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Addressing local stakeholders' priorities on the development process of action plans for forest landscape restoration in Atlantic Forest Biome, Brazil

Luciana Alves[1], Mariana Oliveira[2], Marcia Lederman[3], Ermerson Machado[4]

[1]*World Resource Institute - WRI Brasil*, Forest Program - luciana.alves@wri.org
[2]*World Resource Institute - WRI Brasil*, Forest Program – mariana.oliveira@wri.org
[3]Friends Society from Itaúnas – SAPI – marcialederman@yahoo.com.br
[4]São Mateus Watershed Committee – machado.er@hotmail.com

Abstract

Forest and landscape restoration (FLR) goes beyond planting trees. Ecological and environmental principles guide restoration actions at the landscape level by integrating different land uses, reconciling protected areas with farming practices, and recovery of native vegetation. In the context of restoration planning, the local, social, cultural and economic aspects should be considered. Moreover, the involvement and engagement of key stakeholders from different sectors is also critical to ensure the success of restoration strategies and actions, as well as the identification of the motivational factors to restore degraded lands. This approach is part of the application of the Restoration Opportunity Assessment Methodology (ROAM) and was applied in in Espirito Santo State, Brazil that led to a FLR 10-year action plan. Several tools of ROAM were applied at different scales to generate information that supported decision makers in the formulation of public policies and implementation of restoration. The results of this work showed that the identification of key restoration success factors and barriers were crucial to mobilize and engage key stakeholders and define strategies and solutions that better address local demands and needs in the management of natural resource. Also, mapping the social landscape was essential in creating a larger movement to support restoration commitments. The main outcome was the development of a collaborative action plan aligned with the local reality and the commitments made by different actors. Moreover, the information generated had the potential to attract investment and finance opportunities to support the implementation of restoration actions at scale and to contribute to the state/national and international targets.

Keywords: governance, forest landscape restoration, communities, planning, environment

Introduction, scope and main objectives

Forest and Landscape Restoration (FLR) is more than just planting trees. It is an approach that integrates restoration in a broader perspective: connecting people, identifying opportunities, generating economic, social and environmental benefits, ensuring the maintenance of ecosystem services, combining land use and environmental compliance together with the conservation and restoration. It also connects to the SDGs and helps governments meet national and international commitments and targets related to emission reductions. Restoration is a nature-based solution and strategic to adapt and mitigate climate change impacts. In the New York Declaration on Forests, signatory countries pledged to restore 350 million hectares of forests worldwide. Brazil has committed to restore 12 million hectares, and part of this goal will only be possible with the commitment of subnational governments and the strengthening of multisector initiatives.

Espírito Santo is a Brazilian state that has a population of 4.1 million inhabitants and is fully inserted in the Brazilian Atlantic Forest, one of the biomes with the greatest biodiversity on the planet and one of the most

threatened. The state has pledged under the Bonn Challenge and the 20x20 Initiative, committing to restore 80,000 hectares by 2030. To enable large scale restoration and reforestation, the state's Reflorestar Program supports rural producers to recover degraded areas and conserve forests, which is certainly one of the most robust and innovative government initiatives in the search for restoration at scale, which aims to ensure water security by carrying out forest restoration while generating employment and income.

To help achieve these goals, ROAM was applied considering a collaborative approach and aiming to support the planning process, based on consistent data and in dialogue with the different local actors. ROAM supported the state to identify restoration gaps and opportunities and to provide an assessment of ecosystem services. The results generated were used to help the state identify critical areas for restoration that promote long-term water security, strengthen public policies and promote communication between key actors involved in the restoration chain (SEAMA/ES, 2017).

The north of the state was mapped as one of the highest priorities, where the Itaúnas and São Mateus watersheds are located. The region has approximately 12,665 square kilometers, and its land use is characterized by pastureland, eucalyptus monoculture, sugarcane and fruit production. The history of occupation has driven substantial transformations in the landscape, resulting in severely degraded environments.
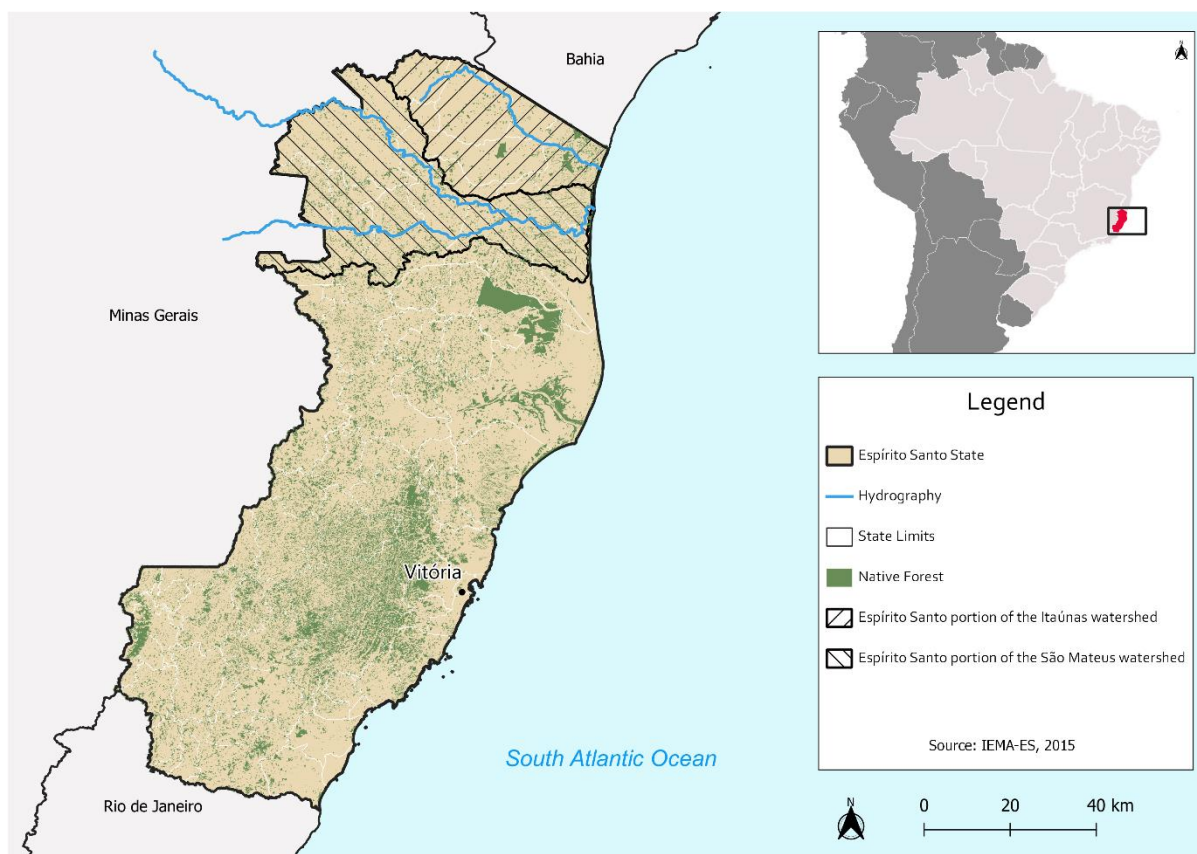

Figure 1. Itaúnas and São Mateus Watersheds location, Espírito Santo, Brazil.

Based on this context, WRI Brasil selected the north of Espírito Santo state as a priority landscape in the project Unlocking economic opportunities to scale Forest and Landscape Restoration in Brazil. The project was developed with support from the International Climate Protection Initiative (IKI) of the Federal Ministry of the Environment, Nature Protection, Construction and Nuclear Safety (BMU) from Germany, during the years 2017 to 2020. The project approach included ROAM tools to prepare a spatial analysis about the region context, and indicated FLR priority areas, supported the local governance structures and identified restoration

opportunities based on the restoration diagnostic of the key success factors. The main objective of the project was, based on the strengthening of local governance, to structure a restoration action plan detailing activities that local actors understand as fundamental to implement the restoration in the landscape.

Methodology/approach

Restoration Opportunities Assessment Methodology (ROAM)

The Restoration Opportunity Assessment Methodology (ROAM) is composed of a set of tools for identifying restoration opportunities in the land area. Through the articulation with local and regional actors and opinion-makers and an analysis of the main data and information available, ROAM makes it possible to design and propose articulated actions and identify financial instruments. The set of data relevant to the application of the methodology includes biophysical, ecological, social, economic, normative, legal and institutional data, and the collection and systematization of this information is done through interviews, public consultations and meetings with specialists and interest groups, using current data sources from technical or research institutions, in addition to hiring new surveys and studies to address specific gaps. ROAM's steps and tools assist governments, private institutions and organized civil society in the development of integrated plans, which reconcile the restoration of the land area with the generation of social, economic and environmental benefits aligned with the interests, motivations and expectations of the actors in the land area of interest. .

The process was carried out in three steps: i) data collection through secondary information, workshops and interviews with key actors; ii) elaboration of maps and calculations of metrics; iii) analysis of results and preparation of the action plan.

Social network analysis

The social network analysis applied to the forest restoration agenda is a tool that helps indentifying and visualizing who the social actors are and how they relate or act in a given landscape, how these actors can influence, as well as the flow of the resources (financial, information, inputs, authority, etc.) that connect them. The analysis of the connectivity between the actors provides guiding information to think about governance arrangements for forest restoration processes at the landscape scale, as it allows to unveil the positioning of different actors and groups of actors, and how this positioning influences the flow of the resource. The methodological framework used was the publication "Mapping Social Landscapes. A Guide to Identifying the Networks, Priorities, and Values of Restoration Actors," published by WRI (Buckingham et al. 2018). For the elaboration of the social network maps, a program Gephi (Bastian et al. 2009) which is free, and an open source was used to calculate the metrics of social networks and create diagrams of the networks of each resource flow.

The analysis of social networks was divided into two sets of metrics - centrality and profile (or format), which generate quantitative information on the importance of actors and the network architecture respectively (Buckingham et al. 2018).

Key Success Factors of FLR diagnosis

Restoration will only be successful if fundamental conditions are current and strengthened. In general, they refer to factors as to MOTIVATE people to do restoration, ENABLE restoration-related processes and IMPLEMENT restoration in the field (Hanson et al., 2015). The diagnosis covers both local and institutional aspects, market, legal and political guidelines, analyzing whether such aspects, when present, are favorable to the expansion of restoration efforts and, and when absent, which paths can be taken to establish them.

Data for diagnosis were collected through workshops held in the territory with the participation of local actors. The methodology for conducting the workshops considered guiding questions, based on the methodology
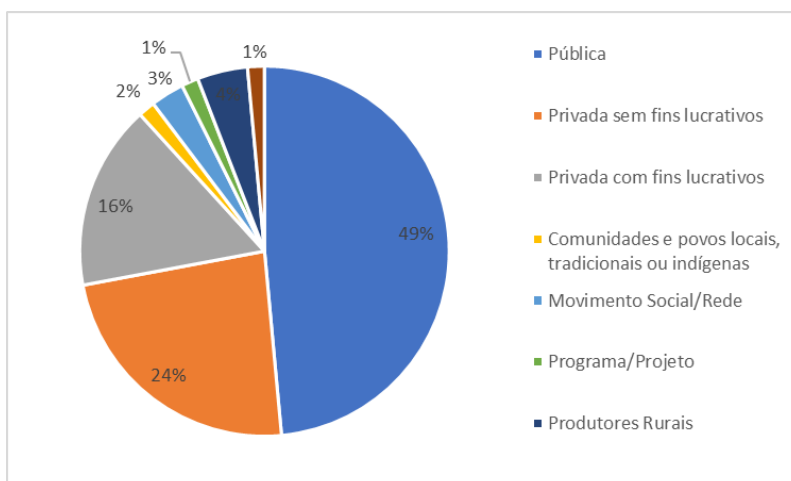
described by Buckingham et al 2018. An interview script was used to complement and deepen the information collected in the workshops.

Results

Social network analysis

The objective of mapping the social network analysis was i) to understand aspects related to FLR initiatives and how the different actors are connected, ii) to identify gaps in governance structures that hinder the development of FLR initiatives in an inclusive way and iii) to identify the main social actors of forest restoration, in particular those who can influence the advances of the FLR in the two watersheds, and understand how they interact in the current FLR governance structure (Araujo et al., 2019).

The result found was a network of FLR actors composed of 76 actors, representing different sectors of society, such as public organizations, civil society organizations, rural producers, companies, rural unions, educational and research institutions and local communities (Graph 1). About 50% of the actors present in the network represent the municipal and state public sector and 14% are private non-profit institutions.

Graph 01. Classification of local social actors from the Itaúnas and São Mateus landscape based on the institution type. Source: created by the authors

Picture 02. General Social Network for Forest Landscape Restoration in the Itaúnas and São Mateus Watersheds. Source: Sanches et al. (2018).

In the mapping by thematic axes, the composition and the connections change, but it still has a strong presence of public authorities in all of them.

The engagement and mobilization of different social actors take place in a collective space in the territory, such as the watershed committee, which is an area of governance that brings together actors from different sectors and is a democratic decision-making space

Key Success Factors of Restoration

The diagnosis of key success factors related to MOTIVATE demonstrates that the conditions needed for the consolidation of restoration actions—such as the existence of social, environmental, and economic benefits, in addition the identification of opportunities—are well implemented in the region, but not widely spread. Likewise, legal requirements exist, but they are not known by local people, which led to the elaboration of a communication plan as one of the priority actions to be structured in the region.

Conditions related to ENABLE, such as ecological, market, social, and institutional conditions, need to be strengthened. Key factors such as availability of seedlings and seeds, lack of degradation, restrictions on deforestation, and institutional coordination are absent or weaken.

Finally, key factors related to IMPLEMENT, such as leadership and knowledge generation, are present in the region but still need to be better articulated. It is being boosted by the structuring of local governance. The main challenge is connecting different actors and strengthening the other key factors to support the restoration chain. It can be achieved by the exchange of experiences, engagement, and fair governance representing different groups and interests present in the region.

Table 1 | Diagnostic Results of Key Success Factors for Restoration in the Itaúnas and São Mateus Watersheds

Legend: ■ In place ■ Partly in place ■ Not in place

Themes	Features	Key Success Factors	Status
MOTIVATE	a. Benefits	Existence of social, environmental, and economic benefits arising from FLR	In place
MOTIVATE	a. Benefits	Benefits of restoration are publicly communicated	Partly in place
MOTIVATE	a. Benefits	Opportunities for restoration are identified	In place
MOTIVATE	b. Crisis events	Transformation of extreme events or crises into opportunities	In place
MOTIVATE	c. Legal requirements	Law requiring restoration exists	Partly in place
MOTIVATE	c. Legal requirements	Law requiring restoration is broadly understood and enforced	Partly in place
ENABLE	d. Ecological conditions	Soil, water, and climate conditions suitable for restoration	Partly in place
ENABLE	d. Ecological conditions	Plants and animals that can hinder restoration are absent	Not in place
ENABLE	d. Ecological conditions	Native seeds, seedlings, or source populations are readily available	Partly in place
ENABLE	e. Market conditions	Competing demands (e.g., food, fuel) for degraded forestlands are declining	Partly in place
ENABLE	e. Market conditions	Value chains for products from restored area exist	In place
ENABLE	f. Policy conditions	Policies affecting restoration are aligned and streamlined	In place
ENABLE	f. Policy conditions	Restrictions on clearing remaining natural forests exist and they are enforced	Partly in place
ENABLE	g. Social conditions	Roles and responsibilities for restoration are clearly defined	Not in place
ENABLE	g. Social conditions	Local people are empowered to make decisions about restoration	In place
ENABLE	h. Institutional conditions	Roles and responsibilities for restoration are clearly defined	Partly in place
ENABLE	h. Institutional conditions	Effective institutional coordination is in place	Partly in place
IMPLEMENT	i. Leadership	Local restoration champions exist	In place
IMPLEMENT	i. Leadership	Sustained political commitment exists	In place
IMPLEMENT	j. Knowledge	Restoration "know-how" relevant to ecosystem recovery	In place
IMPLEMENT	j. Knowledge	Restoration "know-how" transferred via peers or extension services	In place
IMPLEMENT	k. Finance and Incentives	Restoration design is technically grounded and climate resilient	In place
IMPLEMENT	k. Finance and Incentives	Incentives and funds are readily accessible	Partly in place
IMPLEMENT	l. Feedbacks	Effective performance monitoring and evaluation system are in place	In place
IMPLEMENT	l. Feedbacks	Early wins are communicated	Partly in place

Discussion

The FLR approach refers to a dimension of spatial planning, but also includes social and territorial dimensions, where the objective of restoration actions are not restricted to ecological conservation, but also considers the human development of a given territory (Mansourian, 2016).

The governance structure in the north of Espírito Santo is quite diversified, with important organizations working on the matter of restoration, including the state and municipal public authorities that play an important role in connecting the various actors and act as disseminators of restoration initiatives and projects. This strong presence of public authorities is positive for being composed of institutions responsible for establishing regulations and institutional arrangements that can favor FLR in the ecological, social and economic-financial dimensions.

According to the findings in the diagnostic of key restoration factors, the main challenges for advancing restoration in the north of Espírito Santo are related to the level of environmental degradation of the two basins combined with a lack of clarity about the roles and responsibilities related to restoration. The territory has a low native forest cover, with the presence of degradation factors associated with low agricultural productivity, degraded pastures and extensive expansion of eucalyptus forestry. The presence of exotic species and cattle combined with the competition for land use by agricultural production makes the ecological conditions, associated with social conditions, unfavorable for restoration. However, in contrast, key factors associated with benefits generated by restoration, knowledge and leadership are present, which allows conditions for restoration to be more easily established.

The existence of a diverse and cohesive governance structure is one of the main factors that guarantee restoration to advance in the territory. The result of this is the restoration plan structured from the results generated and shared by the project, which brings, in addition to the characterization of the territory and restoration opportunities, the main thematic axes that need to be strengthened so that the restoration chain can be established. The proposed plan projects were identified as priorities by local actors and the construction process generated empowerment and commitment to actions by all actors who work in the territory and compose the local governance.

Conclusions/ wider implications of findings

This is an example on how international commitments and the global restoration movement can contribute to mobilize efforts to support FLR planning and implementation, considering the local actors' perspectives.

The north of Espirito Santo state and the local actors showed that it is possible to structure a local governance to connect local priorities and, at the same time, ensure an effective planning that connects with global restoration goals.

The action plan is a way to consolidate FLR, not only with prospects to recover environmental liabilities, but also as a strategy to establish a forest-based economy that will bring better socioeconomic conditions to local communities, plus the recovery of ecosystem services and the improvement of water resources.

Acknowledgements

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