Science Panel for the Amazon (SPA)

WORKING GROUP 6:

POLICIES IN THE AMAZON AND THEIR IMPACTS

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CHAPTER 18: GLOBALIZATION, EXTRACTIVISM AND SOCIAL EXCLUSION: COUNTRY-SPECIFIC MANIFESTATIONS

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GLOBALIZATION, EXTRACTIVISM AND SOCIAL EXCLUSION: COUNTRY-SPECIFIC MANIFESTATIONS

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ACRONYMS AND ABBREVIATIONS

BCE	Banco Central del Ecuador
CNMH	Centro Nacional de Memoria Histórica (Colombia)
ECLAC	Economic Comission for Latin America and the Caribbean (UN)
FAO	Food and Agriculture Organization
FARC-EP	Fuerzas Armadas Revolucionarias de Colombia – Ejército Popular
FENAP	Federación de la Nacionalidad Achuar del Perú
GTANW	Gobierno Territorial Autónomo de la Nación Wampís
IDEAM	Instituto De Hidrología, Metereología Y Estudios Ambientales (Colombia)
IIRSA	Initiative for the Integration of the Regional Infrastructure of South America
ILO	International Labor Organization
INEC	Instituto Nacional de Estadística y Censos (Ecuador)
ITT	Ishpingo-Tambococha-Tiputini (Ecuador)
MAS	Movimiento al Socialismo (Bolivia)
MPPEFCE	Ministerio del Poder Popular de Economía, Finanzas y Comercio Exterior (Venezuela)
OEC	Observatory of Economic Complexity
RAISG	Red Amazónica de Información Socio-ambiental Georeferenciada

SINCHI	Instituto Amazónico de Investigaciones Científicas (Colombia)
UASB	Universidad Andina Simón Bolívar
WWF	World Wildlife Foundation

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KEY MESSAGES

- Differentiated local manifestations of deforestation and forest degradation are particular to national and local contexts, as a function of its local natural and historical, social, political and economic conditions.

- Two antagonistic ideas have predominated as models for the region: “extractivism” and “conservation”. The current Amazonian development model is not sustainable, and the transition to an alternative development path is necessary. The new model must achieve forest conservation and welfare of Indigenous and local communities, redefining economic activity, within a viable unified trajectory, sustainable in the long term.

- Severe social inequality in the Amazon, and particularly unequal land distribution, coupled with land tenure irregularity, are hindrances to sustainable development goals. The disproportionate impact of COVID-19 on the most vulnerable populations, in particular Indigenous peoples, is a clear example.

- The transition to a low emission sustainable development path must include effective policies to reduce inequalities and involve the just distribution of land and regularization of tenure, coupled with social policies that help maintain ties to the land and enhance the ability to obtain good standards of living.

ABSTRACT

This chapter presents country-specific manifestations of human intervention in the Amazon. A variety of circumstances manifest themselves despite the common underlying international and domestic economic and political forces. A rapid expansion of agricultural and extractive activities, mostly for export but also for domestic markets, and to a lesser degree small scale agriculture have led to serious deforestation and environmental degradation without substantially improving the living conditions of the population. Government policy and the extent of State ascendancy in the area also seem to be a powerful determinant of the nature and scale of the process. In the case of Colombia, the process was shaped by the presence of the guerilla and deteriorated after the Peace Treaty, which does not mention "deforestation" and perpetuates Colombia's extractivist model. Ecuador's case is representative of the link between fossil fuel extraction, environmental deterioration, and social exclusion. The case of Peru shows an Amazon perceived as a territory awaiting "conquest, occupation and exploitation" subjected to an unwavering extractive and market orientated drive. In Bolivia's case, the focus is put on the contradictions between conservation and state-led development policies and business activities, which have transformed it into the second deforestation hotspot of Amazonia after Brazil. The Venezuelan Amazon is shown to be subject to rampant violence and illegal activity driven by the political geography of gold in mixed configurations of governance with blurred boundaries between legality and illegality and no concern for conservation. References are made to the case of Brazil, which succeeded in reducing deforestation with strong policy enforcement between 2005 and 2012. Other conservation experiences are also included. In all cases the extractivist model has outpaced conservation policies; yet these experiences can prove useful in the design of effective conservation policies, emissions reduction, and improvements in living conditions of Indigenous and local peoples.

Keywords: Globalization, Extractivism, Deforestation, Conservation policies.

1. INTRODUCTION

Human intervention in the Amazon escalated since 1970, threatening the rainforest and its environmental benefits, as well as the integrity and survival of its diverse Indigenous cultures. A rapid expansion of agricultural and extractive activities geared mostly to exports but also to domestic markets, generated serious deforestation and environmental degradation without substantially improving the living conditions of the population. Extensive cattle ranching, soy cultivation, oil, gas and mining, illegal gold extraction and drug trafficking, coupled with roads and mega infrastructure projects, such as hydroelectric dams, contributed to unleash this process of unequal and unsustainable development (Chapter 14, WWF, 2016).

Although the underlying international and domestic economic and political forces generating this process are common to all Amazon countries and territories, there are country-specific manifestations and changes over time, as there are variations in conservation policies. This chapter deals with specific traits of country cases, useful to understand the complex and changing character of current human intervention in the Amazon, as well as their underlying causes.

In addition to Brazil's successful experience in curbing deforestation between 2005 and 2012 - the most significant conservation policy in the region- and its subsequent reversal (Chapter 17), two detailed country cases in the Andean Amazon are presented. The first is the Colombian experience after the peace agreement with the FARC guerrilla group, which resulted in a rise in deforestation. The second case is Ecuador's oil-driven intervention of the Amazon, a representative case of the link between fossil fuel extraction, environmental deterioration, and social exclusion. To complement the mosaic of experiences, three short national cases are analyzed: Peru, Bolivia and Venezuela. The first, a country with an unwavering extractive and market orientated profile, the second, a pioneer in environmental legislation but subject to critical contradictions between conservation and state-led development policies and business activities; and the third holds an Amazon subjected to rampant illegal activity and mixed configurations of governance driven by the political geography of gold and limited ascendancy by formal state structures.

National experiences differ not only by their specific drivers of environmental deterioration, but also by magnitude (Costa 2020). Taking the primary forest tree cover loss between 2001 and 2020 (World Resources Institute 2020) as an indicator[9], forest deterioration is led by Brazil, with a 7.8% loss. With 58% of rainforest area in 2000, Brazil accounted for 77% of tree cover loss of all Amazonian countries (Appendix Table 1 and Appendix Charts 1, 2 and 3).

Between 1985 and 2019, the bulk portion (89%) of deforested land in Brazil's Amazon was transformed to pastures, and 9% to soy cultivation (RAISG 2021). Pasture area increased more than three times in the period, but during the 2005-2012 interval, when deforestation declined, pastures did not grow. Soy cultivation began in 2000 and increased 20 times, with an average growth rate of 17% per year. Extensive cattle ranching and soy cultivation have been the leading direct factors in Brazilian deforestation (Chapter 17), but in both cases the growth declined or stopped when deforestation was controlled and resumed with lower intensity when this policy was reversed (Appendix Chart 4).

Brazil also has the largest impact of large-scale mining in the Amazon, particularly iron ore. Large infrastructure projects, -roads (IIRSA) and hydroelectric dams- are significant drivers of environmental degradation (RAISG 2020).

Deterioration was also intense in Bolivia (Appendix Chart 3). Despite the environmentalist rhetoric, the Bolivian government actively promoted land clearing for large-scale cattle ranching and agriculture, extractive activities, and infrastructure, particularly roads and dams, all within and outside national parks. As a result, it closely follows Brazil with 7.5% tree cover loss, while Peru, Colombia, and Ecuador have lower forest losses (3.2%, 3.1% and 1.9% respectively). Commercial agriculture has had an important role in the two former, higher forest loss. In all cases, oil extraction played a significant role as an environmental deterioration driver. Crude oil is currently the main export product of Ecuador and Colombia, while in Peru the Camisea megaproject provides natural gas to export (OEC, 2021). Oil and gas extraction in the Andean Amazon has also led to severe environmental impacts in protected areas, such as the Yasuni National Park in Ecuador, regarded as the most biodiverse hotspot in the Western hemisphere (Bass et al. 2010, Larrea, 2017).

[9] Primary forests are not only located in the Amazon basin in the analyzed countries, but the Amazon cover its most significant part.

Ecuador's study analyses not only the detrimental environmental impacts of oil, but also the lack of social distribution of revenues in the region. The Amazon is still the poorest region in the country and oil extraction areas are more socially deprived than non-oil subregions. In Ecuador's Amazon, deforestation is mostly conducted by poor migrant peasants, as large-scale livestock and plantations are less frequent. The analysis finds that peasant families do not perceive lasting benefits from deforestation, as land productivity is low and declines over time (Larrea, 2017, Wunder, 2000).

While mining megaprojects concentrate in Brazil and have recently expanded to Ecuador, illegal gold mining causes heavy environmental impacts in several countries, most notably Peru, Bolivia, Ecuador, Colombia and Venezuela. According to recent estimates, illegal gold extraction accounts for 28% of gold mined in Peru, 30% in Bolivia, 77% in Ecuador, 80% in Colombia and 80-90% in Venezuela. It is estimated that the value of illegal gold exports is comparable to that of cocaine exports (GI-TOC 2016). Gold is the main export product in Suriname and gold mining is also important in Guyana.

In the recent Colombian experience, after the peace agreement with the guerrilla, was registered an increasing deforestation in the Amazon region. An extractive model predominates, with cattle ranching, oil expansion and land grabbing, prevailing. The study is also illustrative of the effects of illicit extractive activities, often linked with chronic violence, which are also present in Peru and Venezuela, and manifest in most other countries.

A third group of countries and territories with low forest loss are Venezuela (1.4%), Suriname (1.1%), Guyana (0.79%) and French Guyana (0.65%). In all of them land use change from forest to agriculture has been weak, but forest loss has recently increased particularly driven by gold extraction, except in the case of French Guyana, likely due to stronger law enforcement (Dezécache et al,2017).

Venezuela, where abundant oil reserves located outside the Amazon did not stimulate economic diversification, extractive pressures on the rainforest were weaker, and deforestation remained low. During the recent crisis, the government promoted mining in the Orinoco Arc. Although large-scale mining remained relatively weak, an expansion of illegal mining of gold, coltan and

other minerals took place, often linked with organized crime. As a result, not only environmental deterioration increased, but also did social conflict with Indigenous cultures.

2. AMAZON DEFORESTATION IN POST-CONFLICT COLOMBIA

In Colombia, approximately 43% of the national territory is located in the Amazon (Appendix map 1). This region shelters important primary forests as well as much of the enormous wealth of biodiversity that makes Colombia one of the five megadiverse countries in the world. Consequently, in 2018 the Colombian Supreme Court of Justice declared the Colombian Amazon Subject of Right and disposed that the Colombian government must create a concrete mechanism to protect the Amazon and to stop deforestation (Bustamante et al. 2020).[10]

However, in the 21st century, 5.3% of Colombia's forest areas (4.34 million ha) have been cleared (Global Forest Watch 2020). This is roughly equivalent to the area of Denmark. The main areas of deforestation are five Colombian *departamentos:* Caquetá, Meta, Guaviare, Antioquia and Putumayo (Appendix Chart 2). Excepting Antioquia, all departments are in the Amazon/Orinoquía region. Similar to the other countries of the region, also in Colombia the tragedy of deforestation has various facets: a) massive socio-cultural and socio-economic transformations that threaten the traditional lifestyles of Indigenous communities; b) a massive loss of biodiversity; c) a disaster for the global climate (IDEAM et al. 2017).

Deforestation has accelerated significantly with the historic signing of the peace treaty between the Colombian government and the FARC-EP guerrilla in 2016. This is no surprise: International empirical evidence indicates that post-conflict scenarios generally accelerate deforestation (Murillo-Sandoval et al. 2020). This is what happens in the Colombian Amazon. Deforestation has not been addressed properly during the peace negotiations. The term “deforestation” is not mentioned in the Final Agreement. Rather, the document includes objectives aiming to modernize the Colombian countryside that will rather trigger deforestation. However, the main challenge for forest protection is arguably linked to the Colombian extractivist development model. Former president Santos (2010-2018) presented the extractivist development model as the backbone for financing the peace process (Ulloa/Coronado 2016). President Duque (2018-2022) introduced major political changes, especially regarding the peace process. Duque is a skeptic of

[10] Sentencia 4260-2018 of the Colombian Supreme Court of Justice.

the peace process and implementation of the peace agreemment slowed down under his administration (Instituto Kroc 2021). However, Duque's government shares the political orientation towards extractivist development (DNP 2018: 695pp.). The focus on the extraction and the so-called "export of nature" (Coronil 1997) has far-reaching negative economic and social outcomes and above all implies harsh negative social-ecological consequences (Gudynas 2015).

2.1. Amazon Forest: A Victim of the Colombian Peace Process

The Colombian Amazon was a stronghold of the FARC-Guerrilla (Van Dexter/Visseren-Hamakers, 2019; Betancur-Alarcón/Krause 2020). This slowed down the process of deforestation. On the one hand, this was due to tactical considerations of warfare. The FARC was interested in the conservation of the inaccessible forests as retreat areas and giving protection against military operations. On the other hand, the armed groups curbed the expansion of development projects into the region and thereby reduced the pressure on the Amazon forests (Rodríguez-Garavito et al. 2017; Murillo-Sandoval et al. 2020). To avoid misunderstandings: the internal conflict in Colombia had multiple negative effects on the environment such as oil spills or environmental damage due to direct battle impacts., also in the Amazon region (Nuñez-Avellaneda et al. 2014; Hoffmann/García Márquez/Krueger 2019; Pereira et al. 2021). The staged self-image of the FARC guerrillas as armed environmentalists is more myth than reality. However, the strong guerrilla presence in the Amazon region surely slowed down deforestation. Accordingly, the signing of the peace agreement was a game changer. It reduced armed violence and represented a pre-condition for a better future for Colombia. However, at the same time it was also a trigger for a profound transformation of the Colombian Amazon due to the acceleration of development and modernization projects. Official figures (Reardon 2018) show how deforestation rates in Colombia have soared since 2016 (Appendix Charts 1 and 6). Paradoxically, we state that the environment is a victim of the fragile Colombian peace process. This is especially true for large parts of the Amazon region where "unintended peace-induced deforestation rates" (Prem et al. 2020: 7p.) increased dramatically during the peace process (Krause 2020: 404; Graser et al. 2020).[11] This applies also to protected areas and Indigenous territories, where also parallel markets for land are reported (Armenteras et al. 2019; Clerici et al.

[11] The argument that peace will lead to increased pressure on the Colombian forests was already introduced by Álvarez (2003.

2020; Finer/Mamani 2020; Murillo-Sandoval et al. 2020). This process is highly linked to the expansion of the extractive frontier in the Colombian Amazon (mining, hydrocarbons and agrarian extractivism including illicit crops), processes of land grabbing and deep-rooted elite' socio-cultural preferences for land ownership as symbol for status and political power (Richani 2012)

2.2. Drivers of Deforestation and Extractivist Development Projects in the Colombian Amazon

Deforestation in the Amazon region does not follow a shared logic. Rather, the diversity of the region corresponds to the heterogeneity of the dynamics of deforestation and thus requires locally or regionally adapted protection strategies. The main drivers for deforestation include: i) cattle ranching; ii) land grabbing; iii) extractivism; iv) illicit drug cultivation; v) infrastructure development; and vi) the expansion of the agricultural frontier by smallholders. However, the various drivers of deforestation should not be considered as equivalently relevant for deforestation nor should they be analyzed in isolation, but in their interdependence (Hoffmann/García Márquez/Krueger 2019).

Firstly, extensive cattle ranching have been putting the Amazon under pressure for decades. In hectares, cattle ranching are by far the most important driver of deforestation in Colombia (Prem et al. 2020). In Colombia, the cattle ranching model combines the historical continuity of an extremely unequal distribution of land with rentier logics that link land ownership with political power and social status. Extensive cattle ranching are supported institutionally by the fact that this form of land use is an easy and inexpensive way to demonstrate the productive use of land. However, cattle ranching is not to be seen isolated. Rather, the sector is closely linked to the illegal drug economy. On the one hand, clearing for coca production is often followed by livestock farming, and on the other hand, the purchase of land is a preferred form of laundering drug money (Richani 2012; van Dexter/Visseren-Hamakers 2019).

This is –*secondly*– strongly linked to land grabbing. Land is a major investment opportunity both for legal and illegal money. This leads to increased land concentration and deforestation, as clearing the land is seen as a productive improvement and backs legal land claims (Armenteras 2019). In the context of the peace process, one objective consists of formalizing land titles throughout the country. Whereas this is surely an important advance for ensuring smallholders'

rights, it also may support land grabbing and land concentration processes by giving legal certainty to investors.

Thirdly, the Colombian development model fosters extractivism. This was decisively accelerated during the liberalisation of the Colombian economy at the end of the 20th century. Extractivism in Colombia lead to the increase in the share of primary goods in total exports between 2000 (67.5) and 2018 (79.3%) (Peters 2021). Colombia has a comparatively diversified extraction structure with oil production, mining and monocultural agrarian extractivism. The expansion of the extractivist frontier has particularly strong impacts in the Amazon, including deforestation due to mining projects and the start of new projects of oil extraction, deforestation due to lumbering precious woods for export and the expansion of extractivist monocultures with a focus on palm oil - leading also to new conflicts on land use with local communities (Marín Burgos/Clancy 2017; Pereira et al. 2021).

Fourthly, coca cultivation is also an important driver of deforestation, especially in remote areas (Dávalos/Sánchez/Armentreras 2016; Mendoza 2020). In fact, about 47 % of coca cultivation in Colombia takes place beyond the agricultural frontier, mostly on small plots of land in adjacent areas, including Indigenous reservations and Afro-Columbian communities. Coca production in Colombia has risen sharply in recent years and is increasingly found in the Amazon regions Putumayo, but also in Caquetá, Guaviare, Meta and Vichada (UNODC 2020: 26). However, coca production has very different impacts on the local level and therefore data on cultivation on a municipality basis should be taken into consideration (Annex Table 2). Additionally, the activity implies further environmental damage through the extraction of pasta base and the gradual expansion of the agricultural border. In the past, these were controlled by aerial spraying with glyphosate as part of the Plan Colombia, which worrying environmental consequences (Dávalos et al. 2011; Sadinsky/Campos-Iriarte 2019). The Duque government (2018-2022) considers the fight against coca as the most important instrument to curb deforestation by eradication measures. Currently, there is a renewed increase in the number of voices calling for a return to aerial spraying although there is abundant evidence for its detrimental socio-ecological consequences (Erasso/Vélez 2020; Pereira et al. 2021). Recent data suggest that coca cultivation has decreased in 2019. However, this is not necessarily good news for forests. Rather, the

current activities seem to push cultivation further into remote areas, leading to further clearings (Rincón-Ruiz/Kallis 2013).

Fifthly, in the peace process, various infrastructure projects are planned in the Amazon. These also include rural development measures, as explicitly provided for in the first section of the peace treaty, envisaging the construction of rural infrastructure as a means of improving market access for peasants. However, this is arguably not the main driver of deforestation. More worrisome are large road projects that both have a direct impact on deforestation and that are used to opening up the region for development and extraction projects and thus supports further deforestation processes.[12] In this respect, infrastructure projects included in the Amazon Hub of the IIRSA are under criticism (Kileen 2007; Uribe 2019). In addition, the Amazon region gets increasingly into the focus of business as an area with a high potential for hydroelectric generation especially at the Caquetá and Putumayo rivers (La Liga contra el Silencio, 2019).

Sixthly, the agricultural frontier expansion is also pushed forward by smallholders and peasants. Historically, the reasons for this are, on the one hand, the extremely unequal distribution of land and the associated lack of access to land for small farmers or landless people (Sanabria 2019; Villamizar 2020) and, on the other hand, the massive displacement of the rural population during the armed conflict and widespread rural poverty. In this vein, the expansion of the agricultural frontier has been a political constant for attending the agrarian question while preserving the historical privileges of the land-owning elites. However, it is important to highlight that at the same time large amounts of land were given to few – arguably powerful - individuals (CNMH 2017). In practice, in the Colombian Amazon, land was often cleared by peasants and then appropriated by large landowners, preferably using land for extensive cattle ranching. Population growth – especially in a context of unequal land distribution - generates further pressure on forests (Lara, 2021). The different trends (poverty, unequal land distribution, land grabbing, violence) continue in the Amazon today. Hein et al. (2020) similarly suggest that as an effect of the peace process and the "departure of the FARC from the territory" some other actors have taken advantage and used the window of opportunity of a power vacuum to access land through different means (Prem et al. 2020).

[12] Interview with Colombian anthropologists from Caquetá, 2020/09/25.

The large number of drivers of deforestation is by no means due to academic reticence or the exacerbation of complex interrelationships. Rather, in the regional and local differences are crucial. While the Amazon is often homogenized in international debates, there is a great deal of variation on the ground. As a result, deforestation drivers also differ. When we talk about the Colombian Amazon, we need to distinguish among different regional processes. Whereas in the south, and especially in Putumayo, the extractivist development model revolves around mining, oil and coca, in Caquetá, in addition to coca and oil, there is also and above all large pasture farming, and in the Amazon municipalities of Meta, the agro-export model has been extended to include large palm oil monocultures. In Vichada and Vaupés above all, extensive pasture farming can be found. These different models are complemented by large infrastructure projects, in particular hydroelectric power plants and roads, which are intended to accelerate development processes and thus increase deforestation.[13]

2.3. Confronting deforestation: Littles and structural voids

At least in discourse, the last Colombian governments highlighted their efforts against deforestation and climate change. For example, in 2012, then president Santos (2010-2018) stated that he will not permit more "environmental massacres" [14]. This compromise led to important agreements with international cooperation. One example is *Vision Amazonía*, a project introduced in 2015 that counts on important financial support from Norway, Germany and the United Kingdom (Krause 2020). President Duque also made climate protection and fight against deforestation a political priority (El Espectador 2020). Although deforestation rates declined in 2019, there is no trend reversal. In 2020 deforestation once again skyrocketed In fact, the government's policy see to bear fruits. According to official figures, the annual deforestation rate has been declining in 2019. However, data from Global Forest Watch show that there is no trend reversal and in general remains well-above pre-2016 levels (Appendix Chart 1).15 Moreover, especially worrisome is the fact that deforestation also takes place in the protected conservation zones of National Natural Parks.16

[13] Interview with Estefanía Ciro, 2020/09/26.
[14] https://www.elespectador.com/ambiente/no-permitiremos-mas-masacres-ambientales-santos-article-323253/ (30-06-2021).
[15] https://www.globalforestwatch.org/
[16] https://maaproject.org/2020/colombian_amaz/ (2020/12/06).

Moreover, the government's emphasis on the protection of the Amazon forest and its commitment to curb climate change is arguably contradictory to its extractive development strategy. The government seems to concentrate its efforts to protect forests on the fight against coca production. No doubt, production of illicit drugs is one driver of deforestation (refs). However, it is not the main problem causing deforestation (Erasso/Vélez 2020). Given the variety of factors behind the alarming deforestation in the Amazon, this focus on combating illegal drugs seems at least arbitrary and, in some cases, even counterproductive. This is evident having in mind that the current strategy against deforestation focuses primarily on promoting the state presence in the Amazon through militarization (including assigning tasks of forest protection to the military in the Plan Artemisa) and population control.[17] In fact, the Amazon is once again the setting of violent conflicts over territorial control between the military and different non-state armed groups. In this context, the fight against coca legitimizes the militarization of environmental protection and at the same time combines it with counterinsurgency measures. Having in mind the worrying human rights problems of the Colombian security forces, this has counterproductive effects. The Plan Artemisa arguably follows an approach that Wacquant (2009) called - although in a different context - "punishing the poor". It prefers presenting success by capturing poor peasants linked to deforestation over attacking structural problems and practically excludes local participation. Moreover, the militarization of environmental protection increases the spiral of violence in remote areas and even worsens the already dangerous situation for environmental activists and civil society organizations. According to Global Witness, Colombia is the most dangerous place for environmental activists, who face criminalization, threats, violent attacks and assassinations, being Indigenous groups especially vulnerable (Global Witness 2020: 21pp.). Furthermore, military approaches by no means solve the problem of expanding illegal drugs, but rather shift it to more remote areas, thus contributing - albeit unintentionally - to the further expansion of the agrarian frontier (Lessmann 2021). Actually Prem et al. (2020) find that proximity to military presence rather increases deforestation in Colombia.

Furthermore, the government's strategy to combat deforestation by focusing on curbing coca production leaves several gaps. These include especially the lack of viable measures for

[17] Interviews with scholars and activists working on the Colombian Amazon. See official l data of early 2020: El Tiempo (06-12-2020).

alternative income generation for producers (Dávalos/Dávalos 2020; International Crisis Group 2021). Although the peace treaty rightly gives priority to rural development and the solution of the drug problem, progress in implementing the planned measures is at best at a snail's pace (Instituto Kroc 2020). However, in the absence of sustainable reforms for producers, the issue of illicit drugs will not be resolved.

While the government highlights illegal activities as deforestation drivers, the expansion of the extractivist development model is not addressed in the strategy to curb deforestation. In other words, the focus is placed on politically desired important aspects, while the elephant in the room, i.e. land grabbing partly linked to the drug economy, extensive cattle ranching, and in general terms the extractivist development model, are excluded from the measures to curb deforestation, or are even massively promoted by the government. Put differently, the priority given by the government to reduce deforestation is very much welcomed; however, the focus on political interventions needs major changes to ensure that the environmental concerns of the official discourse will also achieve the results the Amazon forests and world's climate need urgently.

2.4. Structural Reforms Needed: Alternatives to Deforestation in the Colombian Amazon

Deforestation in the Colombian Amazon has multiple causes and cannot be reduced to simple formulas. Rather, a regionally or locally adapted strategy is needed to curb deforestation in the short term. In view of the enormous challenges, however, in the medium and long term, a selective reduction of pressure on the forest areas in the Colombian Amazon will not be enough to protect forests, preserve biodiversity and slow down climate change. Quite the contrary: We need to think outside the box and include far-reaching transformations of the status quo.

This includes, firstly, a transformation of the extractivist development model and the development of viable alternatives to extractivism. Currently, Colombia is trapped in an "extractive imperative" (Arsel et al. 2016) which requires a continuous expansion of the extractive frontier and represents a continuous driver of deforestation. Extractivism represents an unsustainable development model. Therefore, economic diversification is key for social development and environmental protection (Peters 2019). Secondly, the country needs to tackle land concentration and reduce the extreme inequalities in land tenure (Oxfam 2016). The land

question in Colombia has been a contested topic that also affects the Amazon. It was considered as one of the main triggers of the armed conflict (Fajardo 2014; Galindo/Pereira, 2020), and some tension around land tenure in the Amazon is currently considered as an element that could lead to new conflictive situations among their inhabitants (Hein et al., 2020). Therefore, the reduction of land inequalities continues to be a pressing and simultaneously conflictive topic.

Still, policy options exist, especially regarding the reduction of the incentives for low productive, land consuming and therefore environmentally damaging extensive cattle ranching. A key instrument would be an important increase in land taxes. Thirdly, alternative ways to tackle the problem of illicit drugs are very much needed. This should also include a reorientation of international drug policy and increased political efforts towards decriminalizing the drug economy (Lessmann 2021). At the national and local level, strategies that offer a decent life for peasants are of particular importance (Dávalos/Dávalos 2020). This includes opportunities for commercialization of legal small-scale farming products, the creation of decent jobs and a reduction of social inequalities. Of course, this also requires the development of infrastructure and transport routes in the Amazon and thus may lead to small-scale deforestation. It is therefore not a question of a radical reversal or even utopian considerations to totally stop deforestation in the short run. Rather, what is needed is intelligent planning to implement projects that promote sustainable development strategies, which provide alternatives to exploitation of nature and at the same time address the problem of land ownership inequalities and the need for socio-economic improvement of impoverished peasants. Such initiatives will need to encourage a new approach that allows inhabitants to access to the need to co-habit the territory, contribute with the goal of radically decrease deforestation, and with the possibility of carrying out activities that give them access to good living conditions and recognition of their organizational forms and participatory mechanisms including social movements and local organizations.

3. SOCIAL AND ENVIRONMENTAL IMPACTS OF OIL EXTRACTION IN ECUADOR'S AMAZON

This section analyzes the economic, social and environmental effects oil extraction in Ecuador since 1967. Although the country has a small share (1.6%) of Amazon rainforest, Ecuador's Amazon, with other Andean countries, holds the highest biodiversity in the region, particularly in

the upper Napo basin and the Yasuni National Park (Bass et al. 2010, RAISG 2015). It shares with the other Andean Amazon countries (Colombia, Peru, and Bolivia) specific climatic conditions, deforestation drivers and impacts of extractive activities. Given the high significance of oil on its development performance, Ecuador lends itself as a representative case study on the impacts of oil extraction in the Amazon.

3.1. Oil and Development in Ecuador

In 1967 large oil reserves were discovered in the northern Amazon, and since 1972 Ecuador has been an oil exporter. Five decades later, it can be concluded that oil contributed little to equitable and sustainable development, despite significant economic, social and institutional transformations. Economic growth remained evasive and unstable, with an average annual growth rate of 1.55% in per capita income between 1972 and 2019, lower than that of the pre-oil period (1950-1972) of 2.07%.[18] Despite important social achievements during the oil boom (1972-1982) and between 2006 and 2014, the social, ethnic, and regional disparities that historically affected the country remained pervasive, as 30% of the population remains poor, underemployment affected 40% of the labour force in 2017 (Ayala and Larrea, 2018). Social inequality barely declined, as the Gini coefficient remained at 0.52 in 2015 (ECLAC, 2015; Vallejo, Falconi, Larrea, and Burbano, 2015, Larrea, 2017). The COVID-19 crisis sparked poverty to 40% and underemployment to 48% (UASB 2020).

Oil extraction in Ecuador occurs in a formerly undisturbed region in the Amazon basin, leading to severe environmental effects, particularly deforestation, loss of biodiversity, pollution, and human health hazards (Herbert, 2010; Amazon Defense Coalition, 2012, Becerra et al. 2018).

Between 2004 and 2014, a new development strategy was applied, strengthening state intervention in the economy and promoting more inclusive social policies, in an international context of high oil and commodity prices. Later the whole option collapsed when oil plummeted since 2014. Neo-extractivist strategies failed to diversify the economy, and under a heavy debt burden and limited oil reserves, the county is currently affected by a deep economic, social and political crisis (Larrea, 2019).

[18] See a periodization of the 1950-2019 interval in Appendix Table 3 and Chart 7.

3.2. Threats to conservation: extractive policies in the Amazon

Since the Spanish conquest, external forces, mostly articulated towards resource extraction -gold, rubber, and recently oil- have led to adverse impacts on ecosystems and Indigenous cultures in the Amazon. Among those cycles, the oil period has had the longest and deepest impacts. Colonial or national policies, fostered by international interests, have seen the Amazon as an unlimited source of raw materials and an almost empty space to be exploited, ignoring both Indigenous cultures and biodiversity. During extractive phases before oil expansion, the Amazon suffered from plunder, without any concerns on exhaustion of natural resources (Taylor 1994). In the oil period, although the resource-extraction vision also prevailed, conservation concerns had also partial effects, resulting in the creation of protected areas, a partial recognition of Indigenous territories, the recognition of nature rights and the "good living" concept in the 2008 constitution, and minor additional conservation policies that have failed to significantly reduce deforestation (Larrea, Larrea and Bravo 2009).

Protected areas cover now 20% of national territory. The most important in the Amazon are the Yasuni National Park with about a million ha, and the Cuyabeno Reserve, both established in 1979. The environment ministry was created in 1996. As oil extraction was allowed in both reserves since the 1980s and the budget for protected areas is low, the degree of effective protection is weak (Larrea 2017). Indigenous territories cover a large extension in Ecuador's Amazon, with a total of about 3 million ha. A large proportion (about 70%) of them has been legally recognized in the form of collective property rights. Nevertheless, the legal competences of Indigenous territories are weak, and several oil and mining concessions have been assigned by the state on Indigenous lands, without properly applying the right of previous consultation to Indigenous peoples, established by ILO and recognized by Ecuador[19].

Since 1964 -when the state signed a large oil concession to Texaco in the Amazon, public policies consistently promoted the expansion of oil extraction, as well as large-scale mining since 2011. The main issue in oil policies has been the debate between nationalistic policies aimed to increase the state participation in oil revenues against transnational companies on the one hand, and strategies to attract foreign investment with incentives on the other. The first line prevailed

[19] Interview with Dr. Mario Melo, lawyer expert in Indigenous rights, Quito, August 22, 2020.

in periods of high oil prices and strong negotiating capacity of the state against transnational interests, while the second trend was mostly applied in periods of low prices and economic crises. Little attention has been paid to public policies aimed to reducing environmental impacts of extractive activities, or introducing low-impact technologies, such as roadless oil exploitation (Larrea 1993).

The only significant exception to the prevailing extractive strategy was the Yasuni-ITT Initiative, aimed to keeping indefinitely unexploited a large oil reserve in the Yasuni National Park, in exchange for an international fund for conservation and investment in renewable energy (Text Box 1) (Larrea 2017).

Transnational participation in oil extraction in Ecuador changed over time. Between 1972 and 1993, the dominant company was Texaco (now owned by Chevron). Later, Occidental and other companies like Repsol were significant, but the share of state companies increased. During the last decade Chinese companies (Sinopec and Petrochina) became significant.

In addition to extractivism, public policies fostered colonization in the Amazon during the 1960s and 1970s, to reduce demographic and political pressures in the Coast and Highlands, and as a strategy to build "living frontiers" in areas close to the Peruvian border.

3.3. Oil and social development in the Amazon region

Although the Amazon provinces account for 47% of national territory, the region remained historically isolated from the rest of the country until oil discoveries in 1967. After the Spaniard conquest only two short periods of resource extraction deeply disrupted the Indigenous cultures of the region. The first took place in the XVI century, with gold mines, and the second occurred in the late XIX and early XX centuries, with rubber extraction (Taylor 1994). Nevertheless, the Amazon population reached only 1.7% of the national total in 1962.

Oil extraction brought about a rapid internal migration to the region, with expansion of agricultural frontier, deforestation, and severe environmental impacts. Between 1962 and 2010, The Ecuadorian Amazon population expanded more than ten times, reaching 739,814 inhabitants in the latter year (Appendix Table 4). In 2018, cumulative deforestation accounted for 16.2% of original Amazon forests in Ecuador (Sierra 2020) (Appendix Map 4).

The expansion of extractive activities -oil and recently mining- has been the most important indirect driver of deforestation and degradation in Ecuador since 1967. Companies opened roads and built infrastructure, allowing migrant families to settle down. Unlike the case of Brazil, the immediate agents of deforestation in Ecuador are mostly small migrant peasants, while large cattle farms or plantations are less frequent.

Unlike Brazil, Colombia and Peru, urbanization in Ecuadorian Amazon has been moderate. Only 33% of the population lived in the cities with more than 5,000 inhabitants in 2010, and the largest city -Lago Agrio- had only 48.500 inhabitants. Despite strong migration, Indigenous peoples still represent 33% of the population and 10 different Indigenous languages are spoken (INEC 2010).

Although agriculture is the main employment source, Amazon soils usually have low aptitude for cultivation, land productivity is poor and decreases over time after deforestation, so that in a period of about 15 years land becomes useless and crops or pastures are abandoned. As a result, peasant families move to deforest a new plot of land. Agricultural expansion mostly takes place through deforestation carried out by poor migrant peasants, who install themselves around new roads, usually open by oil companies (Wunder, 2000, Becerra, Laurence and Desprats-Bologna, 2018, Larrea, 2017). Agriculture in the Amazon is extensive, inefficient and has low capital investment. Land productivity in the region reaches only 31% of the national average, and the figure for labor productivity is similar (35%). Pastures represent 73% of cultivated land (Appendix Table 5).

Oil extraction absorbs the lion share of Ecuador's Amazon GDP (65%), but its contribution to employment is extremely low (0.9%). In contrast, agriculture accounts for only 4% of GDP but provides 54% of employment. Among the remaining employment sources, public and social services are significant, and tourism has importance in particular areas, accounting for 4.2% of reginal employment (INEC 2019, BCE 2018). The Amazon region remains the poorest in the country during the whole period, both in urban and rural areas. Oil revenues benefitted mostly the urban highlands where Quito -Ecuador´s capital - is located, and the gap between rural Amazon and the national average did not decline.

3.4. Social development in Ecuadorian Amazon

To capture local basic needs satisfaction, a social development index (SDI) was elaborated, combining 19 indicators from the population censuses of 1990, 2011 and 2010, using principal component analysis. Six indicators deal with education, two with health, three with gender and employment, and eight with housing. Parishes are the smallest administrative division in Ecuador, and the country was divided into 1024 local circumscriptions. The Methodological Appendix contains the complete list of indicators and the methodology of SDI. (Larrea, 2017, Larrea et al, 2013)

From the Sustainable Development Goals perspective, the selected social indicators and the SDI are directly relevant for goals 1 (no poverty), 3 (health), 4 (education), 5 (gender equality), 6 (clean water) and 7 (energy). There are strong indirect links with goals 2 (zero hunger), 8 (decent work) and 10 (reduced inequalities). To explore the social and regional distribution of oil revenues in Ecuador, the SDI was broken down by region and area of residence for 1990, 2001 and 2010 (Appendix Table 6).

To refine the analysis, the Amazon was divided into an oil extracting sub-region and the remaining part (Appendix Tables 7 and 8). Results illustrate that within the Amazon, oil extracting zones are consistently more affected from social deprivations than the corresponding non-oil zones, both in urban and rural areas. Table 7 illustrates also average schooling years, a representative education indicator, with lower differences, given the high proportion of immigrants in the population. As it is well known, immigrants usually have higher than average levels of education in their original regions. By contrast, in the case of health conditions, differences against oil extracting zones in the Amazon are deeper. As Table 8 shows, results for 1990 and 2001 are similar and inequalities remain consistent during the 20-year period.

3.5. Main Findings of Quantitative Model

The Amazon barely benefited from the regional distribution of oil revenues. Not only the region consistently remained the most socially deprived in Ecuador, but also the oil extracting subregion kept lower social benefits than the non-oil part of the Amazon, both in urban and rural areas. The analysis suggests that oil extraction may have a detrimental net effect on local social

development, but the tables do not demonstrate this relationship, given that social improving is the result of multiple factors, such as soil fertility, access to markets, opportunities of economic diversification, development of non-agricultural employment, and so on.

To test the net effect of local oil activity on social development, including the available information on other factors potentially influencing social development, a spatially autoregressive multiple regression model was elaborated (Methodological Appendix). The model took the SDI as the dependent variable, and its independent variables included: oil extraction proximity, soil fertility, access to markets, proportion of deforested areas, a dummy for rural tracks, and 3 employment indicators (proportions of agriculture, wage earners, and tourism in the labor force). The model results are presented in the Methodological Appendix Table 1. Its main findings can be summarized as follows.

1. All independent variables have regression coefficients significant at least at the 5% level, and most of them are significant at 1% level.

2. The regression coefficient of proximity to oil wells is negative and statistically significant at 1% level. The result is consistent with the negative effect of oil extraction on SDI presented in Appendix Table 7, and strongly suggests that, after controlling for other observable factors that influence social conditions, such as soil fertility, access to markets, proportion of deforested land, and employment structure and diversification, the close proximity or local presence of oil extraction has a net detrimental effect on basic needs satisfaction.

   As oil extraction is highly capital intensive, its local contribution to employment is low, and usually concentrated on skilled labor, coming from outside the Amazon. Only during the brief construction phase oil extraction has an important local unskilled labor component. However, oil may have an important fiscal link with social development, because of local investment of oil revenues in social development (schools, health facilities, housing, credit, technical assistance, and so on). Social investment may come from the national government, local governments or oil companies. On the other hand, detrimental effects of oil extraction may come from pollution, disincentives to tourism, social conflict, prostitution, and corruption. The negative coefficient suggests that in

Ecuador, detrimental effects overcome social benefits from oil. The environmental impact of oil in Ecuador's Amazon has been evaluated as severe, particularly during the intervention of Texaco (1967-1993), as most residuals were systematically thrown to the environment without treatment. Afterwards, the frequency of oil spills remained high, averaging about once in a week (Herbert, 2010; Amazon Defense Coalition, 2012; Durango et al, 2018).

3. Deforestation obviously has a strong impact on biodiversity and is the most important source of CO_2 emissions in Ecuador, with 36% (WRI, 2020). Moreover, deforestation rates in Ecuador remain high due to the lack of effective control and may be increasing (Appendix Chart 1). Although there is not agreement on deforestation figures, according to FAO, Ecuador had a 0.6% yearly deforestation rate betwwen1990 and 2015 (FAO, 2015).

To explore the social effect of deforestation on local living conditions, the model included the proportion of intervened areas in quadratic form. Appendix Chart 8 illustrates the partial regression function of SDI on the proportion of local intervened areas, keeping all the remaining variables at their mean value, selecting only rural census tracks. Broadly speaking, the contribution of deforestation to local living conditions of peasants is low, decreases over time to banish in the later stages of the process, and concentrates only in the initial phases.

Local living conditions improve at the initial stages of deforestation, but with decreasing returns, so that the function reaches a stable level with not further gains when deforestation is higher than 65%, with a small decline after 80% of deforestation (Appendix Chart 8). According to the model, the total social improvement between 0% and 100% of deforestation is 7 points (from 30 to 37), and there is not improvement at all from 65% to 100% of deforestation. This weak and decreasing association between deforestation and living conditions may be due to low and decreasing land productivity in most Amazon soils. During the first years of deforestation, soil fertility remains relatively high and family income may improve by selling wood. Later, decreasing land productivity reduces agricultural revenue up to the point when land is abandoned ant the peasant family moves to deforest another plot of land. These findings are broadly consistent with a research in Brazilian Amazon, which found that social benefits from

deforestation appear only in the early stages of the process, and later social conditions stagnate and finally decline (Rodrigues, 2009).

The soil fertility index captures spatial differences in the land aptitude for agriculture and has the expected positive regression coefficient at 5% significance level. Travel time for markets captures transportation costs of agricultural products and has the expected negative and significant association with SDI. Dummy rural captures differences in living conditions between towns and the countryside, which are high in Ecuador. Its regression coefficient is negative and statistically significant. All the remaining variables refer to employment structure. As a high proportion of agriculture in the labor force implies low diversification, their expected effect on SDI is negative. The proportion of wage earners, an indicator of expansion of capitalist relations, has an expected positive influence. Finally, the proportion of logging and food services, as an indicator of tourism, has a strong positive coefficient with 1% significance, as expected. Its high value suggests an important socially distributive effect of tourism in Ecuador´s Amazon.

3.6. Conclusions and recommendations

The Amazon remained as the most socially deprived region in Ecuador, both in the urban and rural areas. Among the most critical conditions are lack of appropriate health services, and high levels of child mortality, while differences in education were less severe. A spatially autoregressive multiple regression model was built to explore the local effects of oil extraction, local deforestation, soil fertility, access to markets and employment structure on social development. The model found a negative and statistically significant effect of local oil extraction on social development, after controlling for all the remaining variables.

The findings strongly suggests that in Ecuadorian Amazon, the detrimental effects of environmental degradation, pollution, loss of biodiversity, and social conflicts overcome the potential local benefits brought about for the employment generation and local social investment of oil revenues. The lack of a positive relationship between oil extraction and local social improvement extends, at the micro regional level, the conclusions of several national studies, on the weak link between oil extraction and development in Ecuador. From an international perspective, the oil curse theory points out the detrimental economic, social and environmental effects of oil export specialization on developing countries.

In Ecuador, oil expansion has been an important indirect driver of deforestation in the Amazon. The regression model suggests that deforestation has a small and short-lived contribution to improving living conditions of local population. Only in the initial phases of deforestation, some social gains are observed, but as local deforestation continues over 65% of the land, social benefits disappear. The analysis shows that, unfortunately, not only the net local direct contribution of oil extraction to social development is minimal or even negative, but also that the local improvement brought about from deforestation-based agriculture and cattle raising is modest and short-lived. Including the detrimental effects of deforestation on climate change and loss of biodiversity, the whole balance of benefits may turn negative. The Amazon region, therefore, requires a deep structural process of social and economic transformation to find alternatives toward sustainable and distributive social development. The social distributive effects of diversification towards tourism are rewarding. Ecotourism is an example of a way of diversification able to improve living conditions, simultaneously preserving natural and cultural heritage.

As remaining oil reserves in Ecuador are low, lasting no more than 9 years at current extraction levels (BP, 2020), and detrimental effects of current agricultural practices may overcome social gains, a structural transformation towards sustainable and distributive development strategies is required. Fortunately, a low emission development path, based on activities such as ecotourism, agroforestry and agroecology, seems feasible (Larrea 2017). Deforestation can be drastically reduced or eliminated, as the Brazilian experience between 2005 and 2012 demonstrates. Nevertheless, the required transformation in regional development strategies required further research, and available information only suggests some hypothetical transformative ways.

4. EXTRACTIVISM IN THE PERUVIAN AMAZON

Peru is the country with the highest percentage of its territory covered by Amazon forest. In this sense, it is the most "Amazonian"; yet, due to the distance from policy and decision-making centers and Perú's historically centralized form of government, the Amazon has been relegated to the category of a territory awaiting "conquest, occupation and exploitation"[20].

[20] Ex President Fernando Belaúnde, (1980-1985).

The era of oil exploitation in the area was launched by the military governments of Velasco (1968-1975) and Morales (1975-1980). It brought about massive environmental liabilities that have yet to be remediated. During the 1980's the country returned to democracy and in 1981, Shell initiated its activities in blocks 38 and 42. In 1982, oil companies were granted tax exemptions. During this period, Shell discovered the natural gas deposits of Camisea in the Cusco Amazon Region. This new resource became a priority for the government of the incoming president García (1985–90), who signed an exploitation agreement with Shell.

Extractivist policies were further reinforced by the neoliberal model prevailing in the 90's with Fujimori. During those years, a political narrative revolving around economic development based on extractivism penetrated and dominated not only in the circles of economic and political power, but also in all social strata of the urban population. In this way, the dominant classes "succeed in naturalizing inequality and limiting the impact of socioenvironmental protest and discontent," which became much more frequent during this decade (Damonte, 2014). Fujimori adopted policies to stimulate mining exploitation in Amazonia, revising and withdrawing gold concessions from companies that were not using them and making them available to small scale or artisan miners, who were also given incentives for the purchase of machinery and equipment. These measures generated the so-called "machinery fever" and enormous environmental impacts.

The extractivist logic continued during the following administrations. Toledo (2001-2006) modified forest legislation to grant a large number of timber concessions (that eventually failed). Demands by Indigenous organizations for the creation of Reserva Territorial Napo-Tigre, where oil companies were operating, were stalled due to the pressure of the companies. During his second term (2006-2011), President García initiated a confrontation with Indigenous peoples and peasant farmers through a series of editorials in the newspaper El Comercio de Lima, known as "Dog in the Manger" articles. In these texts, the President expressed the deep contempt he felt for those sectors of society, which was largely shared in urban centers and by a significant portion of non-Indigenous society. He considered them perverse, limited intellectually and educationally and susceptible to manipulation, referring specifically to Indigenous peoples, who, having enormous forests, did not cut them down. He lamented that these territories could not be granted in concession to large private companies. For García, the unemployment and economic

problems pervasive in the country were due to these "dogs in the manger" and he was convinced that it was necessary to profit from public property and goods through privatization and land titling schemes.

A peak in conflictivity was reached in 2009 in the context of the Free Trade Agreement with the U.S., when President García promoted several legislative decrees to harmonize Peruvian Legislation with that of the U.S., and that unless these changes were made the U.S would leave the Agreement. Three of these decrees affected Indigenous territories and facilitated extractivism: one modified the forest and wildlife law, another reduced to 50% plus one the quorum necessary to expropriate communal lands, and the third likened the administrative procedures for communal lands in the highlands and forests to those of the coast (Morel, 2014). This triggered an uprising by Indigenous organizations, which was finally repealed. 33 people lost their lives in the brutal clash between police and Indigenous organizations, known as "Baguazo".

In 2011, hopes were high that Humala represented change respect extractivism. In his first term, important steps were taken that seemed to point to a radical shift. Government policy regarding extractivism aimed to establish greater tax-system justice and the Mining Royalty Law was enacted (Lanegra, 2015). To reinforce this initial step, the long-awaited Public Consultation Law was also approved and became a regional milestone. However, this momentum did not last. The 2012 commodity crisis led to a turnabout in Humala's policies. Seeking to promote foreign investment, policy shifted towards making social and environmental regulation more lenient. Despite the instability of the recent years, this tendency in policy has not changed.

Socioenvironmental conflict accompanies this tendency, with Indigenous peoples demanding access to justice and respect for their rights. In July 2020, after many years of campaigning, the Federation of the Achuar Nationality of Perú (FENAP) and the Autonomous Territorial Government of the Wampis Nation (GTANW), succeeded in reverting a concession to the oil company GeoPark, which had been operating in their land without an environmental or social licence. On August 8, Kukama community members occupied the PetroTal company installations in Loreto to demand that the Vizcarra government take immediate action to install basic services and better health care in the context of the COVID-19 pandemic crisis. The

protesters also demanded that the government honor promises made in 2019 that had been translated into commitments in the Gap-Closing Plan. The repression exercised that day led to the death of three Kumala and several seriously wounded on both sides.

The logic of "conquest, occupation and exploitation" of the Peruvian Amazon remains dominant. Petroleum production in 2019 neared 53,000 barrels per day, and the target for 2023 is to arrive at 100,000 b/d. No matter who wins the elections in April 2021, it can be expected that the next administration will implement actions to achieve that goal, with the likely outcome of new social conflicts, environmental consequences and increased emissions.

5. VENEZUELA: PREDATORY EXTRACTIVISM, ILLEGAL ECONOMIES, AND HYBRID GOVERNANCE

The Venezuelan Amazon bioregion covers 453,915 kms^2, representing 49.5% of the national continental surface area[21] (EcoCiencia, 2016). It houses 12 natural protected areas and 29 Indigenous nations, including three groups in voluntary isolation or initial contact. It also contains significant mining resources, like gold, diamonds, bauxite, iron and coltan (MPPEFCE (2021). The territory has suffered from increasing intervention of its ecosystems since the XIX Century. This tendency gained force with the post-war developmentalist model, essentially focused on iron, bauxite and hydropower. However, the 1980's represented a turning point due to the rise in international gold prices, which not only made new mining projects more attractive, but also stimulated the expansion in illegal mining. Additionally, the historical decline of conventional crude oil reserves, located outside Amazonia, drove government elites to focus on new areas of oil exploration -like extra-heavy crude oil from the Orinoco Oil Belt (OOB)- and also to diversify extractivism to activities other than oil. In the 1990's, mining, forestry and tourism projects, connective infrastructure and the expansion of new oil ventures in the Orinoco delta were prioritized. (Terán 2015).

From 1999 onwards the "Bolivarian Revolution" represented a significant change in the political strategy of the country, yet extractivism remained a priority. Despite the 1999 Constitution's protection of environmental and Indigenous rights, the Chavez government executed the

[21] The area in the watershed basin represents only 5,6%. BBC. La Cuenca Amazónica. http://www.bbc.co.uk/spanish/specials/1330_amazon/page10.shtml

extractivist intervention and developmentalist policies in Amazonia that the previous government had promoted but had not been able to consolidate. (Terán, 2015)

In the first decade of the 2000s, the Bolivarian process reached its hegemony and extractivism acquired new dimensions. In addition to aiming to reach 6 bbl/d of oil production by 2021 essentially from OOB, the government advanced towards the expansion of big mining, with enormous consequences on Amazonia. This period saw the launching of new oil, timber, agroindustrial, infrastructure and energy projects. The boom in primary product prices provided an extraordinary incentive, leading to a new "gold fever" that impacted Amazonia not only with new licit mining projects, but also with a notorious expansion of illegal mining in the region (Terán, 2016).

Mining concessions and investments, regularization plans, agreements with Chinese companies and the nationalization of gold culminated with President Chávez' announcement of a mega-project in Amazonia called "Orinoco Mining Arc" (OMA), from where gold, bauxite, coltan and diamonds would be extracted. This involved taking mining in Venezuela to a new scale and represented a fundamental step in the changes that extractivism would undergo in the years of The Big Crisis (2013-2020) (Terán, 2016)

"The Big Crisis" was a national collapse of multi-dimensional character leading to the disintegration of all the spheres of a nation that had been built around the oil industry during the previous 100 years. The process of dissolution of the petro-state - not of the State in itself- involving a complete prevalence of impunity, the resolution of public affairs and conflicts by means of force, and an extraordinary boom in corruption and in underground economies expressed itself in the acceleration of natural resource extraction and destruction, where mining prevailed as a fundamental tool for the reproduction of local and national power structures. The Venezuelan Amazon became the most attractive frontier to materialize these power networks. (Terán, 2016)

The described factors led to the emergence of a new governance structure attuned to processes of territorial conquest and appropriation of natural resources that have resulted in a general landscape of predatory extractivism. In 2016, President Maduro established a "special economic zone" in the OMA, a scheme promoted principally by China, for the liberalization of the territory

from regulations (duties, labor and environmental protection) to stimulate foreign investment. The plan was a call for international investment and a means to put order in the rampant illegal mining activities in the region, but the extractive dynamics of the area soon proved to be profoundly determined by the control of mines and territories by armed actors of diverse types, like criminal gangs ("mining syndicates"), Colombian armed groups, and official security squads, mostly belonging to the military. The political geography of gold ruled: local power structures, commercial transboundary relations (mostly Colombia and Brazil), and operation essentially outside the sphere of legality, be it because the activities themselves are illegal or criminal, or because they violate human rights, the Constitution, environmental regulations, Indigenous rights, among others. Violence was and continues to be the primary resource for operation and control (Terán, 2018).

The government response was to increase the presence of the military in the region and in the management of the companies. Granted with unlimited faculties for the management of natural resources, the military sector was placed openly and thoroughly in the extractivist business. The continuing prevalence of illicit economies and local power networks resulted in the configuration of various hybrid governance structures with blurred boundaries between legality and illegality and no concern for the conservation of the area (Terán, 2018).

The plight of the Venezuelan Amazon, traversed and pervaded by the logic of violent territorial enclave economies, had profound consequences on the natural ecosystem and local peoples. Even before the crisis, the advances on the territory had already generated immense environmental impacts –high levels of deforestation, mercury pollution, degradation of water bodies and watersheds-, displacement of local economies, significant impacts on local populations, conflict and systematic violations of human rights. This critical situation was aggravated by the deepening economic collapse, increasing levels of institutional decomposition and political corruption, international economic sanctions on the country, the need for appropriating gold by local and national power circles, as well as the dynamics of the Colombian armed conflict and migration to mining areas by transboundary actors. The Crisis led to a marked deterioration of the social, ecological and cultural impacts that were already taking place prior to it (Terán, 2018).

Yet, despite these circumstances, compared to other countries in the region, Venezuela has a relatively low rate of deforestation (Appendix Table 1). The described situation of an exposed Amazon, open to forces with logics of conquest and globalization still offers more of a living Amazon, an opportunity for conservation, if only those forces could be kept at bay.

6. BOLIVIA: THE SECOND DEFORESTATION HOTSPOT OF AMAZONIA

Bolivia's forest loss has the second highest rate in the Amazon after Brazil, despite of having one of the lowest human population densities in South America. The largest share of deforestation occurs in the lowland region, predominantly around the city of Santa Cruz de la Sierra and the Santa Cruz Department, the main agricultural center of the country.

Santa Cruz underwent an intense colonization process from the 1950s through to the 1990s. Between the mid 1980s and the early 1990s, deforestation accelerated due to the influx of new actors: agro-industrial corporations, Santa Cruz farmers, and foreign producers, clearing large areas of forest for agriculture. This process was facilitated by government policy and financing by the World Bank aiming to promote market- oriented production and economic growth, but also leading to significant deforestation. During the 2000s, the main drivers of deforestation were: conversion of forest to pasture for grazing (with more than 50% of deforestation from 2000 to 2010); mechanized agriculture -mostly soybeans- largely by Brazilian and Argentinian producers (30%), and to a lesser extent small-scale agriculture (20%). Increased demand from the domestic market due to growing urbanization, important international investments, and greater integration of the agricultural economy to export markets driven by the growing demand for soybeans and beef, increasingly became the major underlying causes of deforestation. Progressively, the expansion zone of deforestation radiated from Santa Cruz to the north and east, and eventually adopted a dispersed pattern, even reaching the northern border with Brazil. (Kaimowitz et al, 1999).

In parallel to this process, Bolivia was a pioneer on many environmental issues. Beginning in the 1990's, faced with environmental and social problems; the government started adopting policies inspired in the sustainable development agenda of Rio Summit of 1992. However, it was not until the early 2000s with the presidency of Morales that a new paradigm was introduced proposing non-market approaches to environmental policy and the principle of "Living Well",

which was encoded in the country's Constitution of 2009 and proposed internationally. Bolivia became a pioneer on environmental legislation: it passed the Law of the Rights of "Mother Earth" (2010) recognizing the rights of nature and the State's obligations to ensure these rights, and the Framework Law of Mother Earth and Integral Development for Living Well (2012), establishing the rights of indigenous, rural and afro communities within a development proposal for sustainable natural resource use (Romero-Muñoz et al. 2019).

Yet, despite this innovative legal framework and sustainable proposals, little progress in avoiding deforestation and forest degradation was made in practical terms. In fact, these conservationist policies are in constant tension with agricultural promotion policies, and directly contradict plans to guarantee and increase food production and exports, widespread road and infrastructure improvement and expansion (after agriculture and pastures, the leading cause of forest degradation and deforestation), and allowing oil exploration in protected areas (PA). It is noteworthy that nearly half the expansion of the hydrocarbon frontier in Amazonia from 2008 to 2015 occurred in Bolivia (Romero-Muñoz et al. 2019).

·The majority of national PA in the lowlands are directly or indirectly threatened by the rapid expansion of commodity frontiers, and as a result, Bolivia has the second highest proportion of PA under intense human pressure in all of South America: agricultural expansion is causing massive biodiversity loss and eroding protected area connectivity; eleven of the 22 PA have overlapping oil and gas blocks covering at least 17% of the protected surface; at least nine Amazonian PA are fragmented by roads and subjected to roadside deforestation; gold mining has been expanding rapidly in the north, including inside PA, causing water and soil pollution; nine hydroelectric projects, mainly for export to Brazil, are located inside or near PA, and at least three dams are planned immediately upstream or downstream of seven Indigenous territories, inducing displacement (Romero-Muñoz et al. 2019).

Despite having the highest percentage of Indigenous population in Latin America (>40%) and despite the protection granted to Indigenous peoples by the Constitution to give free, prior and informed consent to infrastructure development and resource extraction in their territories, a 2015 Decree allows the government to decide the timing and procedure for consultation with national Indigenous organization rather than with the local affected communities, thus rendering

the process ineffective and threatening conservation. Traditional knowledge and livelihoods are associated with forest conservation (Blackman et al, 2017) and many Bolivian Indigenous communities retain their traditional culture and the worldviews on which the Living Well principle set in the Constitution is based (Romero-Muñoz et al. 2019).

The future of the Bolivian Amazon is contingent on the government honoring the Rights of Nature enacted in the law and the principles established in the national Constitution.

7. CONCLUSIONS

Since the 1970s, and particularly during the early XXI century, the Amazon experienced the largest expansion of human intervention in its history. Facing a new wave of globalization and the expansion of commodity exports from Latin America, several commodities extracted from the Amazon boomed, mostly soy, beef, iron ore (Brazil) oil and gas (Colombia, Ecuador, Peru), gold (Peru, Venezuela), and illegal drugs (Colombia, Peru, Bolivia). Moreover, large infrastructure projects -roads, hydroelectric dams- complemented the transformation, becoming far-reaching indirect drivers of deforestation and forest degradation. The neo-extractivist developmental model did not generate significant improvements in living conditions of the local population, including countless Indigenous communities who have suffered the most the impacts on the environment and the loss of forests and biodiversity (Chapter 19).

National manifestations of this process are heterogeneous and vary according to resource endowments, social and political conditions, and changes over time. Yet there is evidence of the shared importance of domestic markets -influenced by urbanization and income increases in in other areas of the country-, international markets and global forces -specially associated with commodities, namely beef, cattle, oil and minerals- and of the role of government policy.

Interestingly, government policy is observed to be determinant, either by positive action or by absence. The latter case is demonstrated in Colombia and Venezuela. A relatively low deforestation in Venezuela is associated with an Amazon that has consistently eluded the intervention of the State, first because the region was forgotten as generous oil revenues came from outside it; and subsequently because of the difficulty of successfully intervening the territory due to the existing informal but consolidated power networks. In Colombia, a rise in

deforestation is experienced after the Peace Agreement with the guerilla, which had restricted the intervention of the State and advance of government policy in the region. Conversely, State policy has been an important determinant the influx of activities that have affected the territory in all other cases, and the degree to which it has been able to control the adverse effect of these activities is associated with political will and consistency of state policy, and also with its capacity for law enforcement.

Excepting Venezuela, agriculture and cattle ranching seem to be the most important deforestation drivers in terms of area. Countries differ in terms of the importance of small versus large scale producers. This process may be influenced by natural conditions, government policy and market access, among other factors, but it may also hide confounding factors associated with small-scale production, which collectively refer to a diverse universe with varying relationships to the market and with drastically different technological packages and environmental impacts. The cases here presented, for example, include small scale farmers- as those who migrate to the Amazon from other regions and activities, and also local small scale traditional farmers and harvesters; another example comes from Peru, where small scale farmers supply the domestic and international market of cocoa and coffee (Ravikumar et al, 2016); therefore, shedding a different angle on the driver of deforestation. Yet, the role of large scale modernized agriculture and cattle ranching is clear cut in the part it plays in radically accelerating deforestation and fragmentation where it is introduced (Brazil and Bolivia).

Infrastructure development, in particular road expansion, is an underlying indirect driver of massive changes in forest area by opening access to direct drivers, legal and illegal. Road construction and improvements have gone hand in hand with strong forest conversion, particularly in Bolivia and Brazil, where large scale agriculture is predominant, Road building plans are widespread in the region. It has been estimated that 75 planned projects for the next five years in Bolivia, Brazil, Colombia, Ecuador and Perú extending 12,000 km and "most [lacking] rigorous impact assessments or even basic economic justification", could lead to 2.4 million hectares of deforestation in the two decades after (Vilela et al, 2020). From the perspective of the intensity of the deforestation process, three main groups can be identified. Brazil and Bolivia share high tree forest loss, involving land use change from forest to cattle

ranching, intensive soy cultivation, oil and gas (Bolivia and mining (Brazil), and infrastructure development.

A second group with middle impacts includes three Andean countries (Colombia, Peru and Ecuador). In all cases oil has been significant, commercial farming is important in Perú and peasant agriculture in Ecuador. Illegal activities, such as coca cultivation and small-scale gold mining, are relevant mostly in Colombia and Peru, although the extent to which illegal activities, including gold mining, logging and drug trafficking are widespread the region remains open, as they cater to international markets, are "deeply transnational" and may have a significant degree of integration.

A third group, with relatively low tree cover loss includes Venezuela, Suriname, Guyana, and French Guyana. In all the cases forest conversion to agriculture has been moderate, but the recent expansion of illegal mining and criminal activities mostly in Venezuela created a well-defined increase in forest impacts, excepting in French Guyana.

In all cases the neo-extractivist model has been stronger than conservation policies, although an important portion of Amazon land is protected or covered by recognized Indigenous territories (47%). The only national policy with substantial effects in curving deforestation was the Brazilian experience between 2005 and 2012, with an 84% reduction in deforestation rates. Although the outcome is currently reversed, the model success sheds light for future replications embedded in a comprehensive new paradigm towards preserving biodiversity and forest ecosystems, reducing emissions while improving living conditions of local peoples and respect of Indigenous cultures.

8. KEY MESSAGES & RECOMMENDATIONS

- Differentiated local manifestations of deforestation and forest degradation are particular to national and local contexts, as a function of its local natural and historical, social, political and economic conditions. In designing policies and programs, context matters. There are no one-size solutions applicable to all countries or even to all of Amazonia within the same country.

- The state role has been decisive in determining the type and scale of human intervention in Amazonia, by concrete action or by omission. It is necessary to redefine state policies so that forest conservation and human welfare are necessary conditions for all Amazonian policies. Governments must implement positive actions (policies, rules and regulations, enforcement, etc.) to drive sustainable development in the Amazon.

- Two antagonistic ideas have predominated as models for the region: “extractivism” and “conservation”. The current Amazonian development model is not sustainable, and the transition to an alternative development path is necessary. The new model must achieve forest conservation and welfare of Indigenous and local communities, redefining economic activity, within a viable unified trajectory, sustainable in the long term.

- Severe social inequality in the Amazon, and particularly unequal land distribution, coupled with land tenure irregularity, are hindrances to sustainable development goals. The disproportionate impact of COVID-19 on the most vulnerable populations, in particular Indigenous peoples, is a clear example.

- The transition to a low emission sustainable development path must include effective policies to reduce inequalities and involve the just distribution of land and regularization of tenure, coupled with social policies that help maintain ties to the land and enhance the ability to obtain good standards of living.

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10. BOXES

BOX 1 - Successful conservation experiences in Colombia and Bolivia

Conservation Agreements in the Department of Guaviare (Colombian Amazon). A Strategy from Science and Public Policy to Defeat Deforestation.

Luz Marina Mantilla

Colombian public policy included fighting deforestation as a significant goal. Recently, as a result of the environmental and social crisis caused by forest fires, and under the leadership of the Colombian government, the Leticia Pact for the Amazon was signed. This pact commits the countries to issues such as: Protection, conservation, research, and joint management of this region, regarded as vital for the planet's climate balance.

In the department of Guaviare, Colombia, a conservation project, based on non-deforestation agreements with peasants, has been successfully applied. The framework was an agro-environmental approach developed by the SINCHI Institute (An NGO linked to public policies, https://sinchi.org.co/), which also takes into account the singularities of the Colombian Amazon. Science and technology have been used to implement agroforestry arrangements that include Non-Timber Forest Products (NTFP), and technological tools to follow up and monitor the agreements, which by 2020 benefit the inhabitants of the department and contribute to achieve the country's goals on reducing deforestation.

The agro-environmental approach integrates food security and rural poverty reduction, climate change mitigation and adaptation. It has a systemic scope with multiple objectives based on the economic, social and environmental dimensions of sustainability. This approach also recognizes the vulnerabilities and particularities of the various landscapes that make up the Colombian Amazon.

In addition, in Colombia's Amazon region, the agro-environmental approach has been oriented towards an alternative model of territory intervention based on reducing deforestation and conserving forests, through activities that ensure the organization of communities, improving

their incomes with competitive market insertion, the establishment of agreements between actors aiming at reducing deforestation and promoting sustainability over the time of the initiatives undertaken.

Between 2017 and 2019, the Agreements with Peasants signed in the department of Guaviare reached 1,046 families, with 32,446 Has under agreement. In this way, a conservation index of 85% was achieved (MosCAL, 2019). From the results, it is highlighted that the decisions of the peasants to be implemented on the sustainable productive system within the framework of the property planning and the conservation and restoration agreements, 75% have been oriented to the enrichment of stubble and degraded forests. In addition, the attention to the population of small peasant owners with technical assistance and technology transfer is evident (Castro et al, 2017).

Conclusions and Recommendations

- Research institutions play an important role in positioning priority issues on the country's political agenda.
- Actors responsible for public policy must engage in dialogue and find opportunities arising from the potentialities of territories.
- Conservation agreements and the agro-environmental approach have shown the effectiveness of science and technology for solving real problems with stakeholder participation.
- Amazonian countries must take concerted actions to advance in the conservation of the region, with participatory approaches. The Leticia Pact provides an opportunity for this type of action.

Eco-harvest: challenges and opportunities in the Bolivian Amazon

Daniel Larrea

In Bolivia, the Political Constitution of the State approved in 2009 (CPE), delimits the

Amazon to 23 municipalities ("Constitutional Amazon"). This political-administrative delimitation includes in its limits all of Amazon forests with Brazil nut trees (*Bertholletia excelsa*) occurring in Bolivia (approx. 84,000 km^2, Larrea-Alcázar et al. 2018). The CPE also refers to the elaboration and promulgation of a law to promote the integral development of the region, including tourist, ecotourism or regional enterprises, together with establishing the penalty for the felling of the Brazil nut and rubber or "syringa" (*Hevea brasiliensis*) trees. Both non-timber species form part of the recent past and the history of the Bolivian Amazon.

The eco-harvest of Brazil nuts represents the main economic driver of the region (Guariguata et al. 2017). However, its contribution to the national GDP is low (approx. 2%, INE). The exploitation of Brazil nuts has limited the conversion of the forest to livestock landscapes due to high prices and demand in the international market, which helps to value the living Brazil nut forests. Besides, deforestation requires increased investment. Most of the land tenure or ownership in the Constitutional Amazon belongs to indigenous territories and other rural communities which represent the base of the Brazil nut production chain and of other emerging resources in the process of consolidation (e.g., açai and other palm trees such as *Mauritia flexuosa* and *Euterpe precatoria*, paiche meat and leather, *Arapaima gigas*). Currently, inter-institutional articulation efforts are underway seeking to strengthen the use of Amazonian fruits in the region as a basis and input for planning in the area (PICFA, 2020).

Law of the Rights of Mother Earth (2010) and the Framework Law of Mother Earth and Integral Development to Live Well (2012) establish foundations and principles aimed at promoting the integral development of the country in harmony and balance with nature ("Mother Earth"). Yet, they do not relate or allude to the Constitutional Amazon.

On the other hand, subsequent laws on road construction, oil and gas exploration and expansion of the agricultural frontier seem to contradict the principles proposed by both aforementioned laws (Romero-Muñoz et al. 2019). Additionally, still pending is the resolution to solve the spillover of informal gold mining on the Madre de Dios River, today the main threat to the Constitutional Amazon, which requires clear policies and decisions.

1

BOX 2: The Yasuni-ITT Initiative

The Yasuni-ITT Initiative was launched in 2007 by Ecuador's president Correa to maintain unexploited the oil in the ITT fields of Yasuni National Park, one of the most biologically diverse hotspots in the Western Hemisphere. Ecuador committed itself to refraining from extracting the 846 million barrels of petroleum reserves in the ITT fields, and requested the cooperation of the international community in the form of half of the income that would be received by extracting the oil. A capital fund was created, administered by UNDP, with the participation of the Ecuadorian government and civil society, and international contributors. The Fund's capital would be invested in renewable energy projects throughout the country and the interest in local sustainable development and forest recovery and conservation. In addition to mitigation, its purpose was to overcome Ecuador's dependence on fossil fuels and help the country make the transition to sustainable development, placing social and environmental values first and exploring ways other than oil to benefit economically from the Amazon. The strategy also aimed to reduce vulnerability to climate change. In addition, it involved respecting local communities and, particularly, allowing the Tagaeri and Taromenane peoples to remain in voluntary isolation.

The Initiative received a unanimous support from the German Parliament, the active participation of United Nations, and economic contributions from Spain, Italy, Chile, Peru, among others (Larrea 2015). According to members of the 2008 steering committee, the international support was adequate for maintaining the project, but the main reason for the cancellation was the lack of political support from President Correa, who publicly discouraged donations, removed several times the Initiative's managers, and persistently threatened to extract oil from the ITT fields.

Yet, that the initiative did not prosper in its time should not be a reason to abandon the idea today when we know the limits of the carbon budget and have universal endorsement of the Paris Agreement. If we are to keep two thirds of fossil fuels underground (Meinshausen et al, 2009; McGlade & Ekins,2015) the reserves lying under the world's areas of highest

conservation value must be among them.

In addition, it is time to take advantage of instruments that are embraced by the Paris Agreement PA. The PA calls for ambitious action and cooperation between developed and developing countries (Art. 6.1, 9.1). It also encourages actions to conserve and enhance sinks and reservoirs of greenhouse gases, including forests (5.1) and engage in adaptation (7.1). Launched in 2007, the Initiative is consistent with the precepts 2015 Paris Agreement. Additionally, it was designed to promote equitable access to sustainable development, food security, human rights and rights of Indigenous peoples, the integrity of ecosystems and sustainable lifestyles, consistent with the principles held forth in the Preamble of the PA for all actions to combat climate change.

Within the context of the PA and helping meet the limits imposed by the carbon budget, the Initiative could be transformed into an international cooperation instrument involving more than one megadiverse country as beneficiary, thus scaling up sustainability benefits and emissions reductions, while having a more stable institutional structure.

It is recognized that the Yasuni-ITT Initiative had many strengths but also weaknesses, and that these must be addressed in any proposal to bring forth a similar initiative. However, it was a first and innovative experience, and as such it was unlikely to be perfected, just as Brazil's successful and subsequently abandoned policy to reduce deforestation. Neither of the two should be discarded; rather, they must be thought of as powerful stepping stones and be built-upon for a sustainable and just low emissions future.

Sources: Larrea & Murmis, We can start leaving the oil in the ground right now – here's how The Guardian, 9 Feb. 2015; Murmis & Larrea, ¿Cómo comenzar ya a mantener inexplotadas las reservas de combustible fósiles? El legado internacional de la Iniciativa Yasuní-ITT , UASB, 2015; interviews by C. Larrea with Roque Sevilla and Yolanda Kakabadse.

APPENDIX

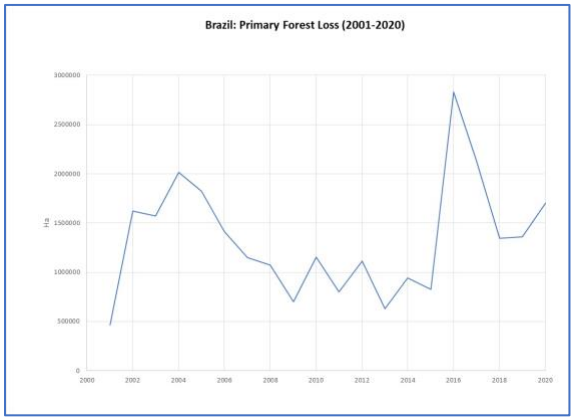
Table 1

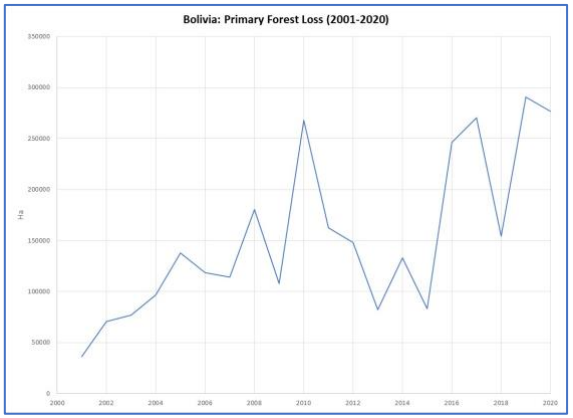
Tree Cover Loss in Primary Forests

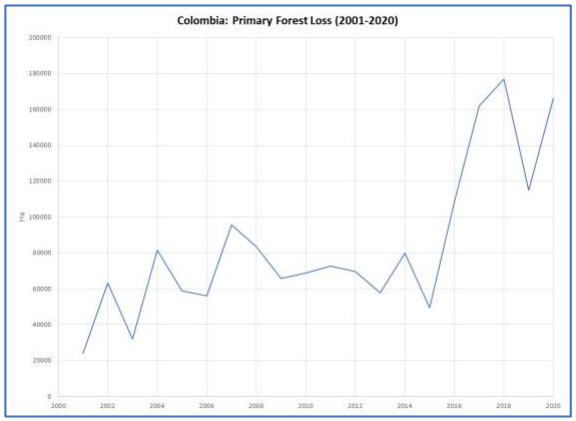
Year	Brazil	Bolivia	Colombia	Peru	Ecuador	Venezuela	Guyana	Suriname	French Guyana	Total
2001	465543	36530	24082	28699	4701	10438	1835	1145	313	573285
2002	1621765	70601	63302	46059	5693	11323	2825	1932	655	1824155
2003	1570576	77167	32050	43733	3379	20775	4216	2243	465	1754604
2004	2016477	96611	81695	62035	5436	15924	2630	2814	1283	2284906
2005	1824425	137831	58906	97399	6205	15565	3579	1808	965	2146683
2006	1415580	118804	56051	58813	6438	14244	3744	1893	804	1676371
2007	1149563	114376	95539	77992	6995	26116	3346	2158	1313	1477398
2008	1075146	180575	83619	88797	8953	19859	6377	4431	1757	1469512
2009	700169	108163	65824	120186	8112	23435	4929	4227	820	1035865
2010	1153025	267751	68739	100970	8491	25809	6656	4797	1620	1637857
2011	803049	162625	72601	88886	11175	15590	5831	4125	1279	1165161
2012	1116088	148294	69587	177236	16354	22125	8942	13540	3872	1576038
2013	632094	82290	57713	142870	11590	15349	4512	6628	1001	954046
2014	940905	133268	80036	133107	6330	20609	7790	9659	1386	1333088
2015	828870	83299	49643	104864	8472	15546	8463	8080	1116	1108352
2016	2830977	246088	108566	142720	13198	84705	16689	10457	2195	3455595
2017	2134649	270346	161945	181090	21085	43759	13505	13718	1097	2841194
2018	1347133	154489	176977	140185	13220	30169	7628	15367	1318	1886485
2019	1361094	290499	115090	161590	12231	58827	12964	14013	883.8961893	2027194
2020	1704092	276883	166485	190199	19747	53702	10763	11076	1498	2434446
Total Loss	**24987130**	**2779604**	**1521963**	**1997230**	**178060**	**490167**	**126460**	**123033**	**24142**	**32227789**
% Area 2000	7.77	7.49	3.08	3.16	1.86	1.41	0.79	1.05	0.65	5.86
Area 2000	343383394	40833752	54836889	69170714	10652183	38666663	17297899	12775509	3923496	591540498
% by country	58.0	6.9	9.3	11.7	1.8	6.5	2.9	2.2	0.7	100.0
Loss % Area 2000	77.0	8.8	4.9	6.3	0.6	1.6	0.4	0.4	0.1	100.0

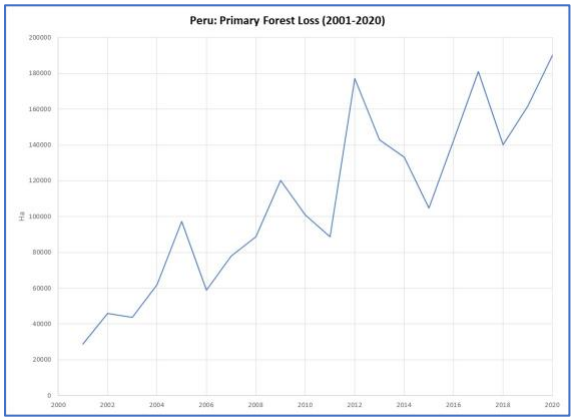
Source: World Resources Institute 2001.

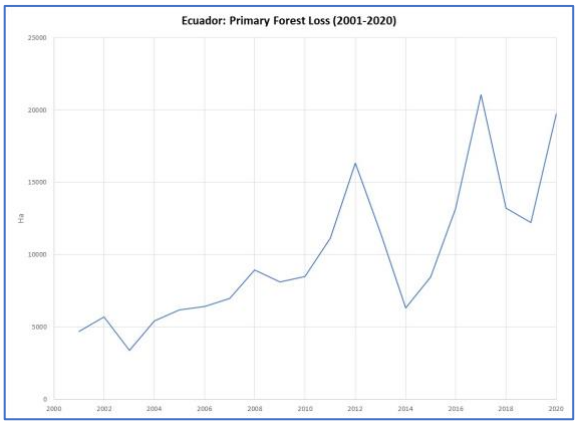
Chart 1. Primary Forest Loss by Countries (2001-2020)

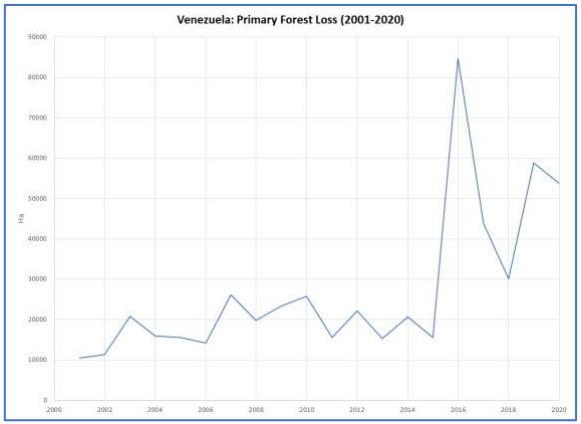


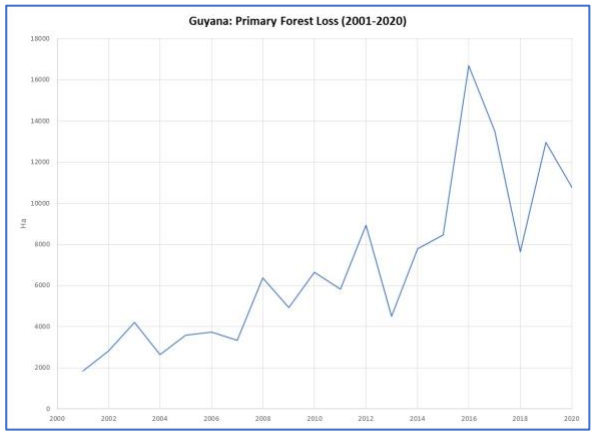


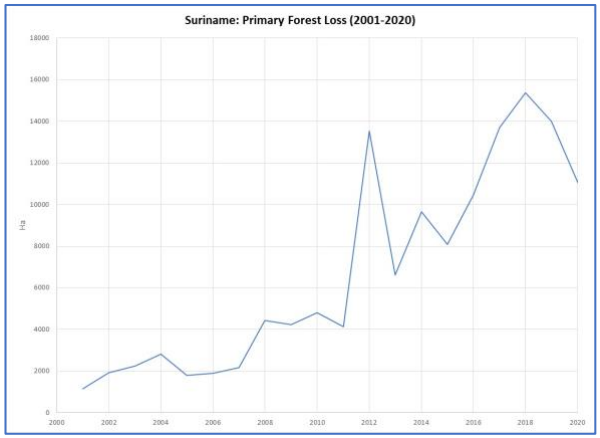


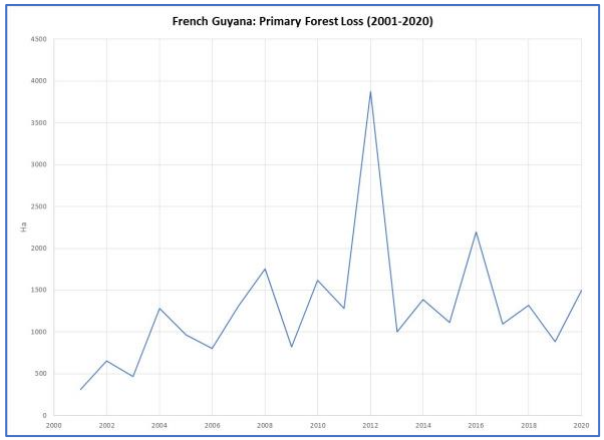






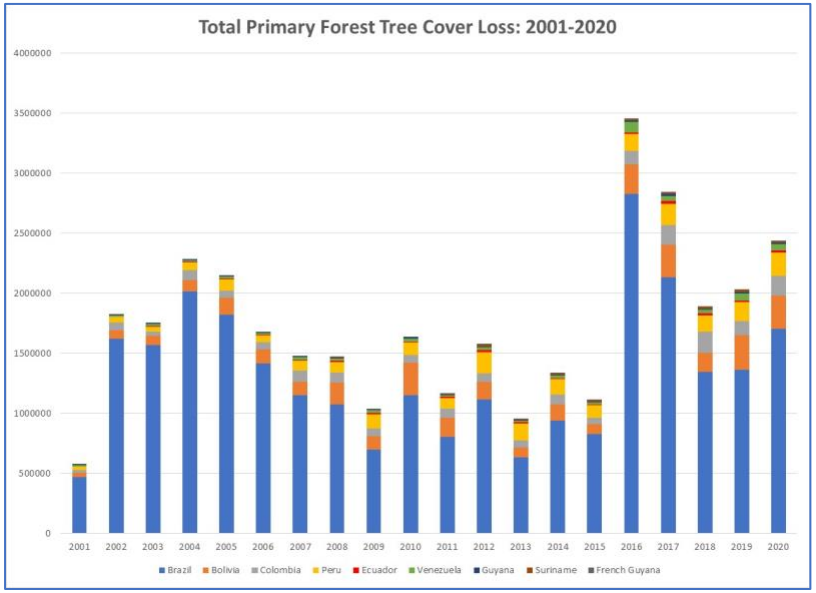






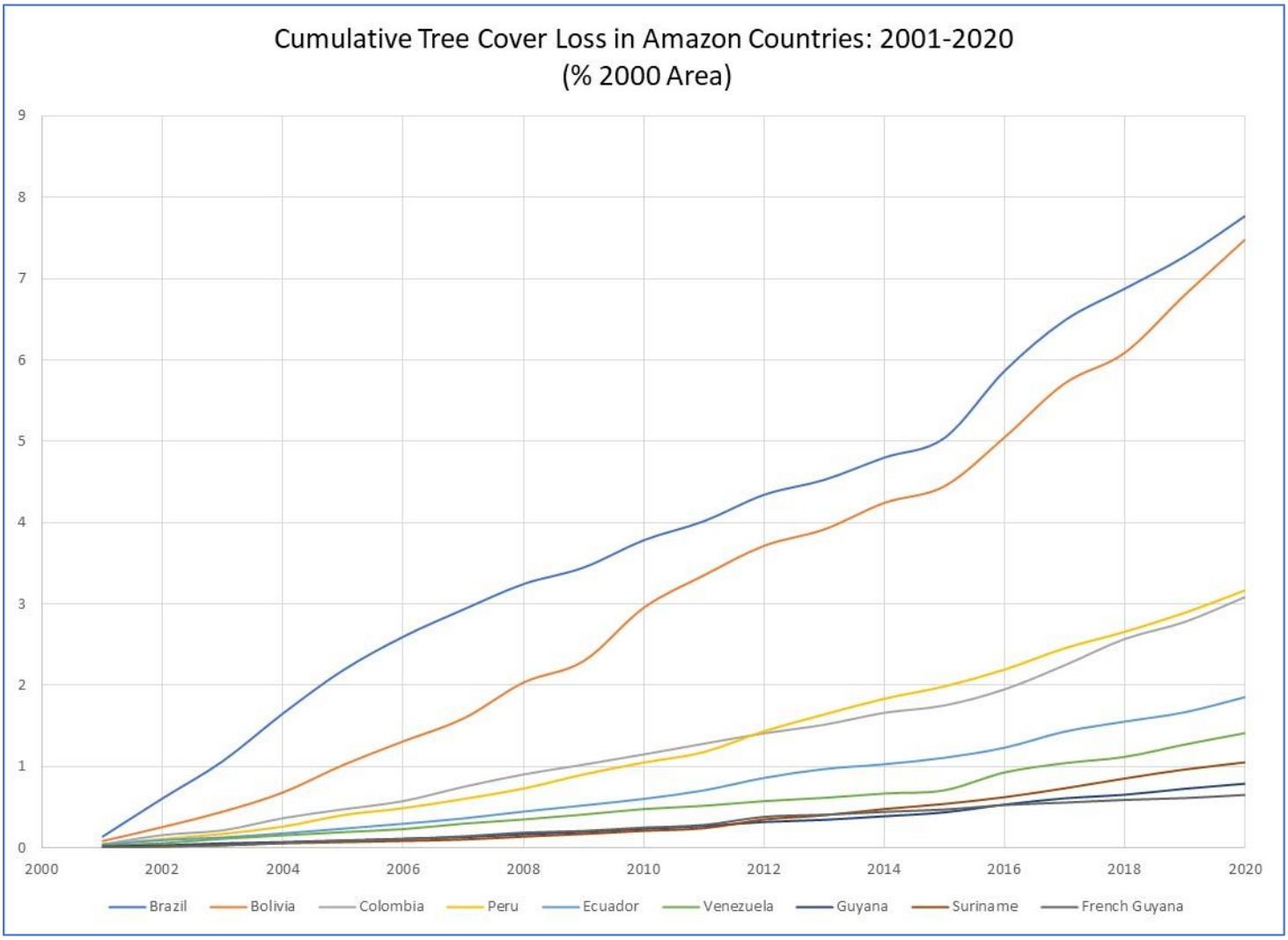
Source: World Resources Institute (2021).

Chart 2



Source: World Resources Institute (2021)

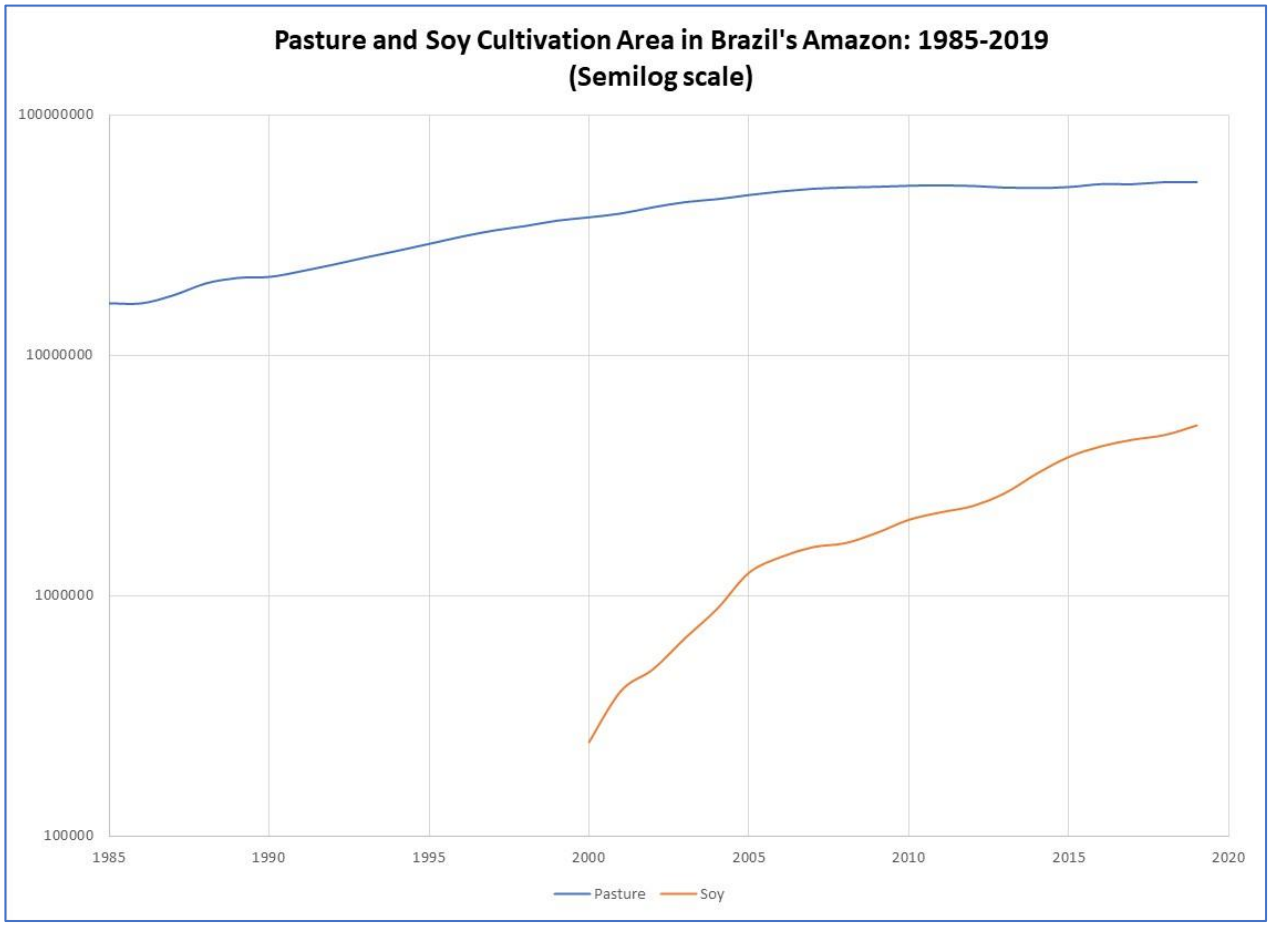
Chart 3



Cumulative Tree Forest Loss in Amazon Countries: 2001-2020

Source: World Resources Institute (2021).

Chart 4



Pasture and Soy Area in Brazilian Amazon: 1985-2019

Source: RAISIG 2021.

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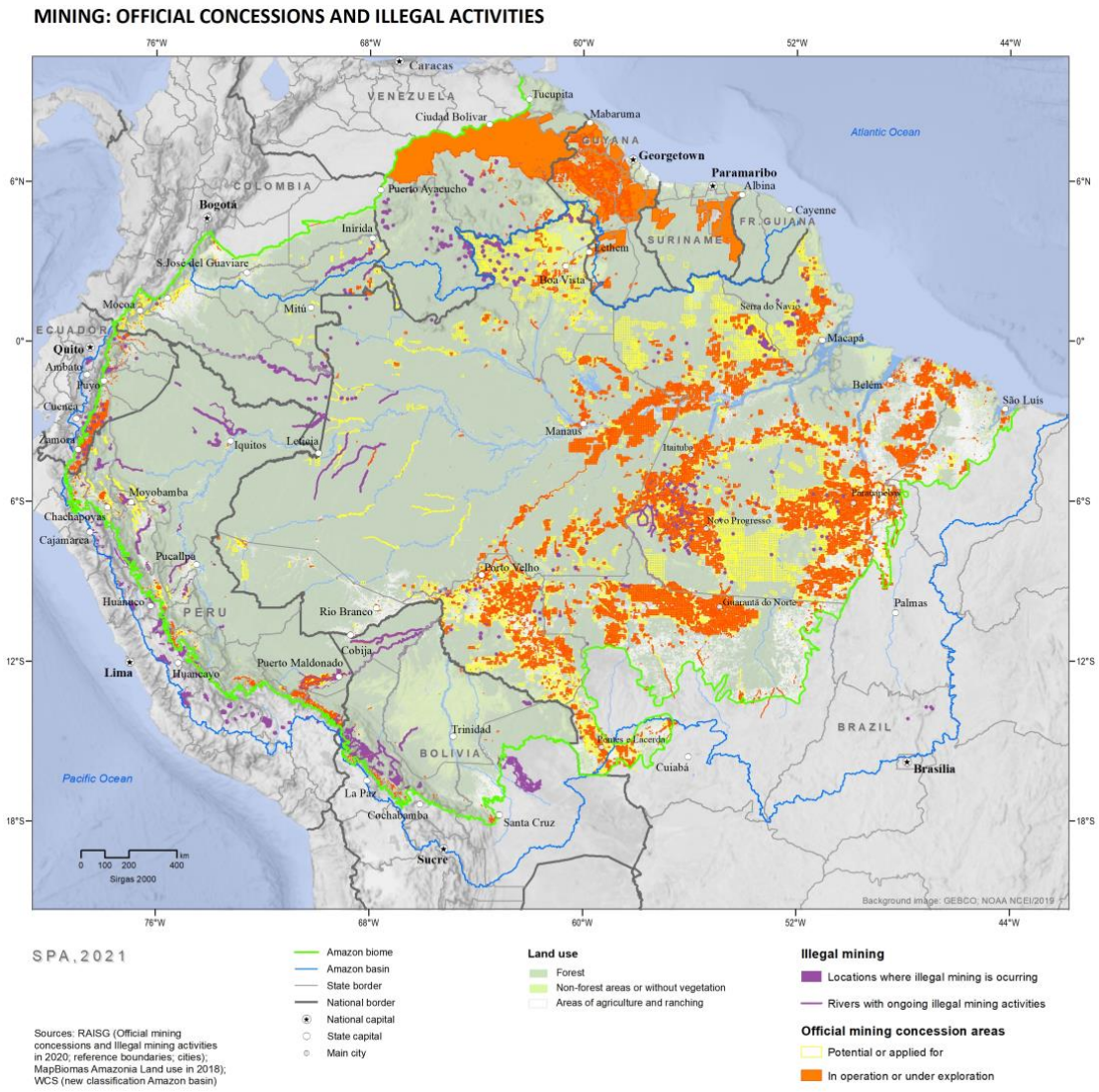
Map 1



Source: RAISG 2020.

Map 2

Source: RAISG 2020.

Map 3

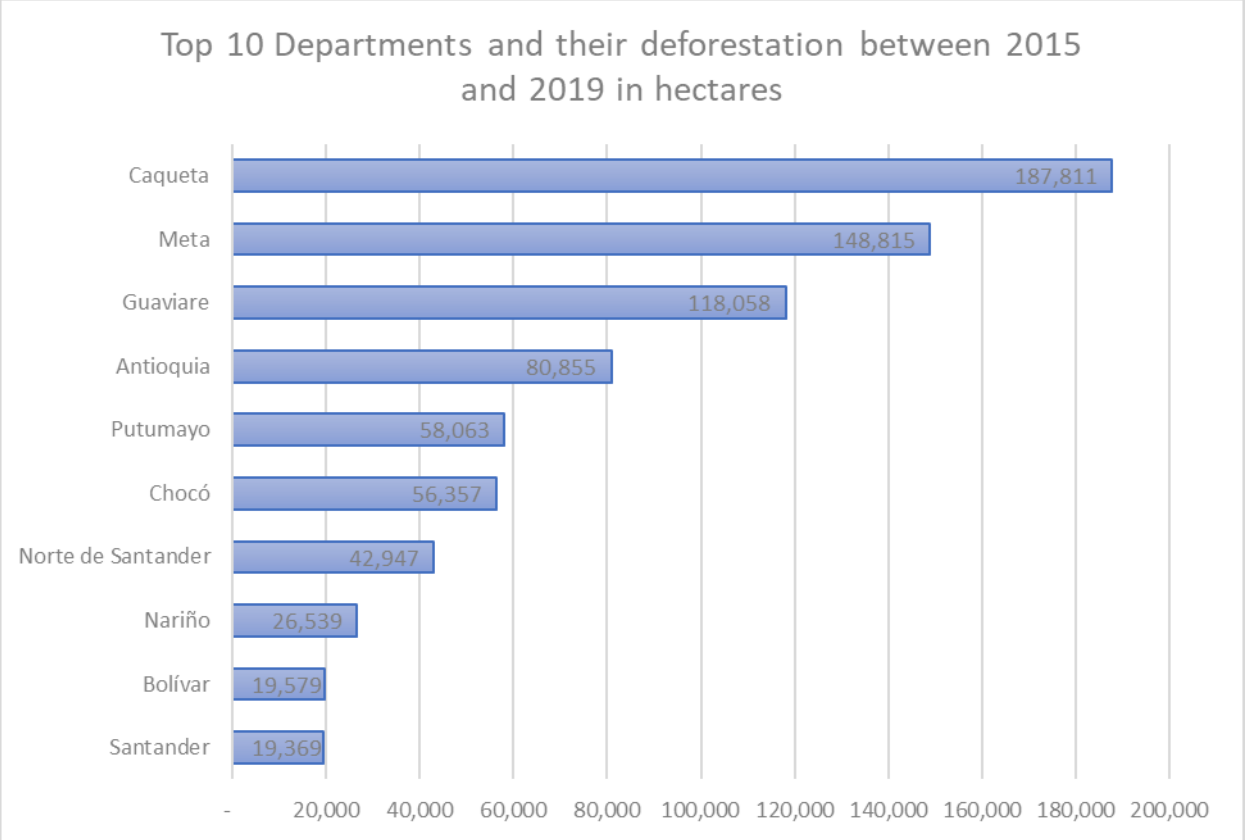
The Colombian Amazon[22]

Note: Colombian Amazon is distributed in the departments of Amazonas, Caquetá, Guainía, Guaviare, Putumayo and Vaupés as well as parts of Meta and Vichada, and small parts of Cauca and Nariño.

[22] Authors' map.

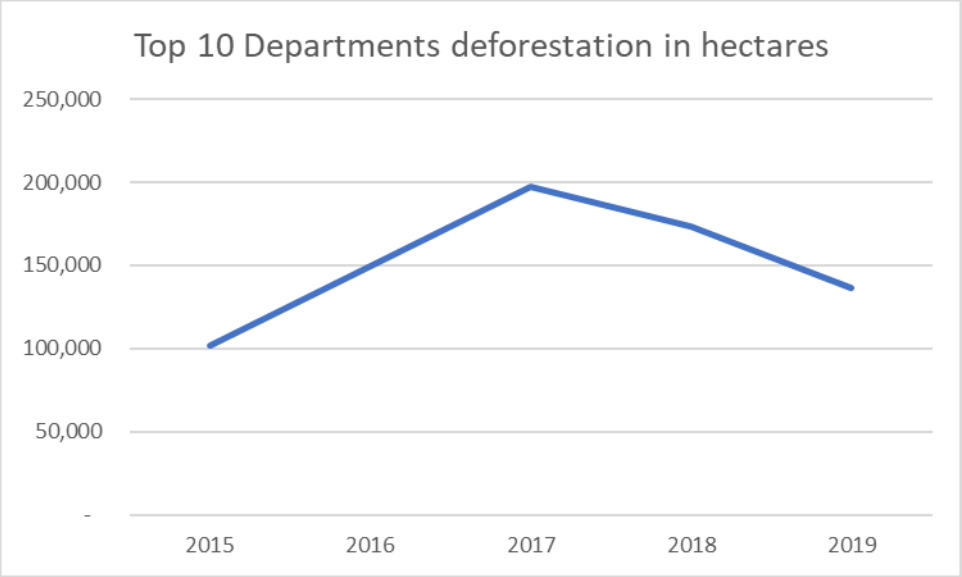
Chart 5

Deforestation in Colombia between 2015 and 2019



Source. Own construction based on IDEAM (Colombian Institute of Environmental Analysis) deforestation reports between 2015 and 2019

Chart 6. Accumulated deforestation top ten Departments in Colombia: 2015 - 2019



Own construction based on IDEAM (Colombian Institute of Environmental Analysis), deforestation reports between 2015 and 2019

Table 2: Coca Cultivation in selected Amazon municipalities 2013-2019 in hectares[23]

Municipality (Departmant)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cartagena de Chairá (Caquetá)	703	1,050	949	1,188	1,369	1,007	416
Milan (Caquetá)	359	530	696	1,040	1,135	1,226	461
MontaNita (Caquetá)	816	1,335	1,504	1,744	2,492	2,990	823
San José de Fragua (Caquetá)	488	611	1,084	1,031	1,415	1,593	1,410
Solano (Caquetá)	933	1,269	1,285	1,577	764	825	447
Piamonte (Cauca)	461	602	1,167	1,459	1,780	1,997	1,905
El Retorno (Guaviare)	1,314	1,600	1,615	2,192	1,406	1,545	1,195
Miraflores (Guaviare)	1,780	1,922	1,852	2,297	1,699	1,378	1,022
San José de Guaviare (Guaviare)	1,232	1,522	1,501	1,807	1,401	1,175	758
Puerto Rico (Meta)	1,101	1,616	1,620	1,593	1,773	1,082	617
Vistahermosa (Meta)	806	1,337	1,353	1,451	1,473	857	488
Orito (Putumayo)	784	1,639	2,190	2,988	3,970	3,949	3,073
Puerto Asís (Putumayo)	2,150	4,437	6,052	7,453	9,665	7,658	6,810
Puerto Caicedo (Putumayo)	682	1,046	1,481	1,782	2,998	2,905	2,617
Puerto Guzmán (Putumayo)	624	915	1,299	1,585	2,030	2,014	1,750
Puerto Leguízamo (Putumayo)	1,077	1,276	1,805	1,992	1,404	1,104	1,652
San Miguel (Putumayo)	659	1,094	2,338	3,128	3,554	3,329	3,752
Valle del Guamuez (Putumayo)	1,093	2,050	3,660	4,886	4,132	3,363	3,540
Villagarzón (Putumayo)	545	1,041	1,131	1,231	1,760	2,015	1,703

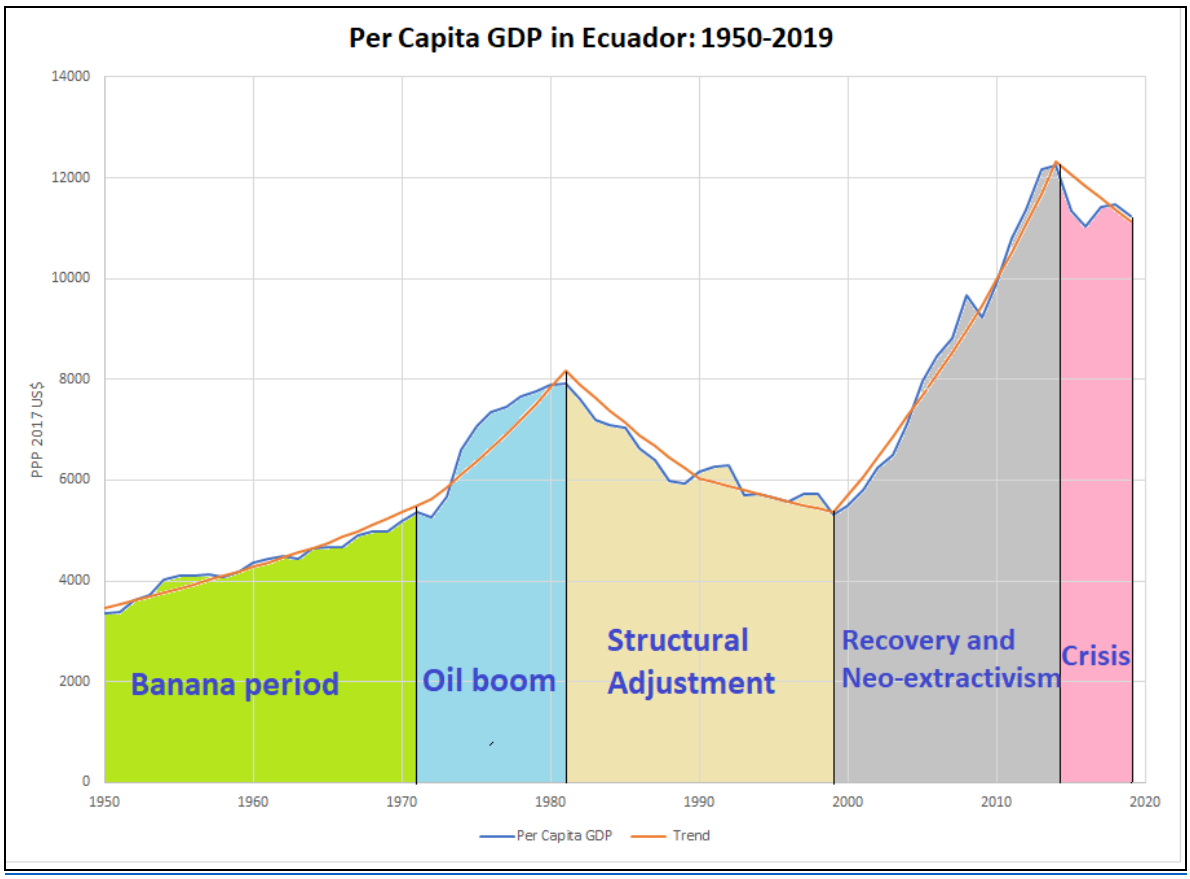
[23] All Amazon municipalities that have at least in one year exceeded 1,000 hectares of coca cultivation are considered in this list.

Table 3
Average annual growth rates on Ecuador GDP by periods (1950-2019)

Period	Growth rate
1950-1965	2.14
1966-1972	2.42
1973-1981	4.23
1982-1990	-3.31
1990-1999	-1.29
2000-2004	6.31
2005-2014	5.40
2015-2020	-1.99

Note: Growth rates were estimated from a kinked regression, controlled from first order autocorrelation, using Prais-Winsten and Cochrane-Orcutt models.
Source: Author estimates based on PENN World Table, 10.0

Chart 7



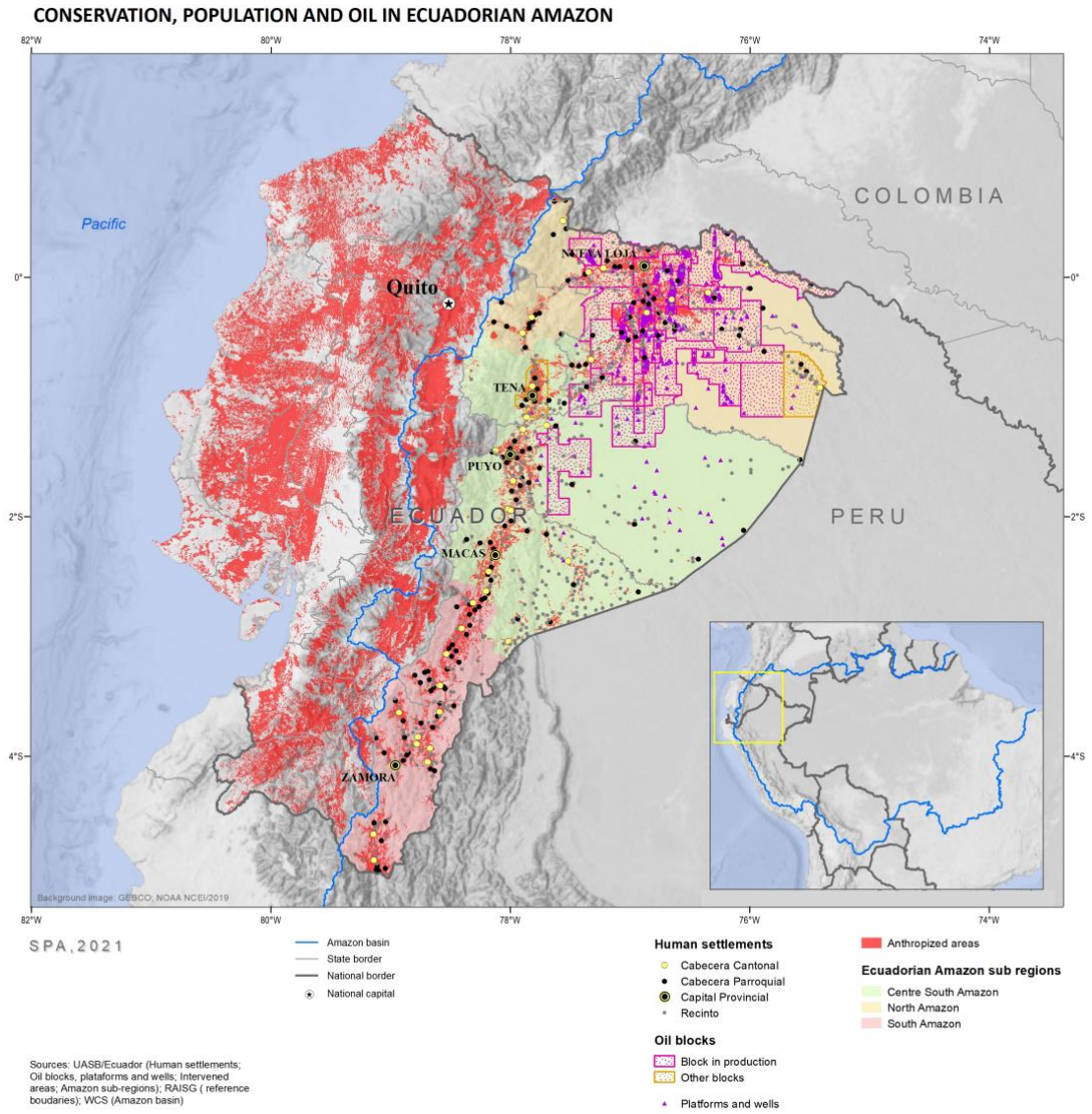
Source: Author estimates based on PENN World Table, 10.0.

Table 4
Ecuador's Population by Region: 1950-2010

Región y área	**1950**	**1962**	**1974**	**1982**	**1990**	**2001**	**2010**
Quito	209932	354746	599828	866472	1201954	1621646	1979831
Resto Urbano Sierra	191111	325261	537834	785349	1079922	1520092	1960146
Rural Sierra	1453909	1591338	2008903	2150018	2117137	2319000	2509378
Total Sierra	1854952	2271345	3146565	3801839	4399013	5460738	6449355
Guayaquil	258966	510804	823219	1119344	1535393	2007892	2307587
Resto Urbano Costa	133072	334231	703649	1161982	1678402	2266478	2987451
Rural Costa	910059	1290559	1670771	1707631	1653063	1854439	1974168
Total Costa	1302098	2135594	3197639	3988957	4866858	6128809	7269206
Urbano Oriente	0	0	0	32763	59575	152696	241236
Rural Oriente	46471	74913	173469	224915	312958	395723	498578
Total Oriente	46471	74913	173469	257678	372533	548419	739814
Urbano Galápagos	698	1165	2381	4493	8013	14142	18085
Rural Galápagos	648	1226	1656	1626	1772	4498	7039
Total Galápagos	1346	2391	4037	6119	9785	18640	25124
Total Urbano	**793779**	**1526207**	**2666910**	**3970403**	**5563259**	**7582946**	**9494336**
Total Rural	**2411087**	**2958036**	**3854800**	**4084190**	**4084930**	**4573660**	**4989163**
Total Nacional	**3204867**	**4484243**	**6521710**	**8054593**	**9648189**	**12156606**	**14483499**

Sources: INEC. Population censuses.

Map 4



Source: Unidad de Información Socio Ambiental, UASB.

Table 5
Output, Labor and Land Use of Ecuadorian Agriculture by Region: 2018-2019

				Productivity		
Region	Employment	Area	Output	Land	Labor	Labor per ha
	(Workers)	(ha)	(Thousand $)	($/ha)	($/worker)	(Workers/ha)
Coast	983949	2,884,000	6418415	2,226	6,523	0.34
Highlands	1069015	1,621,496	2842171	1,753	2,659	0.66
Amazon	234723	605,052	353811	585	1,507	0.39
Total	2287687	5,110,548	9614396	1,881.28	4,202.67	0.45

Sources: Banco Central del Ecuador 2019, INEC 2019a, INEC 2019b.

Appendix

Table 6

Social Development Index in Ecuador by region and Area: 1990-2010

Region and Area	**1990**	**2001**	**2010**
Rural Highlands	42.1	49.0	59.0
Urban Highlands	67.3	72.1	78.4
Rural Coast	42.4	47.7	55.3
Urban Coast	59.6	63.1	69.6
Rural Amazon	41.0	45.8	54.3
Urban Amazon	54.1	60.5	68.3
Rural Galápagos	62.1	65.9	69.6
Urban Galápagos	65.5	66.8	74.6
Total	55.2	60.4	68.1

Sources: UASB-UISA, based on: INEC, Censos de Población y Vivienda, 1990, 2001, 2010.

Table 7
Selected Social indicators in oil extracting and remaining Amazon regions: 2010

Subregion	Area	Years of Schooling	Child mortality proportion	Social Development Index
Amazon oil extracting region	Rural	6.7	0.057	48.7
	Urban	8.6	0.044	64.1
	Total	7.7	0.050	56.8
Amazon non-oil extracting region	Rural	7.1	0.047	50.8
	Urban	9.8	0.034	72.9
	Total	8.2	0.042	58.7
National Total	Rural	5.9	0.046	51.9
	Urban	9.5	0.032	73.1
	Total	8.7	0.035	68.1

Sources: UASB-UISA, based on: INEC, Censos de Población y Vivienda, 1990, 2001, 2010.

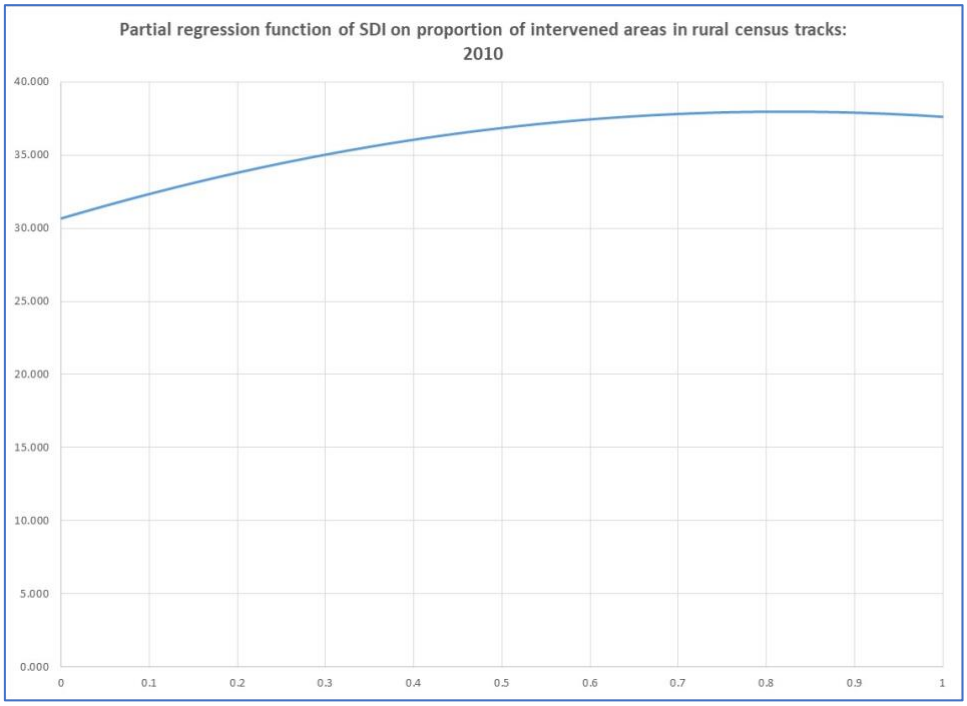
Table 8
Social Development Index by Subregion and Area: 1990-2010

Subregión	Zone	1990	2001	2010
Urban Amazon	Oil extracting	47.6	55.3	64.1
	Non oil extracting	58.3	64.8	72.5
Amazonia Rural	Oil extracting	40.4	44.9	53.0
	Intervened, Non-oil extracting	41.9	47.0	55.8
	Non intervened	31.1	35.6	42.3
Rural Highlands		42.1	49.0	59.0
Urban Highlands		67.3	72.1	78.4
Rural Coast		42.4	47.7	55.3
Urban Coast		59.6	63.1	69.6
Galápagos Islands		63.6	66.4	73.4
Total Nacional	Total	55.2	60.4	68.1

Sources: UASB-UISA, based on: INEC, Censos de Población y Vivienda, 1990, 2001, 2010.

Chart 8

Partial regression function of SDI on proportion of intervened area in rural census tracks: 2010



Note: 1,509 rural census tracks were included in the model.
Source: Methodological Appendix Table 1.

METHODOLOGICAL APPENDIX

The social development index (SDI). The Social Development Index was estimated from 19 indicators from the 1990, 2001 and 2010 Ecuadorian census databases, broken down by parishes in the rural area and municipalities in the urban area. Six indicators deal with education, 2 with health, 3 with gender differences in education and employment, and 8 with housing. Parishes are the smallest administrative division in Ecuador, and the country was divided into 1024 local circumscriptions. The SDI was estimated as the first component using principal components analysis, maximizing its statistical representativity, and explained 50.5% of the total variance of its 19 components.

Education indicators were: 1. Average years of schooling for the population older than 23 years (ESCOL). 2. Proportion of literacy in the population older than 14 years (ALFAB). 3. Net assistance rate for primary education (TPRIM). 4. Net assistance rate for secondary education (TSECUN). 5. Net assistance rate for higher education (TSUP). 6. Proportion of population older than 23 years with access to higher education (TACSUP).

Health indicators were: 7. Weighted health personal for each 10,000 inhabitants (PERSAL). 8. Proportion of dead sons and daughters from mothers aged between 15 and 49 (PNINMUER).
Gender indicators were: 9. Difference between male and female literacy rates (DISEXAL). 10. Difference between male and female schooling (DISEXESCOL). 11. Female proportion in the economically active population (PFEMPEA).

Housing indicators were: 12. Proportion of dwellings with access to piped water inside the house (PAGUA). 13. Proportion of dwellings with sewerage (PALCAN). 14. Proportion of dwellings with collecting garbage service (PBASURA). 15. Proportion of dwellings with electricity (PELEC). 16. Proportion of dwellings with adequate walls (PPARED). 17. Proportion of dwellings with adequate floor (PPISO). 18. Proportion of households with less than 3 persons per room. 19. Proportion of dwellings with toilettes inside the house (PSSHH).

The SDI was rescaled to an interval between o and 100 points. Its formula is:
SDI = 0.904 * ESCOL24 + 0.707 * ALFAB15 + 0.604 * TPRIM + 0.859 * TSECUN + 0.822 * TSUP + 0.771 * TACSUP - 0.452 * DISEXAL + -0.299 * DISEXESCOL + 0.714 * PERSAL - 0.722 * PNINMUER+ 0.233 * PFEMPEA + 0.802 * PAGUA + 0.749 * PALCAN + 0.848 * PBASURA + 0.734 * PELECT + 0.693 * PPARED + 0.602 * PPISO + 0.716 * PPERCUA + 0.839 * PSSHH (Larrea et al 2013).

The initial analysis broke down the SDI by area of residence (urban and rural) and natural region (Coast, Highlands, Amazon and Galapagos). The urban area includes all cities and towns with population higher than 10,000 inhabitants. The Amazon region was further divided into an oil extractive sub-region and the remaining part. The oil extractive subregion was integrated by the parishes or municipalities containing oil blocks in production in 2017.

The spatially autoregressive multiple regression model. In the regression analysis, the SDI was used as dependent variable, breaking down the 2010 Census by census tracks (sectors). Ecuador was divided into 40,640 census tracks in 2010.The model included 2,408 census tracks in the Amazon region with valid data (145 tracks were excluded due to missing values). The Amazon region was defined including all the six regional provinces, which incorporate not only the dominant lowlands but also the foothills of the Andean mountains, where many Amazon headwaters originate.

As information is spatially defined, OLS regression models may have a bias due to spatial autocorrelation, as a result of influences among neighboring or closer tracks. To control for

spatial autocorrelation, a spatially autoregressive model was used, with a dependent variable lag and an inverse distance matrix among tracks.

Independent variables in the regression model

Proximity to oil wells index. Defined as the sum of inverse distances between the centroid of each census track and the surrounding oil wells. The PRAS map (2013) was used to identify wells.[24] A radius of 50 Km from the centroid was used to identify surrounding oil wells. The variable was included for identifying the effects of local oil extraction on social conditions.

Soil fertility index. Defined as the percent of area with at least medium soil fertility in each census track. The source is the map of soil agricultural aptitude from the MAGAP-SIGTIERRAS (2015) program of Ecuador´s Ministry of Agriculture, which identify 4 categories of fertility: very low, low, medium and high. The variable intends to evaluate effects of local soil quality on living conditions.

Proportion of intervened areas. Defined as the proportion of artificially modified areas on the total area of each census track, excluding natural water bodies. Modified areas include cropland, pastures, artificial water bodies, human settlements, infrastructure and no forested-covered areas. The source is the 2016 map of land use of the Ministry of Environment. This variable was included in the regression model in parabolic quadratic form. The variable intends measuring the effect of deforestation on local social conditions.

Travel time to the closest agricultural market. Defined as the number of hours required to travel from the centroid of each census track to the closest agricultural market. The variable is expected to evaluate the social contribution of market access.

Dummy rural. Dichotomous variable included to differentiate rural sectors from small towns, concentrated (blocked) settlements and cities.

Additionally, 3 local employment indicators were included in the regression model, to capture the potential effect of economic diversification and the expansion of capitalist relations in the labor force. Information was obtained from the 2010 population census.

Proportion of agriculture in economically active population (EAP). Included as an indicator of economic diversification from agriculture, the traditionally dominant sector.

Proportion of wage earners in EAP. Expected to capture the influence of capitalist social relations of production, as opposed to traditional family based or independent ways of production, which prevail among peasants and urban small producers.

Proportion of hotels, lodging, restaurants and food services in EAP. Expected to capture the extent of tourism in employment.

To differentiate between deforestation leading to expansion of agricultural frontier and deforestation leading to urban expansion, an interaction term **(Dummy rural)*(Proportion of intervened areas)** was also included.

[24] PRAS (Programa de Reparación Ambiental y Social) is a public institution dependent of the Ministry of Environment in Ecuador.

Results of the spatially autoregressive multiple regression model

Table 1

Spatially Autoregressive model on factors influencing local social development in Ecuador's Amazon: 2010

Dependent variable: Social Development Index (SDI)
Number of observations = 2408
Maximum likelihood estimates:
Wald chi2 (11) = 8894.03
Prob > chi2 <= 0.0001
Log likelihood = - 7016.191
Pseudo R2 = 0.7842

InDesSoc100	Coefficient	Std. Error	z	P>|z|	[95% Conf. Interval]	
InDesSoc100					Minimum	Maximum
Proximity to oil wells index	-0.261	0.026312	-9.93	<0.001	-0.313	-0.210
Soil fertility index	0.854	0.4222169	2.02	0.043	0.026	1.681
Prop. of intervened areas	20.506	2.231269	9.19	<0.001	16.133	24.880
Prop. of intervened areas^2	-10.879	1.392222	-7.81	<0.001	-13.607	-8.150
Travel time to markets	-0.482	0.0688226	-7	<0.001	-0.616	-0.347
Prop. Agriculture in EAP	-5.042	0.6216075	-8.11	<0.001	-6.260	-3.823
Prop. wage earners in EAP	7.233	0.6529073	11.08	<0.001	5.953	8.512
Prop. logging in EAP	22.438	3.684288	6.09	<0.001	15.217	29.659
Dummy rural	-2.675	1.202942	-2.22	0.026	-5.033	-0.318
DRural*PropIntAreas	-2.666	1.328097	-2.01	0.045	-5.269	-0.063
Constant	35.197	1.363232	25.82	<0.001	32.525	37.869
Widist2 distance matrix						
InDesSoc100	0.077	0.009	9.05	<0.001	0.061	0.094
var(e.InDesSoc100)	19.876	0.573			18.784	21.031

Note: To control for spatial autocorrelation, a spatially autoregressive model was used, with a dependent variable lag and an inverse distance matrix among tracks. The model was run with Stata statistical software (version 15).