



Research paper

Time for change: The legacy of a Euro-Andean model of landscape versus the need for landscape connectivity

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HIGHLIGHTS

- The Andean valley-upland landscape model emphasizes the separation of binary units.
- This model emerged via a wide range of Euro-Andean landscape knowledge (e.g. maps).
- The valley-upland model owed to colonial-era global sociocultural-climate changes.
- Recent global changes require the strengthening of social-ecological connectivity.
- Recent change and new approaches are transforming the valley-upland landscape model.

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ABSTRACT

The extreme social-ecological diversity and human use of tropical mountains has led to the development of complex and globally influential models of humanized landscapes. At the same time, such regions are increasingly subject to challenges from new global socioeconomic and environmental changes. This study investigates the role of landscape models amid new social-ecological challenges in the Andes of western South America. Research is focused on the Andean valley-upland landscape model that emerged in the early colonial period (1550–1750), and its long-lasting legacies. This model drew on the hybrid Euro-Andean landscape knowledge forged in contexts of landholding institutions, urbanization, and demographic and climatic change of the early colonial period. It is examined here through multi-dimensional sources ranging from Chronicles; indigenous texts and maps; colonial laws; imperial Geographic Reports; sanctioned Inspections; demographic and land use changes; impacts of Little Ice Age climate change; historical cartography; and landholding litigation documents. Andean valley basins were treated as fixed sites of Spanish control and private property, whereas uplands featured fugitive qualities. The valley-upland landscape model thus exemplified a binary and relational territorial logic of settled/unsettled that contributed to the colonial dispossession of indigenous lands. Its powerful legacy is a major counterpoint to environmental interpretations of European conquest and colonialism such as pristine myth debates. Today the valley-upland model is notably incongruous with expanding needs for landscape connectivity and sustainability. Its emphasis on spatial distinctness and separateness is at odds with current challenges, especially climate change, that require enhancing connectivity to strengthen resilience across social-ecological units.

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1. General landscape models and complex social-ecological interactions

Landscapes of the Andes Mountains of equatorial western South American (Colombia, Ecuador, Peru, Bolivia, northern Chile, and Argentina) are estimated to contain some of the world's highest degrees of combined ecological and socio-cultural diversity (Sarmiento, 2000). The extraordinary landscape diversity of tropical and sub-tropical mountains developed historically through social-ecological interactions (Gade, 1999). Many models have

been created to understand this diversity and govern landscape resources, an especially significant undertaking amid new global social–ecological changes and sustainability challenges in the Andes (Zimmerer & Bell, 2013). Modern models incorporate aspects of elevation, ecology, land use and food production, and varied socioeconomic, cultural, and governance activities. They range from climate–ecological zonation schema (e.g. Tosi, 1964; Troll, 1968), to the frameworks of indigenous land use tiers and verticality of Pulgar Vidal (1972) and others (e.g., Brush, 1976; Mayer, 1985; Murra, 1972, 1985) and to such alternative models as overlapping patchworks (Zimmerer, 1999, 2011). Since the 20th century these models have served planners in defining national- and region-scale landscape zones for a variety of policies and projects.

Our article is focused on a significant early landscape model that developed during the 16th–17th centuries. Influential, yet distinct and to-date unstudied, this 460-year old model emerged implicitly and is termed here the valley–upland model. It has depicted the Andean landscape as a contrasting pair of principal zones: habitable valleys and desolate uplands. The valley–upland model reworked Inca precedents through Spanish colonial and Euro–Andean land use, landscape accounts, imperial policies, and landholding litigation. It was influenced by, while standing in contrast to, indigenous Andean conceptualizations of landscape, and thus represents a hybrid European–indigenous system of land use and environmental knowledge. Most notably, the colonial valley–upland model drew significantly upon the spatial dimension of pre-Hispanic Andean traditions of “paired asymmetrical complementary,” in particular the contrast of cultivator and herder habitats (Urton, 2012) and mythohistorical ethnic groups (e.g., the Duviols, Huari, & Llacuz, 1973). In the sections below we show its influential correspondence to pre-Hispanic precursors, while at the same time, the valley–upland model gained distinctive qualities in the context of the new political, economic, and spatial configuration of Spanish imperial rule and new Euro–Andean knowledge systems.

Landscape models are being shown as crucial to understanding the history of social–ecological interactions, and also, of equal significance, they are demonstrated to impact important present day environmental planning and sustainability issues (Antrop, 2005; Marcucci, 2000; Palang, Spek, & Stenseke, 2011). This study analyzes both the past construction and present-day legacies of the Andean valley–upland landscape model, with the goal of elucidating its current role. We define landscape model as a conceptual framework used to relate the socio-cultural and environmental realms across geographic space. Landscapes are treated as both social–ecological outcomes and inputs to human thought and experience (akin to “modeling the models” sensu Naveh, 1995; Taylor, 2005). Landscape models thus have a dual function—they both describe existing conditions and actively influence subsequent ones. The role of landscapes is *both* an *input* to the models and, also, *output* of models. Each perspective requires integration with in-depth case studies to generate the insight that is necessary for contemporary landscape planning and management. This dual function is especially vital in tropical mountains worldwide where social–ecological interactions are represented with influential landscape models (Sarmiento, 2000; Young, 2009; Zimmerer & Bell, 2013).

Understanding how landscape models actively create geographic spaces as distinct and separate, or connected, is crucial to our interpretation of their influence. As we discuss, the valley–upland model functioned relationally to reinforce and reify the characteristics of each zone: “fixed,” stable areas of settled valley zones versus “fugitive” landscapes that were more isolated, fluid, and less subject to state control. “Fugitive landscapes,” which refer to “inhabited and working land dense with meaning and history” (Craib, 2004; 56–57, see also Bryant, Paniagua, & Kizos, 2011; Craib, 2000; Truett, 2006), comprised local Andean uplands resembling

the “regions of refuge” of indigenous people that emerged across relatively isolated and expansive areas less governed by the reach of Latin American state rulers (Aguirre Beltrán, 1979). By contrast, the valley–upland model of colonial Andean landscapes hinged on the paired representation of these areas as settled and unsettled, respectively. According to our analysis and interpretation, this model was more relationally dynamic than the assumed spatial dimension of colonial social and environmental history suggested in the ideas of “regions of refuge” or “emptying the land” (e.g., the Pristine Myth debates: Blaut, 2012; Denevan, 1992; Pratt, 2007; Sluyter, 2002). The latter concept has been a cornerstone of the important debunking of the European and settler Pristine Myth of untouched natural landscape that was first portrayed in nineteenth century literary and artistic movements. The valley–upland model, as described below, indicates a kind of binary landscape delineating *both* “emptying the land” (i.e., settler societies attempting to erase claims of indigenous settlement and rights) *and* nearby settled areas combining colonizer and indigenous populations.

This primacy of the distinction of separate units in the Andean valley–upland model is causing obstacles to current landscape planning and capacity-building that requires enhancing landscape connectivity in order to address global climate changes, soil and water management (e.g., irrigation), urbanization and rural out-migration, food security, biodiversity conservation, participatory development planning, and social justice. Especially in tropical mountains such as the Andes, these current challenges are highlighting the importance of landscape connectivity (Haller, 2012; Mottet, Ladet, Coqué, & Gibon, 2006; Young, 1997, 2009; Young & Lipton, 2006; Zimmerer, 2011, 2012; Zimmerer & Bell, 2013). As a result, we argue the current models of social–ecological units in tropical mountains must be rethought for landscape planning aimed at sustainability and equitable development. We use our findings to discuss the design and use of landscape network and connectivity models in the Andes and elsewhere.

Our analysis of the historical emergence, influence, and present-day importance of the valley–upland model, which has not been researched to-date, is based on early colonial representations and use of Andean landscapes that view valleys (mountain slopes and basins) as predominantly cropping-based agricultural land versus the more extensive high elevation uplands (known in the Andes as the *puna* and *páramo*) as predominantly or exclusively non-agricultural areas of livestock-grazing and forest cover (Fig. 1). This model led to the characteristic treatment of Andean valleys as fixed sites of Spanish control, private property, and legible use of the landscape, whereas uplands featured mostly fugitive and invisible qualities. We use a multi-dimensional social–ecological perspective drawing on historical political ecology and related landscape approaches (Bryant et al., 2011; Craib, 2000, 2004; Davis, 2009; Offen, 2004; Scott, 2009; Widgren, 2010). In order to describe the valley–upland model we studied extensive historical sources dating from the period 1532 to 1750 (Tables 1 and 2). We focus on Spanish imperial documents (e.g., Chronicles, Geographic Reports, maps, censuses, laws and ordinances, urbanization and resettlement policies) (Sections 2 and 3), indigenous chronicles and maps (Section 3), and extensive landholding legal documents and litigation (Section 5). New analyses of past climate and ecological changes (e.g., the Little Ice Age) are then integrated with demographic, urbanization, and land use factors in order to consider fully the complex social–ecological formation of the valley–upland model between roughly 1550 and 1750 (Section 4). Our study concludes with discussion of its legacy in the context of current planning and development, especially the current challenges of strengthening connectivity across networks of spatial units, and thus significantly reworking existing landscape models (Sections 6 and 7).

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