Land Use in the Caribbean from 1950 to the Present

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On September 23rd 2017, only a few days after the two major hurricanes Irma and Maria in quick succession caused vast devastation across the Caribbean, Roosevelt Skerrit, then prime minister of Dominica, addressed the 72nd session of the General Assembly of the United Nations, beginning his speech by stating that: "I come to you straight from the frontline of the war on climate change." He further elaborated: "We in the Caribbean do not produce greenhouse gases or sulphate aerosols. We do not pollute or overfish our oceans. We have made no contribution to global warming that can move the needle. But yet, we are among the main victims, on the frontline" (Skerrit 2017). These remarks highlight two important aspects of the current era, often framed as the Anthropocene: First, the Anthropocene is characterized by global (environmental) change, which leads to a state of severe crisis. Current observed and projected changes for the Caribbean include an increase in land and sea surface temperatures, rising mean sea level, and shifting seasonal rainfall patterns (including, most notably, a decrease in wet season precipitation). There is also a strong possibility of a higher frequency of major hurricanes in the region (Bender et al. 2010; Karmalkar et al. 2013). Second, the causes and effects of global (environmental) change in the Anthropocene are unevenly distributed. In the Caribbean, these observed changes have serious socioeconomic implications, because the capacities to adapt and cope with the effects of global change vary at both the national and sub-national levels and are more often than not characterized by high levels of vulnerability (Bohle 2021; Rhiney 2015).

In analyzing the Anthropocene as a multiple crisis, one needs to consider the importance of temporal and spatial characteristics of human-environment relations. One area where these characteristics merge is land use. Land use can be seen as a materialization of human-environment relations; it is primarily defined by socioeconomic practices and environmental conditions. The most important of these practices and conditions in the Caribbean are the uneven distribution of arable land, the high coastal concentration of human settlement, as well as the economic disparities within Caribbean societies. The main process discernible out of such an analysis is the longstanding consumption, or "use," of Caribbean land(scapes) and its people (Sheller 2003). Land use is strongly embedded in the colonial history of

the region, the foundation of land use being the colonial plantation, which continues to shape contemporary land use practices across the region. It is, therefore, no surprise that land use is linked to ethical questions about (climate) justice (Perry 2021; Sealey-Huggins 2017) and reparations (Rauhut 2018), as highlighted by another prominent reaction in the aftermath of hurricanes Irma and Maria, in which Beckles (2017) makes the explicit connection between land use and the Anthropocene: "Irma-Maria blew away the roof of the long and ongoing imperial cover-up, and critically, was revelatory of the horrific history that dwells in the ruins of the present. […] The persistent loss of black life and the dereliction of poor peoples' materialism in a backward built environment that was designed for the sole purpose of servicing imperial sugar plantations reside squarely at the core of their respective metropolitan capitols." These two interventions highlight long-standing lines of thought of the Caribbean's place in modernity (Mintz 1966, 1986; Scott 2004) and hint at today's pressing challenges, both defined by the colonial-globalized past and present that shape the (im)possibilities of the region's future. As Sheller (2018: 971) puts it: "The devastating impacts of Hurricanes Irma and Maria across the northeastern Caribbean not only bring closer a world of immediate climate disaster and halting recovery, but also cast a long shadow of slow disasters and impossible futures for small island states in the face of significantly unstable and unpredictable climate patterns."

These interventions in the wake of immediate destruction by extreme climate events and fear of what futures might hold for the Caribbean also point, on an epistemological level, to blind spots of the Anthropocene discussion. From this standpoint, it seems indispensable to question "the racial and colonial logics of the abstract universal *anthropos* embedded in the notion of Anthropocene. Importantly, such critique has emphasized the uneven causes and consequences of global environmental change, as well as the unmarked whiteness and Eurocentricity of Anthropocene discourses" (Davis et al. 2019: 3). Thinking about the Anthropocene is an ethical venture in which the framing and conceptualizing of the analytical lens is important because the chosen framework (e.g., Anthropocene vs. Capitalocene vs. Plantationocene; Moulton and Machado 2019) renders in/visible where the causes and effects of ecological crises are to be found. The notion of the Anthropocene must be sharpened to fundamentally understand ecological crises regarding land use in the Caribbean. Land use in the Caribbean, therefore, needs to be understood within a framework that rejects universalizing, and, in this way, apolitical and naturalizing claims about an unspecified, all-encompassing "humanity." In view of this, the notion of the Plantationocene should be integrated in the debate on the Anthropocene, as it "points to the ongoing socioecological consequences of plantation agriculture and the permutations and persistence of the plantation across time and space" (Davis et al. 2019: 1). This chapter, therefore, uses the concept of the Plantationocene as an analytic to trace the ways the plantation logic extends into the

present moment through continued processes of extraction, land dispossession and racial capitalism across the Caribbean.

Along the same lines, this chapter rejects any ontological understanding of "the Caribbean" as a fixed entity. Rather, the authors propose to think with the Caribbean as an analytical space by discussing selected examples which highlight certain important changes in land use in the Caribbean with reference to the Plantationocene. While these empirically grounded examples cover a diverse range of Caribbean territories and manifold processes of land use change, many territories and processes are not covered here. The endeavor to explain quantitative and qualitative land use change in detail covering the vast area of the Caribbean as well as a timeframe of more than seven decades seems impossible given the length of this handbook entry. One of the few examples of such an endeavor is the book *Die Westindischen Inseln* by Blume (1968), which gives an extensive overview of the status quo of land use in the Caribbean in the mid-sixties. In contrast, due to changes in available data collection technologies, more recent literature often focuses on detailed small-scale surveys. Rienow et al.'s (2022) study *Detecting land use and cover change on Barbuda before and after Hurricane Irma with respect to potential land grabbing* being a case in point.

The question in this chapter is: How can the Caribbean help us understand the ongoing multiple crises unfolding in the contemporary era of the Anthropocene? In this sense, Gray (2004: 358) stresses that the central problem lies in the difficulty to capture the Caribbean's relationship "to capitalist civilization, to modernity and also how to address these issues in order to achieve an emancipated existence." Putting emancipation, or in other words, social and environmental justice, at the heart of an analysis of post-war land use change in the Caribbean, leads to a non-essentialist and relational understanding of land use of the Caribbean. Thinking with the Caribbean is an active practice that "may in fact be a form of post-Anthropocene experimentation" (Sheller 2018: 979). In this chapter, these processes and their effects on human-environment relations in the Plantationocene are accentuated through the lens of three axes of land use in the Caribbean since the 1950s: agriculture, urbanization, and services.

Land Use Patterns

Analyzing land use patterns in the Caribbean through the lens of the Plantationocene points to two distinct sets of human-environment relations. On the one hand, there is the capitalist-extractive mode of the cash-crop-plantation fueling manifold processes like industrialization, racial oppression, and ecological degradation. Mimi Sheller (2018) traces this from the Caribbean's initial forceful insertion into the world economy under European colonialism that led to indigenous genocide, African enslavement, the establishment, and expansion of the plantation

complex and its accompanying systems of indentured labor, imperialism, and racial capitalism spanning more than 300 years. In the second phase, Sheller describes the deepening and extension of this global system of power from the nineteenth century that was based almost entirely on extractive practices ranging from coal mining to the extraction of tar, guano fertilizer, and ultimately bauxite, oil, and natural gas.

On the other hand, the resistant-resilient mode of subsistence agriculture, as well as common land and collective practices outside the plantation, show that alternative forms of socio-ecological relations have long existed alongside and in opposition to the plantation. Small-scale farming, predominantly but not only for subsistence, is a major factor in land use in the Caribbean and of great economic, social, and cultural importance (Mintz 1985). While the historical plantation ceased to exist, these two modes are the basis for land use in the Caribbean. In this regard, thinking through the Caribbean also entails challenging notions of the human-nature divide and foregrounding the entangled character of human-environment relations (Bohle and Littschwager 2015; Ferdinand 2019).

Since the 1950s, land use in the Caribbean has been characterized by a general shift away from plantation agriculture, first towards primarily futile efforts to foster industrialization, which were later replaced by the widespread promotion and adoption of service-based economies (Mullings 2004). For centuries, Caribbean societies were founded on an agrarian-based economy producing (to some extent for domestic, but most notably) for export markets (Rhiney 2016), a trend that persisted up to the 1950s, thus dominating labor relations and land use patterns throughout the region. Starting in the mid-1950s, however, the economic significance of the agriculture sector in the Caribbean began to decline due in large part to efforts in promoting industrialization as a means for regional development. These efforts followed two distinct lines of thought: while some argued for import substitution strategies, others contended for a model called industrialization-by-invitation, the latter gaining more acceptance at that time. On the ground, these economic policies led to the intensification of non-agricultural activities, such as mining bauxite and drilling for oil, manufacturing (notably apparel export), and tourism. This development pattern further intensified in subsequent decades. While today, there exists domestic agricultural production with some export of agricultural products, as well as mineral exports, Caribbean economies are dominated by service-based economies: tourism, business process outsourcing (BPO), special economic zones (SEZ), and offshore financial services (Pantin and Attzs 2009).

In the way of discussing the three axes of land use taken up in this chapter, agriculture, urbanization, and services, this chapter aims to highlight the effects discourses, strategies, and practices have on human-environment entanglements across the Caribbean. The three axes below foreground what Leichenko and O'Brien (2008) call "double exposure," the drivers and effects of environmental change in-

tertwined with economic globalization, which merges at the intersection of capital, labor, and territory in the concept of the Plantationocene. The cross-cutting theme of the three axes is thus the plantation's racially biased extractive mode of labor organization, notably putting black and brown bodies in vulnerable positions (Yusoff 2018) and establishing systemic sufferation. Systemic sufferation "is experienced as the lived spatialization of endemic poverty […], and the inequalities and adversities that cause it. As such, it produces scalar repercussions that represent a protracted state of crisis that is not just a crisis of the state, which it is, but also a multiplication of everyday crises experienced with such regularity that their discreteness becomes indiscernible from the normative functioning of society" (Lewis 2020: 49). Thus, the formation of human-environment relations through socioeconomic practices and environmental conditions materializes in distinct discursive and corporeal Caribbean landscapes.

Axis I: Agriculture

Caribbean economies were founded on agriculture and have been an integral part of the global economy from as early as the sixteenth century (Best 1968; Klak 1998; Levitt 1991; Momsen 1998). For centuries, Caribbean economies have been geared towards supplying primary agricultural commodities such as sugar and bananas to metropolitan markets in Europe. Alongside the region's painful legacies of genocide, chattel slavery, and indentureship, the immense wealth generated from Caribbean plantation economies powered industrial revolutions in Western Europe and the wider North Atlantic (Mintz 1986).

Since the 1950s, agriculture's status (the sugar industry in particular) in the Caribbean has waned significantly as regional governments have sought to diversify their economies in light of changes in the international economy (Levitt 1991). During the interwar years and immediately after World War II, it became increasingly evident that agriculture alone could not satisfy the region's need for achieving economic growth, employment generation, and overall improvement of living standards for its growing population (Farrell 1980; Potter et al. 2004). Added to this were the structural challenges that were handed down over the centuries from the region's colonial past. Land was unevenly distributed and skewed primarily towards export-oriented plantation agriculture. As Beckford (1972) pointed out in his seminal book, *Persistent Poverty*, the establishment of plantation economies meant that the majority of foods were produced to satisfy demands in Europe's expanding metropolitan markets while cheap food products (like salted cod) were imported to sustain the local population. As a result, the best agricultural lands have traditionally been devoted to plantation agriculture, while domestic agriculture was confined to small fragmented and marginal lands (Mintz 1985).

The 1950s and 1960s represented a milestone period in Caribbean history. The post-war era not only saw growing calls for independence but went alongside a concerted effort to set the region on a new development trajectory based more on industry and services. Post-war development policy in the Caribbean was thus characterized by a deliberate attempt to shift away from agriculture towards industries that were to be fueled by foreign capital and technology. Lewis (1950; 1954) proposed a dual sector development model that became known as the "industrialization-by-invitation" model. The model recommended economic policies to stimulate industrialization through the facilitation of direct foreign investment, which was based on the rationale that agricultural production could not sustain Caribbean development. Lewis rejected import substitution strategies arguing that the region's domestic markets were too small to support such an approach. He also contended that the lack of local capital and knowledge presupposed the out-sourcing of investment and expertise (Blomström 1984; Figueroa 1996; Lewis 1950; Lewis, 1954; Lewis, 1955; Rose 2002).

This thinking dominated regional development policy up to the 1960s (Girvan 2005). There was an increasing shift away from agricultural exports towards non-agricultural activities such as bauxite, light manufacturing, and tourism (Bernal 1982; Girvan 1971; Girvan and Jefferson 1971; Jefferson 1972; Levitt 1991). Development was to be achieved by shifting the surplus labor from "backward" underperforming agricultural sub-sectors to more competitive manufacturing industrial activities. While Lewis did not recommend abandoning agriculture (Figueroa 1993; Figueroa, 1996; Rose 2002), he was critical of its economic competitiveness. Traditional agriculture was plagued by low productivity, low-income generation, and considerable underemployment. Aside from it being a supplier of surplus labor to the more modern industrialized sector, Lewis theorized that growth in other industries would, over time, create increased demand for agricultural products thus providing an impetus for furthering and modernizing agricultural development in the islands.

The Lewis-inspired policies of the 1950s and 1960s did not however transform Caribbean economies as anticipated. Factors such as the region's small size and limited natural resource base played a part in this. So did regional governments' failure to precisely follow the model's prescribed strategies (Conway 1998; Farrell 1980; Figueroa 1993). In reality, there was little attention to the promotion of manufactured exports and the forging of linkages between the different industries. This was exacerbated by the general neglect of agriculture (particularly domestic agriculture) in development policies across the region (Rose 2002; Timms 2008). In larger islands such as Jamaica, this went alongside rural depopulation, with people seeking salaried jobs in urban centers including resort towns.

Market protectionism and achieving self-sufficiency were emphasized during the 1970s, which was partly linked to different regional governments' engagement and experimentation with social democracy. In countries like Grenada and Ja-

maica, there were interests in land redistribution and increasing state-led support to smallholder farmers. This was, however, short-lived as the 1980s represented a period of intense market liberalization, increased privatization, and state retrenchment in the Caribbean. Caribbean economies were confronted with severe economic pressures arising from inflated oil and food prices, stagnant or declining economic growth rates, and widening national debt burdens (Timms 2008). As a result, more and more Caribbean states entered negotiations with the International Monetary Fund (IMF) and World Bank in an attempt to secure loans to help resuscitate their ailing economies. These loans came with rigid conditionalities that prescribed the application of neoliberal economic policies. This saw a reduction in state expenditures, removal of subsidies, and the progressive liberalization of domestic markets (Deere 1990; Klak 1998; Weis 2004), with agriculture (particularly support for domestic agriculture) being one of the hardest hits.

The impact of structural adjustment on agriculture in the Caribbean was substantial as the decline in government spending and trade tariffs meant reduced support for local smallholder farmers and increased competition from food imports (Timms 2008; Weis 2004). Research across the region demonstrates the extent to which the imposition of neoliberal development policies impacted the productive capacity of regional states (Ahmed 2004; Barker and Beckford 2008; Clegg 2004; Handa and King 2003; Mullings 2004; Timms 2006; Wiley 1998).

Since the 1980s, the deprioritization of the regional agriculture sector has continued. Progressive market liberalization and free trade policies have had a twofold impact on Caribbean agriculture. Commencing since the late 1970s, regional governments have come under increasing pressure to liberalize their domestic markets to facilitate more and more food imports. The removal of state support to local farmers and the liberalization of the food import regime have led to massive food importation – mostly highly subsidized processed foods from North America. For instance, Weis (2004) has shown how the liberalization of the Jamaican economy in the 1990s has threatened the viability of the island's agriculture sector and resulted in a flooding of cheap food imports in local markets. Later, progressive neoliberalism under the disguise of free trade policies handed down by the World Trade Organization (WTO) led to the removal of the region's preferential market access to Europe and a general lowering of world commodity prices. These have severely affected regional agricultural exports, particularly banana and sugar (Ahmed 2004; Blythman 2005; Clegg 2004; Momsen 2008).

Apart from the significant influx of food imports, Caribbean economies have had to contend with contracting world commodity markets and declining terms of trade for their few traditional exports. Caribbean vulnerability to globalization in general and to changes in the global trading environment was exposed by the WTO rulings on the European Union's banana regime and its associated impact on the small economies of the Windward Islands. This has led to the phasing out of prefer-

ential European market access for Commonwealth Caribbean banana producers in response to the WTO-imposed sanction in 2002 emerging from the dispute largely between the EU and several Latin American countries, who were supported by the United States acting on behalf of its banana companies. This resulted in banana production declining from rates as high as 92 percent of total exports in Dominica and 87 percent in St. Lucia in 1991 to 24 percent and 48 percent in 1999 respectively (Ahmed 2004; Bernal 2000).

Trade liberalization policies have thus had a profound impact on Caribbean agriculture. Throughout the Eastern Caribbean, former plantation lands have been converted to tourism attractions or being targeted for prime housing development schemes. Most Caribbean countries (probably with the exception of Guyana and Cuba) continue to be net importers of foods, with ever increasing food import bills. These problems are being compounded by a persistent decline in regional food production and exports, as well as by low levels of investments, limited transfer of technology, and a worsening labor crisis as more and more young people choose jobs outside of agriculture. Climate induced changes such as rising sea levels and shifting rainfall patterns, will likely compound the situation. Scientific studies are already showing that the amount of land suitable for agricultural production will likely decrease across the Caribbean in coming decades under a warmer and drier regional climate (Rhiney et al. 2018).

In sum, agricultural landscapes have experienced significant changes since the 1950s. Agriculture is no more the mainstay for Caribbean economies. This has given way to tourism and other service industries. The multiple overlapping crises of the sector are traceable back to the plantation system, highlighted by the decline of the sugar and banana industries without an adequate sustainable replacement. Recent shifts in population have gone alongside rapid urbanization and a concomitant decline in agricultural lands. Increasing amounts of agricultural lands are being converted to other land use activities such as housing, tourism, and manufacturing. The effects of anthropogenic climate change, notably shifting precipitation patterns and likely increasing number of major hurricanes, renders agricultural activity more and more difficult. And while agriculture remains an important source of livelihood for many rural households, the future sustainability of this important industry is very uncertain, which poses serious negative food security implications for the Caribbean.

Axis II: Urbanization

While agriculture has been the dominant factor shaping land use in the Caribbean since the sixteenth century, urban centers were, from the beginning, a pillar of the colonial plantation system. Scholars like Robert Potter have proposed models that conceptualize how the plantation system shaped urban development and land use

from the colonial era onwards (see, for example, the plantopolis model in Potter 1995). Otherwise, isolated plantations were connected in each colony through a single or small number of port towns that served primarily as administrative centers for trade and political control. Indeed, from the onset of European colonialism, Caribbean towns were set up to serve as ports, and administrative centers within a largely mercantilist system that facilitated the export of raw materials from colonies to metropolitan markets in Europe. These towns also served as retail outlets for imported goods from Europe but were never locations for manufacturing activities. As Clarke points out, these towns "were pre-industrial by predilection and proscription" (1974: 224). This also meant that these towns did not experience the same level of expansion that took place across western European centers in the eighteenth and nineteenth centuries, linked in large part to the industrial revolution.

Instead, the establishment of a plantation economy in the Caribbean relegated these colonies primarily as sites of extraction and agriculture, with limited urban growth. This meant that the majority of the population in these colonies lived outside of the urban centers, which served almost exclusively as sites for administering trade, agricultural exports, services, and various commercial activities. And while emancipation saw the emergence of free villages in the nineteenth century, urban growth and form experienced very little change. The rapid expansion of Caribbean cities only began in the 1950s driven by massive rural-to-urban migratory flows, a period that also coincided with many Caribbean territories becoming independent nation states and the growth of service industries. These flows towards urban areas were also fueled by the diminishing role of agriculture (as aforementioned) as well as by the representation of the move to the city as a way of social mobility and participation in modernity (Chamoiseau 1992). In the insular Caribbean, this resulted in a distinctive spatial polarization in terms of politics and economy alongside spatial concentration of population within one city, developed prior to the rural hinterland under strictly strategic military and economic aspects, playing a dominant role, framed as hypercephalism (*macrocéphalie*) or urban primacy in the literature.

According to Potter et al. (2004: 290), the total population of the Caribbean living in urban areas grew from 7.7 million (representing 38.2 percent of the total population) to 28.8 million (64.6 percent) from 1960 to 2000. Today, the Caribbean is a highly urbanized region with a distinct set of settlement structures and labor organization patterns. On average, almost 70 percent of the population in Caribbean territories is living in urban areas. Some territories even reach urbanization rates of over 90 percent (Dodman, McGregor, and Barker 2009: 366; Klaufus and Jaffe 2015: 64; Marc and Saffache 2011: 435). The large extent of urbanization produces a range of environmental and health issues for the population (Jaffe 2016). For instance, Martinique's capital Fort-de-France, saw its population grow from 60,000 inhabitants in 1954 to 100,000 in 1969. Today, 76,500 people live within the city limits (*commune*), as well as 152,000 in the wider area (*agglomération*) (INSEE 2021;

Martouzet 2001). The urban sprawl has manifested in the growth of urbanized areas in the city from 156 hectares (385 acres) in 1945 to 1,897 hectares (4,688 acres) in 2015 (Ville de Fort-de-France 2022: 60). Without substantial industrialization, the arriving new urban dwellers formed an increasingly large group of inhabitants who rely on precarious and insecure, often part-time, and disorganized low-paid labor. On most of the Lesser Antilles like Martinique, the migrating rural population settled in the peripheral, not yet urbanized, areas surrounding the city center: along the coast, rivers, and on steep hills. These areas are especially exposed to natural hazards such as flooding and landslides (Bohle 2018; Saffache 2000). On the Greater Antilles, where the capitals tend to be larger in terms of number of inhabitants, the incoming rural population often moves to inner city tenement housing, before eventually moving either to middle-income areas or informal settlements (Clarke 1974: 228; Potter et al. 2004: 304).

Alongside other social and economic factors (which can be found in urban areas all around the world), climate change notably poses enormous challenges for Caribbean cities, since these cities are located along the coast and are thus especially exposed to the threats associated with rising sea levels. All over the Caribbean, adaptation strategies designed especially for urban areas are set up to address various challenges related to coastal protection, resilient housing, and sustainable transport, to name a few areas (Rhiney 2015; Robinson and Butchart 2022).

Caribbean urban structure is also characterized by social-spatial fragmentation and residential segregation in very confined spaces. In the modern era, town centers adjacent to the colonial port with their old colonial commercial, administrative, and residential remnants have either become rundown areas characterized by low social status but still play an essential role for the local economy or have been transformed in rather cliché-ridden representations of a Caribbean city for touristic purposes. The most prominent example in point for the first case is downtown Kingston (Jamaica), where low-income households dominate and where the extensive *Coronation Market* is vital for the city's marginalized population in terms of food supply and small-scale economic activities. Some of the neighborhoods in Kingston's inner city have been shaped by long standing gang warfare and violence to an extent that today one may find stretches of vacant areas in central locations rendered uninhabitable (Gray 2004; Howard 2005; Jaffe 2015).

In cities like Kingston, the central business district has been moved from downtown to other areas. In this case, New Kingston has been built north of the inner city, where companies set up offices for white-collar workers in high-rise buildings. Also, middle- and high-income households have left the inner city and moved to suburban areas. While the tendency of middle- and upper-class movement to the suburbs – often accompanied by the establishment of U.S. style shopping malls or plazas alongside the roads leading from the city center to the suburbs – hints at a concentric pattern of land use alongside socioeconomic factors, the parallel settlement of

urban poor all over the urban area leads to a clutter of middle- to high-income areas located in close proximity to informal settlements and even peri-urban communities. This urban fragmentation in very confined spaces means that while e.g., low-income and high-income households are clearly spatially separated and form discrete communities, they are nevertheless located in close proximity. This leads to two sets of relations between different social classes. On the one hand, different housing areas are functionally interconnected, especially in terms of low-income areas providing a steady supply of low-paid labor for wealthier areas. On the other hand, lives of those living in different areas may be fully disconnected and their "transnational linkages are perhaps stronger than intra-urban ones" (Jaffe, de Bruijne, and Schalkwijk 2008: 9).

Due to the lack of housing, which goes back to the neoliberal approach "no housing policy as housing policy" which was outlined by Potter et al. (2004: 252) for the Eastern Caribbean, the poor migrants from the provinces organize themselves. Thus, makeshift squatter settlements emerge on the edges of cities. Where they are not displaced by the private sector or the state, they become entrenched over the years (Potter et al. 2004). This illustrates how the lack of prospects in the rural provinces leads to migration processes that result in renewed land use through urbanization and sprawl.

A recent urbanization process localized in Haiti is, on the one hand, very particular due to its genesis. On the other hand, it can be considered as an example of non-sustainable land use as a consequence of decades of centralization and extensive exploitation of the hinterlands and their people. In the aftermath of the earthquake on January 12, 2010, more than 1.5 million people were left homeless and more than 250,000 lost their life. Soon after the earthquake a decision was made that permanently changed the spatial organization of the country (Balandier 2015). Under intense pressure, a committee made up of the Haitian government, the international community, various NGOs, and the U.S. military decided to set up a tent camp about 18 kilometers from the gates of Port-au-Prince. This was followed by two presidential decrees in February and March 2010, which declared the surrounding area of approximately 33 square kilometers as an area of public utility (Petter et al. 2020). Who exactly made this first decision of placing the camp is difficult to reconstruct today and to a certain extent irrelevant. The fact is that in the mentioned area and beyond today stands one of the largest cities of the country. Called Canaan, the place is not formally recognized as a city but is home to more than 200,000 people (Sherwood, Smits, and Konotchick 2018: 226). Situated on an alluvial fan on the slope of the Chaine des Matheux mountain range and on the tectonic Matheux-Neiba fold, the settlement has neither a necessary sewage system nor permanent access to electricity. Surveys from Habitat for Humanity also found that basic earthquake-resistant construction techniques had not been followed for a majority of the buildings (Kersaint 2023).

In a close examination of the process of urbanization, it becomes apparent that this city is emblematic and the materialization of decades of exploitative land use. The Haitian ecological crisis is fueled by largely foreign agro-industries all over the country. The extensive monoculture cultivation of crops has a long tradition in the Caribbean islands. From sugar cane during colonial times to sisal and rubber during the twentieth century. Anthropogenic land use has not only exploited the land and the people who had to cultivate it. The profits generated were generally transferred elsewhere. These agro- and montane-industrial ventures usually acted ruthlessly regarding socially grown structures and the fertility of the soils.

In addition to the ecological crisis in large parts of the country produced by land use, this also led to a lack of social perspectives, whereby the former often reinforced the latter (Joos 2021). This is because the peasant communities that originally worked in social alliances, such as the *lakou*, could no longer exist due to the degradation of the soil after the foreign companies left. This devaluation of the structures in the provinces, together with the centralization that had already begun during the U.S. occupation (1915–1934), led to massive rural exodus since the beginning of the twentieth century, which intensified during François Duvalier's government, became extreme under Jean-Claude Duvalier, and has continued ever since (Anglade 1982; Godard et al. 2015). Thus, a continuity in the Plantationocene is evident in the axis of urbanization. The focus of spatial development – driven primarily by external actors – was not the production of living space for the people, but the further exploitation of the soil and the use of the land.

While special trade zones for the composing industry and the cultivation of cash crops are spatially organized, housing in Haiti functions as for other parts in the Caribbean according to the principle "let the poor provide for themselves" (Potter 2016: 252). Thus, since 1950, an extreme housing deficit has emerged in the Port-au-Prince metropolitan area, the magnitude of which was highlighted by the 2010 earthquake. Concerning the issue of housing in Haiti, the Port-au-Prince metropolitan area acted like a pressure cooker. The earthquake was the valve through which the pressure could escape, and Canaan the area that absorbed it. Thus, the entire area was urbanized within a few years, while the government turned a blind eye to the ongoing processes of influx. Following this principle, housing for at least 200,000 people was created in Haiti within ten years. However, this was accompanied by high risks for the population.

Canaan today not only represents the decades-long anthropogenic ecological crisis in the Haitian provinces, but the agglomeration itself produces new risks for the environment and the population living there. Due to the tectonic risk and the lack of control to comply with the *Comité interministériel d'Aménagement du Territoire* construction standards, an earthquake triggered by activities of the Matheux-Neiba fold could have dramatic consequences. Already now, parts of the agglomeration are repeatedly inundated by strong floods accompanied by transported debris. Even

more dramatic, however, is the contamination of the soil and groundwater. Due to the lack of a sewer system, in addition to hazardous substances from car repairs, for example, huge amounts of fecal bacteria enter the permeable alluvial soils using latrines (Jérôme et al. 2021).

Urban agglomerations are probably the most obvious anthropogenic overprinting of natural spaces. The removal and sealing of soils, the installation of infrastructures, the construction and transformation of space turns cities into cathedrals of the Anthropocene. It should not be forgotten that cities not only use the land on which they stand, but also exploit the urban hinterland. The use of concrete solidifies man's claim to be master over nature. At the same time, little represents the ecological crisis provoked by humanity more than this very concrete. And so, in Haiti in 2010, this very concrete led to arguably one of the largest man-made disasters in the twenty-first century. However, it did not cause a rethinking in relation to land use and urbanization, much more it dramatized the urban situation, as the example of Canaan shows.

Axis III: Services

Service-based economic activities, most notably tourism, business process outsorcing (BPO), and offshore financial services, play a crucial role in today's Caribbean. Nevertheless, from a land use perspective, there are significant differences within this sector. For instance, the offshore financial services take place in a deterritorialized manner: that means that while offshore financial services are an important source of income for some Caribbean governments, only few people in the Caribbean work in this sector and there are very few material traces of these economic activities in the region. Therefore, for an analysis of land use patterns, these activities are neglectable. The same holds true for a major employer in the Caribbean, the BPO industry, which primarily consists of data processing and call center services. In this case, a large amount of Caribbean workforce is involved, but the industry's labor is scattered and does not require larger areas of land. In its most extreme form, the lottery scams (Lewis 2020), labor is mostly detached from space as it is condensed to an individual or a small group and some smartphones or laptops. Tourism, however, is the sector which considerably transformed Caribbean landscapes. Tourism needs lots of land space and infrastructure and leads to massive resource consumption and environmental degradation.

The tourism industry in the Caribbean is based entirely "on (the idea of) unspoiled natural landscapes and an image of the region as paradise" (Jaffe 2009: 317). These notions are widely challenged in critique of contemporary mass tourism practices as neocolonial and neoliberal consumption and commodification of the Caribbean (Cruse and Marques 2013; Sheller 2003; Walcott 1993). From a solely economic standpoint, the tourism sector is of utmost economic importance for the

Caribbean. In the early 1960s, the steam shipping liner service (originally established for the banana export) eventually declined due to the rise of jet planes and the comparatively inexpensive air fares. In the beginning of the 1970s, the modern cruise ship industry began to form, and the former liners became the first operating modern cruise ships. Today, the Caribbean represents the main market for cruising with an estimate of 40 percent (Rodrigue and Notteboom 2013) of worldwide cruise passengers.

It is rather challenging to determine the exact numbers for tourism's contribution to the region's economies due to the issues surrounding data collection in the Caribbean. Nevertheless, the sheer number of visitors in context of the size of the Caribbean territories makes it clear that tourism is a major economic sector. In 2014, the 29 Caribbean Tourism Organization's member territories reported 22 million tourist arrivals plus 24.5 million cruise ship passenger arrivals that year (CTO 2015). The tourist's expenditures are an important factor in many of these territories and generate large double-digit shares of Caribbean territories' GDP. In the same vein, tourism accounts for a large share of employment (Pantin and Attz 2009).

Cruise ship tourism has some interesting insights into land use, as territorial detachment is a characteristic of cruise ships. The ships, as "mobile chunks of multinational capital," sail under so-called flags of convenience allowing them to avoid strict "labor, environmental, health, and safety laws" (Wood 2004: 160) and to minimize fiscal burden. Today's cruising is characterized by the fact that the cruise ships themselves are more important for their customers than the destinations of the cruise. In the extreme case, there is no connection to the region, neither onboard (supplies and employees are predominantly sourced from other regions) nor ashore (interchangeability of ports of call, or even avoidance of contact between tourists and residents by establishing private sites). It is often emphasized that stay-over tourists are better for local economies than cruise ship passengers, as the latter just spend a few hours ashore and do not need, for instance, accommodation and food. For example, data from 2000 shows that "[w]hile cruise tourists constituted about 42 percent of all tourists to the Caribbean […], they accounted for only 12 percent of expenditures" (Wood 2004: 159). Although these are not the latest figures, the ratio has probably not changed dramatically. Nevertheless, cruise ship terminals and related infrastructure like casinos and duty-free shops have been established all over the Caribbean. Even more so, since 1977, cruise lines have established private sites for their customers. Currently, cruise lines operate nine sites in the region, mostly referred to as "private islands." These enclosed sites are just as much detached from their respective territories as the cruise ships themselves. In many Caribbean locations, cruise ship tourism has led to major landscape transformation, contamination of land and water, air pollution, and the like. Cruise ship tourism thus represents another form of commodification and externalization (Lessenich 2016) of land and resources where profits and revenues are transferred

in other world regions while environmental impact is located and suffered in the Caribbean.

The Mexican federal state of Quintana Roo is another illustrative example for extensive land use on the grounds of mass tourism (Bohle 2021). Due to its geographic conditions and lack of exploitable resources, the region did not have many plantations in the colonial era, notable exceptions being *chicle* and *copra* plantations. For centuries, the densely wooded karst landscape at the eastern coast of Yucatán, was Mexico's outermost periphery, sparsely populated by indigenous peoples. Until the beginning of the twentieth century, the region was thus conceptualized as a peripheral hinterland and "empty" space. Only over the course of the twentieth century, the Mexican state started efforts to develop the region as part of the nation-state.

Since early in the 1950s, there have been more and more concerted efforts to populate the region by the Mexican government with the aim to establish *Nuevos Centros de Población Ejidal*. Parallel to this, in 1968, the Mexican central bank Banxico established a program to foster the development of the region as a tourist destination. The area's population grew immensely, from 27,000 in 1950 to 50,200 in 1960 to 1,857,985 in 2020. Today, most of the inhabitants (90 percent) are living in urban areas along the coast. Almost half of Quintana Roo's population (911,503) is living in the *Municipio* Benito Juárez, in other words, in and nearby Cancún (Boggio Vázquez 2008; INEGI 2020; Mendoza Ramírez 2004).

The well-known city of Cancún is the result of planning processes by the Mexican government, Banxico and later the *Fondo Nacional de Fomento al Turismo* (FONATUR). The overarching goal of these planning efforts was "to transform remote tropical lagoons and mangroves into an elite 'sea, sun, and sand' resort destination. […] To accomplish this mission, and to successfully attract the necessary capital, FONATUR turned 12,700 hectares of *ejidos* (communal lands) committed to the project into a city with two spatially enclosed and functionally segregated areas with differential access routes and infrastructure provision" (Córdoba Azcárate, Baptista, and Dominguez Rubio 2014: 100). Since the 1990s, the Cancún-model of tourism development was expanded under the plan of Ecological Land Zoning along the coast to the south to reorganize the entire coastline (Manuel-Navarrete 2012). The regional development is based solely on the region's commodification for mass tourism. In this way, the entire Caribbean coast of Quintana Roo was transformed into an urbanized touristic landscape within decades. In 2019, Quintana Roo counted 17,125,344 stay-over tourist arrivals and roughly 9,000,000 cruise passenger arrivals (SEDETUR 2022). The Cancún model was discursively framed as kick-off for the region's development with estimated positive effects for other economic sectors like agriculture and small industry, especially for the rural indigenous population. Though, in their analysis, Torres and Momsen argue that these positive effects did not take place and they conclude that the Cancún model "generated profit for the government, transnational corporations, and entrepreneurial elites, it has failed

to achieve backward linkages that may have improved conditions for the region's impoverished rural population" (Torres and Momsen 2005: 259).

The service sector, especially the tourism sector, reveals the competing perspectives on the region in a concise manner. While the tourism industry sells imaginations of an untouched nature, the reality is characterized by technically and energetically demanding large-scale projects. The tourism sector shows a clear continuity of colonial services. This is because the wants and needs of North Atlantic clients dictate the conditions and tasks of local workers. Especially when it comes to sex work, the control over the Caribbean bodies and thus the colonial continuity becomes particularly clear. Furthermore, as has been shown, tourism's profits do not end up in the hands of the local population to a larger extent. Thus, the service sector appears to be the anthropogenic driver of the ecological crises, starting with infrastructure, the CO_2 intensive transport of tourists by ship or plane, and the import of food and consumer goods. As it is the case with Caribbean cities, due to its coastal location, mass tourism infrastructure is highly vulnerable to climate-induced sea-level rise and growing intensity of hurricanes.

Conclusion

Land use in the Caribbean since the 1950s is marked by a series of continuities going back to the plantation system, as well as major shifts in a globalizing world. The socioecological consequences of the extremely extractive mode of land use in the Caribbean mount to multiple crises. The discussed examples highlight the main patterns regarding agriculture, urbanization, and services. It has become clear that these are in many ways intertwined. At the same time, there is a wide range of diverse and distinct processes which remind us of the great regional diversity in the Caribbean. In general, the shift from plantation-based agriculture to mining, composite industries, and tourism in the second half of the twentieth century occurred in the context of a more and more liberalized world economy. These economic changes had different manifestations and traits in the various Caribbean islands but have common features. The variations were largely shaped by different (neo-)colonial policies, the specific decolonization processes, divergent interests, and undertakings of the United States of America and resulting political regimen. Therefore, this chapter argues that the Caribbean should not be understood as a regional unit, but that the specific individual cases should always be examined. The overarching similarity is that the adjustments were not oriented to the needs of the peoples but primarily to those of foreign political and economic powers. For this reason, land use in the Caribbean was not designed for sustainability, but for short-term profits, without considering the consequences for the local population and its environment.

The commodification of land for export-oriented crop production, mining, and the tourism industry was accompanied by internal and external migration, and an overall undermining of social structures. The triggered rural exodus processes led to the transformation from rural to urban societies, which was often not accompanied by an improvement in living conditions, despite the hopes associated with it. So, while rural habitat was destroyed, no adequate urban habitat was created. Which lead to seemingly uncontrolled urban sprawl accompanied by the production of risk to people and the environment. With the migration to the cities, the former peasants became precarious workers as *petit commercants* on the streets or low-paid jobbers in the service sector. Moreover, land use was usually accompanied by massive environmental degradation. In particular, the monocultural cultivation of cash crops and the coal and steel industry left behind nutrient-poor soils. The extensive soil surface sealing alongside the coasts for the development of tourist centers, as well as the excavation of landing channels for the ever-larger cruise ships, led to the degradation of coastal areas and marine biotopes.

Nevertheless, uncertainty and risk are not new or unknown aspects of life in the region (Rohland 2021). Rather, the (dis)continuities point to the need to think about the Anthropocene in flux. The Anthropocene as an analytical concept has its limits, and the authors, therefore, suggest the integration of the Plantationocene into the debate to highlight where the drivers of land use are located: in the plantation system and the global capitalist system. The overarching extractive mode of organizing life and death (in human-human, as well as in human-environment relations), which "is predicated on the presumed absorbent qualities of black and brown bodies to take up the body burdens of exposure to toxicities and to buffer the violence of the earth" (Yusoff 2018), represents an unsustainable and unjust way of land use in the Caribbean. Land use in the Caribbean is thus – due to the outlined conditions of the Plantationocene – very much prone to disasters and driver of ongoing and overlapping crises. Extreme events like the hurricanes Irma and Maria reveal the closely intertwined effects of land use in the Caribbean. Thinking through the Caribbean about land use thus makes it clear that it allows to highlight the relevance of (environmental) justice within Anthropocene debates. For instance, in post-disaster reconstruction efforts after hurricanes, the biopolitical discourses and practices of different actors become evident (Bohle 2018; Bohle 2021; Bonilla 2020; Grove 2013; Grove 2014; Moulton and Machado 2019; Rhiney 2019; Sheller 2018). It seems crucial to resist the urge to just "bounce back" and continue the current mode of land use in the Caribbean, but rather to pause in order to think about how land use should be organized, in other words, to think about desirable Caribbean futures.

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