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Spatial dynamics of values, rules, and knowledge in restoration governance: Insights from western Rwanda

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Abstract

Forest and landscape restoration (FLR) is widely promoted to address environmental degradation while supporting rural livelihoods, yet its outcomes remain uneven across contexts. These differences are not only ecological but also reflect how restoration interventions interact with local values, institutional rules, and knowledge systems. Despite increasing recognition of these human dimensions, they are rarely examined spatially, limiting the ability to identify where restoration aligns with or conflicts with local priorities.

This study aims to examine how values, rules, and knowledge (VRK) are spatially distributed and interact to shape restoration dynamics in Western Rwanda. Specifically, we ask: (1) how are VRK elements mapped across restoration landscapes? (2) How do they interact to produce spatial patterns of alignment or mismatch with restoration interventions? and (3) how do these patterns influence perceived legitimacy and engagement?

Drawing on participatory geographic information systems (PPGIS), the study collects data from approximately 400 respondents across multiple villages engaged in interventions such as terracing, agroforestry, and woodlot management. Using a methodological framework for participatory mapping data (Fagerholm et al., 2021), we analyse spatial patterns of mapped values and examine how they relate to institutional rules and local ecological knowledge.

Expected results identify spatial “hotspots” of alignment, adaptation, and contestation within restoration landscapes. Areas where institutional arrangements reflect local values and knowledge are associated with higher perceived legitimacy and engagement, while mismatches correspond to zones of resistance or disengagement. These patterns are shaped by differences in access rights, rule enforcement, and locally grounded practices.

By integrating VRK with spatial analysis, this study advances a process and place-based understanding of restoration governance. It highlights the importance of aligning interventions with local priorities and recognising spatial variability in knowledge and institutions to support more legitimate and effective restoration outcomes.

Keywords: Knowledge, landscape restoration, participatory mapping, public Participation GIS (PPGIS), rules, values