Contrasting regulatory frameworks to govern riparian forest restoration in Mexico and Brazil: Current status and need for advances

Paula Meli and Pedro H. S. Brancalion
Department of Forest Sciences, "Luiz de Queiroz" College of Agriculture, University of São Paulo, Av. Pádua Dias 11, Piracicaba, SP 13418-260, Brazil.

Author for correspondence: P. Meli, pmeli@usp.br

Abstract

We contrasted regulatory instruments to govern riparian forest restoration in Mexico and Brazil. Overall, Mexico has a few regulatory instruments covering the protection and restoration of riparian buffers but no specific instrument to operationalize restoration demands, while Brazil has objective norms supporting the restoration of riparian forests. Benchmarking regulatory frameworks from other countries can be a valuable approach for supporting the governance of riparian forest restoration.

Keywords governance; legal framework; public policy; recovery; social perceptions.

1. Introduction

Ecological restoration has emerged in the last decades as a promising alternative to promote a new paradigm of socio-economic development, better integration of society with nature and with the interest of local communities. From this perspective, a restoration strategy should integrate ecological, social and legal aspects, as well as consider the costs and benefits for decision-making. This implies a need for multi-actor (i.e. involving public–private organizations and institutions) and multi-level interactions (i.e. federal, regional and local institutions), which should be facilitated and sustained by governance structures. Although many governance principles exist, legal aspects (i.e. regulatory frameworks, such as laws, instruments and norms) are central of any governance structure. Restoration regulation is yet incipient in most countries, so exploring the particularities and effectiveness of existing legal instruments is crucial for supporting the further development of regulatory frameworks for the practice of restoration. Restoration regulatory frameworks frequently target riparian buffers, given the general recognition of the importance of native forests to supply water-related ecosystem services.

Riparian forests are unique ecosystems, requiring local solutions for supporting their restoration, which includes the development of policies designed according to specific institutional, cultural, socioeconomic and ecological contexts of countries. Riparian forests

largely contribute to human well-being, harboring a high diversity of plant and animal species, as well as sustaining numerous ecological functions that derive in ecosystem services supplied at varying spatial and temporal scales. Usually, this contribution is proportionally higher to non-riparian areas they occupy within a watershed. Restoration of riparian forests results crucial in terms of biodiversity and ecosystem services maintenance, landscape connectivity and conservation of aquatic ecosystems, and has then been target as restoration priority in many countries.

Land tenure-use, regulatory frameworks, policies on agriculture and environment, economic incentives and disincentives for restoration activities, payments for ecosystem services, and mechanisms to enhance participation and collaboration of stakeholders are examples of governance variables presenting a substantial influence on the outcomes of riparian forest restoration. Regulatory frameworks have become a central element for the governance of riparian forest restoration because they may prevent the continuity of agricultural activities in these environmentally fragile areas, setting aside areas for restoration, while also establishing mandatory restoration activities to offset past degradation. Mexico and Brazil have adopted contracting governance approaches for dealing with riparian forest restoration, which are worth considering for developing more effective mechanisms in these two countries or elsewhere. Here, we contrasted regulatory instruments in Mexico and Brazil to govern riparian forest restoration and provided recommendations emerging from this case study to better integrate riparian forest restoration in future regulatory frameworks.

2. Regulatory instruments for riparian forest restoration in Mexico

Although there is no specific policy for restoring riparian buffers, regulatory frameworks exist to govern the regimes of use of these landscape portions. Article #27 of the National Constitution of 1917 determines that watercourses are submitted to a regime of public ownership, while the 1992 National Waters Law established riparian buffers as 'federal zone' and determined objective rules for their spatial allocation (riparian buffers of at least 5 m for streams with width < 5 m, and of 10 m for larger watercourses). In this legal context, all forests covering riparian buffers would constitute a public good. After defining the spatial extent of riparian buffers, the General Law on Ecological Equilibrium and Environmental Protection, established in 1988 and updated in 1996, even not mentioning riparian forest, include other legal concepts that could be applied to restore these ecosystems. It also enacted various environmental policy instruments for supporting this goal (e.g. ecological management of land). In 1994 two Official Mexican Norms (#60 and #62) complemented the regulatory framework and defined riparian vegetation as "*the vegetation that grows on or near the banks of streams or water bodies in soils that have*

certain characteristics of humidity" (it not includes wetlands), and further regulated the protection and restoration of the natural vegetation within riparian buffers. Further, the 2003 General Law of Sustainable Forest Development regulated forest management, including – but not restricted to – riparian forests, as well as considering areas where the vegetation has been partially or totally eliminated.

The aforementioned regulatory frameworks are mainly focused in the mitigation of negative impacts of land use changes on soils and water bodies, or even forests, but they are not explicitly focused on riparian forest as an ecosystem type. The General Law of Climatic Change of 2012 advanced the official promotion of restoration in the country to mitigate and adapt to climate change, including the design of policies and mechanisms for the protection, conservation and restoration of riparian vegetation of the federal zones (art. 34), in accordance with the National Waters Law. It contains also other key concepts for restoration. At first, it is the only one in the national legal system defining 'biological corridors', whose function is to maintain the connectivity of biological processes to avoid the isolation of populations. Second, it defined the National Forestry Commission as responsible for designing restoration strategies, now included in the current National Forestry Program. Overall, there are a few regulatory instruments covering the protection and restoration of riparian buffers, but no specific instrument to operationalize restoration demands. Consequently, the reach of riparian buffer restoration projects has been limited in the country, in spite of the active involvement of NGOs and local communities.

3. Regulatory instruments for riparian forest restoration in Brazil

Brazil has one of the most advanced legislation for supporting the restoration of native ecosystems in riparian buffers. Since 1934, with the enactment of the first version of the Brazilian Forest Code (Federal Decree #23,793), riparian forests were recognized as important ecosystems for supplying ecosystem services and should then be protected; however, clear rules for classifying an area as riparian were only established by in 1965 the so-called "New Forest Code" (Federal Decree #7,731). Riparian buffers were legally classified as Areas of Permanent Protection (APP), and the width of riparian corridors were determined according to the width of watercourses (minimum of 5 m for rivers with width < 10 m, and equivalent to the half of river width for larger watercourses); the width of APPs was substantially increased by complementary regulatory instruments enacted after the Federal Constitution of 1988. Natural vegetation on riparian buffers could not be destroyed or used, and areas where they have been already destroyed had to be abandoned for further regeneration. However, there was no need to actively restore native vegetation in riparian buffers.

After a long and controversial process of legal reform, the 1965 Forest Code was

substituted by the 2012 Native Vegetation Protection Law (Federal Law #12,651). Overall, the width of APPs to be protected was maintained, but the width of APPs to be restored was reduced. In this new law, farmers can maintain agricultural activities established before 2008 in a portion of APPs dual corridors along watercourses if they restore another portion of it, as a kind of compensation. The width of riparian buffers where restoration is mandatory varies according to the width of the watercourse and size of the landholding (5 to 100 m; see details in Brancalion et al. 2016). An innovative tool to support legal compliance was the establishment of the Rural Registry System, an on-line, self-declaratory system to register, among other things, the areas requiring restoration of APPs. The new law also created the Program of Environmental Compliance, through which landholders formally recognize the need to restore their APPs in the next 20 years, and receive "benefits" of it, like reductions of the area of APP to be restored. A project for recovering degraded APPs has to be further submitted for describing how the restoration plan will be implemented and monitored for achieving full recovery of native vegetation. Therefore, there are objective norms establishing the localization of riparian buffers, and supporting their restoration.

5. Implications for governing riparian forest restoration

Good governance has been increasingly considered as a critical missing link and an important enabling factor in forest restoration (Guariguata and Brancalion 2014), but still presents a number of challenges to be operationalized, such as financial disincentives, poor institutional set up, unclear tenure and lack of local empowerment. Unfortunately, in most Latin America, riparian buffers have not received enough attention from public policies related to safeguard their protection and restoration. This was the case of Mexico, which lacks an operational framework to guide the spatial location of riparian buffers, the protection of existing vegetation, and the recovery of native ecosystems in degraded riparian buffers. A comprehensive framework to support riparian forest restoration is imperative to eliminate the dispersion of legal concepts and regulations, to fill legal gaps, and reconcile regulatory instruments (Carabias et al. 2016). A particular complication with governance is the overlap between social and ecological systems with differing spatial and temporal scales (Mansourian 2016). This incongruence of scales between policies and governance levels (local, regional, national) versus the ecological processes that occur in the ecosystem enhances the challenge to understand and promote restoration governance. Mexico and Brazil are good examples of this incongruence; successful forest restorations are usually local, but many policies, development actions and investments are planned, implemented and evaluated centrally by national governments and international agencies, and not always coincide with local needs.

Restoration of riparian forests should be implemented in the context of a transversal management policy from various sectors, including ecological, social and economic aspects, which are needed to achieve higher levels of stakeholder agreement on what is needed for a successful land management and restoration. Riparian forest restoration should be addressed at a watershed management context, with criteria that allow defining areas where the benefit-cost ratio of restoration is optimal according to scientific standards and also perceptions and needs of the stakeholders involved. This is particularly important considering the social recognition of the importance of riparian forests, as expressed by communal agreements to conserve the riparian areas in Mexico (Meli et al. 2015) and the long history of legal protection in Brazil. A recent positive experience in Mexico was the Special Program for the Conservation, Restoration and Sustainable Use of the Lacandona Forest in Chiapas State, a section specially oriented to the region within the framework of the National Forestry Program. This program formed a baseline for the engagement of local institutions and communities in programs of riparian forest restoration, but lasted only between 2010 and 2015.

Although restoration governance is a new and emerging interdisciplinary endeavor, countries should not consider that governance solutions will have to be fully developed in isolation. Opportunities exist for benchmarking successful regulatory instruments for governing riparian forest restoration established by other countries, especially if these countries share socioeconomic and environmental similarities. Brazil and Mexico can be potential partners for developing innovative regulatory instruments for restoration, taking advantage of the rich experience accumulated by these countries. Brazil, in particular, has a substantial experience, an advanced regulatory frameworks, and innovative supportive tools for promoting legal compliance to offer to Mexico. However, both countries still have a long way to develop regulatory instruments that are effective on the ground. Shifting the paradigm of a centralized planning focused in command and control mechanisms to a participatory planning supported by incentives will be essential for achieving successful outcomes in governing riparian forest restoration. Working together will certainly yield better results than if countries develop their own regulatory frameworks in isolation.

References

Brancalion P. H. S., Garcia, L. G., Loyola, R., Rodrigues, R. R., Pillar, V. D. & Lewinsohn, T. M. (2016) A critical analysis of the native vegetation protection law of Brazil: updates and ongoing initiatives. *Brazilian Journal of Nature and Conservation* I4S:1–15

Carabias, J., Ruiz, L. & Rabasa, A. (2016). El marco legal de la restauración de ecosistemas forestales en México. In: Ceccon, E., Martínez-Garza, C. (coord.). Experiencias

mexicanas en la restauración de los ecosistemas, Universidad Nacional Autónoma de México, Universidad Autónoma del Estado de Morelos, Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, Cuernavaca, pp. 49-78.
Guariguata, M. R. & Brancalion, P. H. S. (2014). Current challenges and perspectives for governing forest restoration. *Forests*, 5, 3022−3030.
Mansourian, S. (2016). Understanding the relationship between governance and forest landscape restoration. *Conservation & Society*, 14, 267−278.
Meli, P., Landa, R., López-Medellín, X. & Carabias, J. (2015). Social perceptions of rainforest and climatic change from rural communities in Southern Mexico. *Ecosystems*, 18, 1343−1355.

Acknowledgements

PM thanks to São Paulo Research Foundation (FAPESP) for a post-doctoral grant (2016/00052-9). PHSB thanks the National Council for Scientific and Technological Development (CNPq) for a productivity grant (#304817/2015- 5) and to FAPESP for financial support (#2013/50718-5).