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Article

Understanding the Relationship between Governance and Forest Landscape Restoration

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Abstract

Restoring forested landscapes is being promoted widely as a solution to the world's deforestation and degradation problems, as well as for climate change mitigation and adaptation, for supporting poor rural communities, and for water and soil protection. Yet, while practitioners understand reasonably well many of the technical aspects of forest restoration, they have a much poorer understanding of governance dimensions. Governance challenges come under many guises—financial disincentives, poor institutional set up, unclear tenure and lack of local empowerment, amongst others. Not much has been written to date on forest landscape restoration and governance. This article aims to better understand the governance challenges that practitioners face when restoring forest landscapes and to explore the points of intersection between forest landscape restoration and governance. To achieve this, a broader review of concepts related to governance, forests and landscapes was conducted, followed by a review of existing landscape-scale forest restoration projects to identify the governance factors that have been considered (if any). Findings indicate the need for a more dynamic and process-orientated approach to address governance as it relates to forest landscape restoration. The author proposes a classification for the intersection between governance and forest landscape restoration.

Keywords: forest, restoration, landscape, governance, forest landscape restoration, governance challenges, governance factors, classification

INTRODUCTION

Large-scale forest restoration is being promoted through a number of private, public, international, national, and local initiatives (e.g., Aronson and Alexander 2013; Chazdon 2013), including Aichi Biodiversity Target 15 of the United Nations Convention on Biological Diversity (CBD 2010), the Bonn Challenge to restore 150 million ha of forests and landscapes by 2020 (Aronson and Alexander 2013), and the New York Declaration on Forests (UNFCCC 2014). Recently the governments of Rwanda, Colombia, and Germany, amongst others, committed to restoring several million hectares. Processes such as REDD+ (reducing emissions from deforestation and forest degradation, sustainable management and restoration) promoted under the United Nations Framework Convention on Climate Change (UNFCCC) are also encouraging large-scale restoration efforts (Alexander et al. 2011).

Beyond tree cover, the restoration of forest goods and services has been widely advocated for a number of years, notably under the umbrella of 'forest landscape restoration' (FLR) promoted by large organisations such as World Wide Fund for Nature (WWF), International Union for Conservation of Nature (IUCN), the World Resources Institute (WRI), and the Food and Agriculture Organization (FAO) of the United Nations (UN) since 2000 (e.g., Mansourian et al. 2005; Rietbergen-McCracken et al. 2007; Lamb et al. 2012). It is

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defined as "a planned process that aims to regain ecological integrity and enhance human well-being in deforested or degraded landscapes" (WWF and IUCN 2000). As such, FLR was intended to portray the explicit intention to return some trees in the landscape to restore landscape functionality for the greater benefit of both people and biodiversity. The key variables in the definition of FLR are 'process', 'landscapes', 'regaining ecological integrity', and 'enhancing human well-being', thus providing three dimensions: 1) a dual objective (ecological conservation and human development); 2) a spatial dimension (the landscape); and 3) an implicit time dimension, due to its very nature as a 'process'. Importantly, the term 'landscape' introduces both, a spatial dimension and a context for an integrated approach. Rather than attempting to define a specific scale applicable across all projects, it prompts considerations of "where, how, how much, with whom and for what purposes" to restore. Thus, in the framework of FLR, the landscape is defined on a case by case basis as a meaningful planning unit in a given project or situation, either from a biological (e.g., a species' range) or a human (e.g., group of villages) dimension (Antrop 2005; Sayer et al. 2014) or both. It is important to note that FLR is a relatively loose term, and has been interpreted somewhat differently by different groups. Further, it is made up of terms for which there is no universal agreement (particularly, 'forests' and 'landscapes').

Over a decade later, while some plantations have been established, there is still minimal large-scale visible change in terms of 'restored forest landscapes', particularly in tropical countries (Aronson et al. 2011; Menz et al. 2013). Increasingly, governance is being considered as a critical missing link and an important enabling factor in forest landscape restoration (Guariguata and Brancalion 2014; van Oosten et al. 2014).

While there are attempts at analysing or designing governance frameworks in the forest sector and research on landscape governance is growing (e.g., Sayer et al. 2013; Ros-Tonen et al. 2014), research on the specific interaction between governance and large-scale forest restoration (and more specifically, FLR) is just beginning (van Oosten 2013; Guariguata and Brancalion 2014).

Governance is particularly important in forest landscape restoration for four fundamental reasons (Mansourian, in press):

a) New value is 'generated'—returning trees and forests to the landscape generates additional value—such as water and soil protection, micro-climate regulation, goods such as nuts and oils etc. (Light and Higgs 1996; Vieira et al. 2014). In turn, this change in potential economic value of the landscape may generate new interests, which could result in shifts in the balance of power, conflicts, misuse of natural resources, as well as exacerbating inequalities particularly for vulnerable communities, women, and other groups (Barr and Sayer 2012).

b) Competing land use–allocating land for forest restoration signifies reducing the options to use that land for other purposes (such as food production or mining, e.g., Barr and Sayer 2012). Furthermore, the impulse and funding that determine this change in land use are frequently from beyond the landscape, resulting in competition for land between powerful international private investors and legitimate but weak interests of local communities (Newton and Tejedor 2011; Guariguata and Brancalion 2014).

c) Tenure and rights–within landscapes, a range of tenure and rights systems may be the norm (Schlager and Ostrom 1992), as well as unclear tenure, leading to conflict. Furthermore, restoring tree cover can alter tenure and rights, particularly where these are unclear.

d) Scaling up–expanding restoration to landscapes implies an increase in the number of actors, thereby adding further complexity to governance, especially as the landscape rarely corresponds to any political unit.

This article seeks to understand the role of governance in forest landscape restoration projects and programmes. Its intent is specifically to support practitioners to better understand how forest landscape restoration and governance intersect, and therefore, which aspects to consider and at which stage in a restoration process.

METHODOLOGY

Given the relative newness of FLR, there is limited literature specific to governance and FLR. Instead, I firstly reviewed key concepts and frameworks related to governance, forests, and landscapes with the aim to see how and which aspects could be useful for FLR. Also, in early 2015, I examined five major environmental project databases to explore real examples (Table 1) and to extract projects that involved large-scale restoration. The choice of databases was based on their being publicly accessible, from well-recognised international bodies and containing projects, either specifically about restoration or about carbon sequestration via reforestation and afforestation. As a first step, only forest restoration projects were selected (rather than other habitat restoration) using the database search engine. For each project, I checked if they could be considered FLR using the key criteria implicit in the definition of FLR, specifically: a) their scale (landscapes or larger than individual plots); and b) their dual dimension of improving

Table 1

Project databases and number of restoration projects reviewed

Database	Total number of projects	Number of forest restoration (or reforestation/ afforestation) projects	Number of projects that qualify as FLR
Global Restoration Network	203	93	26
Forest Carbon Portal	50	50	5
Global Partnership on Forest and Landscape Restoration(GPFLR)	32	32	23(*)
Plan Vivo	37	37	27
Global Environment Facility (GEF)	3,974	19	8
Total	4,296	231	89

(1) Note: *Limited data for some projects

both human well-being and ecological integrity. The initial intent was to identify which governance challenges had been considered in each FLR project. However, it proved impossible to: a) find a clear list of well-defined FLR projects (many that were called FLR were not and many that were not, qualified according to the FLR definition), and b) to obtain clear and comprehensive data on which governance challenges or factors were considered within the projects. Adapting WRI's forest governance framework (2009), I reviewed five large-scale forest restoration projects (Appendix 1) to better understand the governance factors that they considered. These five projects were selected: a) for the quality of project data available; and b) to ensure a breadth of regions and organisations. All projects consider forest restoration within landscapes, although they are at different stages of implementation, for example, the project in Liberia has not yet integrated concrete restoration practices, while the Madagascar project is in its tenth year and showing clear results on the ground (Appendix 1). My own experience of managing FLR projects also contributed to the analysis.

The five-step process approach for FLR introduced by Vallauri et al. (2005) was used as a starting point (Table 2) to classify and illustrate the intersection between governance and FLR in some of these FLR projects. It provides a valuable guiding thread for breaking up the restoration process into manageable units and steps (even if they are, in reality, all interlinked and non-linear).

REVIEW OF KEY CONCEPTS

Three key concepts were reviewed to aid understanding of the issues surrounding governance and forest landscape restoration: a) governance; b) landscapes and governance; and c) forests and governance. These key concepts are detailed below.

Governance

Until the middle of the twentieth century, governance equated to central government power, but this situation changed in the second half of the century, as the centres of decision-making powers, notably in the environment sector, shifted to other actors, such as rural communities and the private sector (Lemos and Agrawal 2006; Cashore et al. 2007; McDermott et al. 2012). In some instances, alliances of actors (e.g., private-public partnerships, consumer groups) took governance matters in their own hands, leading to 'hybrid' governance arrangements (Lemos and Agrawal 2006).

Governance essentially relates to power and to decision-making (Lemos and Agrawal 2006; Chhotray and Stoker 2009; Gunningham 2009; Colfer and Pfund 2011). It concerns who takes decisions, how these decisions are taken, and what supportive frameworks enable the implementation of these decisions. Specifically, environmental governance relates

Table 2

Steps in restoring forest landscapes and links with governance (adapted from Vallauri et al. 2005)

Sample of activities related to governance	Examples from projects
Step 1. Initiating a restoration programme and partnerships (identifying problems and agreeing on solutions)	
Identifying and engaging stakeholders (e.g., Newton and Tejedor 2011; Kozar et al. 2014; Mansourian and Vallauri 2014) Assessing perceived needs by stakeholders for restoration (e.g., van Oosten et al. 2014) Assessing political will and support for restoration (e.g., Mansourian et al. 2014)	China's restoration/rehabilitation project in the northwestern provinces inscribes itself in the country's political desire to improve and increase forest cover
Step 2. Defining restoration needs and linking restoration to a large-scale conservation vision	
Reviewing local and national level priorities, targets and enabling institutions (e.g., Clement 2010) Discussing and debating restoration needs with land/forest owners (e.g., Emborg et al. 2012); Together with stakeholders, assessing future scenarios as a decision-support tool (e.g., Pullar and Lamb 2012)	In Liberia's Wonegizi reserve, the community forest management committee provides a forum for discussion of restoration activities with community members
Step 3. Defining restoration strategy and tactics, including land-use scenarios	
Assessing winners and losers in restoration (e.g., Barr and Sayer 2012) Defining and agreeing trade-offs (e.g., De Fries et al. 2005; Sayer et al. 2008) Assessing and sharing costs and benefits of restoration (e.g., Aronson et al. 2011; Kozar et al. 2014) and identifying/establishing relevant mechanisms (e.g., Bullock et al. 2011)	In South Africa's Northern Cape, private landowners benefit from funding for restoration on their lands
Step 4. Implementing restoration	
Working through national and local level institutions to implement restoration (e.g., Agrawal and Chhatre 2006; Gerber and Knoepfel 2008) Establishing partnerships to engage in collaborative large-scale restoration (e.g., Pinto et al. 2014)	In the Khasi Hills (India) REDD project, communities are meant to be the implementers and managers of the project (through a sub-watershed Federation that re-groups communities from the 10 districts)
Step 5. Piloting systems towards fully restored ecosystems (including evaluation and corrective actions)	
Changing tenure and rights (e.g., Lemenih and Kassa 2014) Using local level institutions to resolve potential conflicts (e.g., Brown 2003) Ensuring local buy-in (e.g., Newton and Tejedor 2011)	In Madagascar, a large number of local facilitators were brought into the FLR project in Fandriana Marolambo to engage and work with the different local communities in the landscape

to "*regulatory processes, mechanisms and organisations through which political actors influence environmental actions and outcomes*" (Lemos and Agrawal 2006). Increasingly, governance is understood as a key determinant of success in the environment sector and for forest restoration specifically (Carter et al. 2009; Guariguata and Brancalion 2014). A particular complication with governance in the environment sector is the overlap between social and ecological systems with differing spatial and temporal scales (Wyborn and Bixler 2013). This is especially relevant to FLR that seeks to achieve improvements in both, social and ecological systems.

Because of the nature of FLR, governance challenges that emerge include, among others: how to reconcile human well-being and ecological integrity? Who decides what to restore? Who pays, and who benefits? How are stakeholders engaged? How are trade-offs negotiated among landscape stakeholders? What policies support or hinder FLR? How are they enforced?

Landscapes and governance

Landscapes offer both a scale (Antrop 2005; Pfund 2010) and a means of integrating social and ecological dimensions (Sayer et al. 2008; Sunderland et al. 2015). Landscape approaches, landscape science, and landscape ecology all provide ways to analyse large scales and to study the human and ecological interactions as envisaged in FLR (Pfund 2010; Opdam et al. 2013; Sayer et al. 2013; Sunderland et al. 2015).

As the conservation movement gravitated towards larger scale units in the second half of the twentieth century (e.g., Myers et al. 2000), the 'social' dimension, and the role of governance became even more central. This coincided with an increased understanding of complex social-ecological systems (SES) (Ostrom et al. 2007; Ostrom 2009) and of the key factors that influence the ability of these complex systems to self-regulate. One important element that characterises landscapes is the fact that they are dynamic and constantly evolving (Sayer et al. 2008; 2014), both from social and ecological lens. Indeed, landscapes provide a 'bridge' between social and ecological concepts (Görg 2007) with landscape ecology at the crossroads of many disciplines (Opdam et al. 2013).

In the framework of landscape ecology, a noteworthy distinction can be made between the American and the European schools, with the former traditionally focusing on ecological dimensions, and the latter generally better integrating the human and ecological dimensions (Field et al. 2003). More specifically, for many analysts, landscapes are a means of integrating agricultural, environmental, and rural livelihood outcomes (Scherr et al. 2013). Indeed, with the reduced powers of central states, multi-level governance has become more prevalent as a means of addressing complex environmental challenges. Where there are multiple actors and rules may be unclear, decision-making becomes more complex (Gerber and Knoepfel 2008; Derkyi 2012; Emborg et al. 2012).

Limited work has been done to date specifically on landscape governance (e.g., Sayer et al. 2013; Ros-Tonen et al. 2014). Attempts at assessing governance of landscapes have been researched under three broad areas: a) stakeholders and their relationships; b) access to resources; and c) structure and function of governance (Colfer and Fentreinie 2011). Through their work, which is grounded in practical examples, Colfer and Fentreinie (2011) identified 12 indicators (including notably, security of rights, enforcement of rules, efficiency of participatory mechanisms) to diagnose and evaluate governance, many of which are of relevance to FLR. Principles of landscape governance also offer useful elements when seeking to understand how governance relates to FLR, including, for example, the relevance of negotiation among landscape stakeholders (Ros-Tonen et al. 2014). Work on landscape governance to date has sought to define principles or indicators to assess or monitor a situation, however, it does not provide concrete guidance for FLR practitioners, such as how and when to identify and effectively engage key stakeholders in restoration. Both human and ecological dimensions have been explored. Yet, overall, a key challenge remains the mismatch between social and ecological scales. There is still a long way to go to ensure the suitable and equitable consideration of both dimensions as intended in FLR (van Oosten 2013).

Forests and governance

Forest governance has been of central interest at the international level, to a large extent because of the huge strategic and financial importance of forests (Rayner et al. 2010). Poor development outcomes in the forest sector generated much of the focus on governance, notably through the advent of market-based modes of governance (e.g., Pattberg 2006) or through bilateral or multi-lateral agreements to control illegal logging, such as the European Union's Forest and Law Enforcement, Governance and Trade (FLEGT) process (McDermott et al. 2010). The gradual weakening of national governments in the forest sector was matched by a strengthening of civil society and markets, characterised by three governance trends: a) decentralisation, b) an increased role of logging companies, and c) the growing importance of market-oriented schemes such as certification (Agrawal et al. 2008). Local governments, private companies, civil society organisations, rural communities, and informal or traditional structures have increasingly become more involved in the governance of forests (Tucker 2010). Furthermore, traditional governance institutions exist in many forested regions, and while they may not have legal recognition, in many instances they play a major role in supporting or impeding effective forest governance (Chokkalingham et al. 2005).

To better understand forest governance, four frameworks have been developed by major international organisations: a) the "Framework For Assessing and Monitoring Forest Governance" (FAO and Profor 2011); b) the "Roots for Good Forest Outcomes: An analytical framework for governance reforms" (World Bank 2009); c) "Assessing Forest Governance" (WRI 2009); and d) "The Pyramid: A Diagnostic And Planning Tool For Good Forest Governance" (Mayers et al. 2002).

All these frameworks attempt to highlight the key principles and dimensions (e.g., stakeholders, rules, legislation) of forest governance, and were developed in the period 2002-2011, when there was growing interest in sustainable management of forests and in reducing illegal logging. They share similar features such as considering tenure, policies, and institutions. Equally, they generally consider a number of basic principles such as transparency, accountability, and public participation. While Mayers' 'pyramid' more specifically recognises the impact of other sectors, the three others are essentially focused on the forest sector.

These frameworks provide descriptive and analytical approaches to governance, yielding a snapshot of the governance context in a given sector and at a given point in time. While there are important elements of use to restoration, none of the frameworks were developed specifically with restoration in mind.

FINDINGS AND ANALYSIS

This section explores the implications of the literature review for FLR and governance, and also findings from the in-depth review of five projects that qualify as FLR to see how and which elements of governance were considered.

Forest landscape restoration and governance

The literature review demonstrated that understanding of governance as it relates to the forest sector is growing and that, although in its infancy, there are increasing attempts at exploring governance of landscapes (e.g., Colfer and Fentreinie 2011; van Oosten et al. 2014; Ros-Tonen et al. 2014). In contrast there is still limited data on FLR and governance (Guariguata and Brancalion 2014). Existing governance information for forests and landscapes provides some guiding lines but cannot be transposed to FLR. Importantly, while landscape governance principles and indicators offer a better understanding of the issues, the question remains for FLR practitioners—faced with limited time and resources—on how best to address governance challenges in project implementation.

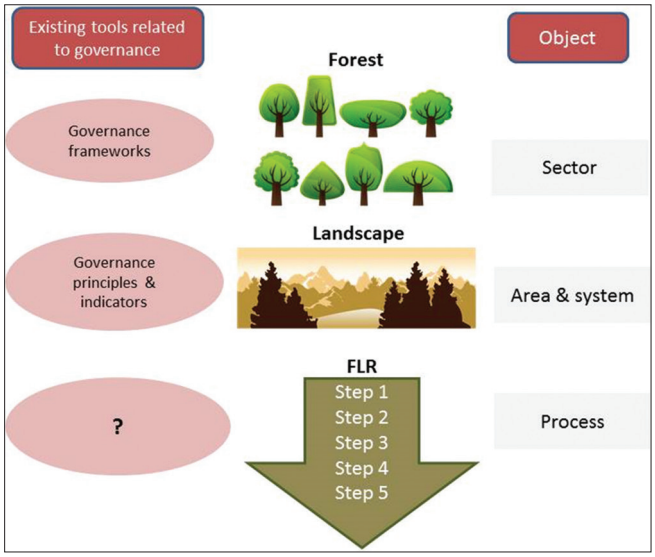

Figure 1
Different objects of governance

For a start, the incongruence of scales between the political and governance levels (local, regional, national, and international) versus the biophysical levels which include the landscape, enhances the challenge of understanding governance of forest landscape restoration (van Oosten 2013). Furthermore, while for forests the object of governance is a sector, and for landscapes it is an area and a system (social-ecological system), for FLR it is a dynamic process which crosses sectors, takes place in a landscape, remains part of a SES, and evolves over time (Figure 1). In contrast, the majority of existing forest governance frameworks is analytical and static rather than process-orientated. While they serve as a tool to assess a situation at a given point in time, their use during the evolving period and transformative stages of a restoration project or programme is limited.

Projects reviewed (Appendix 1) show an ad hoc approach to integrating governance with no guiding framework, principles, or systematic approach. Governance concerns were either analysed in a pre-project phase (notably, to respond to donor requirements for stakeholder analyses), or occasionally included within the project activities or objectives, or highlighted in post-project evaluations. Specific governance factors fell broadly under the following dimensions: stakeholders, institutions, policies, tenure and rights, and financing (Appendix 1). For example, in Madagascar, the cultural diversity among community groups involved in the restoration project signified that many more local facilitators were needed (Mansourian and Vallauri 2014). In the project analysis phase of Liberia's Wonegizi REDD project, some key forest and land laws were highlighted. For projects with a carbon sequestration dimension, tenure was the key governance factor that was considered because of its importance in ensuring the 'permanence' of carbon sequestration, as shown in the Khasi Hills project in India. Ultimately, results highlight the absence of an overarching framework, approach or guidelines to consider governance challenges.

It appeared from the review of literature and projects that it was impossible to determine which governance challenges could or should have been considered since, in reality, the scope of influence on a restored landscape spans many sectors, systems, and scales. In other words, did the project explore all governance factors that it could or should have considered? Multiple scales of influence (both vertically, from international conventions to local institutions, and horizontally across sectors), a large landscape to consider, the reconciliation of social and ecological dimensions, and the specific changes to the landscape implied by restoration over time, all contribute to making governance as it relates to FLR highly complex. It results that providing a checklist of governance factors to consider upfront for effective FLR could be a bottomless

pit. Concomitantly, assessing whether all the governance dimensions were suitably considered is impractical and could discourage many FLR practitioners.

A way forward

This leaves us with the question "how can we address governance in the context of forest landscape restoration?" Given the spatial, temporal and multidisciplinary scales at stake and the diversity of settings (Armitage 2007; Ostrom 2009), an investigative approach is proposed rather than a descriptive or normative one as currently exists for forests and landscapes (Chhotray and Stoker 2009).

Instead of posing the question 'which governance challenges should be considered in FLR projects', it emerged from the analysis undertaken here to be more useful to re-phrase this question to 'how and *when* should *which* governance factors be considered in FLR projects/programmes'? Taking as a starting point, the FLR stepwise approach proposed by Vallauri et al. (2005), some possible governance-related activities pertinent to FLR can be mapped. Importantly, these governance-related activities may support or hinder the process of restoration.

Through this mapping it becomes apparent that different aspects of governance may be more important at different stages in an FLR process.

An emerging classification of governance as it intersects with forest landscape restoration

I propose to identify the different entry points for practitioners to consider governance within projects aimed at restoring forest landscapes. Changes over time characterise the evolving process of an FLR project, and along this path, different aspects of governance take more importance. For example, early in the process, financial incentives may be necessary to stimulate adoption of a large-scale restoration programme. Equally, governance cannot be seen as a steady state, but rather as an evolving process with different dimensions (e.g., identifying actors, new policies) taking on more or less importance at different moments in time. A better understanding of the intersections between FLR and governance promotes a more practical approach for implementation.

Governance is important throughout a project cycle as an enabler of (or obstacle to) restoration. However, both being processes, FLR and governance cannot be neatly mapped, instead a cycle is used to illustrate the proposed classification (Figure 2). The classification of aspects of governance of relevance to FLR can be sketched out from the initiation of an FLR project/programme through to its monitoring.

Governance to initiate

Forest landscape restoration projects may be initiated through external project funding, international or national policies or local practices and customs. The demand to initiate large-scale forest restoration can be generated by a number of governance-related factors, such as legally-binding requirements under international conventions, new land-use policies, or traditional structures/customs promoting restoration. The global Aichi Biodiversity Target 15 of the CBD is a good example of such an international political commitment that supports the initiation of FLR. At the national level, several countries such as Paraguay and Brazil, have legislation to restore riparian forests. Existing or new legislation, funding sources as well as customary practices may provide the impetus to start an FLR programme and act as a rallying platform to engage stakeholders.

Governance to stimulate

Forest landscape restoration can be stimulated through coercive measures, such as sanctions for non-compliance of legal conditions, or through positive, market-based incentives such as direct or indirect subsidies. For example, communities in Madagascar received seedlings, direct funding and technical support to undertake restoration (Razafimahatratra, pers. comm.). Other options to stimulate FLR include securing land tenure and rights. In the project in China's northwestern provinces, transfer of titling to local farmers is intended to encourage the restoration (or at least rehabilitation) of forestlands (Appendix I). Thus, specific fiscal, monetary or tenurial instruments at different levels can directly stimulate FLR.

Governance to mediate

Mediation is necessary at landscape scales when different stakeholders have to discuss and agree trade-offs (e.g., Sayer et al. 2008). When negotiating trade-offs between stakeholders, and between well-being and biodiversity dimensions of FLR, decision-making tools and methods, such as facilitation, mediation and negotiation institutions, play an important role (e.g., Ros-Tonen et al. 2014). For example, in the Khasi Hills project (Appendix I) a sub-watershed federation was set up to represent 10 different districts and act as mediator between the communities and the government. Mediation tools provide a means of reaching decisions on restoration that are acceptable to all key stakeholders (e.g., Emborg et al. 2012).

Governance for change

In the course of implementing large-scale restoration, a project or programme may need to tackle a fundamental governance challenge (possibly remote to the actual object in question) that is a stumbling block for success. For example, without sufficient incentives to maintain and restore forests in the case of Liberia's Wonegizi landscape, there is a risk that once they gain title to the land (under the Community Rights Law) communities may sell it off to the private sector for conversion (Kempinski pers. comm.). Such fundamental obstacles may often be overlooked, and only emerge when the project is over (and a post-project evaluation undertaken). For example, the evaluation of the Global Environment Facility (GEF) project 'Ecosystem Restoration of Riparian Forests in Sao Paulo' noted the failure to recognise incentives and disincentives for landowners (IEG 2014). Recognising and addressing governance challenges that may obstruct or promote

sustainability and long-term success is particularly critical in the design of FLR projects.

Governance to equitably share benefits and costs

The restoration of forests may generate both costs and benefits. Some costs are immediate, while benefits are frequently long-term (reinforcing the temporal dimension of FLR). Furthermore, costs and benefits may be distributed unequally across stakeholders. Bullock et al. (2011) highlight the relevance of payments for ecosystem services as a means of financing restoration, but also note the importance and challenge of ensuring that local and regional institutional frameworks can cope with the complexity of such schemes. In the Khasi Hills project (Appendix I), meetings were held with communities to explore alternatives to compensate them for their losses induced by forest restoration and conservation (Poffenberger 2014). Recognising winners and losers and establishing systems to equitably share costs and benefits is essential for long-term restoration results.

Governance to enforce

Enforcement mechanisms are critical to ensure that the restoration effort is sustained. In this respect, governance factors, such as strong and locally-respected institutions that stop encroachment, support user rights, enforce rules and regulations, to name a few, (Pinto et al. 2014) will play a key role in the long-term effort implied by FLR. For example, in Paraguay's eastern region, while there is a legal requirement (Forestry Law 422/73) to keep 25% of private land under forest cover (or to restore it to ensure that percentage is met), it is frequently not respected, and there are limited enforcement procedures (Mansourian et al. 2014). Enforcement tends to be associated with central government but may equally fall to local authorities or civil society groups (Nagendra and Ostrom 2012).

Governance to monitor

Monitoring restoration impacts within a landscape affects future management actions. Mechanisms and institutions to support credible and effective monitoring and adaptive management for large-scale restoration may be required. These will need to be acceptable to all stakeholders and inform necessary changes. For example, Ostrom and Nagendra (2007) describe successful monitoring by local communities in Nepal around Chitwan National Park as a means of securing, amongst other benefits, long-term forest regeneration.

This proposed classification is intended to provide practitioners with a means of considering specific governance factors in the course of their projects. The different elements in this classification are iterative as no single element relates only to one step in the FLR process (Figure 3). For example, mediation may be necessary throughout the life of an FLR programme. Equally a single element may be relevant at different geographical scales (Figure 2). For example, subsidies motivating stakeholders to restore (or not) may be at the national or regional scale.

CONCLUSION

A review of the literature and of FLR projects revealed that there is limited data on governance and forest landscape restoration. Furthermore, specific information on the governance challenges of projects reviewed was found to be incomplete as technical aspects of restoration preceded other considerations in most cases. Yet governance is an important factor in favouring, or not, forest landscape restoration particularly because of the temporal, spatial and sectoral scales implied by this process.

Landscapes are complex social-ecological systems. The fact that they cross vertical (multi-scale), horizontal (multi-sector), and temporal dimensions adds to their complexity. Modifying

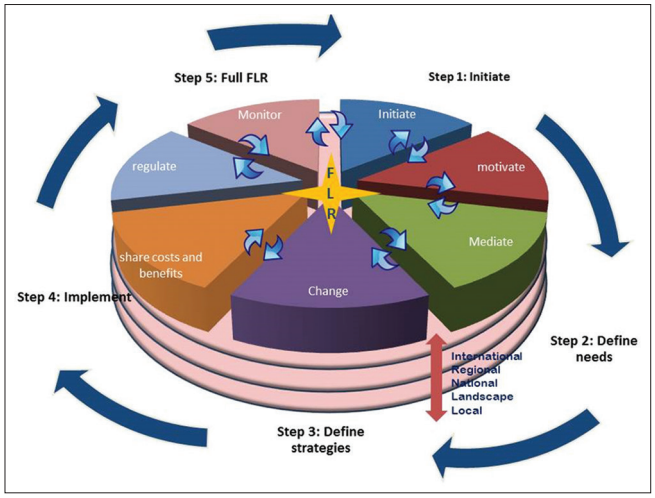

Figure 2

Characterising governance intersections with forest landscape restoration Note: The outer arrows illustrate the different steps proposed by Vallauri et al. (2005) in an FLR process. The pie chart represents the key governance factors that intersect with FLR, with the whole process being iterative as demonstrated by the 6 pairs of two-way arrows. Finally, all of these governance factors operate at different scales, from local to international

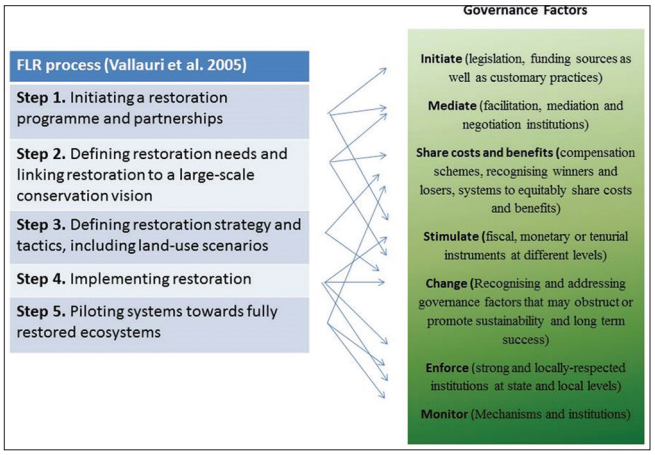

Figure 3

Key elements related to governance along the FLR process (note that only some links are noted here for illustrative purposes)

landscapes through forest restoration further alters these already complex systems. Governance contributes to providing the enabling conditions whereby large-scale forest restoration can be implemented successfully. Importantly, different governance factors intervene or are more prominent at different stages in the FLR process. While there is a need to use tools to assist in the diagnosis and monitoring of governance to support forest restoration in landscapes, it is also important for practitioners to better understand at each step in the process, how they can influence governance through their projects/programmes, funding and actions, and also how they can use specific tools (for example, mediating tools) to achieve desired outcomes, as well as how they can ensure that governance is used to effectively monitor and regulate the restoration outcome on the landscape.

Through this article, it can be concluded that existing landscape governance and forest governance frameworks do not provide the flexibility needed for supporting forest landscape restoration work as they are not relevant to a process, but rather to a sector, area, or system. Also, currently most large-scale restoration projects recognise the importance of governance but tackle it in an ad hoc and incomplete manner. There remains a need to develop concrete tools to address and support governance at different steps along the way towards restoring forest landscapes. As a first step, this article is intended to help structure practitioners' thinking and planning for tackling governance in large-scale forest restoration efforts, while recognising that some governance factors may be beyond the scope of a project. Rather than focusing on a framework to assess, review or diagnose governance, a classification is proposed that characterises the ways in which governance interlinks with the different stages in the forest landscape restoration process with a view to providing practitioners with a useful means to integrate governance in their FLR projects or programmes.

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LIST OF APPENDICES

Appendix 1

Some governance factors considered in a selection of large-scale restoration projects

Project	Objective (and scale)	Stakeholders	Institutions	Policies	Tenure & rights	Financing
PRESENCE (Northern Cape, South Africa)	To mainstream and institutionalise restoration as a socially desirable, economically feasible and ecologically acceptable multi-functional land use. (~150,000 ha within a 28,800,000 ha landscape)	Farmers; International stakeholders (e.g., the Dutch Ministry of Agriculture, Nature and Food Quality (LNV)); Government (South African Department of Water and Environmental Affairs (DWAE); the Working for Water (WfW) and Working for Wetlands (WfWe) programmes ; Eastern Cape Parks Civil Society: WWF South Africa, EarthCollective and Living Lands; Research institutes (e.g., Nelson Mandela Metropolitan University) Companies (e.g., Coca Cola).	Engaging governmental institutions in restoration through existing and new forms of governance arrangements; empowering local stakeholders and communities for restoration; catalysing new partnerships across various countries, institutions and disciplines; agreeing on new collaboration arrangements between programme partners. Implementing agencies bid for tenders to restore farmers' land.	Favourable: 'WfW' policy is providing funding. Government pays a percent of the restoration effort. Obstacles: Environmental impact assessments (EIAs) are required for any restoration work which can be lengthy, costly and complicated. Some contradictory policies such as the need to clear alien species along riparian zones but then inability to restore these areas once they have been cleared.	Part owned by farmers and part by the government.	Funding is made available by the S. African government. 'WfW' policy is providing EUR 120 million for restoration.

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Appendix 1

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Forestry and Ecological Restoration Project in Three Northwest Provinces (China)	To restore degraded and barren forest land in Gansu, Shaanxi, and Xinjiang with a focus on assisting: (i) households to turn degraded and barren forest land into economic tree crops, and (ii) state forest farms (SFFs) and forest stations improve ecological forestry development and management. (economic tree crop development: 38,000 ha; ecological forestry: 300,000 ha)	Department of Finance, the Forestry Department, and the Provincial Development and Reform Commission. State Forest authority (SFA) and the forestry departments of the three participating provinces together with the county forestry bureaus. The three participating provinces, including counties. Forest farms, farmers, and counties. Ethnic minority groups live in the five project counties of Xinjiang.	The national project management office (NPMO) is under the leadership of a director from SFA. A Provincial Project Management Office (PPMO) is maintained in each provincial implementing agency to organise, manage, and monitor project implementation activities. The PPMOs are units within the provincial forest department. Promotion of public-private partnerships in Shaanxi.	Favourable: National target to increase forest cover. Reform of collective forest land tenure, to allocate forest rights to households and individuals; Reform to accelerate the development of SFFs by defining and classifying forest resources as economic and ecological resources; Reform to develop capacity to support reformed forestry institutions.	Depending on province or county, ownership lies either with forest farms (plantations) or with farmers' associations or individual farmers. Land ownership is often collective community land. Associations or cooperatives are set up to manage these lands. Some farmers are allowed to rent their land out to such cooperatives.	State funding Funding from ADB and the GEF
Wonegizi Community-based REDD + pilot project (Liberia)	To ensure the long-term conservation of Wonegizi forest reserve, its biodiversity and ecosystem services, by empowering rural communities to fulfil their rightful roles in sustainably managing forest resources, to improve their livelihoods. (37,000 ha.)	Twenty Ziama Clan communities. Approximately 7,000 people, mostly illiterate. Mainly farming community. Forest service (FDA).	Ancestral tribal institutions. Communities take decisions. Village elders and women groups. Community forest management committees (CFMCs) developed recently by a local NGO (SADS). Each village has two members on the CFMC. CFMC act as the 'eyes and ears' of the community, and go-between with the forest administration; more like a community monitoring and liaison force. The project envisages a 'Trust Board' that would be like a steering committee for Wonegizi.	Favourable: Community rights law; Forest reform law – focuses on benefit sharing and supporting communities to access forest benefits. New land law (draft) - raises traditional rights to full ownership (titling). Obstacles: Promotion of the plantation sector and a big drive towards commercial agriculture (notably oil palm). Generally the country has used a development model that focuses on exploitation of natural resources. Lack of coordinated land use planning.	For the protected area, the community would be co-manager but the state would remain the owner. User rights organised according to rules developed by the community over time. Customary ownership is not subject to any higher title; customary land is used to the exclusion of other communities.	Norwegian bilateral funding. Eventually, payments for ecosystem services.

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Khasi Hills REDD + Project: Restoring and Conserving Meghalaya's Hills Forests through Community Action (Meghalaya, India)	To slow, halt and reverse the loss of community forests by providing institutional support, new technologies for forest management and financial incentives to conserve existing old growth community forests while regenerating degraded forests. (27,139 ha (landscape) of which 5,947 being restored).	62 villages from 10 communities/districts. Very literate community. The main occupation of all target groups is agriculture. Women self-help groups receive carbon money to develop income-generating activities.	Sub-watershed federation re-grouping 10 districts created to ensure a common voice, representation at higher levels, a common strategy, financing etc. Those leading it are respected by the community. Project area is divided into 18 micro-watersheds and for each there is a local working community which deals with technical aspects (e.g., thinning) and each has a community facilitator. Community forests are managed for the benefit of the entire community including strict conservation of sacred forests, as well as multiple use in production forests. Decision-making is mainly through indigenous community structures such as durbars (village council) and himas (cluster of villages).	Favourable: Inclusion of the area under the Sixth Schedule Area within the government constitution which means that Autonomous District Councils are responsible to manage the forest. Obstacles: Restriction by the Indian government on receiving funds from abroad. Corruption. International policies towards REDD.	Land/forest is divided as: 1) village forest land, 2) private and 3) clan forest land. Forest is divided as production, protection and sacred forest. Less than 10% of the state's forests are under the Government of India and the State Forest Department, and these are largely national parks and wildlife sanctuaries, while the remaining 90% are held by communities, clans, and families.	Initial grant of GBP 100,000 from the Waterloo foundation. Carbon credits started coming in in 2012 (25,000$/y). Belgian Reforest organisation to plant 500,000 trees. Payments for ecosystem services.
Fandriana-Marolambo (Madagascar)	Working with local stakeholders to restore goods, services and authenticity of the landscape's moist forests to support local development and secure biodiversity conservation. (Landscape of 200,000 ha but restoration area is about 6,000 ha)	Forestry authority Local communities. Community councils. Non-governmental organisations (Madagascar national parks, Durrell Institute, WWF)	Land-use plans include zoning which looks at restoration and is led by the forestry administration, WWF and the Madagascar National Parks with the endorsement of local communities. Incentives for communities to restore via technical support, seedlings and direct funding (1/4 dollar per plant).	Favourable: The decree to create a restored belt (« décret de création de périmètre de reboisement et de restauration »). Requirement for a land-use plan Two out of six fundamental principles in Madagascar's forest policy are favourable to restoration Obstacles : No specific and comprehensive policies on restoration. Tenure certificates recently created facilitate land appropriation. Poor support by local authorities and forestry administration. Corruption.	Traditional appropriation of degraded land by farmers. Local communities can exercise use rights on the area. Communities having restored areas claim the land as theirs - which is contested by the forestry administration but accepted by the « service des domaines » (land registry services).	NGO funding. Dependence on external aid. Lack of funding.

Note: The categories for the columns in this table are adapted from WRI (2009) and Mansourian et al. (2014)