Ecosystem restoration and human well-being in Latin America

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1. Introduction

Ecosystem restoration has become increasingly prominent in global, national and regional treaties, coalitions and conventions. Significantly, 2021 marked the beginning of the United Nations Decade on Ecosystem Restoration (UNEP and FAO 2020). This strategy aims to engage actors from all spheres of society to overcome political, socioeconomic and technical barriers to implementing ecosystem restoration at multiple scales. However, it demands trans-disciplinary approaches to address its inherently complex and multi-dimensional implementation (Cengiz et al. 2019; Mansourian and Parrotta 2019).

Some challenges to implementing ecosystem restoration in Latin America emerge due to its particular political and social-ecological context. Major environmental challenges in Latin America occur in rural landscapes and are not related to livelihood improvements but survival; the dichotomy is survival versus conservation (Gligo 2001). The average percentage of Latin American people living in multi-dimensional poverty in rural areas is high (52.6%). There is a huge difference among countries. For instance, Honduras and Guatemala hold 82% and 77% of rural poor, while Uruguay and Chile only 2% and 7%, respectively (FAO 2018). This social problem is associated with ecological degradation since Latin America is one of the three regions where deforestation has advanced the most (FAO 2018). Due to the joint impacts of poverty and deforestation, the communities’ cultural identity and forms of social reproduction are weakened, given the fragmentation of their societies and landscapes.

Besides, as the total population in Latin American countries continues to increase, extensively natural ecosystems are still converted to pastures for low-density livestock and crops. The future of these ecosystems will depend on how the region responds to this conversion. In this sense, ecosystem restoration is gaining momentum on the political agenda. Thirteen of 28 Latin American countries signed an agreement in 2014 to restore 20 million hectares by 2020 and achieve carbon neutrality by 2050 (https://initiative20x20.org). These political aspirations have the potential to create jobs, increase environmental values and capture from 4.5 to 8.8 billion tons of annual CO2 emissions by 2030 (Suding et al. 2015). However, only five signatory countries currently count on a policy instrument (for example, a restoration plan) to achieve the objectives proposed (Méndez-Toribio et al. 2017; Assad et al. 2020).

This scenario has prompted Latin American scientists to rethink their paradigms as they face decades of economic crisis, poverty, social and agrarian injustice, migration, biodiversity loss, climate threats, civil wars, narcotraffic violence, and many other consequences of sustainable development goals. Thus, a perspective focusing on the interaction between social and ecological systems is emerging strongly in Latin America to understand better the complexity of this crisis, exacerbated by global climatic and ecological changes (Castro-Díaz et al. 2019).

Managing the current human-modified landscapes in Latin America to restore ecosystems while maintaining ecosystem services to produce human well-being is crucial to promoting win-win schemes for the environment and societies (Meyfroidt et al. 2010). This Special Issue presents five papers featuring cases and viewpoints of those working on ecosystem restoration to produce human well-being and associated issues such as governance and social participation in the region.

2. Linking ecosystem restoration and human well-being in Latin America

Ecological restoration consolidated as a discipline during in the last two decades of the 20th century, with some definitions by Bradshaw (and his colleagues) about restoration being the ‘acid test’ of ecology.
(Figure 1). Since this origin, ecological restoration has considered the social aspects of human society (Wyant et al. 1995; Cairns and Heckman 1996; Hobbs and Norton 1996; Gann et al. 2019) and even its impacts on sustainable development (Urbanska et al. 1997). The ‘human dimension’ of restoration was brought out to discussion during the first decade of the 21st century (Pfadenhauer 2001; Hobbs et al. 2004). During this decade, the Millennium Ecosystem Assessment (2005) highlighted the importance of ecosystem services to maintain people’s well-being and poverty alleviation. By this moment, the human dimension of restoration is fully embraced in the theoretical discussion (Choi 2007) and also in the practice, for instance in terms to find a ‘socially strategic restoration’ (Buckley and Haddad 2006).

The ecosystem services concept gained importance in restoration when in 2009, Rey Benayas et al. (2009) gave an empirical precedent on how restoration may recover biodiversity and ecosystem services, providing an implicit and subsequent link on the potential benefits of restoration on human well-being (Alexander et al. 2016). The use of the ecosystem services concept in the restoration context in Latin America thus came together with notions such as ‘natural capital’, ‘economic values’, and ‘tangible benefits and goods’ (e.g. Aronson et al. 2007; Blignaut et al. 2014). These notions were incorporated through programs and policies involving market-based schemes, such as payments, compensations, tax redemptions, economic incentives, and subsidies, supported by increasingly prominent global, national and regional treaties, coalitions, and conventions (e.g. Bonn Challenge and 20×20 Initiative).

Recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) proposed the term ‘nature contributions to people’ (NCP), a notion that recognises a range of representations of worldviews, interests, and values, highlighting how critical inclusive framings are to the broad political legitimacy of the international objectives and their implementation instruments (Pascual et al. 2017; Diaz et al. 2018). The NCP approach recognises the central and pervasive role that culture plays in defining all links between people and nature and elevates, emphasises, and operationalises the role of indigenous and local knowledge in understanding nature’s contribution to people (Diaz et al. 2018). Thus, in the NCP notion, the cultural visions permeate through and across the NCP rather than being confined to an isolated category, and the main NCP groups – rather than being independent compartments, as typically framed.
within the ecosystem services approach (MA 2005)—explicitly overlap. In this sense, ecosystem restoration interventions must result from decisions taken together with local inhabitants by considering their wishes, customs, spirituality, knowledge, and laws. However, this cultural dimension of ecosystem services remains less developed when compared with the ecological dimension (Musacchio 2013).

In the last ten years, other concepts have gained a place in the environmental discussion in Latin America and could also sound for linking ecosystem restoration and human well-being. For instance, the buen vivir, in its most general sense, constructs a life system based on the communion of beings (human and otherwise) and nature (Mahali et al. 2018). It points toward a correlation, complementarity and reciprocity with the rest in harmony, respect, dignity and continuous relation. In this sense, the individual is not separate from but an integral part of nature. This plural concept, still under construction, is not limited to indigenous worldviews. However, it provides a platform for a political debate on the alternatives to development, where even though there is a diversity and overlapping of different positions, there are critical elements in common, and it questions the bases of the conventional conceptions of development (Gudynas 2011). Another concept is ‘productive restoration’, as a strategy to recover soil productivity, together with some elements of the structure and function of the original ecosystem, to offer tangible benefits to the local population (Cecon 2014, 2020). Productive restoration has been used in Colombia, Argentina, and Chile.

All these concepts go hand-by-hand with the principles of sustainability; but this should also be a ‘shared sustainability’ (Leff 2002) that summons all the social actors (governments, academics, private sector, peasants, indigenous people, citizens) to a joint effort in an operating agreement and participation in which different visions are integrated (Cecon and DR 2017). Nature must maintain its quality and harmony to harbour the human being, who is an absolute part of it. Humans do not use nature (or mother earth) but instead, nurture it and allow themselves to be nurtured in the sense of mutual protection born of affection that emerges when one and the other are a constituent part (Gerritsen et al. 2018). Under these visions, the Earth is understood as a constantly renewing source of gifts; humans have a responsibility to reciprocate for all they have been given, while non-human species with which we share the planet are recognised as non-human persons, as relatives, and indeed as teachers (Kimmerer 2017).

Even with the increasing interest in academic, governmental, and non-governmental circles worldwide in developing universal definitions of well-being, searching for a theoretical definition could be fruitless in Latin America (Artaraz and Celestani 2015). Most restoration in Latin America occurs in poor rural areas (Chazdon et al. 2021). In this region, including the human dimension in the restoration is an ineludible process, and its goals and practices must be value-filled activities involving human perceptions, beliefs, emotions, knowledge, and behaviours (Higgs 2011). As different groups of actors rarely share the same norms and values, and power relations are unevenly distributed, conflicts around natural resource management are frequently generated, which may hinder efficient restoration (de Castro et al. 2016). Below we present the five papers included in this Special Issue and how they include this human dimension of restoration to embrace diverse human perceptions, to ultimately link ecosystem restoration and human well-being.

3. Studies included in this special issue

The practical approaches to link ecosystem restoration and human well-being may be diverse. The five studies in this Special Issue help address these practical approaches and help answer three main questions (Table 1). First, how have ecosystem restoration initiatives in Latin America considered ecosystem services and their contributions to the well-being of multiple social actors? Second, how have these ecosystem restoration initiatives included marginalised actors (such as women, indigenous communities, and afro-communities)? And furthermore, what are the enablers and constraints to bolster the link between ecosystem restoration and human well-being? We describe each study below and provide a comparison leading to some conclusions about reinforcing the link between ecosystem restoration and human well-being in Latin America.

Carrasco Henríquez and Mendoza Leal (2021) describe the articulation of collaborative relationships between local communities and the private sector in the temperate forests of Southern Chile. Their study reveals how a group of local women (i.e. peasants and small-scale farmers) from the ‘Cordillera de Nahuelbuta’ moved forward with a restoration process that involved several stakeholders, which not only advanced ecological recovery but, most importantly, turned into a form of ‘re-communalization’, bringing well-being through building cultural identity. Using qualitative and ethnographic methodologies to collect and analyse the perspectives of various actors (including these leading women), they show
Table 1. Summarised information on the three mains questions of the special issue in each paper.

| Paper | Country | Description | The contribution of ecosystem restoration to human well-being | Inclusion of marginalised actors | The enablers and constraints to bolster the link between restoration and human well-being |
|-------|---------|-------------|---------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------|
| Carrasco Henríquez and Mendoza Leal (2021) | Chile | Restoration initiatives as a form of re-communalization, involving distinct paradigms of nature. | Recovering cultural identity and social capital. | Organising women to plan and implement restoration. | Existent social capital in local communities helps to produce well-being. Constraints in the local-private dialogue and their different languages. |
| Farinaccio et al. (2021) | Argentina | Social assessment of native flora of drylands and its implications for ecological restoration of desertified areas. | Recovering traditional knowledge and culture. Recovering ecosystem productivity. | Local community participation | Cultural and knowledge erosion discourages local people. Promoting a restoration program embracing historical knowledge and collective learning to recover social capital. |
| Gómez-Ruiz et al. (2022) | Mexico | Restoring the human-ecosystem link in Mexican mangroves. | Closely involving local communities in all phases of the restoration processes and building legitimacy. | Local community participation | The permanent social participation in decision-making and implementation strengthen legitimacy. Constraints in terms of ecological success. |
| Cotroneo et al. (2021) | Argentina | Reconstruction of historical processes leading to social-ecological collapse or recovery. | Restoring native forests increases adaptive capacity to cope with external stressors | Local community participation | Local knowledge and social capital as enablers, and external pressure and lack of government support as constraints |
| Aguiar et al. (2021) | Argentina | Perspectives on the Latin American context in terms of how we practice and evaluate the benefits of ecological restoration for well-being. | Through building transformative governance that can respond to, manage, and trigger regime shifts in coupled socio-ecological systems at multiple scales | By using approaches and instruments that promote innovative governance systems | Not constraints but four challenges related to the specific Latin American socio-ecological systems. Reinforce the link through bolstering effectiveness, social equity, transparency, and legitimacy of restoration interventions. |
that the obstacles that may impede further development and sustainability of the experience arise in the difficulties of maintaining permanent coordination with the private sector and whether they value the sustainability of these initiatives. As a result, women built a ‘restoration cooperative’. This experience is highly relevant for socio-ecological studies since restoration initiatives can integrate disparate interests responding to distinct paradigms of nature and economy.

Farinaccio et al. (2021) describe a social assessment of native flora and its implications for ecological restoration in the Patagonian desertified drylands of Argentina. Through semi-structured surveys and open interviews, they show rural people’s knowledge (locally called ‘puesteros’) about the native flora, the value people give to the species and their interest in planting those species on their farms. In the surveys, puesteros mentioned 44 multipurpose species classified by their uses, while almost all of them expressed interest in planting on their farms. They found that immersed in unfavourable socio-ecological and cultural contexts, the puesteros recognise a low percentage of native useful species. At the same time, use a large proportion of exotic species as a result of the historic extermination of indigenous people and cultural erosion. However, local people expressed motivation and interest in ecosystem restoration. A cultural and productive restoration program focusing on restoration-based education may help implement these projects successfully and build well-being by strengthening local capacities, rescuing traditional knowledge, and increasing collective learning to ultimately restore the historical links between local people and the natural ecosystem.

Gómez-Ruiz et al. (2022) describe how to restore the human-ecosystem link in the ecological restoration of the mangroves in Pantanos de Centla Biosphere Reserve, in Mexico, by closely involving two local communities in all phases of the restoration process. During the planning phase, they identified local needs and interests to determine the project’s viability and performed social and ecological diagnostics to further involve community members in the restoration actions during the implementation phase. People participated in the reforestation activities and restoring water flow dynamics in parallel with training workshops focused on ecosystem services, ecological restoration, and monitoring techniques. With guidance from the project team, community members conducted initial monitoring of restoration actions four months after implementation. The local communities’ participation in all stages was fundamental to promoting an integrated and sustainable socio-ecosystem restoration process and fostering greater awareness of mangroves’ full range of services.

In the contribution by Cotroneo et al. (2021), forest replacement and degradation driven by crop expansion and livestock intensification are some of the leading global socio-ecological threats severely affecting the dry Chaco region in Argentina. By involving stakeholders whose actions are decisive in dealing with the problem under analysis, the authors assessed the interactions among processes of multiple dimensions and spatial scales, currently controlling communal forest degradation in 11 peasant communities in Santiago del Estero province. Then, by reconstructing the historical processes undergone by these communities over the last century, they showed how different system settings have conducted to the system collapse (forests and community loss) or strengthened its adaptive capacity facing natural disturbances (droughts) and anthropogenic stressors (economic shocks, land disputes). The study unveils system attributes related to native resource management and economic diversification on the farm, family and community structure, and social networking with peasant organisations and other institutions, which are crucial for building social-ecological resilience. Thus, its results explain why forest (protection) law and state subsidies for sustainable management have been insufficient and suggest some insights to reorient them and promote restoration.

Finally, Aguiar et al. (2021) present a perspective piece of work on the challenges and options to foster the link between forest and landscape restoration to human well-being in Latin America. They describe how the particularities of the Latin American context in terms of how we practice and evaluate the impacts of ecological restoration determine four challenges to better link forest restoration and human well-being in Latin America: (1) the high dependence of local communities and countries’ economies on natural resources, (2) conflicts over land tenure and access, (3) divergence in perceptions and values, and (4) the fragility of public institutions and policies. Finding an equitable and legitimate balance between global interests and urgency and increasing local well-being is the main challenge of forest restoration in Latin America to tackle by implementing instruments and approaches recently organised under transformative governance.

4. Concluding remarks

Attempts to contribute to human well-being require disaggregated analyses that recognise the different groups who benefit from each ecosystem service, the access mechanisms determining who benefits, and the individual contexts and aspirations determining how well-being is improved.
The ecological and political dimensions of ecosystem restoration should be integrated, considering the mutual influences between political control, the social distribution of access to natural resources, and the associated biophysical processes. Because the practice of ecological restoration presents a series of issues and uncertainties, it requires ongoing learning and negotiation instead of a unique solution for a single problem. In this sense, ecological restoration must be a humanistic project to reach new human values regarding nature (Cecon et al. 2020). Including the human dimension in restoration is an inescapable process, and its goals and practices must be value-filled activities involving human perceptions, beliefs, emotions, knowledge, and behaviours. Engagement could be broadened and deepened to reinforce the link between ecosystem restoration and human well-being, reinforcing networks of scientific persons and programs which may directly connect to essential issues to human well-being (e.g. linking to Future Earth 2013). Furthermore, ecosystem restoration in Latin America needs to be more strongly transdisciplinary and include the highest possible levels of governmental actors.

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