Community forestry as a requisite for REDD[1]

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Abstract
Community forestry has proven in many countries to be an effective mechanism to enhance the sustainable management of forest resources in many tropical countries around the world. Active involvement of local communities leads to effective management protecting valuable forest resources, which has often been elusive to state management forestry organizations.

Under the UNFCCC a new instrument is being developed that will make emission reduction in natural forests eligible for financial compensation. Reducing Emissions from Deforestation and Degradation (REDD) has the potential to generate large amounts of income for forest managers, thereby making sustainable management (more) profitable. There is recognition among the negotiators at the UNFCCC that indigenous groups and local communities need to be involved in the implementation of REDD – and have a meaningful share of the proceeds – but many countries are still debating how to operationalize such involvement.

In this paper we will demonstrate how communities can contribute in the collection of basic data on forest properties, in a very cost-effective manner. This community-based inventory is not only cost-effective; it is also addressing many of the technical obstacles that other inventory techniques present, in particular for the assessment of forest degradation. Forest degradation occurs in different forms: not only as the result of selective logging in by commercial parties, but as the result of increasing pressure from local populations for subsistence purposes. The emissions from this second type of degradation have probably been greatly underestimated as they are gradual, on-going and very widespread, rather than episodic like selective logging. The associated biomass losses do not show up on remotely sensed images. Reversing this trend is possibly the greatest source of emission reductions to be achieved.

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[1] This paper is based on submissions made by the authors to the UNFCCC, with contributions from fellow researchers in the "Kyoto: Think Global, Act Local" research project. These submissions can be accessed from the UNFCCC website at http://unfccc.int/resource/docs/2009/smsn/ngo/109.pdf and http://unfccc.int/resource/docs/2009/smsn/ngo/107.pdf. More information, publications and supporting material can be found on http://www.communitycarbonforestry.org.

Keywords
Community forestry, carbon sequestration, REDD, biomass

Introduction

Forest inventory work is usually considered a professional activity requiring specialised forest education. However, it is well established that indigenous communities have extensive knowledge as regards the local ecosystem, tree species distribution, age distributions, plant associations, etc. Such information is needed for inventories, and there is growing evidence that land users with very little professional training can in addition make adequate and reliable stock assessments (Skutsch et al., 2007). It is argued in this paper that community forest management (CFM) groups and societies are in a very good position to carry out forest inventories, and that it would be worthwhile for them to do so if and when there is any prospect of payment for environmental services, since for accountability in PES systems there is a need for reliable, detailed measurements. Carbon services under REDD are a prime example, if communities who are engaged in forest inventory work are to be rewarded for improvements in stock with benefits in cash or kind. Moreover, if communities measure the carbon stock changes in the forests they manage, they may establish 'ownership' of any carbon savings, to strengthen their stake in the REDD reward system and greatly increase transparency in the sub-national / intra-national governance of REDD finances.

How the involvement of local communities in REDD will be achieved in individual countries is within the purview of the national government. Government philosophy, land ownership and tenure rights, competing claims on forest resources (e.g. commercial logging operations) all contribute to creating a variety of conditions, such that no single solution will fit all cases. However, in general the requirements for large scale data collection in the field call for the meaningful involvement of local communities, if only to reduce the cost of the inventories (Skutsch, 2008).

Community Forest Management, in which rights and responsibilities for forest management are devolved to recognized communities, is carried out on a small scale in a large number of tropical countries. Nepal is the front runner with 1.22 million hectares (25% of its total forest area) successfully and sustainably managed by over 14,000 Community Forest User Groups (CFUG) reaching out to 1.87 million households or nearly one-third of the nation's population. CFM was developed in response to the failure of earlier government approaches to halting degradation. It recognizes that communities are dependent on forest products and that this demand cannot be eliminated. Conservation of forest resources cannot be done in isolation without the direct involvement of people that rely on forest resources. By giving rights to communities to extract sustainable levels of forest products, provided they carry out basic forest management activities, CFM moves forest from being in an open access situation to being a true common property resource with community enforced

rules to ensure that it is not overexploited. Degrading and degraded forests regenerate naturally and their output increases as they move to a more productive point on the natural growth curve, which benefits communities while also creating an increased carbon stock. Hence CFM is strongly to be supported in national REDD programmes by recognizing the roles of indigenous people and local communities in sustainable forest management.

The methodology for forest inventory here presented is based on procedures recommended in the IPCC Good Practice Guidelines (IPCC, 2003), but structured in such a way that the involvement of forest-dependent communities becomes an obvious choice. Intermediary organizations may be required to support some of the tasks, but such intermediary organizations are often already present and assisting communities in their forest management work. The procedures described have been tested by the KTGAL research project at 35 sites in seven countries (KTGAL, 2009). The reliability of the measurements has been cross-checked using independent professional forest surveyors. In all cases, the communities' estimates of average carbon content in the forest differed by less than 5% from that of the professionals.

Forest biomass assessment methods

The assessment of reductions in emissions from above-ground biomass due to deforestation and degradation in tropical countries is typically undertaken using one of two methodologies approved by the IPCC (2003):

1. The **default method**, in which annual increments and reductions in the biomass are calculated. (Also known as the gain-loss method.)
2. The **stock change method**, in which periodic changes in biomass between two observations of stand volume are calculated.

With both methodologies, countries are facing two primary obstacles in generating estimates of emission reductions in the entire national forest estate with sufficient accuracy (Van Laake & Verplanke, 2008):

1. The forests are **heterogeneous**, being an expression of ecological condition determined by environmental factors such as elevation, soil type, (seasonality of) precipitation, etc. For each of the resulting forest types specific parameters have to be derived. Impacts from anthropogenic sources vary by population density, regional socio-economic development status and accessibility to the forest and markets for forest products. In combination, these make for a very diffuse picture, which has important implications for the default method in particular (since different approaches may be necessary to account for different growth and extraction scenarios). The heterogeneity needs to be addressed by stratifying the forest into more homogeneous sub-units in terms of eco-type (both methods) and exploitation regime (default

method). Obviously, this requires substantial effort from experts in the national forest services.

2. The **measurements** have to be fine-grained in space and time and accurate in terms of biomass, to capture relatively small changes in emission reductions, as this will lower the uncertainties in the estimates and thus raise the credibility of the national emission reduction claim and hence the (potential) revenue through sale in the international carbon market. In addition, small local emission reductions could generate substantial revenue for individual land owners, communities or local governments, and attribution of emission reductions to such individual actors requires localized estimates.

Much emphasis is placed on the application of satellite imagery to address the above obstacles. Satellite imagery can indeed play an important role in several aspects of a national REDD programme, in particular the stratification mentioned above, a national monitoring and accounting system, and validation of emission reduction claims, but for the direct assessment of biomass the technology has not yet reached a level of accuracy that would qualify it for application in this area[2].

A more fundamental problem with the reliance on satellite imagery is that it is exclusive, accessible only to highly trained experts in short supply even in central governments in many developing countries, and that it does not address the drivers and underlying causes of deforestation and forest degradation: even the best satellite technology is of little value unless it relates directly to, and can pick up accurately real emission reductions that are achieved in the forest due to improvements in management (Skutsch & Van Laake, 2008). It is our contention that these two activities – improved forest management to achieve emission reductions and monitoring of biomass in the forest – are in fact two sides of the same coin. While the first issue is clearly recognized[3], the second has not yet reached that level of prominence in the debate. In the remainder of this paper we will present a method that bases the assessment of carbon in the forest on the collection of basic forest properties by local communities, thereby addressing issues of accuracy, ownership and cost.

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[2] The Woods Hole Research Center (Goetz et al., 2008) released a report at CoP-14 that indicated an error in the estimate of 25 tC/ha in forests with a biomass content corresponding to 0-225 tC/ha, i.e. an error of at least 11%. When compared to typical year-over-year changes of 3-5 tC/ha as observed by the KTGAL project it is immediately clear that the current uncertainty is too large for practical application.

[3] Both the Forest Carbon Partnership Facility of The World Bank and the UN-REDD program require the meaningful participation of forest dwellers in the implementation of REDD activities.

Community participation in biomass assessment

There are many good reasons to include communities in the collection of data for REDD, especially when the IPCC stock change method is used. Foremost are ownership and commitment: if the communities are involved and get a fair share of the benefits, then they will automatically become custodians of the forest and protect the local resources; the experience of Nepal with CFM has clearly shown this potential. More practically, the IPCC stock change methods require only basic data on the forest and community involvement is the most cost-efficient mechanism to collect large volumes of such data, achieving a fine granularity in space and time in the assessment of forest carbon. There are, however, limitations to the kind of data that communities can reliably collect, and it is best limited to a small set of basic forest properties:

- Species identification, with common names. (Botanical expert to convert common names to scientific nomenclature.) Periodic (e.g. once every five years).
- Tree count. Annual.
- Measurement of girth. Annual.

Such data need to be paired with more traditional forest inventory data – e.g. wood density, average tree height, biomass expansion factor, root-shoot ratio – or allometric equations, specific to the forest type. The collection of such data is simple and repetitive and can be carried out by people with very little education, working in teams. Certain activities, such as laying out permanent sample plots, need expertise, but once they are established, periodic measurements can be made by the communities without further assistance. Hence there will be higher costs in the initial years, but these fall rapidly over time.

Even while reporting of carbon emission reduction is not done annually, it is important to collect the basic data annually. There are a number of reasons for this:

- If forests are measured annually, communities will be more aware of changes in the forest, moreover they will not forget how to make the measurements.
- Assessment of the quality of the data collection process. Data quality assessment over time in a given community can be augmented by jointly analyzing the data from many communities in a single ecological zone or forest type. If a certain community is found to produce data that is divergent from that of the other communities, then remedial action can be taken by investigating its cause:
    - Errors in the measurement procedure. Any errors of measurement in a particular year may be more easily detected and eliminated.

    - Errors in the stratification of the forest (e.g. forest belongs to a different ecological zone).
    - Effectiveness of intervention (improved forest management) is different.
- It provides insight in the effectiveness of interventions to reduce emissions.
- Off-take of timber or minor products may result in deleterious effects on the forest or the biomass content. Such effects may be countered if they are detected in time.

It is likely that national REDD programmes will have to offer annual incentives for carbon savings rather than end-of-commitment-period payments, as communities are unlikely to accept a five year waiting period. The KTGAL project estimated costs of community forest inventory as ranging between $1 and $4 per hectare per year, including day wages for the community members involved and an intermediary, and a factor for use of any required equipment (PDA, GPS, etc) (Skutsch, 2008). (The costs in the first year are higher than this, given the substantial inputs by the forest service or an intermediary in training community members and establishment of the sampling plots. The equivalent costs if professional organizations were to be employed instead of communities are two to three times higher than this.) These costs are for the actual sampling of small plots, while the crediting is for the much larger area of forest that is represented by these plots. The potential for substantial income from REDD are therefore quite high, even if the government reserves a share of the national sales of Carbon Emission Rights (CER) to operate the programme[4].

Carbon may be credited on a longer time interval (e.g. 5 years), but local communities need to be paid annually or even more frequent to maintain their commitment to the process. Countries receiving payments for carbon credits derived from CFM must be able to present to the international community a transparent benefits sharing mechanism which indicates not just in general, but very precisely in which way communities will benefit and how much. This does not mean that the funds from the sale of credits must necessarily be handed over, in whole or part, to the communities in proportion to the carbon savings they have generated. Various other models are also possible. For example, for reasons of equity, countries may decide to distribute benefits internally on the basis of effort or input, rather than output (of carbon savings). Communities might be paid for their work in measuring the carbon stock, rather than for the increases of stock as such. Benefits might also be distributed

[4] A typical value that has been circulating in the UNFCCC is 30%, or rather, 70% of the sale has to be made available to the immediate stakeholders involved in forest management, whether government or community-based.

in kind rather than in financial forms. However what is important is that each country describes in a clear and accountable way what the plans for distribution of benefits resulting from carbon revenue under CFM are. It must be made possible for the transactions in this system to be counterchecked by stakeholders or their representatives.

Carbon sequestration as an ecosystem service

Carbon sequestration can be considered a service of the ecosystem. It must be understood, though, that this is a temporary service: once the vegetation in the forest reaches it climax state, no more carbon will be sequestered and the basis for REDD disappears[5]. REDD is therefore a temporary measure to foster the regeneration of degraded forests. For CFUGs this need not be an obstacle. Climax forests provide far higher sustainable yields of timber and NTFPs than degraded forests and as REDD revenue reduces with reducing carbon sequestration rates, the sustainable off-take of forest products increases. In addition, through REDD delivery or production of other ecosystem services and goods will increase as well. The benefit of forest restoration on biodiversity has been recorded worldwide, as well as benefits on soil protection and qualitative and quantitative watershed hydrology.

In general, through restored forest ecological functioning, both the natural resources and rural livelihoods will achieve a higher level of resilience. REDD should therefore not only be considered for its immediate impact on national and rural economies, but also as a means to restore the environment to a level where it can provide sustainable livelihoods to more people through increased provisioning of ecosystem goods and services.

Conclusion

The successful implementation of REDD can only be expected when the drivers and underlying causes of deforestation and forest degradation are addressed. This requires the meaningful involvement of local communities. Involving the same communities in the assessment of biomass in the forest, providing the basic data to estimate emission reductions, is then the logical choice. Involvement creates ownership – and thus protection of the forest resources – and generates a steady revenue stream to the local communities that may help establish sustainable livelihoods. The costs associated with community-based assessment of forest carbon are typically lower than any other method – including remote sensing – yielding estimates with accuracy sufficient for international marketing of CERs. The CERs will have a "production profile"

[5] There are, however, also suggestions made for crediting the conservation of high-carbon forests, irrespective of carbon sequestration or degradation. India has propagated a proposal to this effect, called Compensated Conservation.

acceptable to buyers concerned with the rights of indigenous groups and continued accessibility to forest resources for their sustainable livelihood.

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