Info Note

Making trees count in non-Annex I countries

Measurement, reporting and verification (MRV) of agroforestry in the UNFCCC

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Key messages

- Many developing countries recognize that agroforestry offers benefits for both people and planet and have integrated it into national policy to help meet development and climate goals.
- Despite this interest, technical and institutional barriers often prevent trees outside forests and agroforestry from being recognized in United Nations Framework Convention on Climate Change (UNFCCC) measurement, reporting and verification (MRV) processes, such as national greenhouse gas inventories and REDD+.
- This lack of inclusion means agroforestry is less likely to receive financial investments and other support to match its potential significance in addressing climate change.
- Some countries have found ways to overcome these barriers, providing lessons for others to follow. Successful arrangements include: development of policy and regulations directly addressing agroforestry; farmer and producer groups are involved in the process; there is a collaborative research environment; and coordination among the diverse institutions involved with land use.

MRV of agroforestry under the UNFCCC

Agroforestry and trees outside forests (ToF)[1] offer many benefits for both people and the planet. Such trees store carbon, prevent erosion, filter water, offer shade for crops and livestock, provide fuelwood and create sources of food and income. In short, agroforestry and ToF play a role in adaptation to and mitigation of the effects of climate change, increasing the resilience of livelihoods and landscapes.

Most measurement, reporting and verification (MRV) systems, however, fail to include agroforestry and ToF. This absence has serious implications. If such trees aren't counted in MRV systems, then in many ways they don't count: Only if agroforestry resources are measured, reported and verified will they gain access to the financial and other support needed to scale up use.

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have agreed to submit national greenhouse gas (GHG) inventories, as well as information on their adaptation and mitigation efforts. These inventories include sources of emissions—such as those from energy production, transportation and agriculture—as well as efforts to remove GHGs from the atmosphere through "sinks" such as forests, vegetation and soils, which take up and store carbon. National GHG inventories are a main component of MRV in the UNFCCC. For specific GHG mitigation actions, such as REDD+ and nationally appropriate mitigation actions (NAMAs), countries must establish MRV systems to quantify emission reductions and other impacts.

[1] ToF refers to all trees that do not meet a particular nation's definition of forest. Agroforestry refers to trees integrated into farming systems and landscapes. Agroforestry is found on virtually all types of landuse cropland (e.g., leguminous tree-maize intercrops), settlements (e.g, home gardens with trees), grazing lands (e.g., silvopastoral systems), wetland (e.g., tree-rice), other lands (e.g., natural regeneration, afforestation) and forest land (e.g., multi-strata complex agroforests). Thus, not all agroforestry is outside forests and not all trees outside of forest are agroforestry.

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Figure 1. Cocoa agroforestry systems improve productivity and resilience and serve as carbon sinks in Southeast Asia. Photo credit: ICRAF.

Improved, robust, MRV is critical to the future of agroforestry in climate change mitigation and adaptation. Here we report on a first appraisal of agroforestry in MRV systems under the UNFCCC, with a focus on national inventories and REDD+/NAMAs. We examine attempts by countries to monitor and report on trees outside forests, the barriers they have encountered, and the ways they have sought to overcome these challenges.

Agroforestry ambitions in developing countries

For this study we closely examined country submissions of NCs, NDCs, REDD+ strategies and NAMAs for developing countries around the world. The study included NCs and NDCs of 147 countries, 73 countries for REDD+, and 283 NAMAs listed in global NAMA databases. Countries whose documents made explicit references to agroforestry, or that mentioned related topics such as wood fuel, were judged to have an interest in agroforestry or ToF.

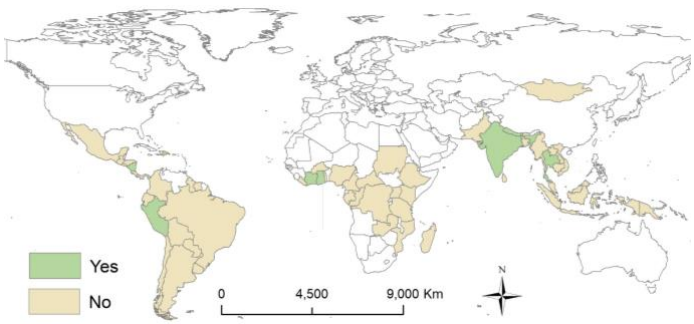

Figure 2. Countries that have expressed an interest in using agroforestry and trees outside of forests to meet climate goals (both colors) and whether they have experience in monitoring agroforestry or trees outside forests.

Our analysis shows that many countries recognize the potential of agroforestry and have integrated it into national policy for both adaptation and mitigation. Forty percent of developing countries (59 of 147) explicitly propose agroforestry as a solution in their NDCs, although there is considerable variation by continent. Furthermore, seven countries have proposed 10 agroforestry-based NAMAs. Of 73 developing countries that have REDD+ strategies, about 50% identify agroforestry as a way to combat drivers of forest decline. In the Land-Use Change and Forestry (LUCF) section of their national GHG inventories, 69 of 105 countries (70%) mentioned including some non-forest trees, such as home gardens (Sri Lanka), roadside trees (Myanmar) and trees on agricultural lands (Indonesia) or pastures (Sierra Leone). The majority of non-forest trees included are plantation and tree crops, such as vineyards (Albania), cacao (Cote d'Ivoire) and coconut (several Pacific islands). Overall, the analysis revealed strong interest in ToF.

Barriers to measurement and reporting of agroforestry

Despite good intentions, however, MRV of agroforestry is often weak. The challenges are both institutional and technical. In many ways, the challenges for MRV of agroforestry identified in the review and through interviews are the same as other sources of agriculture, forestry and other land use—e.g., capacity and finance, etc. and thus agroforestry is just caught up in a strong general current of challenges for agricultural MRV. However, in other ways, agroforestry also presents unique challenges—e.g., institutional ownership—and we highlight both types of challenges below.

Institutional challenges were common but varied. Saint Lucia's NC mentioned agroforestry extensively as a strategy for mitigation, adaptation and economic improvement, but efforts in that direction were hampered by funding and national commitments that were subject to changing priorities of donors and government institutions. In Rwanda there are separate ministries for lands, natural resource management and the environment, creating a division between those who carry out the national mandate for climate change and those who implement agroforestry. This hinders not only agroforestry but also the larger effort to address climate change. And many countries simply lack not only dedicated funding but also the technical capacity to compile, process and store the data necessary for effective MRV systems.

The challenges often follow from the definitions of forest used in national GHG inventories and REDD+. Each country develops its own definition of forest. Definitions may be the same for each MRV purpose. But also may differ between inventories and REDD+ MRV. These definitions are often written by the ministries of natural resources or forestry, which generally lack experience in agroforestry (which is often under the purview of the agriculture ministry). Some countries exclude all

agroforestry from the forest category, while others include some forms of agroforestry but not others. These definitions of forest often ensure that agroforestry and ToF are not counted.

Definitional issues also constrain the measurement and reporting of agroforestry under REDD+. The monitoring baselines under REDD+, referred to as the Forest Reference Emissions Levels (FRELs) or Forest Reference Levels (FRLs), benchmark the performance of subsequent REDD+ activities. Whether agroforestry is included or excluded from a country's FRELs/FRLs depends largely on how that country defines forest, because REDD+ is explicitly a forest conservation program. In our review of REDD+ strategy documents for 73 developing countries, we found that only 34 (47%) have submitted FRELs/FRLs. Of these 34, only Vanuatu and India explicitly include agroforestry in their forest definition (though El Salvador and Pakistan have expressed interest in including it in the future). In these two countries, carbon stock changes resulting from agroforestry or ToF will be captured and reported to the UNFCCC. More commonly, forest definitions explicitly exclude agroforestry, as is the case in Belize, Colombia, Fiji, Ghana and Uganda. Agroforestry is explicitly excluded despite the fact that these countries mention it as a relevant response measure in their REDD+ strategies. In short, without inclusion in the definition, agroforestry will not be counted in the FREL/FRL or follow-up activities, thus will constrain finance or projects. A majority of REDD+ developing countries are still creating FREL/FRL, a key action point is therefore to address the integration of agroforestry in the FREL/FRL.

Our review suggests that there is a need for additional monitoring systems to supplement the REDD+ MRV system and estimate the contributions of carbon stocks outside forests. This is especially important considering the wide variety of funding mechanisms, diverse stakeholder information needs, and widespread interest in promoting forest carbon action even before national REDD+ systems are fully in place.

Some countries have already taken steps in this direction. Alongside promoting agroforestry as part of their REDD+ strategies, they have begun to develop additional MRV systems to quantify the benefits of agroforestry. For example, Ghana has developed investment proposals to support cocoa and shea agroforestry in line with the national REDD+ strategy. These agroforestry programmes have their own MRV systems to track progress and estimate the contributions of carbon stocks outside forests. Although developing such systems can be expensive and time-consuming, the investment results in a far more complete picture of the contributions of agroforestry to climate change response.

Technology for measuring ToF has improved greatly. The most common data sources used for estimation of the extent of tree cover were national forest inventories and analysis of satellite imagery, which were used by 50% and 37%, respectively, of the countries assessed. A recent review (Schnell et al. 2015) found that the ability to remotely sense trees—through both satellite imagery and laser technology—can be quite accurate. In areas where satellite images show that trees meet specified criteria (e.g., for patch size or crown cover), agroforestry may be included in analysis along with other forms of forest. Where vegetation map layers are overlaid on land-use maps, trees or shrubs outside administratively defined forests (such as on croplands or in settlements) may be a clearly distinguishable category of tree cover. Some countries reported that the use of higher-resolution satellite imagery has improved their ability to identify trees that are growing in small patches or scattered across the landscape. Such imaging may also improve the ability to clearly identify different types of agroforestry systems, which can help to quantify changes in carbon stocks.

Although such imaging shows great promise, cost can be a barrier, especially given that it is necessary to buy a series of images from different time periods in order to document how the carbon stock is changing. Several interviewees cited the cost of high-resolution images as an obstacle. Similarly, laser sensors are not typically used by developing countries because of costs, especially for national-scale assessment. This suggests that increased funding or improved access to high-resolution imagery would improve the ability of developing countries to accurately account for trees outside forests. But costs for imagery were not the only capacity limiting analyze. Expertise with statics and accounting and infrastructure including computers not to mention storage etc. constrains the ability to capitalize on the advantages of remote sensing.

Because remote imaging has its limits, some countries turn to statistical reporting systems and land cadastres to identify ToF. Chile's GHG inventory, for instance, uses statistical information on area planted to different fruit tree crops, while Vietnam collects quarterly data on plantings of scattered trees. Although other countries have such reports available as well, in some cases they are not included in national inventories because of doubts about the reliability of the collected data or the sampling methods used.

In sum, the visibility of trees outside forests can be hindered by factors that include institutional inadequacies, restrictive definitions of forest, lack of access to remote sensing technologies and potentially unreliable statistical reports. While there are methods for including ToF in national forest inventories, perception of their limited mitigation potential and concern about the cost-effectiveness of measurement and monitoring methods

may lead to a lack of emphasis on quantification of agroforestry.

Opportunities for improvement

Some countries have made progress in including agroforestry in MRV processes, and they offer guidance to improving this practice globally. Enabling factors cited by countries included the inclusion of ToF in regular statistical reporting, availability of high-resolution satellite imagery, and the use of multiple data sources for different types of tree cover. In Colombia creation of a time series for land-use transitions was a significant step forward in the inventory process: It enabled the country to move from simple reporting of annual land-use classes to a land-use transition matrix, and it also highlighted where significant uncertainties lie, thus providing the basis for future inventory improvements.

A supportive institutional environment is also crucial. GHG inventories are more likely to include agroforestry if:

- the policy and regulation address agroforestry
- farmer and producer groups are brought into the process
- researchers within the country collaborate with one another
- the many institutions involved with land use coordinate with one another

Political interest can be sparked by highlighting that the benefits of including agroforestry within MRV include not only climate change mitigation and adaptation but also fighting land degradation, preserving biodiversity and improving people's livelihoods. In Peru and Colombia, inventory improvements have been facilitated by the involvement of diverse stakeholders in developing NAMAs and by the focus on low-emission development encouraged by the NDCs. The case of Bangladesh (see box) shows that international funding and technical support can also improve quantification of ToF.

Despite the flexibility regarding methods offered in the UNFCCC and IPCC guidance for MRV, many countries still struggle with design and implementation of MRV systems. There is limited practical experience of MRV in the current international framework, and even more limited experience of MRV of agroforestry and ToF. The successes in Colombia and elsewhere highlight the need for sharing successful experiences of scaling up. These experiences reveal opportunities for meeting the urgent need for explicit representation of agroforestry in MRV systems so that the contribution of agroforestry to global climate goals can be properly recognized and rewarded.

Following are a set of priority actions that would help address this issue.

1. ***Develop accessible approaches for representation of lands with agroforestry.*** Costs, time, capacity and complexity stand in the way of countries including agroforestry in MRV consistently and comprehensively. Development of cost-effective ways to represent lands with agroforestry will be essential.
2. ***Create guidelines for reporting to improve transparency*.** We found that even if agroforestry was quantified, it would not have been visible in the national communication. This represent a missed opportunity for tracking contributions of agroforestry. Better guidelines could solve this problem and ensure that agroforestry is properly reported.
3. ***Build capacity at the regional level*.** In terms of capacity and challenges, clear regional patterns emerged from this assessment. Regional approaches to capacity building may yield opportunities for South-South learning. Building on regional platforms such as the Regional Low Emissions Development (LEDs) platforms and integrating with other monitoring and evaluation needs can help mainstream the lessons learned for agroforestry in a cost-effective way.
4. ***Assess institutional arrangement needed to include agroforestry in MRV*.** Many institutional obstacles are country-specific. However, currently there is neither the data or case studies to understand where and how lessons can be drawn out to create lessons for institutions. Future work needs to better characterize successes and challenges.
5. ***Research and practical guidelines on linking national and project-level MRV*.** While agroforestry is rarely visible in MRV at the national level, project-level applications are prevalent. Much work is needed to ensure that the two work together in ways that reduce transaction costs, build trust and share benefits. With the increase in funding to climate responses (such as through the Green Climate Fund), alignment of goals and tools for integration will be paramount.
6. ***Create mechanisms that increase the likelihood of continued funding for MRV activities*.** MRV is often an afterthought to programming, where funds are already stretched thin. Many countries identified the need for continuity of funding as a key ingredient to consistent MRV.

Further reading

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