestry has the potential for reducing degradation by supplying timber and fuelwood that would otherwise be sourced from adjacent or distant forests. In fact, agroforestry has been used in several protected area landscape buffer zones and within conservation as one way of alleviating pressure on forests, thereby reducing deforestation. However, enabling market infrastructure, policies on tree rights and ownership and safeguards would be necessary for agroforestry and other tree-based systems in the landscape to effectively contribute to the goals of REDD+ and Nationally Appropriate Mitigation Actions (NAMAs).

Key messages

1 **Agroforestry can be part of REDD+ depending on the definition of forest in a given country.**

2 **Agroforestry can potentially prevent deforestation as a sustainable intensification and diversification pathway in tropical forest margins.**

3 **Agroforestry can reduce emissions from forest degradation through increased production of on-farm timber and fuelwood especially in instances of restricted access to forests or limited supply in "open access" forests.**

4 **Planting trees is not enough. An enabling legal and policy environment that guarantees tree rights and ownership, investments in and a market infrastructure for agroforestry and tree-based systems is necessary.**

Implications

- Countries should consider giving agroforestry a special place in the REDD+ and NAMAs strategies given the great potential benefits from emission reductions as well as the biodiversity and livelihoods benefits that can be generated.
- There is a need to consider investing REDD+ funds into intensification pathways, including agroforestry given that such pathways could significantly contribute to the success of REDD+.
- Agroforestry and other tree based systems could be considered as avenues for enhancing synergies between climate change mitigation and adaptation.
- Policy reforms for REDD+ should consider including legal, incentives and market frameworks for tree-based enterprises that could enhance the roles of trees outside "forests" in emission reductions.

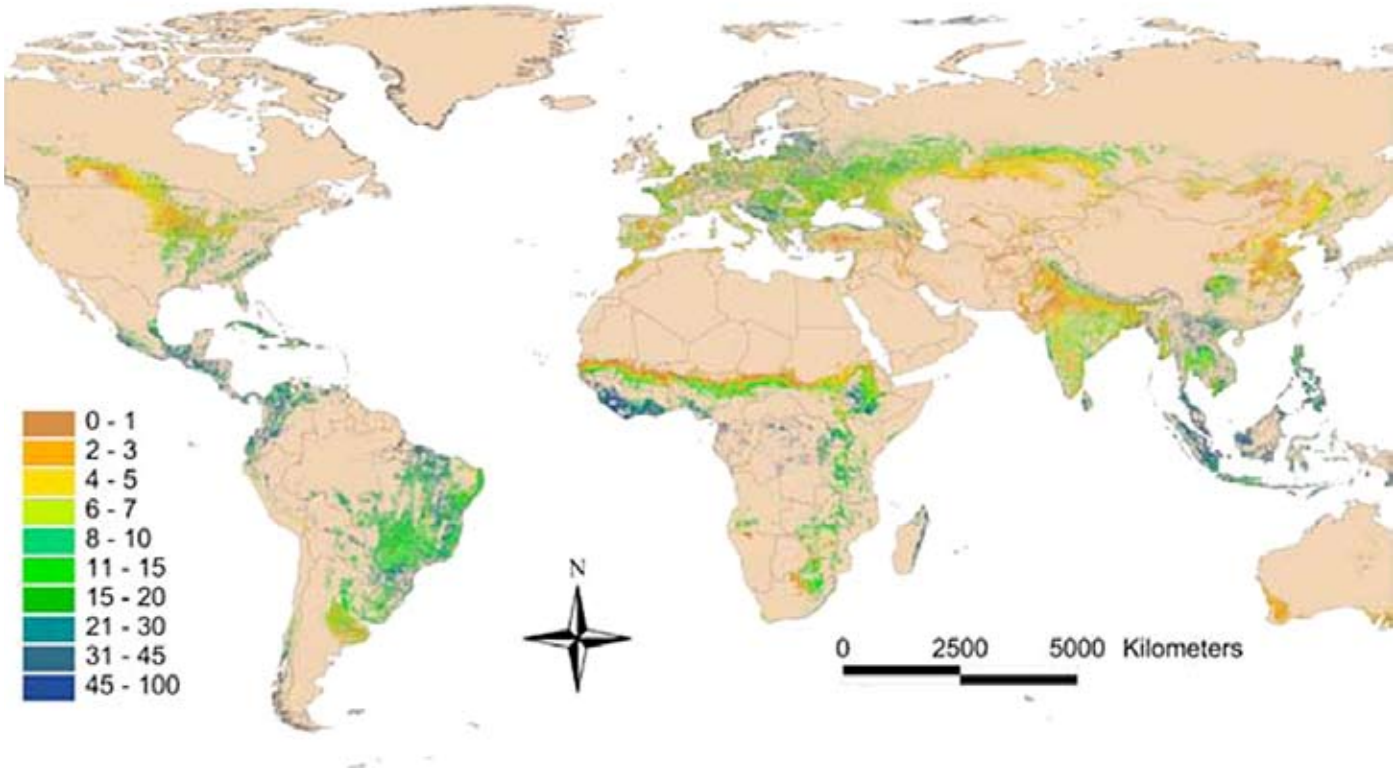

Figure 1: Map showing tree canopy cover on agricultural land at global level. Forty-six percent of agricultural land globally has at least 10% tree cover implying that all these lands could qualify under the UNFCCC 10 – 30 % canopy cover forest definition range. (Source: Zomer et. al 2009)

Reduced Emissions from Deforestation and Degradation (REDD+) envisages a mechanism in which countries elect to reduce national level deforestation to below an agreed baseline and receive post facto compensation or rewards. Key principles for REDD+ agreed in Cancun, Mexico in 2010 (Decision--/CP.16) indicate the following:

a) participation by countries is voluntary;

b) compensation is subject to monitoring, reporting and verification;

c) reductions are obtained through "reducing emissions from deforestation", "reducing emissions from degradation", "conservation of forest carbon stocks", "sustainable management of forests" and "enhancement of carbon stocks"; and

d) REDD should generate sustainable development benefits.

Agroforestry can be part of REDD+ depending on the definition of forest in a given country

Agroforestry (the deliberate management of trees on farms) is not explicitly mentioned as part of REDD+ or any current United Nations Framework Convention for Climate Change (UNFCCC) Mechanism. However, considering the UNFCCC definition of forest, a great deal of existing agroforestry systems worldwide could qualify to be an integral part of a REDD+ mechanism. The forest definition agreed on by UNFCCC in the context of the Kyoto protocol has three significant parts, only the first of which has received a lot of attention:

1. Forest refers to a country-specific choice of a threshold canopy cover (10–30 percent) and tree height (two to five m);
2. These thresholds are applied through "expert judgment" based on the potential to be reached in situ, not necessarily to the current vegetation; and
3. Temporarily unstocked areas ("temporarily" being undefined) remain forest as long as a state forest entity thinks they will, can or should return to tree cover conditions.

Taking rule 1 above into consideration and the fact that several agroforestry systems fall within the threshold canopy cover of between 10 and 30 % , many agroforestry systems would automatically qualify for REDD+. Zomer et al., (2009) found that about 46% of agricultural land globally has at least 10% tree cover: in Southeast Asia and Central America, 50% of agricultural land has at least 30% tree cover, while in Sub-Saharan Africa about 15% of agricultural land has at least 30% tree cover (Zomer et al., 2009) – see figure 1. This implies that most tree crop production and agroforestry systems meet the minimum requirements of forest – unpruned coffee, for example, can easily reach a height of five metres (van Noordwijk and Minang, 2009). Therefore countries that choose the lower limit of 10% crown cover will potentially include more agroforestry systems into the REDD+ mechanism.

Agroforestry can potentially prevent deforestation as a sustainable intensification and diversification pathway in tropical forest margins

The land sparing or intensification hypothesis suggests the following process. First, investments are made in agriculture that result in increased productivity per unit area, through increased inputs and better technology. Once these interventions enable adequate supply of demands for food, fuel and fiber, less

forest land would be cleared for agriculture, thereby sparing more forest lands and enabling recovering of degraded forests (Borlaug, 2007). If the deliberate introduction and management of trees into farming systems (agroforestry) leads to better yields per unit of land, then it qualifies as an intensification pathway, hence a potential land sparing process. If and when this works, it could prevent deforestation.

Gockowski and Sonwa (2011), showed that intensification of cacao (*Theobroma cacao L.*) agroforestry systems through seed-fertilizer technologies and the integration of timber species in the Guinean rainforest of West and Central Africa – Cote D'Ivoire, Ghana, Nigeria, Cameroon could have spared 21,000 km^2 of forests and reduced emissions of nearly 1.4 billion t CO_2 if it was adopted in the late 1960s. This is against a baseline of extensive expansion of cacao, cassava and oil palm into forest areas by about 68000km^2 over the same period.

Figure 2: An agroforestry demonstration farm in the Phillipines.

Agroforestry can reduce emissions from forest degradation through increased production of on-farm timber and fuelwood especially in instances of restricted access to forests or limited supply in "open access" forests.

Fuelwood, charcoal and timber have been documented as frontline drivers of forest degradation in several countries and to some extent a driver of deforestation in especially dry forest countries in Africa (e.g in Burkina Faso). Therefore, increasing on-farm timber and fuelwood production is likely to relieve forests of pressures from an increasing demand for timber and fuelwood. On-farm timber is increasingly becoming mainstream timber sources in a number of tropical countries across the world (Robiglio et al. 2011) *See ASB Policy Brief 23.*

Kimaro et al. (2011), demonstrate the significant contributions of rotational woodlot systems to reduce forest degradation and offset CO_2 emissions through on-farm wood supply in semi-arid Morogoro in Eastern Tanzania. Using native vegetation fallows forests as a reference, they show that after a 5-year rotation, wood yield (23 – 51 Mg Cha-1) was sufficient to meet household demand for fuelwood. They also provide evidence that highly productive acacia fallows (*Acacia crassicarpa A. Cunn. Ex Benth., Acacia leptocarpa A. Cunn. Ex Benth*., and *Acacia mangium Wild*) would take 4 - 9 years to recover carbon lost through clearance of Miombo forest for agricultural expansion compared to 2 decades required for re-growing Miombo Woodlands. In a study in the Kirinci Seblat National Park in Sumatra, Indonesia, Murniati et al (2001) show that households with more diversified farms (both wetland rice fields and other mixed gardens) had dramatically less dependence on adjacent national park resources compared to households that farmed wetland rice only. Farmers that had mixed gardens only also had an intermediate level of dependence on forest resources especially in terms of values of products obtained. This and other studies show that diversification through agroforestry can indeed alleviate increasing pressure on forests.

Planting trees is not enough. An enabling legal and policy environment that guarantees tree rights and ownership, investments in and a market infrastructure for agroforestry and tree-based systems is necessary

For agroforestry to effectively contribute to REDD+ or indeed any of the UNFCCC Mechanisms such as the Clean Development Mechanism (CDM) and Nationally Appropriate Mitigation Actions (NAMAs) there is need to go beyond planting trees. Designing and implementing a policy package that addresses a number of key challenges for agroforestry, afforestation and reforestation (tree-based systems) within a context of sustainable development will be necessary.

Challenges of agroforestry in the protected area landscape management and sustainable development context documented so far include (Ashley et al., 2006; Santos-Martin et al., 2011):

- The need to clarify and guarantee rights and ownership of trees, their products and services such as carbon. In many countries over regulation sometimes having competing national and customary laws and or silence on these issues feed corruption and demotivates farmers that could potentially adopt tree-based systems;
- Overcoming investment barriers given that there is an initial period during which trees do not yield any income but require time and resources to tend them;
- Developing an appropriate market infrastructure that allows for greater benefit from and value-added for tree products. A great deal of on-farm timber and charcoal are currently traded in the informal sector with middlemen making the most out of the products to the detriment of farmers.

Implications

Countries should consider giving agroforestry a special place in the REDD+ and NAMAs strategies given the great potential benefits from emission reductions as well as the biodiversity and livelihoods benefits that can be generated. If so, countries will need to consider whether or not their forest definition captures agroforestry and other tree based systems and benefits therein.

There is need to consider investing REDD+ funds into intensification pathways, including agroforestry given that such pathways could significantly contribute to REDD+. Little thinking has gone into this, or the development of a broader policy framework that is needed to manage agriculture as driver of deforestation in the REDD+ domain. More work is needed both at scientific and policy levels.

Agroforestry and other tree based systems could be considered as avenues for enhancing synergies between climate change mitigation and adaptation. One way would be to consider using adaptation funding to promote agroforestry and tree-based farming systems as these systems will potentially contribute to emission reduction but might not be implemented due to the high initial investment requirements especially in the first two years when no revenues are expected. This will provide a practical way of optimizing on both adaptation and mitigation funding- both currently in short supply.

Policy reforms for REDD+ should consider including legal, incentives and market frameworks for tree-based enterprises that could enhance the roles of trees outside "forests" in emission reduction. There is evidence from Asia, Africa and Latin America that agroforestry and other tree based systems will not thrive, without appropriate market infrastructure and proper attention on adding value to tree-products and services and robust extension services. The role of tree rights reforms in Niger and the subsequent transformation it fostered as well as the market oriented policy reforms in the coffee sector in Vietnam have great lessons for the kind of approach that is needed (Minang et al, 2011).

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. The partners have established 12 benchmark sites in the tropical forest biome of Brazil, Cameroon, Indonesia, Peru, Philippines and Vietnam.

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.

ASB Partnership for the Tropical Forest Margins,
United Nations Avenue, Gigiri
P.O. Box 30677 - 00100 Nairobi, Kenya
Tel. +254 20 7224000
Email: asb@cgiar.org
http://www.asb.cgiar.org

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