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Research Paper

Integrated landscape management for agriculture, rural livelihoods, and ecosystem conservation: An assessment of experience from Latin America and the Caribbean

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HIGHLIGHTS

- We surveyed 104 integrated landscape initiatives in Latin America and the Caribbean.
- Such initiatives are growing as a means to manage for landscape multifunctionality.
- Multi-objective management is associated with greater numbers of positive outcomes.
- Unsupportive policy frameworks may limit effectiveness and scalability.

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ABSTRACT

Approaches to integrated landscape management are currently garnering new interest as scientists, policymakers, and local stakeholders recognize the need to increase the multi-functionality of agricultural landscapes for food production, livelihood improvement, and ecosystem conservation. Such approaches have been attempted in many parts of Latin America and the Caribbean (LAC) but to date there has been no systematic assessment of their characteristics, outcomes, and limitations. To fill this gap, we surveyed participants and managers in integrated landscape initiatives throughout the LAC region to characterize these initiatives' contexts, motivations and objectives, stakeholders and participants, activities and investments, outcomes, and major successes and shortcomings. Results from 104 initiatives in 21 countries indicate that integrated landscape management is being applied across the region to address a variety of challenges in diverse contexts, and that use of this approach is expanding. Initiatives reported investing across four key "domains" of landscape multi-functionality: agricultural production, ecosystem conservation, human livelihoods, and institutional planning and coordination. Initiatives reported positive outcomes across all four domains, but particularly with respect to institutional planning and coordination. Initiatives with larger numbers of objectives, investments, and participating stakeholder groups all reported significantly higher numbers of positive outcomes, suggesting significant value in the core precepts of the integrated landscape management approach. Key challenges identified by survey respondents—including the long time horizon required to achieve results at scale, unsupportive policy frameworks, and difficulty in engaging the private sector and other important stakeholders—offer insights for improving the future effectiveness of integrated landscape initiatives.

1. Introduction

Recent years have witnessed a proliferation of research on the impacts, tradeoffs, and ramifications of rural land-use management relative to the set of social and ecological goods and services

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that society demands from landscapes, including food and fiber production, biodiversity conservation, ecosystem service delivery, poverty alleviation, and economic development (Barrett, Travis, & Dasgupta, 2011; Brussaard et al., 2010; Tscharntke et al., 2012). Much of this work has highlighted the scale and severity of agricultural impacts on ecological systems, as well as the formidable challenge of designing management approaches to meet escalating global demands for food production and ecosystem services in the context of limited land and water resources, climate change, and widespread ecosystem degradation (Ellis, Goldewijk, Siebert, Lightman, & Ramankutty, 2010; Foley et al., 2005). A parallel stream of work has elaborated a variety of landscape analysis, planning and management approaches to address some of these challenges (De Groot, Alkemade, Braat, Hein, & Willemen, 2010; Nelson et al., 2009; O'Farrell & Anderson, 2010; Selman, 2009).

The increasingly contested nexus between agricultural production, biodiversity and ecosystem service conservation, and economic development in rural landscapes is clearly evident in Latin America and the Caribbean (LAC). This region contains eight of the world's 34 biodiversity hotspots and provides key ecosystem services at local, regional, and global scales (Myers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000; Turner et al., 2012), but still contains high levels of rural poverty and inequality in many areas (Berdegué et al., 2012). During the last 30 years, the LAC region has accounted for the 35% of the growth in global food production (FAO, 2011). Looking ahead, as other regions of the world became increasingly land and water constrained, or continued to experience low productivity, the region's role as a food exporter is likely to grow, with agricultural land projected to increase 43% by 2050 (FAO, 2011). Historically, agricultural expansion in the LAC region has been associated with the loss of high-biodiversity tropical ecosystems (Clark, Aide, & Riner, 2012), often in a poorly regulated context where economic benefits associated with tropical deforestation accrued inequitably and did little to alleviate poverty (Schatan, 2002).

These dynamics highlight the need for strategies that support the delivery of multiple benefits from rural landscapes by increasing synergies and minimizing or mitigating tradeoffs among food production, biodiversity conservation, ecosystem service provision, and poverty alleviation. Approaches to "integrated landscape management" seek to do so by analyzing, implementing, and evaluating land management decisions relative to multiple landscape objectives and stakeholder needs (Sayer et al., 2013). This is achieved through landscape planning and design processes, improved coordination among sectoral activities and investments, enhancement of human and institutional capacities for decision support and negotiation, and supportive policies and incentives. Integrated landscape management processes may support the alignment of agricultural production and ecosystem conservation at a variety of scales, including both "land sharing" and "land sparing" approaches, as dictated by local context (Cunningham et al., 2013). Integrated landscape management has been practiced and studied under many names, including "whole landscape" management (DeFries & Rosenzweig, 2010), "multifunctional agriculture" (Jordan & Warner, 2010), "ecoagriculture" (Scherr & McNeely, 2008), "bioregional planning" (Brunckhorst, 2000), and "multifunctional landscapes" (Fry, 2001; Naveh, 2001), to name a few. Such approaches have recently garnered new interest as scientists, policymakers, and local stakeholders increasingly recognize both the need and the possibility for more synergistic management of mosaic rural landscapes (LPFN, 2012).

The LAC region has a history of integrated landscape management efforts dating back at least three decades. The region's first formal landscape management paradigm was likely the UNESCO's Man and the Biosphere program (established in 1977), which sought to balance human needs and ecological conservation through multi-objective management of critical landscapes. Beginning in the mid-1990s, the "new rurality" (*la nueva ruralidad*) was proposed as a framework for participatory, place-based economic development that linked agricultural production with rural poverty alleviation (Echeverry-Perico & Ribero, 2002). More recently, the concept of rural territorial development (*desarrollo territorial rural*) has been adopted in several LAC countries as a framework to support rural economic development, improve the multifunctionality of rural regions, and foster constructive interdependence between urban and rural populations (Bebbington, Abramovay, & Chiriboga, 2008; Schejtman & Berdegué, 2008). This approach has been catalyzed, in different places, by government-led efforts as well as by initiatives of rural communities and indigenous peoples.

Simultaneously, the biological corridor concept has been promoted—particularly in Mesoamerica—as a way to increase conservation value and habitat connectivity while improving livelihoods in fragmented landscapes that connect core nature reserves (Harvey et al., 2008; SINAC, 2008). More broadly, conservation-friendly management of agricultural mosaics is now regarded as critical for conserving the region's biodiversity while furnishing key ecosystem services (DeClerck et al., 2010; Perfecto, Vandermeer, & Wright, 2009). Various networks have emerged to support grassroots-led integrated landscape management efforts, such as the Ibero-American Model Forest Network, which was established in 2002 and now includes 27 "Model Forests" in 12 LAC countries, managed for multifunctional outcomes through participatory processes (IMFN, 2013). Beyond these specific paradigms for landscape and territorial management, other approaches such as community-based natural resource management (Armitage, 2005) and the establishment of indigenous and community conserved areas (Kothari, Corrigan, Jonas, Neumann, & Shrumm, 2012) have also been applied widely throughout the LAC region and often share some if not all of the characteristics of integrated landscape management.

But despite the growing practice of and interest in integrated landscape approaches in the LAC region, to date there has been little formal effort to characterize these approaches and their role in helping to address conservation, food production, and rural development challenges. Such work is urgently needed to take stock of the diverse forms, experiences, and results of integrated landscape approaches and to use this information to guide the design and implementation of new and ongoing efforts to reconcile agricultural production, economic development and biodiversity conservation. The purpose of this study is to begin to fill this critical need by conducting a systematic characterization of integrated landscape approaches in the LAC region. Specifically, the study seeks to document the location and context, motivations and impetus, participants and stakeholders, investments and governance structures, outcomes, and most and least successful aspects of integrated landscape approaches in the region, as identified by individuals involved in landscape approaches. Results of the study can help inform recommendations about where and when integrated landscape management may be an appropriate strategy and how landscape management efforts can be designed or conducted to address common challenges and barriers.

As integrated landscape management can take many forms—both explicit and nebulous—in the interest of clearly bounding the purview of this study, we focus our assessment on discernible "integrated landscape initiatives" (ILIs), which we define as projects, programs, platforms, initiatives, or sets of activities that: (1) explicitly seek to simultaneously improve food production, biodiversity or ecosystem conservation, and rural livelihoods; (2) work at a landscape scale and include deliberate planning, policy, management, or support activities at this scale; (3) involve inter-sectoral coordination or alignment of activities, policies, or investments at the level of ministries, local