Multiple levels and multiple challenges for measurement, reporting and verification of REDD+

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Abstract: REDD+ is a multilevel endeavour. Global demands, national and subnational structures and local people's needs and aspirations must all be linked in efforts to reduce emissions from deforestation and forest degradation. We use Brockhaus and Angelsen's (2012) framework of Institutions, Interests, Information and Ideas (4Is) to analyse the multilevel governance of REDD+

through one of its core elements: measurement, reporting and verification. We present the multilevel dimensions of REDD+ and the risks if they are disregarded. We analyse the flow and interplay of information, institutions and interests across levels in REDD+ measurement, reporting and verification and examine which multilevel governance mechanisms enable this flow. To support our analysis, we provide anecdotal evidence of challenges and opportunities from three countries: Brazil, Vietnam and Indonesia. Our analysis shows that it is essential to enhance and harmonize information flows between local and national levels for measurement, reporting and verification to be accountable. Furthermore, sound information flows between levels can increase the negotiation power of disadvantaged groups and ensure a more effective, efficient and equitable REDD+. To reduce the risk of conflict, REDD+ multilevel governance systems should match incentives and interests with transparent institutions. Effective multilevel governance mechanisms, such as novel cross-scale institutional arrangements, uniform regulations on the rights, responsibilities and procedures for monitoring information flows, and participation across levels, will provide tools for both information flow and greater matching of different interests across levels.

1. Introduction

The objective of reducing emissions from deforestation and degradation and enhancing carbon stocks (REDD+) presents a multilevel puzzle. Local communities are called upon to respond to a global demand for climate change mitigation that must be met through existing and emerging national and subnational institutions and structures. REDD+ thus requires an integrated approach that involves international and local governance levels. Both external and national organizations and structures are needed to guarantee accountability and ensure independent and credible measurement, reporting and verification (MRV).

REDD+ initially emphasized a national approach to help manage emissions leakage, encourage permanence and provide consistent national MRV as part of an international market-based system (Phelps et al. 2010). However, national

governments struggle with multilevel challenges and have had problems with enforcement in the land use sector for decades (Corbera and Schroeder 2011). It is often claimed that a clear regulatory framework, effective law enforcement, transparency and participatory decision-making are essential for the success of REDD+ (Saunders et al. 2008; Forsyth 2009), yet a method for translating the principles of 'good governance' into forest management outcomes remains elusive (Agrawal et al. 2008; Miles and Kapos 2008), largely because of the complexity of the forest governance context. This issue is exacerbated in the case of REDD+, because its progress is fragmented between and within international, national and subnational levels of governance.

There have been various theoretical reflections about multilevel governance and natural resource management in general (e.g. Armitage 2008; Pahl-Wostl 2009) and about multilevel governance and REDD+ in particular (e.g. Skutsch and van Laake 2008; Forsyth 2009). Additionally, multilevel governance has triggered the attention of commons scholars for a long time (see Larson and Lewis-Mendoza 2012; Mwangi and Wardell 2012; Ostrom 2012; Poteete 2012). This paper contributes to this body of literature by providing examples from countries in which emerging multilevel governance mechanisms are being used to respond to REDD+ implementation challenges. Based on our analysis, we find that while multilevel challenges are unavoidable in any REDD+ context, multilevel governance mechanisms can enhance the effectiveness, efficiency and equitability of REDD+ through bridging gaps across decision-making levels. We base our study on Brockhaus and Angelsen's (2012) framework of Institutions, Interests, Information and Ideas (4Is) and ask the following questions: (i) What are the multilevel dimensions of REDD+ and why are they important? (ii) Using the example of MRV as one core element of REDD+ architecture, how do information, institutions and interests flow and interplay across levels, and what kinds of multilevel governance mechanisms enable this interplay? To support our analysis, we provide anecdotal evidence of challenges and opportunities of MRV implementation for REDD+ from three countries: Brazil, Vietnam and Indonesia.[1]

In this paper, we first introduce the concept of multilevel governance and the theoretical framework used in the study. We then briefly present the multilevel dimensions of core REDD+ elements. Finally, we concentrate our analysis on the multilevel governance mechanisms for one of these core elements, MRV, through the framework of institutions, interests and information flows.

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[1] The anecdotal evidence is drawn from CIFOR's Global Comparative Study on REDD+, which is underway in 12 REDD+ countries, including Brazil, Vietnam and Indonesia. For the purpose of this study we chose to focus on the data from national and subnational levels from these three countries, since while REDD+ is advanced in all three (Korhonen-Kurki et al. submitted), the different forest governance, and consequently REDD+, contexts provide an interesting comparison for analysing multilevel governance for MRV. For more information, see www.forestsclimatechange.org/global-comparative-study-on-redd.html.

2. Multilevel governance and the flow of information and incentives

Multilevel governance mechanisms provide a means of bridging the gaps between the international, national and subnational spheres of decision-making. Larson and Petkova (2011, 6–9) define governance as follows: 'Governance refers to *who makes decisions* and *how decisions are made*, from national to local scales, including formal and informal institutions and rules, power relations and practices of decision making.'

Peters and Pierre (2004, 71) characterize multilevel governance as involving: (i) governance, as opposed to government; (ii) a 'complex and contextually defined relationship' between multiple institutional levels, which is not necessarily hierarchical; (iii) 'a negotiated order rather than an order defined by formalized legal frameworks'; and (iv) 'a political game'. In this paper, we apply Forsyth's (2009, 114) broad definition of multilevel governance as 'the implementation of public policy across diverse spatial scales and by actors who have dissimilar influence and values'.

Multilevel governance is generally understood as operating in two directions: vertical (in a hierarchy of jurisdictions or central bodies with co-ordination of actors) and horizontal (a sideways 'dispersion of power' or cross-sector integration across departments or industries). Actors with distinct aims and degrees of political influence may be connected by horizontal links; these horizontally linked actors may then be linked vertically with other actors up or down the hierarchy in a multilevel fashion. Decision-making processes take place at multiple levels and scales,[2] leading to nested governance, and these processes need to interrelate vertically. Cross-scale relationships enable stakeholders from various levels and positions to interact and be heard at scales beyond the one they are most associated with. In this way, multilevel governance relies on notions of jurisdictional levels, namely national, regional and local.

The vertical direction of multilevel governance in REDD+ implies that central governments are implementing national climate strategies through regional and local governments. In this context, a multilevel governance approach recognizes that local governments' authority to act in areas related to climate change is often 'nested' in legal and institutional frameworks at higher scales (Pahl-Wostl 2009). A two-way relationship exists between local and national action on climate change because each can enable or constrain the other.

The implications of vertical and horizontal interplay constitute a central variable in understanding the future effectiveness of REDD+ (Corbera and Schroeder 2011). A multilevel governance perspective on REDD+ can reveal institutional gaps and provide a starting point for improving connectivity across scales (Doherty and Schroeder 2011). For example, Cronkleton et al. (2011) argue

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[2] Scales are the spatial, temporal, quantitative or analytical dimensions which are used to measure and study any phenomenon. Levels are the units of analysis that are located at the same position on a scale (Gibson et al. 2000).

that the success of REDD+depends on the existence of secure rights to forest resources, and the development of multi-scale governance institutions, because these elements allow local people to establish control over forest resources and develop local-level governance mechanisms that are appropriate given the emerging management demands. These local governance institutions will develop further when they are given the necessary support to form alliances with networks of national and international governmental bodies and civil society organizations.

Furthermore, REDD+ requires flows of information and incentives in both vertical and horizontal directions. Such flows can be achieved by employing existing and newly created institutions and by responding to actors' interests at all levels. The framework of the 4Is (Institutions, Information, Ideas and Interests), which Brockhaus and Angelsen (2012) introduced for the REDD+ policy arena, helps explain these flows. Institutions are created, at least in part, to serve the interests of actors in the REDD+ policy domain. These actors adhere to specific ideas[3] about how to manage national forests. Discourses then unfold across levels and scales with diverse and often conflicting information. Three of these 4Is (institutions, interests and information) comprise the core of our analysis because of the ways they overlap and interplay across the levels and scales of governance.

In our analysis, we also draw on the work of Pahl-Wostl (2009), who considers three processes that enable integration across levels. First, actors from one level can participate in processes at another level. Second, institutions created at one level can influence processes or institutions at other levels. Third, knowledge produced at one level can influence processes at other levels.

To sum up, while the work of Peters and Pierre (2004) drafts the structures for the multilevel governance, the frameworks of 4Is and Pahl-Wostl (2009) emphasise to the functioning of a multilevel governance system. A multilevel governance system is about integrating various processes at all institutional levels of government, which will ultimately strengthen the system. Multilevel governance mechanisms are tools (such as policies and measures) for these integration processes. Taken together, these concepts provide a useful overall analytical framework for this study.

3. Multilevel dimensions of REDD+

Key issues in REDD+ implementation include the challenges of MRV system implementation, leakage control, permanence, financial mechanisms and benefit sharing, as well as the participation and rights of indigenous people and local communities (Angelsen et al. 2009; Kanninen et al. 2010). To address our first

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[3] Ideas are understood as concepts or mental constructions and beliefs and discursive practices that actors have in addition to their material interests. See more in Brockhaus and Angelsen (2012, 24–25). In this study, we focus less on the discourses around the setup of an MRV system but rather look at interests, institutional path dependencies and information – where the latter is clearly linked to discourses, as information is not objective but gets selected, interpreted, and presented in many different ways.

question, in Table 1, we describe the explicit multilevel dimensions of each of these core REDD+ elements, and outline the risks if these dimensions are disregarded.

As seen in Table 1, REDD+ faces a host of multilevel challenges, which mechanisms of multilevel governance may help overcome. Many of these challenges relate to the need to connect activities at local, subnational and national levels to ensure the flow and consistency of information and the management of interests across levels. For example, benefit-sharing systems are often national but affect local rights; failure to take these aspects into account creates a serious risk of elite capture of benefits at all levels.

4. Analysing Multilevel Governance in MRV: institutions, interests and the flow of information

To answer our second question, we use MRV as a key element in the REDD+ architecture. Due to its explicit multilevel dimensions, and the fact that the implementation of MRV systems is more advanced than many of the other REDD+ elements, it provides a concrete context for analysing the flow of information and the interplay of various institutions and interests across levels. While other key elements of REDD+ also offer a laboratory for studying multilevel governance, there is comparatively less analysis of the governance aspects of MRV compared to these elements. Our study addresses this gap through highlighting how multilevel governance mechanisms provide opportunities to solve MRV problems, while addressing how challenging it can be to design an MRV system that can respond to the multilevel complexities and resulting requirements.[4]

MRV is a system for providing quantitative estimates of greenhouse gas fluxes (emission reductions and removals). Results-based mechanisms, such as REDD+ require reliable MRV systems to measure performance. The primary focus is on measuring changes in forest carbon stocks and/or flows, reporting those changes in a transparent and timely manner and verifying estimates through an independent third party (Herold and Skutsch 2009). MRV builds on the long history of forest monitoring efforts (see e.g. Grainger and Matthews 2002; Grainger 2008) and has to face various challenges for getting the reliable information on forest carbon (see e.g. Swart et al. 2007). For instance, one of the reasons why the Clean Development Mechanism excluded deforestation was the concern that existing MRV methodologies were not sufficiently reliable to measure emissions it reduces (Gupta et al. 2013). While MRV systems have advanced in many countries, it still faces challenges in integrating different types of information across levels (global monitoring systems, establishment of national systems, and techniques used by

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[4] MRV is a discussion point at all levels, from international to the local. In this paper, we focus explicitly on domestic MRV issues that encompass national and subnational challenges and opportunities.

Table 1: Core elements in REDD+ and their multilevel dimensions (adapted from Korhonen-Kurki et al. 2012).

Core elements in REDD+	Multilevel dimensions	Risks if multilevel dimensions are disregarded
MRV	– Flow of information and verification across levels – Integration of spatial and field-based data – Technical capacity to use information across levels – Overlapping jurisdictional power over land use data by national and subnational agencies – Aggregation and standardization of data across levels	– Potential conflict between subnational and national agencies on responsibility for land cover data – Datasets of differing quantity and quality and based on different methods, making aggregation difficult
Reference levels (RLs)	– Various sectors, markets and policies drive deforestation in different ways within the same country – Variation in methods to establish RLs for same area	– Inconsistency between subnational and national RLs – Lack of ownership among subnational actors if local context and land use drivers not taken into account at national level – Poor accuracy of RLs if regional RLs are not modified based on local drivers and context
Leakage	– Leakage management tasks can be assigned at the subnational level; national-level carbon monitoring systems must assign liability for leakage across subnational boundaries – Guidelines for subnational governments to support and negotiate settlement of leakage-related disputes with other subnational governments	– No legitimate assignment of liability to subnational governments – Deforestation and degradation shifts to areas that have lower capacity to monitor emissions and enforce REDD+ policies
Permanence	– Varying interests at different levels operate at different time horizons, creating difficulties in achieving permanent emission reductions – Establishment of national/international mechanisms to settle disputes between entities in assigning liability over emissions in the future – Establishment of insurance systems that account for variable subnational forest conditions/trends to help provide certainty where risk of emissions exists	– Different life spans (project cycles, election cycles, sustainability needs) can lead to inconsistent decision-making over time – Distorted efforts for emission reductions when political and commodity market conditions change – Doubtful additionality when claims for credits are based on emission reductions due to exogenous factors

(Table 1: Continued)

Core elements in REDD+	Multilevel dimensions	Risks if multilevel dimensions are disregarded
Benefit-sharing and financial mechanisms	– Benefit-sharing systems are often national but affect local rights (colonial/post-colonial tenure regimes, customary rights, local practices; see also tenure) – Distribution of financial resources and technical assistance across levels to support readiness and ongoing activities – Decisions over performance and release of funds across levels	– Elite capture because of unequal power relations between donor and beneficiary across levels and scales – Corruption
Participation and rights of indigenous people and local communities	– Rights of local communities to participate – Flow of information and communication of interests from local to global level – Indicators of participation must recognize possibility of elite capture at all levels – Decisions at national level have local consequences	– Elite capture across levels – Missed opportunities to learn from past failures/successes as claims of benefits to communities and real emission reductions made at higher levels, despite lack of/conflicting evidence in the field
Co-benefits (poverty alleviation, biodiversity conservation)	– Interest in co-benefits vs. emission reductions differs across levels: achieving emission reductions is main concern at the international level but poverty alleviation is main concern at subnational/local level. National levels may try to balance both.	– Insufficient attention to differing interests could cause disengagement of subnational/local actors, who are crucial in implementation success
Tenure	– Unclear land tenure systems are further complicated by REDD+, which operates under additional dimensions (carbon rights, which are still undefined in most countries) – Rights and responsibilities for REDD+ among land rights holders (ownership and use rights) at different levels are generally unclear and new legal frameworks under REDD+ may lead to usurpation of traditional rights	– Lack of clarity on rights to carbon and land creates injustice across levels – Insecurity of land claims and elite capture due to legal pluralism – If people are unsure of their ownership of REDD+ benefits, their incentive to reduce emissions will be diminished

subnational REDD+ projects) (see also Boyd 2012). Our case studies from Brazil, Vietnam and Indonesia illustrate these multilevel challenges and the mechanisms being adopted to address them (Table 2).

Most countries are still finalizing their national REDD+ frameworks and policies, while some countries like Vietnam have their national strategies in place. In the meantime, many REDD+ pilot projects have been initiated and decisions on REDD+ strategies made at subnational levels. As a result, the proponents of subnational REDD+ initiatives are setting reference levels for their project sites and/or jurisdictions[5] and developing their own MRV systems. However, communication and co-operation between levels are essential to determine how emission reductions from these subnational initiatives will be accounted for at the national level. Furthermore, third-party organizations are needed to ensure accountability and independent and credible reporting and verification. Most countries do not have a national MRV institution that could serve this function. To fill this gap, many subnational initiatives are seeking certification through the Verified Carbon Standard (VCS), one of the primary independent third-party verification bodies (Estrada 2011), which recently created a Jurisdictional and Nested REDD+ framework for REDD+ programs designed to account and credit government-led REDD+ programs at national and sub-national scales.

Nagendra and Ostrom (2012) note that, in addition to carbon monitoring, REDD+ should incorporate social impact assessments of the benefits and costs to local communities. The Climate, Community and Biodiversity standards for REDD+ projects and the REDD+ Social and Environmental Safeguards (SES) Initiative for government-led programs have been developed to address the social (and biodiversity) components of monitoring. Many REDD+ initiatives are seeking these certifications as a complement to VCS certification. Social impact assessments could involve a collaborative effort between scientists and local communities to develop approaches that enable comparisons of findings at regional and national scales (Richards and Panfil 2011). One way of formalizing the role of local people in Measurement (the "M" in MRV) is merging the requirements specified by international carbon standards for MRV and the social safeguards guidelines developed by governmental authorities. REDD+ subnational initiatives (e.g. REDD+ projects) could provide valuable lessons on whether combining the two sources of guidelines is feasible and could lead to more participatory emissions measurements and social impact monitoring. In some countries, such as Vietnam, however, ministries relevant to social impact assessments have been absent from national-level REDD+ discussions.

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[5] REDD+ projects are generally small in scope with non-governmental organization or private sector proponents (although governmental agencies can also be involved). Jurisdictional REDD+ initiatives are government-led and designed to regulate REDD+ within a jurisdictional unit (e.g. state or province).

Table 2: Relationship between the interests, institutions and information and MRV at national, regional and local levels.

	Interests	Institutions	Information	Multilevel governance mechanisms	Evidence from case countries
MRV: Measurement, reporting and verification	*National:* – Sectoral interests to maintain control over data collection and sharing – To obtain accurate data to leverage negotiations for REDD+ benefit sharing – To provide a trusted, centralized source of data on emission changes from REDD+ for verification *Regional/Local* – To have local contexts taken into account in REDD+ (e.g. reference levels and drivers of deforestation tailored to subnational context) – To secure a role in provision of information as a means for better negotiation of benefit sharing	*National* – National MRV body with the legal, financial and practical power to get, maintain and regulate sharing of information on land use cover and emissions data across sectors *Regional* – Regional multi-stakeholder dialogues *Local* – Community-based participatory monitoring, potentially part of a network for ground truthing	*National* – Remotely sensed land cover data, national registry of national to local REDD+ activities, land concessions *Regional* – Regional spatial planning, regional maps of land concessions *Local* – On-the-ground experience of impacts of REDD+ on deforestation and forest degradation and livelihoods – Integration of local knowledge	– Establishment of uniform regulations on the rights, responsibilities and procedures for monitoring across subnational governments – Establishment of funds and a transparent mechanism for allocating resources to support subnational monitoring – Institutional arrangements for information flow and monitoring across levels: new organizations, voluntary working groups and networks, strengthening of existing institutions	*Brazil* Advanced forest monitoring techniques used at national and subnational levels; subnational MRV systems in place undergoing third-party verification; need for harmonization of information between levels *Vietnam* Data are scattered and fragmented; national MRV framework established but still needs to be localized *Indonesia* Efforts to reconcile spatial data on land cover, concession borders and administrative boundaries; Website to openly share spatial data on land use has gained widespread public feedback

4.1. The flow of information and incentives

Evidence from the case study countries shows that not only are there numerous challenges for multilevel governance with regard to MRV systems for REDD+, but there are also promising opportunities. Improving communication and flows of information between subnational REDD+ initiatives and national authorities is an important step in creating a multilevel governance system.

Brazil is a global leader in large-scale deforestation monitoring through its National Institute for Space Research (INPE). Since 1988, INPE has monitored annual deforestation rates in the Brazilian Amazon through its forest monitoring program (PRODES), and in 2004, created a system for nearly real time detection of deforestation (DETER); these data are freely available. Additionally, Brazilian researchers have developed advanced techniques to detect and monitor deforestation and degradation (Martins et al. 2013) and simulate future deforestation in the Amazon (Soares et al. 2006), which have been widely disseminated. Despite the high technical and institutional capacity for MRV in Brazil, several issues related to REDD+ MRV systems remain unresolved, such as the most appropriate method for setting baselines and the ideal combination of advanced remote sensing techniques and ground-based methods.

Differences between national and subnational methods for setting reference levels for use in deforestation monitoring could have critical implications for carbon accounting. For instance, the state of Acre's deforestation monitoring programme shows historical deforestation at 20% higher than the national-level system (based on PRODES); this would translate into higher emissions reductions and potential carbon revenues for Acre's System of Incentives for Environmental Services (Alencar et al. 2012). Also, forward-looking baselines (based on simulation models) that are used by some REDD+ projects are considered questionable due to their high volatility and the difficulty of separating the localized effects of projects from the overall trajectory of deforestation in an area (Soares-Filho et al. 2012). Harmonization of information across levels is still needed to build accountable MRV systems for REDD+.

In Vietnam and Indonesia, conflicts of interest and the use of different land classification systems by different ministries (and even within ministries) exacerbate difficulties in obtaining accurate data on forest lands and resources. Data are scattered across departments and units and are neither shared between institutions nor made available to the public. This failure to share data and resources results in overlapping and duplicated activities, and has partly hampered the efforts by donor agencies to assist these governments in developing or improving their MRV systems. However, on the other hand, in Indonesia, the data sharing difficulties motivated donors to assist the governments.

Enabling the flow of information requires building capacity to deal with information of various types (e.g. local and spatial data) and quality. In Indonesia and Vietnam, the main problem in establishing a national MRV system is the lack of reliable, harmonized and centralized spatial data on land uses, such as forestry/

mining/agriculture concessions, conservation areas and economic development zones. However, there are attempts towards harmonization in Vietnam, where the ministry has developed the Management Information System for Forestry Sector (FORMIS), which collects and synthesizes all information related to the sector. It also aims to encourage information sharing between relevant ministries, identify needs for information sharing, harmonize technical information and improve reporting systems. In addition, most forest inventory data in Vietnam are located and controlled by central level government and research institutes. Local authorities want to access and use these data but they do not know how to interpret the result. Central level ministries and institutes also complained that they cannot pass on the information when there is no technology to do so.

In Indonesia, efforts have been made to increase data transparency and to harmonize land use maps across provinces and sectors. The REDD+ Task Force under the President's Unit for Development Control and Monitoring (UKP4) has posted spatial data on the Internet and invited public analysis and input. This process revealed the state of discordance in Indonesia's land use mapping system. Backing from the Indonesian President was critical in legitimizing the mapping process. At the same time, a multi-agency initiative – the Indonesian National Carbon Accounting System – is establishing methods for national carbon accounting. The system complies with IPCC requirements, thus contributing to the provision of reliable and standardized data. Efforts to centralize data scattered between agencies remain limited, but the draft national MRV strategy makes data harmonization a key priority. But the series of laws and institutions related to land use mapping were supported by other sectors of the government, who realized the importance of a synchronized land use map in development planning. Together with the REDD+ agenda, they generated interest at the district level to build their own capacity in mapping and geospatial information management. For example, in 2011, the district planning agency (Bappeda) of Kapuas District (Central Kalimantan) held geographic information system (GIS) training, attended by almost all subdistrict heads.

In the REDD+ context, information related to baseline setting, carbon measurements and MRV is a source of power; the institutions that hold this knowledge, and hence have control over and capacity for its dissemination at project and national levels, wield considerable influence in national REDD+ politics. For this reason, it is important to include local people in MRV systems both as a source of knowledge and as recipients of other actors' knowledge, so that they can participate equally in REDD+; recent initiatives in Brazil and Vietnam are attempting to achieve this. Armitage (2008) argues that one expected benefit of multilevel governance is the linking of formal science with local or indigenous knowledge systems. For example, a study by Nagendra and Ostrom (2012) provides evidence that local users can provide extremely accurate predictions of changes in tree density in forest. However, the difficulty is to systematically include them into a national MRV system. Differences in the language used to measure emissions, difficulties in meeting data quality standards, and lack of clear

incentives to provide monitoring services are some of the challenges in integrating local measurements into a national MRV system. Another issue is the complexity of international verification standards and methods for measuring unplanned deforestation, which makes them less accessible to REDD+ proponents. These processes need to be simplified, preferably before national MRV frameworks are fixed into place.

The distribution of REDD+ benefits and responsibilities is of great concern to stakeholders at every level, as all want to be fairly represented and receive their fair share of benefits. An equitable national MRV framework will be based both on comprehensive multi-sectoral and historical data to ensure local deforestation trends are accurately captured. Methods are transparent and communicated across levels and sectors. Key issues in the discussion on benefit sharing are the relationship between national and local governments and the need for local governments to be given the flexibility to implement broader REDD+ interventions (Luttrell et al. 2012).

Corruption and fraud also affect the distribution of incentives at all levels of government. In Indonesia and Vietnam, there have been delays in disbursing and spending shared revenues from forestry across government levels, and funds for national reforestation programmes were misused in several places (Barr et al. 2010; Pham et al. 2012). Recent studies in Vietnam (Pham et al. 2009, 2012) highlighted that corruption in relation to national reforestation/afforestation and payments for environmental services (PES) programmes either delayed or halted PES payments for local communities. In Indonesia, the fiscal balancing law prohibits money from being distributed directly between government levels and communities. In the absence of a transparent benefit-sharing mechanism based on an official national MRV system, the approval of future REDD+ revenue levels and the allocation of these revenues might involve protracted negotiations between districts, provinces and central agencies, thereby increasing transaction costs and creating opportunities for corruption. Evidence from Indonesia indicates that, after each level of government receives its share of forest revenues, factors such as poor financial management, elites who act outside the law with impunity and the absence of accountability mechanisms have led to corruption and misuse of forest funds. This suggests that there are significant risks for corruption in climate finance in Indonesia (Dermawan et al. 2011).

4.2. Matching issues and institutions to scale

Poteete and Ostrom (2004) point out that one of the factors that need to be considered in fostering collaboration across scales is institutional environment: We need to understand what institutions are already in place, and how they can serve as the basis for new systems that foster collaboration across scales. To establish an accountable MRV system, new institutional arrangements are needed that create or build on existing bodies, with a particular focus on tools for overcoming the obstacles to information flow across levels.

Efforts to establish such institutions in the case study countries, however, are hampered by political and economic obstacles. Vietnam, for example, is experiencing problems in arranging additional and independent bodies for MRV because of high transaction costs, conflicts with existing government policy (e.g. with regard to national security), disagreement between central and local authorities and among donors, and lack of support from local agencies. Local governments have challenged the central government and donors regarding the practicality and feasibility of these independent bodies, calling for a more realistic and cost-effective approach. If the potential for REDD+ payment is small, local governments may prefer to use existing mechanisms and institutional arrangements with additional functions.

Subnational governments and institutions will be pivotal in REDD+ implementation, especially in countries such as Indonesia and Brazil, where decentralization has given subnational governments the authority over land and natural resource management. In such countries, it is essential that subnational governments establish coherent regulations on the rights, responsibilities and procedures for MRV and set up funds and transparent mechanisms for allocating resources to subnational REDD+ actors.

A promising example of an institution focused on the subnational level is the Governors' Climate and Forests Task Force (GCF), which recognizes the key role of state and provincial governments in building REDD+ programs. The GCF began in 2008 through agreements between select subnational governments in the United States, Brazil and Indonesia, and has since expanded to include a total of 19 states and provinces in the collaboration (adding representatives from Mexico, Nigeria, Peru, and Spain as well). In Brazil, assuming leadership for REDD+ at the subnational level has been an important strategy for decreasing the risks of leakage and establishing a reliable MRV system. Since 2008, seven of the nine Amazonian states have initiated plans to control deforestation within the framework of the National Plan for the Prevention and Control of Deforestation in the Amazon (May et al. 2011). The state of Amazonas passed climate change legislation in 2007 with its Climate and Conservation Law (3135/2007). The states of Acre and Mato Grosso have passed laws designed to reduce emissions from deforestation and degradation: namely the 2010 State System of Incentives for Environmental Services (SISA) Law (Government of Acre 2010; Law 2308/2010), and the 2013 State System of REDD+ (Government of Mato Grosso 2013; Law 9878/2013), respectively. The SISA law transformed state institutions, and its carbon programme provides an important model for subnational jurisdictional REDD+. The Brazilian states of Acre and Amazonas are pilots for the VCS Jurisdictional and Nested REDD+ framework.

In Indonesia, voluntary working groups, which are helping to address the lack of institutional links between sectors and scales, provide an example of institutional integration across levels. *Ad hoc* REDD+ working groups in the provinces of Central Kalimantan, East Kalimantan and Aceh, in collaboration with the National REDD+ Task Force, are working to improve stakeholder

participation and dialogue between ministries, the private sector, civil society and academia. They also provide a forum for communication between actors at different levels: provincial and district officials, REDD+ project proponents and community representatives. Such temporary working groups are – at least in Indonesia – familiar mechanisms for addressing emerging issues. In both Indonesia and Vietnam, voluntary subtechnical REDD+ working groups have been established with the aim of supporting the respective governments in developing their national REDD+ programmes. Voluntary working groups can be formed through various networks and can be effective in bridging gaps between levels. However, as they are voluntary, they tend to have limited impact and influence, and higher levels may ignore their input, meaning that their effectiveness depends on vertical support from government agencies.

Organizations that are active across scales provide insights for ways to create novel pathways that enable diverse actor groups to exchange experiences, with the aim of nurturing arenas of innovation and thus facilitating a greater range of purposeful collective actions. These organizations serve as bridges between subnational and national governments, and work to combine local REDD+ initiatives into a subnational-scale strategy – a challenging task given the broad local powers granted under decentralization (Gallemore and Dini 2012).

In sum, integration between levels for REDD+ implementation and the establishment of an MRV system may take several forms. The multilevel dimensions of REDD+ create institutional challenges, but these could be overcome by the establishment of new institutions (e.g. those needed for MRV), the strengthening of existing institutions (at all levels) or the use of informal and/or voluntary networks. The solution or response to the complexity inherent in REDD+ might involve a blend of different types of institutional arrangement. Poteete (2012) notes that policy failures are often attributed to poorly aligned institutions, and that the design of multilevel institutions (e.g. those for MRV) based on functional boundaries could facilitate management. As Pahl-Wostl (2009) proposes, integration means that institutions at one level can influence the processes of institutions at other levels – an essential feature for dealing with many of the challenges and risks related to REDD+, outlined in Table 1.

4.3. The need for participation

An important issue for REDD+ is identifying who is participating at each level of governance and how these actors exercise their agency (Corbera and Schroeder 2011). Participation engenders trust and reduces the risks of conflict and failure (Forsyth 2009). As noted by Ostrom (2012), building trust and commitment, particularly at local levels, contributes to addressing problems at larger scales. Participation can be achieved by multi-actor governance systems that allow all stakeholder groups to collaborate in achieving public policy objectives. REDD+ in countries like Vietnam is implemented through top-down approaches. In Indonesia, national and local level initiatives are progressing simultaneously.

In Brazil, state governments have shown particular leadership in REDD+. In all cases, a multilevel governance approach that prioritizes the flow of information and the matching of interests across levels can result in more effective outcomes. In MRV, for example, such flows of information are the main component of emissions data collection and dissemination. Aligning interests can help support the acceptance of benefit sharing decisions that arises from the resulting database.

When actors at one level participate in processes at other levels, vertical co-ordination (Pahl-Wostl 2009) and communication of interests across levels is improved. In the context of MRV, participation encompasses the processes of (i) giving information; (ii) receiving information; (iii) providing input or regulating how information is received or taken; and (iv) converting MRV information into plans of action to reduce emissions while balancing pre-existing goals. However, evidence from REDD+ countries shows that there is much room for improvement in relation to participation in both REDD+ and MRV (Indrarto et al. 2012; Pham et al. 2012).

MRV systems can be designed to take into account input from local stakeholders, and provide back information on emissions from land use change as a way of encouraging more sustainable land use practices. Monitoring and reporting standards can be developed for communities, being simple, scientifically valid, and can be adjusted to meet local social and environmental conditions as seen fit by local people (Van Laake and Skutsch 2008). Also, since the methods by which baselines are established determine how and to whom carbon revenues will be allocated, public consultation about baseline setting can help enhance equity. Local knowledge can be integrated in methodologies for monitoring and reporting. It is possible to develop effective social/development MRV systems that not only ensure the compliance of procedural rights like to consultation but the more substantive rights e.g. rights to land; rights of access to forest resources (Bird and Schreckenberg 2006).

In Brazil, indigenous groups and forest-based communities have mobilized to promote local participation in the REDD+ process. These groups, recognizing the potential benefits and risks associated with REDD+ as well as the potential challenges associated with fair engagement, have taken action to promote the inclusion of social and environmental safeguards (Gomes et al. 2010). Most NGO and government REDD+ project proponents have held, or plan to hold, public consultations with target actors at the project sites as a means of presenting information and eliciting feedback, including on the design and implementation of MRV systems at project and jurisdictional levels. Brazil now has several examples of local-level integration in REDD+ projects' MRV systems, in which community-based monitoring is linked to spatial analyses.

Although participatory MRV remains a controversial issue in Vietnam, many projects there have piloted participatory carbon monitoring. In particular, the World Agroforestry Centre, in collaboration with national partners in BacKan, Thai Nguyen and ThuaThien Hue Provinces, tested a new method, known as RaCSA (rapid carbon stock appraisal), for its potential to help communities

become involved in reporting and monitoring for PES contracts (Kurniatun et al. 2001). The aim of this study was to explore local knowledge and investigate activities that can improve local livelihoods (Van Noordwijk 2007). The findings indicate that RaCSA can indeed facilitate local people's active participation in measurement and monitoring and thus provide insights that could prove valuable in relevant discussions and the design of an MRV system in Vietnam. However, the findings have not been widely shared among stakeholders nor fed into current policy debates, highlighting the disconnection between project-level activities and the national REDD+ programme.

Limited participation in REDD+ is a recurring problem in many countries. In Vietnam, it can be explained by a political process characterized by ineffective consultation mechanisms and weak representation of certain groups. Furthermore, as Pham et al. (2010) highlight, donors often hire intermediaries to carry out consultations but various pressures (time, the donor's priorities, costs) render these consultations inadequate.

Limited participation also comes in the form of flagging interest in REDD+. In Indonesia, there is participation fatigue, stemming from lack of proof of REDD+'s feasibility, lack of clarity in regulations and policies, and strong vested interests in other (potentially high-emission) land uses. Even where voluntary working groups were successfully established to enhance stakeholder participation, an excess of REDD+ workshops and stakeholder discussions and seminars that were not followed by realizations of REDD+ funds and actions, which led to 'REDD+ fatigue'. Despite efforts implementers of local REDD+ initiatives to engage local policymakers in understanding their objectives, interest remains limited, mainly because the REDD+ incentive mechanisms are still unclear.

4.4. Negotiation of interests

Actors negotiate support for their own interests in REDD+ policies and MRV processes, horizontally, vertically and at all stages of the policymaking process. Horizontal negotiations take place, for example, among relevant ministries – forestry, agriculture, mining, planning and finance. Vertically, negotiations can take place, for example, among project implementers, civil society actors and negotiators. Coalition building between actor groups serves to leverage political power and help realize interests; which interest wins is often the result of a combination of economic and political power. Information, Brockhaus and Angelsen (2012) argue, is an important source of power in the REDD+ arena. MRV information and baselines are shaped by politics and the influence of certain interests (Espeland and Stevens 2008).

This can result in situations where the information flow across levels is impeded by conflicts or lack of interest in sharing information with other actors, as seen in the cases of Vietnam and Indonesia. In addition, institutional stickiness and established power structures hinder the flow and match of different types of information across levels. It is important to recognize the effectiveness of informal

relationships and networks in bridging gaps between agencies at different levels. In Vietnam, most stakeholders share information through informal channels, e.g. based on personal relationships or informal networks. However, these informal networks are not widely known or recognized; they lack transparency and are absolutely exclusive. Furthermore, the production and dissemination of knowledge depend on power relations and social concerns, and it is equally important to ask what knowledge is not being produced and disseminated. Therefore, the design of an MRV system and the knowledge upon which it is based are not only technical but also political issues.

It has been claimed that the high economic value of forest resources could create strong incentives for central policymakers and governing elites to retain control over resources and subvert local rights and claims (Ribot 2004). This is known as the REDD+ paradox – that REDD+ may increase the political incentives to retain or recentralize control over forests (Griffiths 2007; Phelps et al. 2010). Others argue that REDD+ will not lead to recentralization. For example, Wunder (2010) suggests that REDD+ might reinforce decentralization, as states come to realize that they cannot reduce deforestation in a centralized system. Nevertheless, decentralization has not been completely effective in linking governance across levels or managing power asymmetries; rather, there is considerable evidence that decentralization leads to elite capture and even negative resource outcomes. In terms of multilevel governance, Mwangi and Wardell (2012) identify two approaches to forging links between levels: top-down (decentralization) and bottom-up (community participation). Both approaches have advantages and drawbacks, and they share some common problems, particularly elite capture, which ultimately hinders healthy cross-scale linkages. Nagendra and Ostrom (2012) propose that polycentric forest governance may alleviate concerns about distribution of financial incentives through REDD+. Therefore, polycentricism and the development of multilevel, integrated social-ecological assessments hold significant potential as ways of addressing some of the major future challenges for REDD+ (Nagendra and Ostrom 2012).

Multilevel governance mechanisms, including the establishment of legal procedures and reliable data for MRV, can settle disputes in implementation, adjust the mismatch of incentives and address problems in the distribution of benefits. Design elements for REDD+ should complement existing forest-related policies and be informed by lessons learned during decades of local and global initiatives; this would make them consistent with proposals for 'nested' climate governance regimes (Forsyth 2009).

5. Conclusions

The lessons from the case study countries show that there are numerous challenges and opportunities for improving multilevel governance with regard to MRV systems for REDD+. Improving flows of information between subnational REDD+ initiatives and national authorities is an important step in improving multilevel governance. As our analysis shows, for the MRV system that works

across the levels and scales, it is essential to have a national framework in place, clear channels of communication and cooperation as well as verification of the accountability, independence and credibility of the system.

Furthermore, multilevel governance for MRV, entails harmonizing information and incentives across all levels. This is, in part, a practical and technical problem: information and data for monitoring REDD+ are formed through a range of processes and according to different standards, making it difficult to aggregate the data at the national level.

The MRV decisions made about setting reference levels and accounting for carbon stocks have clear implications for the distribution of REDD+ benefits. Information and incentives are the two main currencies in the complex REDD+ arena – with difficulties traceable to the power relations among the actors who control them. Poor flows of information and the mismatch of incentives can lead to conflicts between subnational and national actors, because of conflicting interests between levels. A multilevel governance system would entail a shift towards accepting the reality that disagreements will arise in all aspects of environmental governance and that actors must reconcile others' objectives or accept their difference.

Therefore, multilevel governance mechanisms in REDD+ should be designed to achieve two simultaneous aims: 1) to seek ways to help actors at different levels to better match their interests; and 2) to adapt REDD+ to make it flexible enough to work with a range of (often conflicting) interests. Effective mechanisms of multilevel governance for MRV, such as a blend of novel cross-scale institutional arrangements and uniform regulations on rights, responsibilities and procedures for monitoring information flows and participation across levels, provide tools not only for information flow across levels but also for better matching of interests. However, the further research on the commons and the multilevel governance for the MRV could concentrate on the relative importance and contribution of formal institutions and informal networks in addressing horizontal and vertical coordination in the various steps of MRV.

In summary, policy and institutional reforms aimed at redefining existing information, incentive and power structures are needed to ensure the success of REDD+ implementation. REDD+ can serve as a catalyst for wider transformational change, and mechanisms for multilevel governance will play a pivotal role in this process. The sound flow of information and alignment of incentives across levels, in conjunction with transparent institutions, will be a key element in achieving efficient, effective and equitable MRV needed for REDD+ implementation.

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