

# Land Use in the Andes from 1950 to the Present

## Debates on Access to Land and Acceleration of the Transformation of Land Uses

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From the perspective of the Anthropocene, the transformation of land cover and land use, at the current acceleration stage, is a main driver of global environmental change (Foley et al. 2005). Underlying climate change, the loss of biodiversity, and the degradation of natural ecosystems, this transformation contributes to the generation of greenhouse gases, limits carbon capture, affects flora and fauna, and modifies the circulation of surface and groundwater, among other effects.

Such transformation is especially critical in the intertropical Andean region, because it is considered a biodiversity hotspot (Myers et al. 2000) where high levels of biological diversity and endemism are under significant anthropic pressures. At a theoretical level, the different forms of environmental exploitation, which translate into different degrees of ecosystem artificialization, depend on the organization of land access (Le Meur and Rodary 2022: 865). In the recent history of the countries that comprise this region (Bolivia, Colombia, Ecuador, Peru, and Venezuela), changes in land use are associated with conflicts over control of access to land. These conflicts have occurred both in the mountain range itself and its western (Pacific and Caribbean coast) and eastern (Amazon and Orinoco) foothills, as well as in rural and peri-urban areas.

Thus, for the period from the mid-twentieth century onwards, this chapter proposes that land use, as an element of the environmental crisis, should be understood through the debates on land access, based on the analysis of the socioeconomic context in which various problems concerning these debates have developed, from the 1950s to the present. In this period, access to and/or control over land defines land use decisions – including land cover change for anthropogenic uses –, and contextualizes social and economic inequalities that are crucial for understanding its evolution. Furthermore, it allows for making land use decisions that may be more sustainable, as well as defining production, management, or conservation alternatives.

The first part of this chapter situates the land issue in the context of structural changes that took hold from the mid-twentieth century in the Andean region. These

changes, albeit characterized by their own patterns, occurred within global trends: demographic and urban growth, technological innovations in agriculture, social conflicts, and civil wars, and discussion of various political and economic models. It then addresses two moments in the construction of the debate on land access since the 1950s and shows how environmental aspects are integrated into the critiques without radically modifying existing policies on the land issue. The second part presents the outcome of the acceleration of the intensification of land use change according to three axes: the expansion of the agricultural frontier, of urbanized land, and the extraction of natural plant, fossil, and mineral resources. For each of these processes, the relationship between the types of control over land access and the spatial forms they present is specified. Finally, the chapter looks at the question: could changing the forms of control over land access modify the course of land use trajectories? A response is outlined in the conclusions, based on theoretical aspects and experiences studied in the Andean region.

## **Dispute over Land and Gradual Appearance of the Environmental Issue in Debates**

The issue of land has been an analytical entry in the social sciences in Latin America for analyzing structural problems of inequality, poverty, and productivity; therefore, the debate has focused on social and economic issues rather than environmental ones. However, with the rise of extractivism in the context of globalization, since the end of the twentieth century, environmental debates have become central.

## **Structural Changes and Exacerbation of Land Scarcity during the Twentieth Century**

The Andes have suffered the demographic effects of the conquest of the Americas and, despite the arrival of European, African, and Asian populations, probably did not return to the demographic levels of the pre-Hispanic era until the nineteenth century (Dollfus et al. 1990: 447; Mesclier 2006: 20, 37). In 1900, Ecuador had less than 1.5 million inhabitants, Bolivia less than 2 million, Venezuela slightly more than 2 million, and Colombia and Peru less than 4 million each (Sánchez Albornoz 1976; Chevalier 1993: 129). Therefore, the “demographic transition” and “urban transition” of the twentieth century occurred in low-density human populations, when compared to other continents (Dollfus et al. 1990).

These transitions did not occur in the same way in all countries of the Andean region (Cosío Zavala 2011). Colombia has had faster population growth than Peru; by the early 2020s, it has more than 50 million inhabitants (DANE 2018). For their part, Peru and Venezuela had around 31 million inhabitants each at the end of the

2010s (INEI 2023); however, since 2017, the Venezuelan population has decreased by at least two million due to current emigration, according to data by ECLAC (CEPAL n.d.). Ecuador had more than 17 million inhabitants in 2020 (INEC). In Bolivia, the decline in infant mortality has been slower; the country had only about 12 million people in the early 2020s, still more than six times its 1900 population. This population growth has been much greater in urban areas than in rural areas. In 1950, the urban population had a slight majority only in Venezuela whereas in other countries, it was between less than a third and 40 percent of the total. By the beginning of the 2020s, the proportions grew, with urban dwellers now constituting between 66 percent (Ecuador) and 90 percent (Venezuela) of national totals (CEPAL n.d.). During this period of demographic transition, children and young adults were predominant in the population.

These changes began in a context of profound social inequality, particularly in terms of the distribution of land access and the control of its modalities. In the first half of the twentieth century, large private estates dominated the rural land tenure structure. In the hacienda system, whose origins date to colonial times, many tenant families survived on borrowed land in exchange for precarious forms of labor and exploitation without any control by the public authority to limit the power of the owners (Mannarelli 2018). The lands still occupied by the communities or groups of peasant families, many of ancient origin, had been further reduced as a result of the liberal reforms of the nineteenth century and economic processes that led to the formation of large agrarian estates (*latifundios*) (Luna 2023: 138; see also Piel 1983; Fajardo 1998).

This system, however, was under a lot of stress. On the one hand, in some *latifundios*, the ongoing technological modernization had led to the expulsion of dependents, who were replaced by machinery, or in other cases, to the prohibition of peasant families owning native animals that could interbreed with the improved livestock (Martínez Alier 1977). On the other hand, population growth meant that labor, scarce in previous centuries, became more abundant, allowing landowners to replace dependents with temporary or waged workers.

At a more general level, the development of critical thought in Latin America, as well as international pressures since the agreements of Punta del Este (1961) and the Alliance for Progress for the modernization of national economies (Mertins 1979), rendered precarious forms of servitude unacceptable. In the context of the Cold War and revolutions, such as the one in Cuba, the United States pushed for agrarian reforms in an effort to limit the influence of radical movements. The incorporation of traditional haciendas into capitalism was also perceived as essential to optimize agricultural production (Barsky 1984). For their part, the peasants organized themselves. In Bolivia, an “integration of the great social forces of the countryside, the city, and the mining center” took place (García 1973: 118). In Colombia, the civil war of the 1950s was partly a consequence of land monopolization (Fals Borda 1975; Fa-

jardo 1998). In Peru, the increase of peasant movements (see for example Gutiérrez 1986; Monge 1989; Degregori 1990; Degregori 1992; Revesz 1994; Rénique 2004) came together with the growing influence of trade unions and a political party, the APRA (Klarén 1976).

Finally, the growth of cities, driven by population growth, expanded the consumer market and the political concern for food security. Thus, the context became very favorable for new debates on the social, demographic, and economic issues surrounding access to land and its resources. In contrast, environmental problems did not attract attention at that time, despite a growing dynamic of occupation, both by peasant families and haciendas, of the tropical lowlands – often covered with forests. Despite the reality, these areas are strategically described as vacant or “wastelands” (*baldías*), i.e., without inhabitants (Serje 2017), with state control over their access. The territorial occupation of the Amazon became a target for the governments of Bolivia, Ecuador, and Peru, particularly after the rubber boom of the late nineteenth century (García Jordan 2001), a target that was reaffirmed with a different nuance during the agrarian reforms of the second half of the twentieth century.

### **Agrarian Reforms and the Beginnings of a Critical Debate on the Modernization and Expansion of the Agricultural Frontier**

Agrarian reform, i.e., the modification of the distribution of land access among social groups, was the focus of debates between the 1950s and 1970s. The reforms took various forms: structural, when they attempted to modify society, power relations, and institutional norms; conventional, when they resulted from a negotiated operation between old and new social forces and focused on a sectorial issue; and marginal, when they aimed at preserving latifundio structures, diverting peasant pressure towards the colonization of vacant lands (García 1973: 25–26). Broadly speaking, the reforms in Bolivia in 1953 and Peru in 1969 were radical, while the Ecuadorian reforms of 1964 and 1973 were conventional and the Colombian reform marginal, all marked by contradictions and complexities.

The options to respond to both social problems and the growing demand for food were diverse. Although the motto “the land is for those who work it” was present, as in other parts of the world, the debate remained whether lands should be given to the permanent and temporary workers of the haciendas, to its dependents, or to the neighboring communities stripped of their lands over the centuries. There were also extensive debates about the possibility of replacing haciendas with collective forms of organization, such as communes, associations, and cooperatives (Barsky 1984). In Peru, the decision was made to preserve large production structures in the form of agrarian production cooperatives (CAP, for its initials in Spanish), social interest agrarian societies (SAIS, for its initials in Spanish), and sugar cooperatives, in whose

management the state intervened (Matos Mar and Mejía 1980). For its part, Bolivia opted to “incorporate Indigenous communities into the market economy and open a new growth pole – within the framework of the plantation economy – in the tropical plains of the East” (García 1973: 38). In Colombia, as in Ecuador, the reforms did not suppress haciendas nor their dominant role in agricultural production, although they did facilitate their expropriation.

Land access policies were complemented by the idea of modernization of agriculture, and green revolution strategies were employed: use of selected varieties of food crops, importation of pedigree livestock, and promotion of the use of chemical fertilizers and pesticides, especially for mass consumption crops such as potatoes and rice.

The governments were not concerned with limiting the expansion of the agricultural frontier. On the contrary, internal colonization complemented redistribution policies. In this sense, the state supported access to supposed “wastelands,” either to propose a solution to peasant families or to open new spaces for large properties – as in Bolivia.

However, in the 1980s, some of the spatial patterns of land use changes sparked debates in the academic world, combining criticism of their environmental, cultural, economic, and social effects. Thus, in Peru, researchers such as Klaus Urban (1986, cited by Assies 1988) were concerned about the low profitability of irrigation projects, their high costs, and their poor durability. Other authors pointed out the low fertility and high vulnerability of Amazonian soils, as well as the social problems generated by internal colonization (e.g. Aramburú 1986, cited by Assies 1988). Still, others addressed the problem of how to promote the knowledge and practices of Andean agriculture, compromised by the expansion of the Green Revolution and the importation of foreign technologies (Claverias 1986; Hibon 1981; Morlon 1992). Although peasant farms gained greater specialization, the risk in terms of production increased, as well as the environmental consequences, such as the degradation of soil fertility and, with the overuse of chemical inputs, the impacts on human health and water and soil contamination.

At the same time, the urban transition continued. Agrarian reforms made it possible to absorb part of the peasant labor force, and the rural population continued to grow, albeit slowly, until at least the end of the twentieth century, and even into the twenty-first, in the case of Bolivia and Ecuador (CEPAL n.d.). However, mainly young people continued to migrate to the cities for the quality of their educational and cultural services and access to better jobs. Migration added to the natural growth, which was also high due to the predominance of reproductive age population. This phase was also marked by the national elites’ fear of a “popular overflow” (Matos Mar 2004) and the almost total absence of state policies to plan housing complexes, for example.

In the academic discussion, urban growth did not appear as an environmental problem, but a social one, focused on the key roles of the popular classes, labor markets, public policies, and city planning (Carrión and Dammert Guardia 2016: 245). The concern about food security emphasized quantity, rather than quality, due to the total population growth, while the number of peasants stagnated (Fajardo 1998: 58).

### **End of Agrarian Reforms, Globalization, Extractivism, and Environmentalist Turn(s)**

The debate on land access has taken new directions from the late 1980s and especially in the 1990s. Agrarian reforms must be considered “in a dynamic perspective” due to the evolution of markets, demographics, and the political context (Léonard and Colin 2022: 851–852). Cooperative or state schemes of agrarian production often did not meet the social and economic expectations that were projected; therefore, peasant families opted for parceling, private property, and the formation or expansion of communities in which individual access to land was granted. Neoliberal policies challenged these results. The cooperative organization had seen itself discredited; there were criticisms of the violent land struggles around the communes in Ecuador; and suspicions were placed on the peasants during both the internal war in Peru in the eighties and nineties and the Colombian conflict. Against this backdrop, another criticism arose from the press and the economic elites regarding the poor technologies, the lack of capital, and the fragmentation of family farms. Private investment was promoted against the “peasant path” (Mesclier 2000; Van der Ploeg 2013). The debate became more acute in the face of production uncertainty due to climate change, the problem of rural depopulation, international migration, and generational replacement. Thus, the viability of the peasantry itself as an economic and political segment of Andean society was questioned.

This discourse is reflected in policies promoting the privatization of community and cooperative lands and the formalization of private property, as “neoliberalism” distinguishes itself from liberalism by the determined intervention of the state to adapt society to the market (Stiegler 2019). The laws of the 1990s confirmed the end of land reforms. The Ecuadorian Agrarian Development Law (1994) replaced the Agrarian Reform Law, promoting the possibility of privatizing communal lands; the affectation of land ownership, as a form of expropriation, was maintained, but in very particular cases. Colombian Law 160 of 1994 gave the land market a preponderant role as an alternative for land redistribution (Suárez 1999). In Peru, the agrarian reform was terminated and laws were issued to facilitate the sale of community lands and oblige sugar cooperatives to transform themselves into corporations (Del Castillo 1995; Del Castillo 1997; Chaléard et al. 2008; Mesclier 2000). At the same time, the dynamics of world trade changed, with a new boom in commodities, non-

traditional exports (fruits, vegetables, etc.), and agro-industrial business development based on the idea of “comparative advantages” granted by natural resources or the existence of cheap labor. The intensification of agriculture was encouraged, thus increasing the need for capital intermediation by incorporating financial entities in the production chain. According to business discourse, technological sophistication (e.g. computerized drip irrigation) also leads to productive efficiency and environmental care, justifying the consolidation of large farms. The same discourse indicates that “traditional” agricultural production techniques are no longer adequate. The loss of agrobiodiversity is justified by the global discourse on competitiveness and the need to feed the planet, leading to the exclusion of peasants from productive lands and the denial of their traditional knowledge. Extractive practices are associated with an alleged national interest in achieving development and are thus politically legitimized (Burchardt and Dietz 2014).

The model of the “(neo-)extractivism” (Gudynas 2009) promotes an accelerated search for new resources, mostly in under-exploited areas. The actors involved in defining the rules are very diverse, including transnational corporations and development finance agencies linked to the World Bank. Likewise, the nation-states’ intermediation is substantial in this model, as they are constitutionally the owners of the subsoil resources in Latin American countries. In this context, the control exercised by transnational capital grew towards the end of the twentieth century. The state played an intermediary role between the demands and interests of the companies and the specific territories – particularly by facilitating access to land and water – and developed regulations to define how to access land and negotiate with the population (e.g., concessions, prior consultations), regulations that are not always respected. Therefore, the state also became an accomplice to violent and illegal forms of land dispossession. When land access is linked to other resources, such as minerals, oil, water, timber, and wildlife, the situation becomes even more conflictive.

The same voracious search for land appeared in the development of cities. The mobilization of real estate capital through private actors produces urban space, extracts and manages urban wealth; the central state, as well as the municipalities, facilitate this access to urban land through the development of policies and other mechanisms aimed at reducing investors’ risks (De Mattos 2002; De Mattos 2007). Access to the city for a new middle class with sufficient resources to integrate into the peripheries’ legal housing market is promoted, favoring economic growth and the real estate business (Prévôt-Schapira 2013). The process is mostly based on purchase and sale transactions with private owners. However, conflicts and illegality also persist: opaque transaction methods arise to obtain access to land, especially in areas belonging to peasant communities, as seen in Lima (Huamantínco and Mesclier 2016; Diez Hurtado 2023). In other cases, people have been pressured to

sell their land through municipal regulation, as occurred around the new Quito airport (Bayón 2016).

In this context, politics increasingly included nature and Indigenous cultures in the debate. On the one hand, the so-called progressive governments in Ecuador, Bolivia, and Venezuela introduced a partly environmentalist discourse, promoting “*buen vivir*” (good living), a concept that includes the environmental protection and food sovereignty. At the same time, national legislation handed over control and regulation of natural resources defined as strategic (oil, minerals, water) to the state, limiting land access and other resources to Indigenous or peasant populations located in areas also defined as strategic. In countries with neoliberal governments, academia and civil society stressed the irregularities that accompany the attribution of public markets for infrastructure construction and land acquisition. Some institutions, such as the *Centro Peruano de Estudios Sociales* or the *Instituto del Bien Común* in Peru, denounce the inertia of governments and support farmers’ associations and peasant and native communities in their land titling efforts, as well as their territorial claims. In Colombia, conflicts were also numerous, particularly in the face of extractivism (Rodríguez Maldonado 2017).

An international initiative also arose to protect the collective rights of Indigenous and Tribal Peoples through ILO Convention 169, ratified by, among others, the Andean countries (Bolivia and Colombia in 1991, Peru in 1994, Ecuador in 1998, and Venezuela in 2002). A large part of the convention is devoted to “lands” and “territories,” i.e., the “totality of the habitat” occupied by these peoples. Article 14 recognizes “the rights of ownership and possession of the peoples concerned over the lands which they traditionally occupy” and, according to Article 15, governments must organize consultations “before undertaking or permitting any programs for the exploration or exploitation of such resources pertaining to their lands” (ILO 2014). However, since it is a consultative and formal process, it is often not even carried out. Since then, the environmental issue has mainly focused on the question of Indigenous territories. With regard to cities, the preservation of public spaces, environmental issues – particularly those related to climate change adaptation –, and new forms of participatory democracy have become important objects of reflection (Metzger and Rebotier 2016). Finally, the emergence of the Anthropocene concept in recent years has generated greater attention to the acceleration of land use transformation in all geographical contexts.

## Access to Land and Spatial Forms of Land Use Transformation

The history of the land question in the Andean countries has made possible three major processes of accelerated land use transformation since 1950: the expansion of agricultural activities, urbanization, and the exploitation of natural resources. Each

process generates its own spatial and temporal forms, as well as particular social and environmental dynamics.

## The Acceleration of the Expansion of the Agricultural Frontier

Promoted as a complement or replacement of agrarian reforms, the state distribution of access rights to vacant land was carried out to the detriment of primary vegetation. To the detriment of the plant cover of the diverse ecosystems of the Andean countries, the intense human mobility produced by colonization directly expanded the agricultural and livestock frontier, the human habitat, and the urban area.

In the Ecuadorian case, the expropriation of haciendas in the Andean Mountain Range was complemented by the colonization of coastal and Amazonian “waste-lands” (Gondard and Mazurek 2001). In Peru, the cultivated area expanded toward the arid coastal piedmont with the creation of new irrigation perimeters in the 1970s; while the settlement of farmers in the Amazon region became more important when the expropriation of the haciendas was interrupted in the early 1980s (Assies 1988). The latter process was carried out gradually through family farming systems with a focus on collective organization. The settlers were assigned lots that they cleared at the pace that their manual labor allowed them. The opening of roads to transport material needed for extraction and the establishment of oil wells contributed to colonization in the Andean countries by facilitating access to more remote areas from the 1970s and especially into the 1980s and 1990s. This phenomenon was associated with an important deforestation process in the Andean Amazon (Myers 1994).

The liberalization of land access in the 1990s aided an investment boom, which grew globally between 2005 and 2011, with investors of very diverse profiles and origins directing capital towards the cultivation of products with strong international demand, such as oil palm, soybeans, or sugarcane. These investors also pursued projects such as groundwater extraction for vegetable or cereal production and forest exploitation (Burnod 2022). Since the twenty-first century, the expansion of agro-industrial crops such as oil palm or soybeans in Ecuador, Bolivia, Peru, and Colombia has entailed the loss of forests, mainly in the Amazon (and to a lesser degree the Pacific Coast). For example, in the context of the development of projects linked to Malaysian agribusiness groups, the cumulative area of oil palm cultivation quadrupled in Peru’s Amazon basin between 2000 and 2013, reaching an area of 60,000 hectares (Dammert Bello 2015). This generated concern in social and environmental organizations about the dynamics of deforestation and dispossession of peasants, mainly colonists settled in the areas of said projects.

The increase in oilseed crops throughout the region reached 170 percent between 1970 and 2019 (Tab. 1), the Bolivian case showing the highest growth. The soybean model could explain why Bolivia is currently one of the countries with the greatest forest loss in the world (Colque 2022). Recently, the use of fire in clearing large

areas of forests for the expansion of agro-industrial crops has heightened the risk of wildfires, an aggressive form of destruction of nature, violent in all dimensions, whether environmental, human, or social. The 2019 fire, which affected forests in the Brazilian and Bolivian Amazon, destroyed almost 5 million hectares of forest in the Bolivian regions of Chiquitania, the Amazon, and the Pantanal (Colque 2022).

*Tab. 1: Harvested Area of Oilseeds\* (Thousands of Hectares), 1970 -2019*

|           | 1970   | 1980   | 1990   | 2000   | 2010    | 2019    | Change<br>in surface<br>area<br>1970–2019 |
|-----------|--------|--------|--------|--------|---------|---------|-------------------------------------------|
| Venezuela | 250.35 | 156.72 | 337.84 | 116.85 | 229.19  | 132.48  | -117.87                                   |
| Colombia  | 372.9  | 346.8  | 440.01 | 223.84 | 300.17  | 592.75  | 219.85                                    |
| Ecuador   | 61.25  | 95.21  | 195.6  | 193.32 | 262.21  | 254.3   | 193.05                                    |
| Bolivia   | 15.28  | 76.32  | 168.21 | 852.13 | 1422.57 | 1676.04 | 1660.76                                   |

\* This includes both annual crops and perennial plants whose seeds, fruits, or mesocarp are mainly used to produce edible or industrial oils that are extracted from them. Some crops of this type are soybeans, oil palm, and sunflower seeds.

Source: CEPAL n.d.

Between 2002 and 2022, according to data from Global Forest Watch (n.d.), the net change in tree cover in the Andean countries was -276,000 hectares (-1.5 percent) in Ecuador, -1.74 million hectares (-2.2 percent) in Colombia, -1.37 million hectares (-2.5 percent) in Venezuela, -762,000 hectares (-0.97 percent) in Peru, and -3.32 million hectares (-5.6 percent) in Bolivia. The mountainous Andean cloud forests in Colombia and Ecuador also sustain the expansion of the agricultural frontier, pastures, or illicit crops (Armenteras et al. 2011, Tapia-Armijos et al. 2015). In Colombia, Rodríguez Eraso et al. (2013) observe important evolutions towards crops, pastures, and secondary vegetation, related to violence and population displacements. Deforestation and, above all, the fragmentation of these forests, unique on a planetary level, result in the remnants of relic vegetation with limited ecosystemic functions, which will probably soon be subject to protection as natural heritage or to complete disappearance.

Other forest ecosystems also have high levels of biodiversity and/or endemism. The seasonally dry tropical forest of the Tumbesian region in southern Ecuador and northern Peru is being replaced by pastures or maize (Rivas et al. 2021). Since the end of the twentieth century, agribusiness has also expanded into these areas. The Peruvian coast, whose fragile and unique ecosystems due to its location at the foot

of the mountain range and the alternating absence and abundance of precipitation with El Niño events, has been occupied by agro-industrial crops that rely excessively on the use of groundwater resources (Whaley et al. 2010; Oré and Damonte 2014). Communal lands are part of those affected, based on legislation from the 1990s (Marshall 2014; Burneo de la Rocha 2020). In Ecuador, according to Beitzl (2016), between 1970 and 1998, about 26 to 27 percent of the original mangroves were destroyed by shrimp farming. This led to the loss of unique and endemic biodiversity (e.g. fish, crustaceans, and shells), accompanied by population impoverishment, the disappearance of livelihoods based on harvesting and fishing, and agrochemical water pollution.

In Colombia and Ecuador, the páramo has been affected mainly by the expansion of the peasant agricultural frontier. This especially includes intensive potato cultivation and livestock production (López Sandoval 2004), which also alter hydrological production (Buytaert et al. 2005). Recently, the pine forestry agroindustry has developed in high Andean spaces such as the Peruvian *jalca* (Raboin and Posner 2012) or the páramo of Ecuador (Farley 2007). In the latter country, it is estimated that the percentage of páramo coverage, which amounted to 5.8 percent in 1990, could be reduced to 1.5 percent by 2030 (PNBV 2013).

One of the most important transformations in the inter-Andean valleys of the northern Andes is attributed to the flower industry, which expanded from the late sixties in the surroundings of Bogotá and reached Ecuador in the early eighties. Knapp (2015), citing producer organizations, indicates that there were fifty-two producers in 1991, growing to 678 by 2014. The intensive use of greenhouses and agrochemicals has resulted in environmental damage and harm to human health (Tanenbaum 2002).

Deforestation due to the settlement of peasant families continues to occur in parallel, and sometimes even in conjunction with the development of agroindustry (as shown in a case study by Siron 2019). Certainly, the rural population is now tending to decrease in almost all Andean countries; however, this does not necessarily mean a reversal of anthropization. “Deagrarization” (Carton de Grammont and Martínez 2009), i.e. changes in peasant productive activities, remittances, and human mobility, generate local urbanization phenomena (growth of hamlets and small and medium-sized towns). The sale of lots and construction of secondary residences scattered in the countryside is also observed, especially in the vicinity of metropolises and communication axes. This contributes to the expansion of urbanized land.

## Uncontrolled Expansion of Urbanized Land and Associated Resource Degradation

The urban sprawl has two major dynamics associated with land use transformations: first, the expansion of the urban infrastructure itself (e.g., housing, service infrastructure, commerce, roads, etc.), characterized by extreme social differences and struggles over the access to land; second, the management of population growth, waste, and water and energy consumption, i.e., intense changes in urban metabolism. Urban sprawl generates the loss or displacement of other uses. In contrast, the concept of land *occupation* within urban use helps to problematize how urban functionality occupies spaces in a segmented and fragmented manner (Borsdorf 2003).

Cities expanded in the outer peripheries. In the second half of the twentieth century, migrants were able to settle by building their own homes, following an “oil-spill” logic. Lima is a paradigmatic case: the “barriadas” occupied agricultural or pastoral lands. These lands, located in the valleys, the desert pampas, and on the hill-sides, were partly ceded (or directly urbanized) by landowners threatened by expropriation, sold by family farmers, or corresponded to the property of peasant communities or the state (Calderón Cockburn 2006). According to Driant and Riofrío (1987), in the mid-1980s, one third of Lima residents lived in this type of neighborhood, occupying 31.7 percent of the usable area of Metropolitan Lima. On the other hand, throughout the region, urban elites abandoned the historic centers to monopolize privileged peripheral areas, close to the central business districts or with favorable environmental conditions.

The dynamics of the twentieth century generated strong asymmetries between affluent and working-class neighborhoods (Deler 1992). In contrast, in the twenty-first century, metropolitan expansion within the economic paradigm of neoliberalism, fueled by globalization, has led to a more fragmented city. First, the location of residential and industrial/business areas in sectors distant from the traditional center, the reduction of direct state intervention, privatization, and deregulation have allowed investors, planners, and citizens greater freedom to organize the city and to appropriate spaces. This, in turn, has influenced the high differentiation of spaces. Second, the location of functional infrastructure in a dispersed manner has caused the structure of consumption in the urban center to lose predominance, with malls, shopping centers, and urban entertainment centers with multiple locations currently becoming more attractive. Originally oriented to upper-class neighborhoods, today this infrastructure is dispersed throughout the city and conurbated areas. In this process, the importance of placing infrastructure in specific locations diminished for the industrial sector. A wide range of locations can be the site of new industrial parks, as well as business parks.

In this context, plots of land acquire a significant economic value, attracting the interest of a wide range of players. For example, in Lima, in the absence of real protection, ecosystem formations such as the *lomas*, formed thanks to the winter mists, are threatened by illegal occupations organized by mafias that create a context of violence (Nieuwland and Mamani 2017). Gated communities arise as a response to insecurity, both in the city limits and the peripheries. Within this development of urban functional infrastructure, the growth of the technosphere, the complex system of objects and elements created by humans, is evident, characterized by the acceleration of the Anthropocene. In the last twenty years, as part of this urban technosphere, the development of road, hydroelectric, and port infrastructure has been critical, precisely in connection to the demands of the population and urban activities, as well as to access to extractive resources and trade.

As a result of this complex history, Latin America and the Caribbean today constitute the second most urbanized region on the planet, with 81 percent of the population concentrated in cities (United Nations 2018). Despite notable growth in all cities, the urbanization dynamics vary. Bogotá and Lima are the most populated agglomerations in the region. According to DANE figures, Bogotá generates a quarter of the country's GDP and, in terms of population, it registered 6,763,325 inhabitants in the 2005 Census and 7,181,469 in the 2018 Census, explaining the increase in densification and in the urbanization of areas of development (Holguín et al. 2021). According to the 2013 study by Parés-Ramos et al. (Tab. 2), in Bogotá, Cali, Medellín, and Guayaquil – cities where the population grew considerably between 1992 and 2009 (Bogotá ~2.5 million, Medellín ~1 million, Guayaquil ~1 million and Cali ~680,000) –, urbanization with a development pattern of high-density compacted areas is evident. In contrast, the dominant pattern in Quito and Santa Cruz has been an expansive development with a more rapid growth of the urbanized land area, but with lower population densities and smaller compact central areas. Lima had less than 2 million inhabitants at the beginning of the sixties. Its expansion recently overflowed from the central area in the Rímac valley and the port. Today, the city has around 10 million inhabitants and has incorporated two other valleys, as well as the interfluves (Matos Mar 2004; Mesclier et al. 2015). Much of the expansion area of La Paz is located in the neighboring municipality of El Alto, progressively urbanizing locations that were rural until recently. In this context, population density decreases as one moves away from the center (Hardy 2013).

*Tab. 2: Growth and Density of the Main Agglomerations of the Andean Countries, 1992–2009*

| Country  | City               | Urban Population in 1992 | Urban Population in 2009 | Annual Population Growth Rate 1992–2009 | Google Earth Image Year | Urban Area (Extension) | Urban Population Density (per/km <sup>2</sup> ) |
|----------|--------------------|--------------------------|--------------------------|-----------------------------------------|-------------------------|------------------------|-------------------------------------------------|
| Bolivia  | La Paz/<br>El Alto | 1,189,000                | 1,847,000                | 2.6                                     | 2009                    | 200<br>km <sup>2</sup> | 9,235                                           |
|          | Santa<br>Cruz      | 710,000                  | 1,584,000                | 4.8                                     | 2009                    | 221<br>km <sup>2</sup> | 7,167                                           |
| Colombia | Bogotá             | 5,030,000                | 7,609,000                | 2.5                                     | 2009                    | 364<br>km <sup>2</sup> | 20,904                                          |
|          | Cali               | 1,976,000                | 2,664,000                | 1.8                                     | 2007                    | 132<br>km <sup>2</sup> | 20,182                                          |
|          | Medellin           | 2,199,000                | 3,231,000                | 2.3                                     | 2008                    | 151<br>km <sup>2</sup> | 21,397                                          |
| Ecuador  | Guayaquil          | 1,711,000                | 2,732,000                | 2.8                                     | 2009                    | 209<br>km <sup>2</sup> | 13,072                                          |
|          | Quito              | 1,372,000                | 2,165,000                | 2.7                                     | 2008                    | 331<br>km <sup>2</sup> | 6,541                                           |
| Peru     | Lima               | 6,106,000                | 8,462,000                | 1.9                                     | 2009                    | 760<br>km <sup>2</sup> | 11,134                                          |
| TOTAL    |                    | 20,292,000               | 30,294,000               | 2.4                                     |                         |                        |                                                 |

Source: Parés-Ramos et al. (2013).

## The Direct and Indirect Consequences of the Extraction of Non-Agricultural Natural Resources

The extractivist model seeks locations with specific resources obtained through land access; however, land use change does not always represent a large absolute area. There is an extensive development of the extractive technosphere: mining camps and settlements, open pit mines, oil wells, roads, ponds, waste dumps – particularly in large-scale mining areas –, in addition to rubbish. This process completely alters ecological and water cycles that cause loss of ecosystem functionality.

The Mirador project in the Córdor mountain range in Ecuador, covering 9,928 ha. under concession, represents the first large-scale mining project since 2012, developed amidst constant resistance from local populations (Sánchez-Vázquez et al. 2017). The Cerrejón coal mine, in La Guajira, Colombia, an open pit mine considered one of the largest in the world, has resulted in the displacement and resettlement of several Afro and Indigenous communities in its more than thirty years of operation (CINEP and Programa por la Paz 2016). In other cases, such as the Toromocho mine in the Peruvian Andes, an entire city had to be displaced in order to access the resources.

In the Andean region, a well-known example of small-scale mining occupying large areas is gold mining in the department of Madre de Dios in southeastern Peru, on the border with Bolivia and Brazil. This mining area has been around for decades, but its expansion has accelerated in the twenty-first century. Sánchez-Cuervo et al. (2020), in an analysis of land use changes between 1993 and 2013, show the acceleration of deforestation produced by this activity, which reached a total area of more than 37,500 hectares in 2013. Furthermore, the consequences of river pollution are serious, similar to what has happened in the historic mining settlements of Nam-bija, Ponce Enriquez, or Portovelo in Ecuador (Mestanza-Ramón et al. 2022), where several studies have been carried out on the health consequences of mercury contamination in children (Counter et al. 1998). This type of mining promotes a change in land use, as well as the development of human settlements and urbanization in residual spaces in conditions of social precarity, poor health, and violence.

In addition to metal mining in Peru, for example, sixty-four concession areas for oil and gas companies covered more than 70 percent of Amazonian lands in 2009: at least eleven of these overlap with protected areas, seventeen with reserves of Indigenous populations in isolation, and fifty-eight with recognized Indigenous territories. Similar situations exist in Ecuador and Bolivia, as well. Likewise, timber extraction has led to the privatization of collective lands (Bebbington 2009). Nevertheless, while disputes until the end of the twentieth century were over large or medium-sized areas, the conflict over land access in the twenty-first century also includes small areas that are privileged because of their location or the strategic resources they possess.

This conflict is not only over access to land but also to these resources and locations; the disputes are also for the protection of ecosystems and environmental care.

Despite the different development policies and visions implemented in Venezuela, Bolivia, and Ecuador – in contrast to Peru and Colombia – the role of the state appears to be similar, playing a key role to a greater or lesser degree by facilitating access to land and strategic territories, soil and subsoil resources, and other ecosystem services. It is claimed that the aim is to move towards a modern and technological, private and controlled business production, with mining and oil extraction projects and control of water sources for energy production, irrigation, and urban consumption. This also justifies displacements, expulsions, and relocations of populations. A revaluation of marginal lands and wastelands – *baldíos* – is promoted through technological innovations, e.g. irrigation. The debate on land access continues, but new concepts are developed to refer to new environmental and political dimensions of the debate, such as territorial dispute and resistance; the notions of dispossession and waste become significant to contextualize the importance of the concept of environmental justice.

### **Conclusions: Access and Control of Land as a Possibility of Reversing Anthropocene Processes**

The processes of deforestation, fragmentation and transformation of unique Andean ecosystems, urbanization, the development of the technosphere, and the functional changes of ecosystems in extractive zones are signs that the limits of the current growth model are near, which is a central idea in the Anthropocene debate. What alternatives are proposed?

From the analysis carried out, the control of and access to land are seen as key elements in the possible responses to the environmental crisis. The state is a central actor due to its capacity to modify laws, generate economic incentives and intervene in negotiations between actors at various scales. Historically, the creation of protected areas within national conservation systems has been a state mechanism for controlling land use to maintain natural plant cover and biodiversity. Currently, in response to international commitments to confront global environmental change, especially climate change, countries must incorporate environmental legislation into their national legal systems for the development of programs and mechanisms – especially financial – for conservation. Their implementation requires international cooperation for financing, making cooperation agencies key actors in the context of alternatives. The state must strengthen and prioritize its position. It must also mediate between local communities and international conservation programs and between the economic interests of extractive exploitation and these same local actors so that

these alternatives can develop in these territories. Uncertainty about the viability of state power to confront the environmental crisis in the Andean region is evident.

The issue of city management and planning becomes urgent due to the concentration of population in these spaces. The process of decentralization has allowed large agglomerations to have authorities with a certain decision-making power and the ability to devise innovative projects; the examples and discourses indicate that the strategy is to reinforce inclusive urban governance that focuses on environmental issues. At the same time, the sustainability discourse points to intermediate cities as the most viable context for a transition.

The alternatives that arise from organizations or groups, especially urban ones, in civil society revolve around options such as agroecology, urban agriculture, short marketing circuits, or responsible consumption, as well as strategies that combine food production, conservation, and the solidarity economy. Citizen consultative mechanisms such as referendums have been used, for example in Ecuador, to include more citizens in environmental advocacy. Populations, especially Indigenous, who maintain collective ownership over “autochthonous” or “ancestral” territories could also produce alternatives to the accelerated changes in land use. Many of them mobilize with the insignia of autonomy in order to extend their capacity for action and decision-making to protect their territories. Although Indigenous autonomy is gaining strength in the political debate, environmental and territorial issues are also prioritized as much as human rights. Added to this dynamic, national and international social movements have supported the defense of Mother Earth.

Peasants, who control the soil but not the subsoil, support the struggles against mining and oil extraction, not only for social reasons but also for the preservation of nature (Grieco and Salazar-Soler 2013). They emphasize their own capacity to care for it through traditional technology and ancestral knowledge, for example in water harvesting, irrigation management, and promoting soil care agriculture. However, the prospect of developing extractivist projects causes division among local communities that are in precarious economic situations and, therefore, prioritize access to employment (Alvarado Vélez and Rebaï 2018).

In the context of the Anthropocene, the underlying debate on land use changes and environmental limits is compounded by the power dissymmetry of the actors who decide on such changes. Eguren (2019) emphasizes responsible land governance, in which democratic political systems would eventually meet the demands of society; for her part, in the face of growing vulnerabilities, Bernex (2018) proposes that “society as a whole” should appropriate a “culture of care.” It is about creating new “commons,” i.e. links between organized human groups and environment that are not limited to resource management.

The Andean countries, like many countries in the Global South, set the need for economic development against the need to protect ecosystems. As a framework of analysis, the Anthropocene not only raises the existence of limits, but also demands

a broader reflection, one that considers the consequences of said limits in time and space. It incorporates into the environmental, social, and political debate the historical notion of dynamics that are centuries old and will have consequences for many future centuries; it considers actors of all spatial scales, from local to global, involved in convergent and divergent dynamics. In this sense, contextualizing future reflections within the framework of the Anthropocene can help societies modify their general perspective on the rules of land access in relation to land use transformations.

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