Implementing forest landscape restoration in Latin America: stakeholder perceptions on legal frameworks

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Abstract

Legal frameworks could play a key role in enabling countries to meet their ambitious forest landscape restoration (FLR) targets. In this paper, we examine the perceptions of different types of stakeholders from 17 Latin American countries on aspects of forestry and environmental legal frameworks that enable or hamper FLR interventions at the national level. We first reviewed general, environmental, social and financial aspects of existing legal frameworks in order to provide the basis for a mixed qualitative–quantitative analysis of perceptions. The analysis combines information from semi-structured interviews and a Likert-scale questionnaire given to relevant stakeholders involved in implementing FLR interventions in the countries assessed. We interviewed stakeholders from government, academia, national non-governmental organizations (NGOs) and local private and non-governmental organizations. We found that most legal frameworks are in the jurisdiction of either the agriculture or the environmental sectors. As a whole, we did not find evidence of the kind of legal frameworks articulation needed to enable the coordinated deployment of various forest FLR interventions across landscapes. We found efforts in Brazil, Colombia, Guatemala, Costa Rica, Ecuador and Mexico to improve cross-sectorial communication and legislation, and to develop innovative financial mechanisms to support FLR interventions. In general, interviewees had a positive perception of the content of legal frameworks in their countries; however, they highlighted weak implementation capacities, insufficient funding, sectorial and social conflicts, and lack of transparency as key impediments for policy implementation. Academic and NGO stakeholders perceived the content of the legal frameworks more negatively, whereas government officials were more positive. Different perceptions and the prevalence of cross-sectorial conflicts highlight the importance of efforts aimed at improving governance mechanisms and policy integration in the region. In addition, a targeted effort is needed to develop long-term, funding options that are public, private or mixed, and to disseminate information on the importance of FLR interventions for national economies and human well-being. We consider our results as a preliminary overview of the legal environment for FLR implementation in Latin America.

Keywords: forest governance; legal frameworks; forest and landscape restoration; social perceptions.

1. Introduction

Forest Landscape Restoration (FLR), a term coined in the early 2000s (Laestadius et al. 2015) is 'the long-term process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes'. FLR occupies center stage in current global discussions on natural resource sustainability, climate change mitigation and adaptation, livelihoods, and biodiversity conservation (Canadell and Raupach, 2008; Wilson and Calaganan, 2016). In this context, FLR implies that a suite of different land uses (hereafter called 'FLR interventions') ranging from conservation of natural forest cover to commercial tree plantations, coexist within a multifunctional landscape (Laestadius et al., 2015; Aronson et al., 2017).

The Bonn Challenge, launched in 2011, is a global effort to implement FLR interventions. To date, 58 national and subnational governments have committed to restore about 170 million hectares of degraded or otherwise deforested lands by 2020 (IUCN, 2018). In Latin America, these pledges are supported by Initiative 20×20, which brings together governments, investors, researchers and practitioners for the restoration of over 50 million hectares (WRI, 2018). Despite such commitment and support, the ability of countries to implement FLR interventions is partially contingent on enabling legal frameworks that can promote such interventions as well as connect national and international restoration aspirations (Meli et al., 2017).

Legal frameworks worldwide have been found to promote the implementation of various FLR interventions, from biodiversity offsets in Colombia (Murcia et al., 2017b) to riparian buffers in Brazil (Aronson et al., 2011; Chaves et al., 2015; Brancalion et al., 2016). In China, India and Vietnam, effective regulatory institutions have contributed to increased forest cover (Barbier and Tesfaw, 2015). In Mexico and across Central America, policies concerning payment for ecosystem services and community forestry have also promoted enhanced forest cover (Min-Venditti et al., 2017). Nevertheless, the multidimensional nature of FLR, with its social, economic and environmental goals (Sabogal et al., 2015), requires that legal frameworks – and the institutions that implement them – become articulated at both national and local scales. One key challenge is that governments regulate activities at jurisdictional levels, whereas landscapes are loosely defined based on their biophysical (e.g. a watershed) and social features (e.g. a traditional community territory). This means that FLR implementation requires the integration of policies, institutions, and relevant stakeholders beyond a single jurisdiction. Multistakeholder arrangements are needed to negotiate the 'where', 'what', and 'why' of different interventions, so that potential conflicts can be accounted for and benefits can be evenly distributed (Guariguata and Brancalion, 2014; Mansourian, 2016; Djenontin et al., 2018; Riggs et al., 2018).

In this study, we reviewed general, environmental, social and financial aspects of existing forestry and environmental legal frameworks, and gathered the perceptions of various stakeholders across seventeen Latin American countries on the legal frameworks as a way to understand the role of current policies in either hindering or enabling FLR interventions and to identify opportunities for improvement. As such, we focused on existing legal frameworks, even if these predated current FLR initiatives, such as the Bonn Challenge. Recent reviews have identified national and regional constraints and opportunities for implementing FLR in the Latin American region (Méndez-Toribio et al., 2017; Murcia et al., 2017a); our analysis complements these efforts by providing a broader overview of the legal environment based on perceptions of relevant stakeholders across several countries.

2. Research design and methodology

Our study focuses on Spanish- and Portuguese-speaking countries in mainland Latin America. Across these countries, we analyzed the content of current forestry and environmental legal frameworks that legislate a variety of FLR interventions (e.g. conservation, restoration, natural regeneration, agroforestry, commercial silviculture and forest management), and gathered the perceptions of various stakeholders regarding the content and factors that affect the implementation of the legal frameworks in each of the countries. Note that the socio-political landscape in Latin America is very dynamic (Rich et al., 2019); therefore as our research was conducted in 2017, these results reflect the situation at that time.

2.1 *Content of legal frameworks regulating forest cover management*

We classified the legal frameworks based on which government sector was responsible for implementation. For each legal framework we also assessed specific regulations, plans and decrees that support policy implementation (hereafter referred as 'supportive frameworks'). We searched for a series of pre-determined terms related to general, environmental, social or financial aspects to review the legal frameworks in a systematic and replicable manner (Bryman, 2008) (**Table 1**). That is, we reviewed a given framework (and its supportive frameworks) and documented the terms being mentioned. We then counted the number of legal frameworks that mentioned a given term and reported its total frequency of appearance. Given the broad geographical scope of this analysis, we acknowledge that this is a preliminary attempt at evaluating forestry and environmental legal frameworks as they relate to FLR implementation in Latin America. Although we analyzed legal frameworks at the country level, we also acknowledge this offers an incomplete picture in decentralized countries; however, detailed subnational analyses were beyond the scope of our work.

2.2 *Perceptions of legal frameworks*

To analyze stakeholder perceptions, we used a mixed qualitative–quantitative approach combining information from semi-structured interviews and a Likert-scale questionnaire. We conducted the interviews between January and August 2017 with stakeholders from all of the countries where we evaluated the legal frameworks in section 2.1 (except Nicaragua, for which we did not receive replies from those contacted). We identified interviewees primarily based on our own contacts, followed by snowball sampling (Gentles et al., 2015). This selective sampling guaranteed that interviewed stakeholders were active in the FLR agenda of their respective countries.

Semi-structured interviews (e.g. Lewis-Beck et al., 2004; Padgett, 2017) aimed at gathering informed perceptions from relevant stakeholders on the content of the legal frameworks and on aspects related to their implementation (**Table 2**). Interviews were open-ended in order to allow interviewees to further elaborate on their perceptions and reshape questions as needed (Lamarque et al., 2011; **Table S1**). We interviewed stakeholders working in the government (at national and subnational scales), NGO stakeholders (including those working at both national and international scales), academics (including those working in research institutions and universities), and local stakeholders (including those in small local NGOs, businesses and environmental consultancies). (**Table S2**)

We used the software MAXQDA (VERBI, 2014) to transcribe, code and analyze interview data. We coded responses based on the predefined leading themes of the interview questions (**Table 2**). We complemented our predefined coding through open coding, which was based on the analysis of word frequencies used to identify concepts or key terms that could constitute emerging ideas beyond the themes predefined in the study.

Policy content	Terms
	General
Motivation	Forest management, environmental management, biodiversity conservation, commercial reforestation, climate change mitigation, ecosystem service provision, protected areas management, water conservation
Accountability	Fines, penalties, imprisonment
	Environmental
FLR interventions legislated	Silviculture, agroforests, restoration, natural regeneration, forest conservation and forest management
Species origin	Native, exotics, mixed
Target area	Riparian forests, mountain tops, slopes, headwaters, degraded pasturelands, forested areas
	Social
Target social group	Local communities, small-scale landholders, indigenous groups
Communication mechanism	Capacitation workshops, rural extension, information platforms, communication
	Financial
Incentives	Credit lines, non-refundable funding, payments for ecosystem services, tax incentives

Table 1. Policy aspects and terms searched for during the content analysis of various legal frameworks in mainland Latin America

The application of the Likert-scale questionnaire was twofold: (i) as a quantitative approach to be complemented and interpreted based on the interviews; and (ii) as a means to corroborate answers collected through the semi-structured interviews. Interviewees assigned their degree of agreement to a series of affirmative sentences (**Table S1**). We used a 1–7 scale to value the level of agreement, where 1 meant 'total disagreement' and 7 meant 'total agreement'. The sentences in the questionnaire corresponded to the themes used in the interview (**Table 2**). As with the content analysis of the legal frameworks, and for clarity, we separated legal frameworks regulating forestry interventions from those regulating environmental interventions. We linearly transformed the 1 to 7 scale to a -1 to 1 scale, whereby -1 corresponds to total disagreement and 1 to total agreement. We then performed Kruskal-Wallis tests to detect differences across stakeholder groups.

	Theme	Subtheme	Description
Content	(1) Institutional structure	–	Official institutions in charge of implementing
	(2) Legal frameworks	Motivation and transparency	Main objectives of legal frameworks Clarity of legal framework regarding objectives, rights and duties regulated Presence of plans, regulations, decrees and other frameworks that support implementation of the law
		Incentives	e.g. credits, payments for ecosystem credits
		Accountability	e.g. obligations and penalties considered
Aspects affecting implementation	(3) Capacities	Institutional	Institutional capacity to implement and enforce the regulations
		Infrastructure	Infrastructure to implement and enforce the regulations (e.g. roads, tree nurseries)
		Technical	Intellectual and information capacity within the institutions
		Social	Other institution types, for example, social organizations involved
	(4) Conflicts	Interest	Cross-sectorial conflicts of interest concerning duties and regulations related to land management
		Social	Social conflicts in general (e.g. land tenure, indigenous rights)
	(5) Implementation transparency	–	Monitoring of actions implemented

Table 2. Semi-structured interview themes to assess stakeholders' perceptions on the content and on aspects that affect the implementation of legal frameworks legislating FLR interventions

3. Results

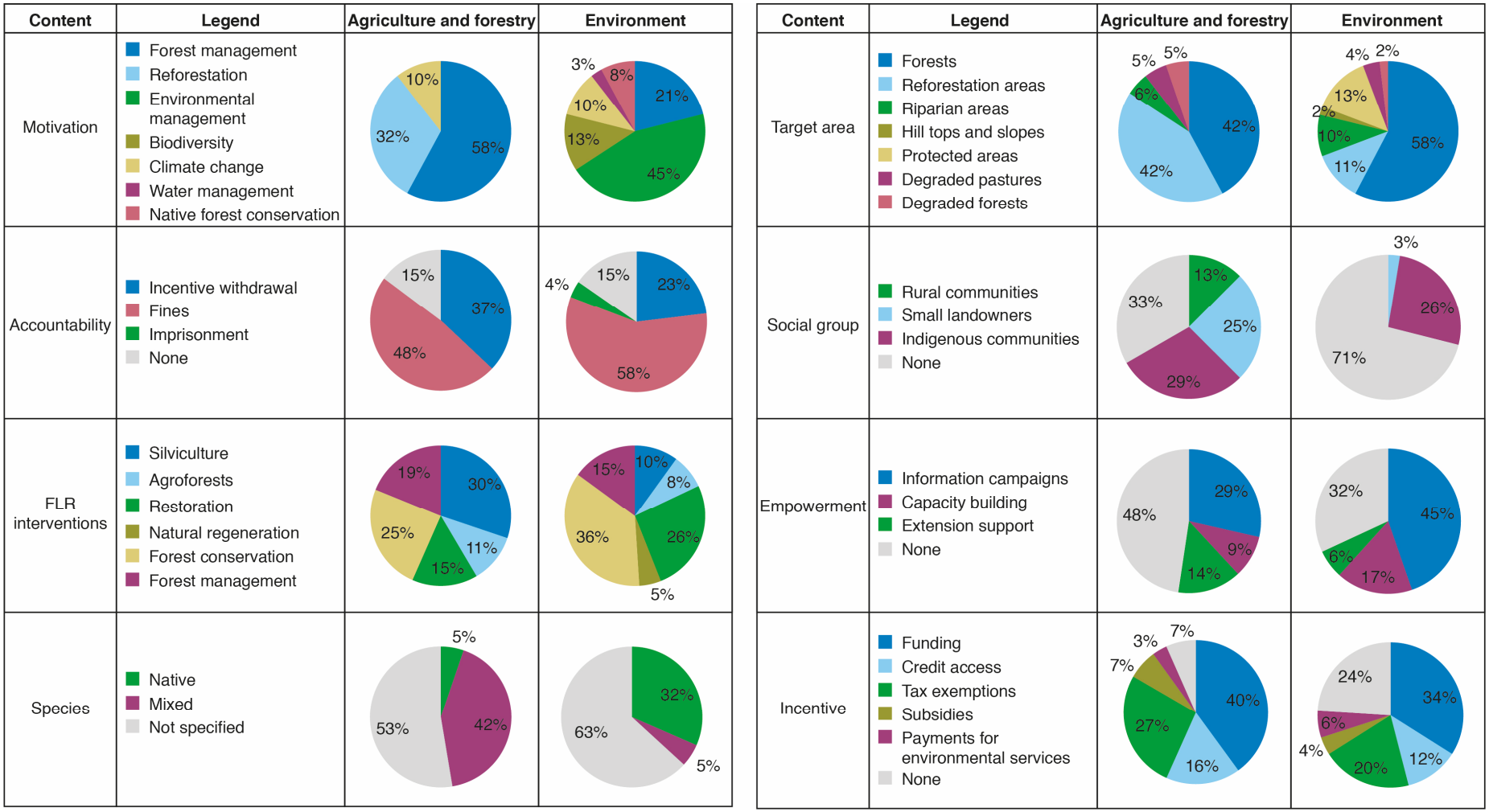
3.1 *Content of legal frameworks regulating forest cover management*

We analyzed a total of 60 legal frameworks, plus their supportive frameworks, regulating different FLR interventions across 17 Latin American countries (**Table S3**). Twenty frameworks fall under the responsibility of the agricultural sector (i.e. ministry of agriculture) while forty fall under the responsibility of the environmental sector (i.e. ministry of environment). A few recent legal frameworks on climate change mitigation and adaptation fall under the responsibility of more than one sector, mostly including the two mentioned above. Below we further compare aspects of the content of forestry and environmental legal frameworks.

The main motivation of legal frameworks falling under the ministry of agriculture related to the regulation of commercial forestry interventions (hereafter called 'forestry legal frameworks'), and thus they focused on the management of natural and planted forests. On the other hand, frameworks linked to the environmental ministry contained a wider variety of stated motivations, including biodiversity conservation and climate change mitigation (**Figure 1**). We found that most legal frameworks reviewed have regulations, plans and decrees to support their implementation, and most establish accountability measures for policy enforcement, mainly in the form of fines or withdrawal of concessions (**Figure 1**). That said, Brazil is the only country with a command-and-control legal framework to promote the recovery of native vegetation on private lands.

Both forestry and environmental legal frameworks legislate for a variety of restorative interventions. However, forestry frameworks mentioned silvicultural activities more often than environmental frameworks. In environmental frameworks, we found a slightly higher presence of the term 'forest restoration' as an action being legislated for. Most legal frameworks, regardless of the responsible sector, did not specify species origin (i.e. native or exotic) for planting purposes (**Figure 1**). Both forestry and environmental frameworks mentioned native forests and reforestation areas (whether degraded or not), as a target for policy implementation. In addition, environmental frameworks usually legislate protected forest areas.

Forestry legal frameworks included clauses on the differential application of legislation for certain social groups, mainly indigenous groups and small landholders. Environmental legal frameworks mostly distinguished indigenous groups (**Figure 1**). The majority of forestry frameworks did not consider a policy communication mechanism, whereas almost half the environmental frameworks included a mandate to hold information platforms. On the other hand, forestry frameworks were more likely to consider incentive mechanisms (mainly funding options) than environmental frameworks. Colombia, Costa Rica, Guatemala and Mexico were the only countries with incentive mechanisms for the implementation of environmental forest restoration, in the form of subsidies and payments for environmental services.



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183 **Figure 1.** Percentage of forestry and environmental legal frameworks that contained the different terms used to review the policy content

3.2. Perceptions on legal frameworks content and implementation

We interviewed 79 stakeholders from 16 of the 17 countries covered in the analysis. Thirty five percent of stakeholders were from academia, 33% were from government, 17% were local stakeholders and 15% were from NGOs. Countries were unequally represented in the final sample, with most interviewees being from Brazil (11), Mexico (11), Argentina (10) and Colombia (10). We highlight three main points: (i) in general, interviewees disagreed more when Likert statements related to environmental legal frameworks [-0.20; 0.24] than when they related to forestry frameworks [-0.10; 0.23]; (ii) differences were higher between government stakeholders and the other stakeholder types (**Figure 2 and 3**); and (iii) differences among stakeholder types were higher for statements on implementation (**Figure 3**) than for statements on content of the legal frameworks (**Figure 2**). Next, we elaborate on these points, complementing them with information from the semi-structured interviews.

Interviewees agreed on the existence of reasonable legal frameworks, institutions and funding mechanisms regulating and supporting forestry (commercial) and environmental FLR interventions in their countries.

> *There are enough legal frameworks … I don't see the need for more.* (**Government, Brazil**)

> *The governmental structure is quite 'rich' in institutions.* (**NGO, Colombia**)

In some countries, interviewees mentioned the existence of decentralized institutions that support the mandates of both the agricultural and the environmental sector. Examples include the Mexican National Commission for the Knowledge and Use of Biodiversity (CONABIO, Spanish acronym), the Bolivian Forest and Land Audit and Social Control Authority (ABT), the existing coordination between the Chilean National Forestry Corporation (CONAF) and the Forestry Institute (IF) merging forestry management with research, and the National Agricultural Technology Institute (INTA) in Argentina that works with rural extensionists.

Even with the existence of relevant institutions and legal frameworks that can support FLR interventions, interviewees (except government stakeholders), did not perceive legislations as overly clear. This was particularly true for environmental legal frameworks, which interviewees found to be conceptually confusing and not specific enough to promote FLR interventions (**Figure 2**):

> *People [who are] not well informed find the laws confusing … they are too 'generic', they should be more accessible for a common reader.* (**Academic, Brazil**)

> *The law talks about environmental restoration but does not explain it … the law is not clear on where the priority areas to invest in restoration are …* (**Academic, Argentina**)

In addition, local stakeholders and academics also mentioned the existence of sectorial conflicts in either the levels of funding attributed to the different institutions or their mandates. As the following quote illustrates:

> *[E]nvironmental ministries always have fewer resource*s. (**Academic, Argentina**)

Interviewees mentioned that legislations with opposite mandates can overlap in a given territory, leading to conflict. The following quotes illustrate this:

> *The main difficulty of the application of the law … is that there are latent overlaps between institutions in carrying out certain actions linked, for example, to reforestation.* (**Academic, Paraguay**)

> *There are some conflicts between the environmental and agriculture ministries, and thus the law has not been implemented.* (**Local, Brazil**)

Basically in Bolivia the agrarian vision and the forestry vision have always been divorced. (**Government, Bolivia**)

Nevertheless, as the quote below illustrates, interviewees from Guatemala, Brazil and Argentina mentioned incipient efforts aimed at diminishing the traditional division between the agricultural and environmental sectors.

[I]n 2015 a multi-ministry board was set up; a joint table between the Ministry of Agriculture and the Environmental Secretary to develop a joint work plan to address some conservation matters … from the table a program called 'Forest Management with Integrated Livestock' came out. It is necessary to better operationalize it, but it is already working in the territory in some way." (**Government, Argentina**)

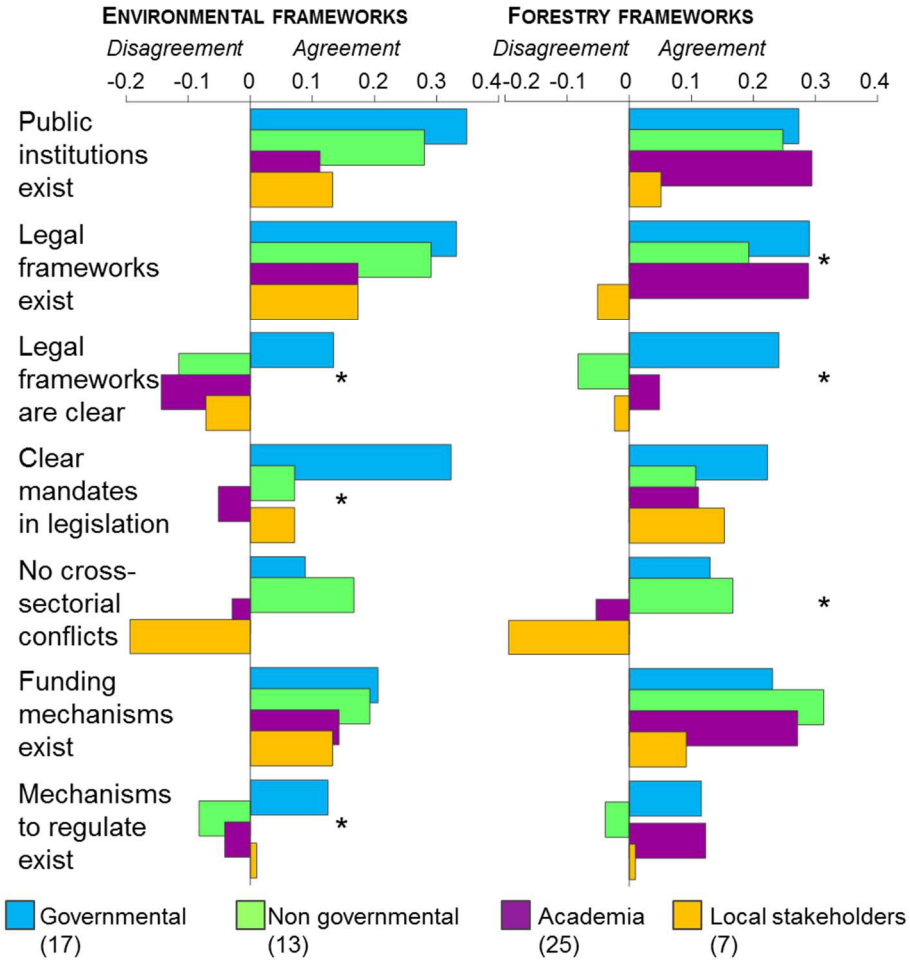

Figure 2. Agreement level of four types of stakeholders in relation to affirmative sentences about the content of legal frameworks regulating FLR interventions across 17 Latin American countries. Local stakeholders represent private and non-governmental organizations working at subnational scales. Asterisks indicate statistical significance at $P<0.05$ from Kruskal-Wallis tests for differences among stakeholder groups. Agreement can potentially vary between -1 (full disagree) and 1 (full agree), however, the figure shows the actual range occupied by the responses.

Most interviewees agreed on the existence of funding mechanisms (as part of the legal frameworks) to support the implementation of FLR interventions. Those mentioned are

subsidies, lines of credit, and payments for environmental services, among others. All these mechanisms are being implemented, and stakeholders perceived they are having positive impacts.

Regarding aspects that affect the implementation of the legal frameworks, all stakeholders agreed that insufficient financial resources, weak institutional and technical capacities, conflicts of interest among social stakeholders, low availability of technology and infrastructure, and land tenure issues were all affecting implementation (**Figure 3**). They perceived there are still insufficient human and financial resources for policy implementation, and an unequal distribution of funding across different sectors of society. Interviewees perceived that large-scale landholders traditionally benefit more from governmental subsidies than smallholders. Small-scale rural landholders often cannot apply for funding sources without external support. The following quotes illustrate these issues:

> *[The] rural population … is more vulnerable and is victim of institutional and governmental disorder and corruption. Local producers have no interest in conservation; they do not receive any incentives.* (**Government, Colombia**)

> *There are sectors that do not agree, given that the law benefits the big and medium producers but not the small ones, who do not receive any benefit*. (**Academic, Paraguay**)

Local stakeholders and academics always disagreed with statements for both legal framework types (i.e. environmental and forestry) (**Figure 3**). In addition, local and academic stakeholders also perceived that the implementation of legal frameworks is not fully transparent. Stakeholders from these sectors also mentioned the existence of corruption and pressure on public institutions from the productive sector, as well as weak institutional capacities, as aspects that limit the impact of the legislation and the ability to monitor Implementation. The quote below illustrates this:

> *It is quite difficult get access to good environmental information about what is happening in the territory … it is almost impossible.* (**Academic, Argentina**)

Perceptions on social issues also showed important differences. Government and NGO stakeholders agree that society, in general, is empowered to affect legislation, and that people legitimize the current legal frameworks. The following quote exemplifies this:

> *There is good receptivity among the people, since this was an open process where there was social consultation … (**Government, Guatemala**)*

On the other hand, locals and academics mostly disagreed with these aspects:

> *… [The] producer is quite suspicious; he believes that the legislation will not be enforced and he can drag his feet.* (**Local, Brazil**)

> *Producers have a better perception of the rural extension agent than of the government … They see the government as the organism that will fine them for not complying with the law …* (**Academic, Brazil**)

Stakeholders from different countries highlighted different factors limiting implementation of the legal frameworks. For instance, stakeholders from Chile perceived that legal frameworks regulating commercial forestry plantations of exotic species had been more effective in achieving their objectives than those currently regulating native forest management. In Bolivia, Paraguay, Venezuela and Uruguay, stakeholders perceived that forest conservation and restoration were not current government priorities.

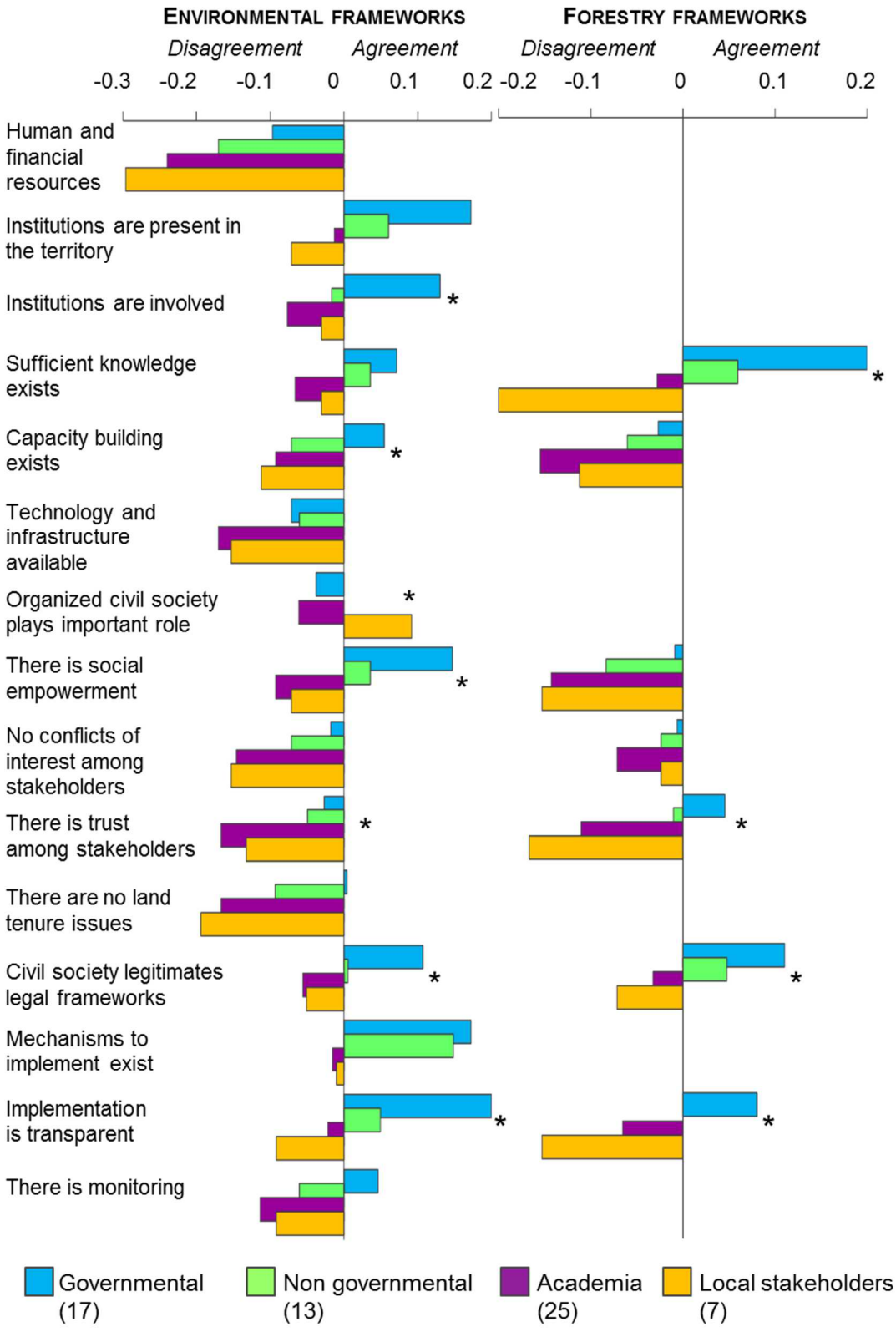

Figure 3. Agreement level of four types of stakeholders in relation to affirmative sentences about the implementation of legal frameworks regulating FLR interventions across 17 Latin American countries. Some themes did not apply to forestry frameworks so are left blank in the figure. Local stakeholders represent private and non-governmental organizations working at

subnational scales. Asterisks indicate statistical significance at $P < 0.05$ from Kruskal-Wallis tests for differences among stakeholder groups.

4. Discussion

We found Latin American countries have longstanding and binding legal frameworks that regulate a variety of FLR interventions, with commercial forestry falling usually under the responsibility of the ministry of agriculture and environmental forest restoration under the ministry of environment. Overall, stakeholders interviewed had positive perceptions around the content of the legal frameworks, but expressed more negative perceptions around implementation.

Positive perceptions on the content of legal frameworks may denote progress on environmental legislation in the region. Brazil's 2012 revision of the Native Vegetation Protection legislation, for example, included innovative compliance mechanisms such as the Rural Environmental Registry, which, although it presents challenges in terms of verification (Soterroni et al., 2018), allows the current extent of forest degradation on private properties to be known (Brancalion et al., 2016). The content assessment conducted showed that Brazil, Colombia, Costa Rica, Ecuador, Mexico and Guatemala have diversified their environmental legal frameworks to specifically legislate on issues such as climate change and restoration. Interviewees from these countries perceived the diversification of legal frameworks as a positive sign that governments in these countries support FLR interventions – a result in line with a recent review of National Forest Restoration Plans in the same countries (Méndez-Toribio et al., 2017).

Despite observed progress on environmental legislation, we found a prevailing division between productive and environmental FLR interventions. Most legal frameworks that exist in the countries assessed fall either under the sector of agriculture (for forestry-related actions), or under the environmental sector (for environmental interventions). This division was also highlighted by interviewees who, when first approached for our interview, clearly treated productive FLR interventions as separate from environmental restoration. This division has been cited in the literature as problematic for the operationalization of the FLR concept that contemplates ecological and economic goals from landscape restoration (Sabogal et al., 2015). The need for policy integration across sectors and jurisdictions to support FLR is critical. Our results show a prevailing cross-sectorial division, yet also indicate some level of improvement. Climate mitigation frameworks in Brazil, Guatemala and Mexico may minimize sectorial divisions by placing both forestry and environmental sectors as responsible for policy implementation and enforcement. These countries created cross-sectorial platforms as spaces for communication and policy harmonization where agreed-upon strategies for FLR interventions may be found. The 'Mesa de Restauración del Paisaje Forestal' in Guatemala and the 'Commission for the Recovery of Native Vegetation (CONAVEG)' in Brazil are examples of this.

The motivations of traditional forestry and environmental frameworks, which, as **Table S3** shows, still dominate the policy arena of land management in Latin America, differ. Forestry frameworks mostly mention a focus on forest management and reforestation, whereas environmental frameworks have a wider array of motivations. However, in terms of FLR interventions being legislated, both forestry and environmental legal frameworks mention a variety of interventions from silviculture to forest restoration, and both types of legal frameworks target mostly the same areas: forest ecosystems, whether degraded or not. The differences in motivations – yet the similarity in actions legislated and areas targeted – show a prevailing division, but also signal opportunities for integration. Beyond the need for new and specific FLR legal frameworks, we believe the integration of current frameworks can provide

the required legal support for FLR, contingent upon better policy and sectorial integration plus effective governance platforms for implementation.

Despite the perceived sufficiency of existing legal frameworks, we found that FLR interventions with potential for achieving ecological (i.e. Poorter et al., 2016) and/or socioeconomic goals (such as agroforestry and natural forest regeneration) are seldom mentioned in either forestry or environmental legal frameworks. Increased inclusion of all plausible FLR interventions in legal frameworks can better support multifunctional landscapes that optimize both environmental and socioeconomic objectives. Natural forest regeneration, for example, is known to be a low-cost, ecologically efficient restoration approach (Crouzeilles et al., 2017), with high capacity to recover biomass and biodiversity. Although natural regeneration is happening across Latin America as part of a forest transition (Nanni et al., 2019), it could be more explicitly included in the legislation on environmental management. The absence of specific laws − or the existence of ambiguous ones − protecting second-growth forests may compromise their persistence in human-modified landscapes (Vieira et al., 2014; Reid et al., 2018).

The forestry frameworks analyzed here mentioned more incentives for the implementation of productive FLR interventions than environmental frameworks did for the implementation of environmental interventions. This result agrees with the perception of most interviewees that public funding for certain FLR interventions exist, but it is still insufficient for environmental interventions. This result further evidences the prevalence of a productive bias in land use management across countries, and the traditional division between the production and conservation sectors. Interviewees in general, but mainly locals and academics, highlighted the prevalence of conflicts between productive and environmental government sectors as a challenge for the integration of different legal frameworks in the restoration of forest landscapes.

In some cases, frameworks regulating FLR interventions with environmental purposes emerged from countries with long-standing forestry traditions, as in the case of Chile and Brazil. In recent decades, Chile incentivized large-scale pine plantations; whereas current legal frameworks incentivize the protection, restoration and sustainable management of native forests (Reyes and Nelson, 2014). Interviewees from Chile, however, expressed that incentives for native forest management are not as attractive for rural landowners as those given to forestry companies in the past. In Brazil, difficulties regulating the commercialization of native species significantly affected the success of a large-scale forest restoration project (Ball et al., 2014). Such perspectives warrant the revision of current incentives for native forest protection, native forestry and restoration to make them more attractive. Expansion of commercial tree plantations in countries like Chile and Brazil was promoted by a clear plan, based on the development of professional capacities (e.g. creation of the first undergraduate and graduate courses, and of the first research centers on forestry), as well as attractive credit lines maintained by public subsidies. FLR has the potential to grow as an economic intervention via agroforests or native and mixed-species silviculture (Brancalion et al., 2017), but this needs political support that targets different sizes of land holdings.

Despite the inclusion of special funding lines for smallholders and indigenous communities in some legal frameworks, interviewees emphasized that these sectors of society are still marginalized, as they often cannot access fiscal incentives or are affected by unclear tenure rights that deny them access to funding or credit lines. This finding highlights, on one hand, the importance of rural extension agents as stakeholders that can support small landholders and indigenous groups in their applications for funding, thus fostering their engagement in FLR interventions; on the other hand, it underscores the reality of prevailing land tenure conflicts among marginalized societal groups. The financial instruments that support the implementation of FLR interventions are usually oriented to landowners. However, in Latin

America the diversity of social contexts is much broader than simple private holdings, and current mechanisms fail to consider this diversity. Interviewees raised this issue as being particularly critical for indigenous communities. Secure land tenure is a key attribute in promoting sustainable land use practices and FLR interventions (Kozar et al., 2014; Djenontin et al., 2018; Higgins et al., 2018), with tensions between formal and informal land tenure regimes viewed as an obstacle to forest restoration in the tropics (Mansourian, 2017). This topic deserves further research, to assess how to include various forms of tenure in legal frameworks promoting FLR.

Stakeholders perceived that technology and infrastructure and, to a lesser extent, institutional and human capacity weaknesses, negatively affect the implementation of legal frameworks. All stakeholder types disagreed that there are sufficient human and financial resources for the implementation of policies and to monitor compliance. Institutional, financial and technical weaknesses have been highlighted in previous research studies as important barriers to the implementation of forest restoration and conservation, not only in the Latin American region, but worldwide (Menz et al., 2013). Vieira et al. (2014) found that the implementation of Brazilian forest legislation is hindered by bureaucracies and capacity weaknesses at the state level. Murcia et al. (2017a) highlight that current Bonn Challenge pledges exceed implementation capacities in Andean countries. Weak technical, financial and institutional capacities have been highlighted as undermining the implementation of REDD+ projects worldwide (Cadman et al., 2017). The relevance of capacity weaknesses hindering the implementation of FLR interventions shows this is a critical area to be addressed. We believe that cross-sector initiatives that involve not only NGOs, but also the private sector, can serve as platforms promoting collaborations to support and improve the capacities of public institutions.

Finally, we found that the perceptions of stakeholders differed depending on the organization where they worked. Government stakeholders perceived current legal frameworks to be clear and that mechanisms to regulate laws and norms do exist, whereas other stakeholders disagreed. Government stakeholders also perceived quite positively that there is sufficient knowledge to implement policies that mechanisms for implementation exist, and that implementation is transparent and legitimized by civil society. Yet local and academic stakeholders were mainly negative about policy implementation aspects. Such positive perceptions by government interviewees may show an obligation to respond positively, since policies are drafted by government. However, as recent research showed, it may also indicate a better understanding and awareness of policy implications by government stakeholders compared to other stakeholder types (Meli et al., 2019).

The different perceptions across stakeholder types highlight the importance of having cross-sectorial platforms as arenas where divergent perceptions can be discussed and strategies for resolving FLR trade-offs and conflicts can be found (Riggs et al., 2018). Despite some cross-sectorial initiatives in certain countries, most forest restoration interventions in the region remain largely 'top-down', initiated either by government or non-governmental organizations (Murcia et al., 2016). In addition, current multistakeholder platforms fail to include all stakeholder types, mainly rural landholders, in discussions on FLR. We believe communication across all stakeholders, at all scales, is very important and can act as an empowering mechanism for rural populations, which are often disenfranchised from decision-making on aspects that ultimately affect them the most, such as decisions over the management of landscapes they live in.

5. Conclusions

We found that, overall, interviewees felt that sufficient and clear legal frameworks for the regulation of a variety of FLR interventions do exist in Latin America. However, current legal

frameworks are not entirely clear with respect to their mandates, and they remain poorly integrated across productive and environmental sectors. FLR calls for the deployment of multiple FLR interventions, both economic and environmental, for attaining multiple socio-ecological benefits. To achieve this, policy integration is crucial, as well as the engagement of all relevant stakeholders across scales, from the national to the local. Some initiatives, such as Brazil's CONAVEG and Guatemala's 'Mesa de Restauración', constitute laudable efforts to bring sectors together into decision-making around the goal of restoration

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