

Editorial

Special Issue: The Potential Role for Community Monitoring in MRV and in Benefit Sharing in REDD+

Arturo Balderas Torres ^{1,2,*} and Margaret Skutsch ^{1,2}

¹ Centro de Investigaciones en Geografía Ambiental, Universidad Nacional Autónoma de México (UNAM), Antigua carretera a Pátzcuaro 8701, CP 58190 Morelia, Michoacán, Mexico; E-Mail: m.skutsch@utwente.nl

² CSTM, Twente Centre for Studies in Technology and Sustainable Development, University of Twente, Postbus 217, Enschede 7500, The Netherlands

* Author to whom correspondence should be addressed; E-Mail: a.balderastorres@utwente.nl; Tel.: +52-443-322-3865.

Academic Editor: Eric J. Jokela

Received: 4 January 2015 / Accepted: 7 January 2015 / Published: 15 January 2015

Abstract: Since the early design of activities to reduce emissions from deforestation and forest degradation in developing countries (REDD+) under the United Nations Framework Convention on Climate Change (UNFCCC), the need to engage local communities and indigenous groups in monitoring and reporting has been recognized. REDD+ has advanced under the UNFCCC negotiations, but most countries still need to define formally what the role of communities in their national monitoring systems will be. Previous research and experiences have shown that local communities can effectively contribute in the monitoring of natural resources. This editorial introduces a Special Issue of *Forests* which discusses the implications of and potential for including community based monitoring (CBM) in monitoring and benefit-sharing systems in REDD+. It outlines the main points of the nine contributions to the Special Issue which cover a wide geographical area and report on projects and research which engages more than 150 communities from eight different countries from Africa, Asia and Latin America. The editorial summarizes how the articles and reports build further understanding of the potential of CBM to contribute to the implementation, monitoring and distribution of benefits in REDD+. It also discusses the results of an on-going opinion survey on issues related to CBM and its relation to benefit sharing, which indicates that there is still disagreement on a number of key elements.

Keywords: monitoring; reporting and verification; climate change mitigation; community forest management; greenhouse gas emissions; carbon sequestration; benefit distribution; safeguards

1. Introduction

Developing countries interested in reducing emissions from deforestation and forest degradation (REDD+) under the United Nations Framework Convention on Climate Change (UNFCCC) have been requested to prepare a national forest monitoring system (NFMS) and a system to monitor, report and verify implementation (MRV). They have also been requested to engage local communities and indigenous groups as critical stakeholders in this process. The NFMS should be consistent with national inventories of emissions and removals of greenhouse gases that are based on methods and guidance published by the Intergovernmental Panel on Climate Change (IPCC). These inventories are usually prepared using national level information with low geographical resolution and without the participation of local communities or other forest owners/managers. However, it has been shown that members of rural forest communities can develop the skills to monitor and measure levels of carbon stocks in their forests and changes in these levels over time. Community monitoring has indeed been proposed as an option for REDD+ monitoring and reporting since international discussion on this policy first began in 2003. However, each country needs to define the role that community monitoring may play in the implementation and monitoring of REDD+. The objective of this Special Issue is to discuss and explore the social, technical and political implications and potential of including community-based monitoring (CBM) in MRV systems and benefit-sharing schemes in REDD+.

The idea for this Special Issue was born after the Side Event “Evolving Requirements and Solutions for REDD+ Monitoring with Community Focus” organized by the University of Twente and the Global Canopy Programme at the UNFCCC Nineteenth Conference of the Parties in Warsaw in November 2013 (COP 19). At this event it was argued that if information gathered by local actors could be included and tracked from the local to regional and national levels, this might help to design transparent mechanisms for the assessment of REDD+ implementation, to increase the level of resolution of data used by national monitoring systems and possibly even for benefit sharing. In the side event, a number of propositions about the potential for community monitoring on these issues were discussed with the audience using an “opinion poll format”; this was an interesting exercise. Among the participants there was general agreement that community monitored data could be sufficiently accurate for the purposes of REDD+ monitoring, and that new technologies offer promising options for this (*i.e.*, handheld computers or smartphones for entering and processing the data). However, there was disagreement about other issues, in particular whether CBM of carbon performance could be used as the basis for calculating financial rewards for local actors and whether the data could be integrated in some way into national forest databases and thus into national MRV systems [1]. It was clear that more research was needed on these issues, and this thus gave rise to the call for papers for this Special Issue in *Forests*.

We are proud to present here a range of responses to this call that include seven research articles and two reports from practical cases studies. The contributions cover a wide geographical range, engaging more

than 150 communities and projects at local level from China, Ethiopia, Guyana, Indonesia, Laos, Mexico, Nepal and Vietnam. They address theoretical and practical aspects of the use of CBM in the context of national monitoring systems and benefit sharing schemes in REDD+.

2. The Special Issue

Departing from a the description of the technical architecture of REDD+ given the decisions adopted at the COPs of the UNFCCC, Balderas Torres [2] in the introductory article identifies four specific opportunities for communities to feed local information into national monitoring systems. First communities can be hired to set forest inventory plots as a means for increasing the sample size of national or sub-national programs; secondly, information on activity data and carbon stocks and changes can be derived from data produced as part of practices already being implemented by communities to obtain or to access specific benefits (*i.e.*, forest management plans); thirdly, activity and carbon related information from projects participating in carbon markets or other certification schemes could also be included in national monitoring systems; and finally, communities may contribute sources of information to demonstrate the implementation of social and environmental safeguards. The author concludes it will be necessary to consider the budgetary needs related to the costs of generating this information and the specific agreements for sharing local information with external stakeholders at national and international levels.

Many of the experiences describing the potential of communities to provide local information are focused in the generation of data on carbon stocks, which in the jargon of greenhouse gas inventories relates to information on emission factors. However there are fewer references exploring the potential of communities to produce activity data or information on forest area; this is one of the contributions of the work by Pratihast *et al.* [3]. In their article, Pratihast *et al.* [3] combine the use of high-resolution satellite imagery and professional measurements to assess the consistency of community monitoring of forest area and forest area changes in Ethiopia in terms of spatial, temporal and thematic accuracy. Community monitoring was used to describe changes associated with deforestation, forest degradation and also reforestation, in terms of their location, size, timing and causes within 10 local administrative units. The authors found a generally good correspondence of the data gathered by communities and observed that mobile devices worked better than paper-based recording systems; they also reported that issues related to accessibility to forest areas, size of forest patches to be mapped, capacity building, weather and motivation need to be addressed when engaging communities into MRV systems. Results show communities can offer complementary information to remotely sensed data particularly to define local land use and to assess forest degradation particularly over small areas.

A second contribution also exploring alternatives for producing information of forest areas at local level deals with the use of emerging new technologies; Paneque-Gálvez *et al.* [4] explore the possibility of using drones for community based surveys. They suggest that the technical potential for using drones to obtain local aerial imagery of forest areas and disturbances with very high resolution is excellent, and the costs are relatively low. Advantages include the possibility for gathering data with high frequency, the systematic coverage and good assessments of areas of degradation. However, there are also disadvantages such as airspace regulations. They conclude that drones should first be tested in areas

where communities are already involved in monitoring, so that communities themselves could evaluate their use.

Another aspect that has been little researched are the capacities of communities to monitor carbon stocks over time since many of the earlier studies present results of measurements from a single point in time. Following up on this, Brofeldt *et al.* [5] present data from a multi-temporal monitoring project from six communities within four countries in South East Asia (Indonesia, China, Laos and Vietnam) to compare the accuracy and costs of community gathered data and professional brigades. Results presented indicate that accuracy of community carbon stock measurements improves over time, while confirming other studies that show costs of repeated community measurements decline and are less than those done by professional foresters. They stress that a key factor for successful monitoring is the use of simple measurement methods.

Two articles discuss the feasibility and sustainability of local participatory approaches as part of forest monitoring systems for REDD+. First, Boissière *et al.* [6] present a research framework analyzing the potential for participatory MRV in Indonesia. The authors present the criteria followed for the selection of seven pilot projects and the research questions and methods used to assess the feasibility of the schemes. To understand the implication of participatory schemes as regards the reporting of information in MRV systems, the existing Indonesian healthcare and forestry information systems will be analyzed to study the associated governance in the flow of information. Authors suggest that this type of study requires several types of analysis: social analysis to probe the enabling conditions for local participation; governance analysis to understand data flow; and remote sensing work to compare the gap between local (land use) and national (land cover) approaches. In all, this article provides a very rich and thoughtful design that hopefully will soon provide interesting results and can inspire similar efforts elsewhere. Continuing on the discussion of the enabling conditions for including communities into monitoring systems, Balderas Torres and colleagues [7] examine, based on a multi-criteria analysis, the potential implementation and sustainability of community monitoring in 11 projects under development in early action programs in Mexico. Projects are evaluated in terms of the prospects to produce carbon and activity data compatible with national systems, and in terms of the motivation for participation and the roles that members of local communities play in the implementation and monitoring of the projects. They note that each project has its own approach to monitoring (*i.e.*, practices and methods are not standardized), and that although all projects have the resources and capacities to carry out monitoring tasks, in most (though not all) cases, these skills reside in intermediary organizations (*i.e.*, NGOs and academia), not within the communities themselves; thus it will be necessary to create local capacities if communities are to do more autonomous monitoring on their own.

Any benefit distribution scheme in REDD+ will require using specific data from monitoring systems in a transparent way to define the magnitude and attribution of benefits associated to carbon performance at different geographical scales. The final article of this Special Issue discusses the data requirements of national monitoring systems for different benefit sharing schemes and potential role of CBM. Skutsch *et al.* [8] evaluate the technical, political and equity implications of two types of benefit sharing schemes: Firstly, output based systems focused on the evaluation of carbon performance; and secondly, input based schemes where financing and compensation relate to the costs of implementing specific activities. The authors indicate that output based systems imply higher transaction costs since they

require more information and with smaller uncertainty, and they require the development of local reference levels and a strong verification system since incentives for actors depend on the data reported and thus there could be an incentive to overestimate the figures. The informational burden of input based schemes is lighter; moreover, in these schemes local actors can provide supplementary data to national systems regarding the success of the implementation of different activities and policies. Skutsch *et al.* [8] present a “dual” proposal where, firstly, reduced emissions could be assessed using data from national systems at regional level (*i.e.*, Tier 2, following IPCC methods) to evaluate the effect of activities promoted via input based schemes. The second component of the system could use output based approaches to promote forest management and conservation where compensation could be based on the carbon stocks and enhancements measured at local level; this data can later feed into national systems to improve the estimates to produce regional and national information with lower levels of uncertainty.

The Special Issue concludes with two case studies in countries which are already experimenting with community monitoring in REDD+ projects: Nepal and Guyana.

Shrestha *et al.* [9] present the information of a pilot REDD+ project involving 112 communities in Nepal that implemented an innovative approach for local forest governance and benefit sharing that included CBM comprehensively within a local MRV system. The rules for distributing the benefits involved combining payments based on carbon performance with payments linked to other socioeconomic criteria in order to produce an equitable and fair scheme (*i.e.*, criteria target poor groups, indigenous people and women aiming to prevent elite capture of benefits). Given the successful history of community forest management in Nepal, emissions from deforestation have been halted already in the area, thus in common with other articles in this Special Issue, benefits from reduced emissions were not considered and the carbon component of local payments was estimated using data on carbon stocks and enhancements. It is necessary to consider the costs of monitoring activities in order to set the right carbon prices. Benefits received at local level were used to co-finance social projects aiming to reduce poverty and took the form of both cash and in-kind payments (e.g., improved community infrastructure). While this case study describes how community monitoring can be included into MRV and benefit sharing in REDD+ in practice, the authors stress that it is necessary that governments define formally the role that CBM will play in national programs to create the necessary capacities and deploy the required governance systems [9].

Finally, Bellfield *et al.* [10] present information on a pilot project under implementation in 16 communities in Guyana and describe how CBM has been included in it. The project is piloting how to set up different elements of REDD+ related to MRV and capacity building. Communities contribute to the project’s MRV system through participatory mapping and ground truthing of satellite imagery, the evaluation of local drivers of deforestation and forest degradation, through the implementation of forest inventories of aboveground biomass to measure carbon stocks and stock changes, and also through the provision of information to document the implementation of social and environmental safeguards and local co-benefits. CBM has been particularly useful in the project to understand the drivers of land use change, and the local dynamics of agricultural and farming practices; the article highlights the importance of keeping consistency within national systems and communities (*i.e.*, nomenclature of forest types). The report also describes how technological tools were used for the different monitoring components; it is clear that digital devices help to reduce time and costs to gather and register data, however more work is necessary to manage and analyze it. Processes to analyze and report this

information need also to be adapted to the local contexts of communities, meanwhile as in the case described from Mexico, this specialized know-how resides on other/external actors (*i.e.* consultants). Authors stressed that in order to be sustainable in the long term these monitoring practices need to deliver local benefits and those participating in CBM should receive compensation for it. In order to harness the benefits that CBM can offer in the implementation of REDD+ it is necessary that governments take action to define the role of communities and reduce the uncertainty of policies as regards the contribution of communities to MRV systems and benefit sharing schemes.

3. Recent Developments

The articles and case studies in this Special Issue, as introduced above, go some way to answering the questions the Special Issue set out to resolve. However, there are still many issues unresolved. Among others the following questions remain:

- How to standardize methods and data for CBM so that it can be integrated into national systems? The article by Balderas Torres *et al.* [7] begins to examine this question but further work will be necessary.
What variables in addition to carbon can be included to get the interest of communities? Should they be paid for the monitoring? The Guyana case study begins to address this but again further work needs to be done.
- How to distribute benefits to non-forest holders who implement REDD+ activities?
- How to (who should) design multi-scale performance-based equitable benefit-sharing schemes? Should rules for this be developed internationally? Nationally? At the local level?

With these questions in mind, a second opinion poll was put forward at the side event “REDD+ monitoring needs to support the distribution of benefits” this time at COP 20 in Lima, in December 2014. In this occasion an e-survey was set up prior to the event (overall 55 people provided inputs, 25 during the initial survey and a further 30 during the side event itself) (an overview of the results and interview with Veronique de Sy, who organized the survey, can be found on-line [11,12]). There was near unanimity on a number of issues, for example views indicated that standardized protocols for CBM would not diminish the interest of communities and that community data would indeed strengthen national data systems. There was also agreement on paying communities for monitoring, independently of carbon payments and on the needs to develop protocols to document inputs (*e.g.*, days of labor) as well as outputs (*i.e.*, carbon). There was a range of opinions on whether other actors (other than forest owners) should be eligible for REDD+ rewards, with the majority favoring inclusion of all major actors behind deforestation, if they reduce their pressure on the forests.

One issue however remains in considerable controversy: the basis on which REDD+ benefits should be distributed. There are various options, but the underlying question is whether payments should be made on the basis of carbon performance or on the basis of other indicators, such as opportunity costs, inputs or effort made for the REDD+ activities, or social needs (poverty). Those who agreed on carbon-performance systems claimed that REDD+ was always intended to be performance based (additional), and that this was determined by UNFCCC. Those who were against this felt that even though countries would be rewarded on the basis of performance, this model was not obligatory at the

local level, indeed it would result in many problems, possibly leading to perverse incentives and possibly corruption. Moreover it was perceived to be too expensive, and would require too much capacity, to be implemented at the level of every community.

Despite this division of opinions, it seems logical that if communities will implement activities that mitigate climate change, they should be involved in the monitoring of such activities, and in particular in the measurement of the carbon savings. It has been proven that with some training and with suitable protocols, it would be feasible and cost-effective to involve communities in monitoring of REDD+ activities in their territories.

However this in no way implies that communities would then be free to sell their measured “carbon credits” in carbon markets or receive compensation based on carbon performance. Firstly, if they were measuring their own achievements against a local baseline there would have to be verification by independent third parties. Secondly, if the activities were part of a national strategy for REDD+, their achievements would have to be included with all other forest carbon losses and gains over the whole country, and assessed against a national reference emission level, before any performance based rewards could be attributed. How the distribution of benefits within national REDD+ programs is organized will be up to each government to decide. Most countries however have not yet clarified how they plan to distribute the benefits from reduced emissions and/or from carbon enhancements, and there is an on-going and active debate within civil society concerning the equity and efficiency of different options. Evidently, more debate will be required on the issue of benefit sharing, and possibly pilot projects using different reward systems are needed so that their relative merits can be tested. We look forward to another Special Issue in *Forests* devoted to this theme in a couple of years’ time.

4. Final Remarks

We are satisfied that this Special Issue has been able to collect information from different geographies and contexts to build further understanding of how communities can contribute to the implementation and monitoring of REDD+. It has identified specific options by which local data can be incorporated into national monitoring systems. The articles and case studies show that CBM can provide data on carbon stocks, carbon stock changes, forest area and area changes, data to understand local drivers of emissions, and the implementation of safeguards according to local interests. They also show, in theory and in practice, how local data can be used to make operational different approaches for the distribution of benefits at the local level. While many issues need to be subjected to further research, the conclusions concur that there is a need to define the roles and rules for including formally CBM into the REDD+ activities implemented by each country. These are needed before plans for capacity building and phased implementation are drawn up. At this stage it will also be important to explore the implications of the different options for benefit-sharing schemes. The next step would involve not only building capacities, but also the institutional arrangements to formally incorporate CBM into monitoring and benefit sharing schemes.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. De Sy, V. 5 controversial questions: Community monitoring for REDD+. Forests Climate Change. Available online: <http://www.forestclimatechange.org/forests-climate-change-mitigation/community-monitoring-survey/> (accessed on 1 January 2015).
2. Balderas Torres, A. Potential for integrating community-based monitoring into REDD+. *Forests* **2014**, *5*, 1815–1833.
3. Pratihast, A.K.; DeVries, B.; Avitabile, V.; de Bruin, S.; Kooistra, L.; Tekle, M.; Herold, M. Combining satellite data and community-based observations for forest monitoring. *Forests* **2014**, *5*, 2464–2489.
4. Paneque-Gálvez, J.; McCall, M.K.; Napoletano, B.M.; Wich, S.A.; Koh, L.P. Small drones for community-based forest monitoring: An assessment of their feasibility and potential in tropical areas. *Forests* **2014**, *5*, 1481–1507.
5. Brofeldt, S.; Theilade, I.; Burgess, N.D.; Danielsen, F.; Poulsen, M.K.; Adrian, T.; Bang, T.N.; Budiman, A.; Jensen, J.; Jensen, A.E.; *et al.* Community monitoring of carbon stocks for REDD+: Does accuracy and cost change over time? *Forests* **2014**, *5*, 1834–1854.
6. Boissière, M.; Beaudoin, G.; Hofstee, C.; Rafanoharana, S. Participating in REDD+ measurement, reporting, and verification (PMRV): Opportunities for local people? *Forests* **2014**, *5*, 1855–1878.
7. Balderas Torres, A.; Santos Acuña, L.A.; Canto Vergara, J.M. Integrating CBM into land-use based mitigation actions implemented by local communities. *Forests* **2014**, *5*, 3295–3326.
8. Skutsch, M.; Turnhout, E.; Vijge, M.J.; Herold, M.; Wits, T.; den Besten, J.M.; Balderas Torres, A. Options for a national framework for benefit distribution and their relation to community-based and national REDD+ monitoring. *Forests* **2014**, *5*, 1596–1617.
9. Shrestha, S.; Karky, B.S.; Karki, S. Case study report: REDD+ pilot project in community forests in three watersheds of Nepal. *Forests* **2014**, *5*, 2425–2439.
10. Bellfield, H.; Sabogal, D.; Mardas, N.; Goodman, L.; Leggett, M. Community-based monitoring systems for REDD+: A case-study from Guyana. *Forests* **2015**, *6*, 133–156.
11. Evans, K. Survey highlights REDD+ controversies over community monitoring. Forests News. A Blog by the Center for International Forestry Research. Available online: http://blog.cifor.org/25637/survey-highlights-redd-controversies-over-community-monitoring?utm_source=November+2014&utm_campaign=NEWS+UPDATE+CC+Special+Report+English+&utm_medium=email (accessed on 1 January 2015).
12. De Sy, V. Surveying opinions on REDD+ and community monitoring. Slide share. Available online: <http://www.slideshare.net/nikidesy/cop-20-survey-on-summary-redd-and-community-monitoring> (accessed on 1 January 2015).