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Trails and roads: from the Paramo to the city.

Exploring the tensions between environmental conservation and economic growth. A case study in Sumapaz, Colombia.

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Abstract:

The need to preserve ecosystems to enable the reproduction of a global market-based economy has led conservationist measures that are in contradiction with a model of Development heavily based on the connectivity to broader markets. The case of protected Colombian Paramo in Sumapaz explores trails' as a conduit to understand social mechanisms for space-time appropriations and how are they contested. Through the application of the extended case method approach, and framing diverse methods in a critical realism perspective, primary and secondary sources are presented to open a discussion around the power embedded in trails to reproduce socio-environmental orders. This thesis draws from different theoretical references, especially from ecological Marxism and Urban Political Ecology (UPE) scholarship, to formulate that trails express different features depending on the scale upon social structures unfold and intertwine with different social actors. Finally, it is discussed how fetishist infrastructure, which aims to highlight a pristine ecosystem by reducing its relation to people, obscures the underlying mechanisms that reproduce environmental degradation. In addition, it is explored how the political aspect of trails, to ensemble socio-environmental orders, underlines the infrastructure's visibility in the global south to navigate and challenge dominant orders and inequalities.

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List of Acronyms

CAR	Regional Autonomous Corporation
CLIP	Intersectoral local commission of participation
DANE	National Administrative Department of Statistics
FARC- EP	Colombian Revolutionary Armed Forces –People's Army
FEDEGAN	National Federation of Cattle Breeding
IAvH	Institution Alexander von Humboldt
NNP	Natural National Park
RAP-E	Entity for Regional administration and Especial Planning
ZRC	Peasant Reserve Zones

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Content

1. Introduction

Diverse disciplines have studied the diverse characteristics, impacts and functions of trails like roads and pathways. Archeologists, anthropologists, ecologists and others, have gotten closer to understand trails not as simple lines that connect place A with place B but to explore them as human-made spaces, thus inherently bounded to human features as *political animals* and their ways of sociability. In consequence, diverse types of trails mark the environment as manifestations of social relations around. Despite the prominent physical relations to them, the forms in which they are thought –imagined, planned, represented and so on- remain a relevant part of their constitution and also reflect how people relate to each other, how they envision their environment or experience change. In the capitalist system, some of these trails play a relevant role in the struggles over the appropriation of space and resources; processes that accelerate to meet an infinite economic growth while distancing from the biosphere's cycles ultimately, causing the current socio-ecological crisis.

The questions that motivate this thesis are partly inspired by Don Mitchell's axioms for reading the landscape, which, among other things, stated that the landscape obscures relations that actively transformed it and has a function in social life (2008, pp.33-35). Following that stream of thought, tracks are seen as an intervention that can be approached to "enlighten" those obscured relations. They might be planned or the unconscious result of activities that evidence diverse social processes. The underlying idea is that by examining the functional role of tracks (roads, pathways, highways, etc.) we can approach other social relations and mechanisms that enrich our understanding of socio-ecological change.

However, how do these physical artifacts of the landscape, which are now dominated by the logic of accumulation, can be compatible with more sustainable forms of social life? To be more precise, the main tension to be explored in this work is the role of the tracks as mediators that embody the struggle between the forces of economic growth -presented as the means and single aim of social development- and the forms of social organization contributing to nature conservation. The latter refers to the collective measures that reflect some kind of alternative to the dominant form of

access, use and control of resources and the landscape in general. In this thesis, the case of Sumapaz, Colombia will be explored to unveil the productive relations and values that arise from a dominant discourse of development based on industrialization, urban livelihoods and imperatives of environmental protection aiming to reproduce a particular social order. In other words, trails evidence the human and political manifestations of the reproduction of nature and capital that are simultaneously driven; Sumapaz will be a window to the contradictions implied in the navigation of these opposite forces controlling the space, time and resources of those dwelling the territory.

In order to do that, the aim (1.2) and the research questions (1.3) guiding the process will be presented to the reader. Then, the Background (1.4) offers an overview of Sumapaz that locates the reader in terms of socio-political and environmental issues that have been developing in the region. Following this, the Methodology section (2) presents the ontological perspective of this work and the epistemological considerations upon which this thesis develops, the methods, the author's positionality and the limitations of the study. In the Theoretical Framework (3), different concepts are illustrated in their relation to previous academic literature, but also in the meaning they adopt in this study and how do they relate to each other. The following Analysis section (4) presents and explains the empirical data which has been organized beforehand and after that, the section of Discussion (5) articulates the theory with the data to address the research questions formulated at the beginning of the study. Finally, in the Bibliography (6) all the different types of sources used in this document can be found by the reader.

1.1 Aim of the research

This work aims to explore how different types of tracks manifest the articulation of relations and values throughout the different scales in which different discourses of development operate. This work attempts to show the socio-ecological importance of places like roads and pathways beyond the physical impact of their construction, and explore how they set in motion context-based relations favoring unequal exchange, which consequently grounds environmental degradation. By taking the specific case study of Sumapaz that, to some extent, reflects Colombia's experience, it could also address the situation of other countries in the Global South or expose some commonalities among places commonly called *developing* countries. This thesis should be

interesting for anyone looking into the articulation of the rural and the urban as part of broader socio-ecological processes of change and their inclusion to think about "sustainability". As well this could be of interest to NGOs, academics or local actors whose studies or strategies to face the ecological crisis would consider addressing the issue of roads, pathways or connectivity in general as a relevant node of analysis and even solutions.

1.2 Research Questions

Main Research Question

- How are different trails articulated with particular productive relations and values around the environment in Sumapaz?

Side Questions

- How do people use and organize themselves around roads/pathways that configure or influence their access and control to natural resources and services?
- What is the role of different types of trails in the development of productive activities that shape the landscape?

1.3 Background

Location

The Andes Mountain range branches out in three when it passes to the north of South America. The Paramo Cruz Verde-Sumapaz is located in the eastern chain of mountains in Colombia, south of Bogota D.C (Capital district) and leads to the plains in the east of the country. Paramo is the word that describes the ecosystem that exists in this area, which could be translated as tropical Moorlands. It constitutes a tropical eco-region that exists only in Peru, Ecuador, Colombia, Costa Rica and Venezuela. Paramo ecosystems not only provide important services, such as water, to millions of persons but is also a symbolic element embedded in different cultural processes (IUCN)[1].

[1] Own translation from Spanish, to see original: https://www.iucn.org/es/regiones/am%C3%A9rica-del-sur/nuestros-proyectos/proyectos-conclu%C3%ADdos/comunidades-de-los-p%C3%A1ramos

Despite their importance, Paramos are relatively small and are constantly shrinking due to the climate crisis. Global warming is responsible for the melting of their glaciers[2] and changing vegetation. Although these ecosystems represent about 2% percent of the national territory, Colombia has 50% of the global total, and constitute the main source of water to nearly 70% of the national population. (Paez Lugo, 2018). Sumapaz is considered to be the largest Paramo of its kind with a total area of 333.000 ha² (Van der Hammen, Cano and Palacio, 2015). It is considered a strategic ecosystem for its high production of water resources, which is commonly described in the media as a "water factory". It provides water to the Orinoco and Magdalena rivers, two macro basins that configure the socio-economic life at the center and east of Colombia. As well, it caters water to Bogotá, home to more than 8 million inhabitants, around 20% of the national population (ibid).

The Sumapaz region could be addressed in two ways; the locality of Sumapaz or Sumapaz province. The latter refers to a broader region, conformed by several municipalities across at least four political divisions -Meta, Cundinamarca, Huila and Bogotá D.C- while the Locality of Sumapaz refers to a smaller division of the province that belongs to Bogotá D.C political administration. Within this smaller division, the towns of Nazareth, Betania and San Juan can be found. Due to the vast area of Sumapaz, the present work is limited to the area that comprises Nazareth and Betania. From now on this area of study will be addressed just as Sumapaz. Although the Locality of Sumapaz represents 42 % of Bogota's area, it has a small population, 7.584 persons, and remains completely rural (Bogota's preventive control agency, 2018). Nonetheless, Sumapaz tends to be excluded from maps and narratives of Bogotá which is mostly represented as urban.

[2] The area of the glaciers in Colombia shrank from 348km^2 in 1850 to 36,6 km^2 in 2018. https://sostenibilidad.semana.com/medio-ambiente/articulo/glaciares-de-colombia-se-derriten/48150 6/03/2020

Figure 1. Sumapaz locality, located south of Bogota

Environment and Conflict

In 1977 the Natural Park of Sumapaz was established. The history in the region of agriculture and some mineral extractivism menaced this ecosystem that provides water to the region. One of the first commodities to be extracted was the wood used as an energy source in Bogotá. Besides, since the XIX, century the exploitation of Quinine bark (Cinchona officinalis) in Sumapaz attracted foreign and Bogotá investors who rented land for this purpose; progressively small villages emerged along the routes used to extract and transport this wood from Sumapaz (Marulanda, 1991; Van der Hammen et. al, 2015). This is to say that by the time that protective measures arrived in the 70s, the ecosystem had been through a process of Europeanization. This means that the prolonged practices of breeding cows, horses and goats, as well as extensive production of wheat and potato, have transformed the landscape of Sumapaz, by clearing out the forests, compacting the soil and other effects[3] (Molano Barrero 2011, pp.51-53). However, at the moment when the NNP was established, the constant confrontations in the context of the civil conflict in Colombia prevented the enforcement of any enforcement of protective measures for the environment or even the presence of any other state representative apart from the Army.

[3] The author refers to all the Paramos in Colombia as "europeanized" by this process, not only Sumapaz

In short, the civil conflict in Colombia emerged in 1948 when bipartisan violence burst, especially in the Andean Region, where many liberals fled their towns. Sumapaz was historically connected to liberal causes like the distribution of lands, which the local movements fought for in the first half of the 20th century against big land-owners, the implementation of several laws[4] favoring landless peasants, who were also used as a cheap workforce to expand the agricultural frontier through the assignment or colonization of *wastelands* (Marulanda, 1989). Due to its central location, Sumapaz became a corridor between Bogotá and other regions for victims and other liberals who fled violence. (Baquero Monroy, 2013). Later in 1953, the military dictatorship took over, a truce between both parties was followed by the prohibition of the communist party and persecution of any type of left-wing organization, which resulted in the creation of diverse guerrillas in the 1960s like the FARC-EP (Molano, 1994). This results in the construction of a jail for political prisoners in Sumapaz, which motivates the intervention of the main road that connected the building to Bogotá city. However, Sumapaz was used for many decades by the FARC-EP as a natural "barrier" that would allow them to move between the center of political power in Bogotá and the guerrilla settlements (Molano, 1994; Osorio Rendón, 2010). Some reports attribute the construction of some roads to the FARC-EP, later these trails would be re-appropriated by the government (Gómez Ramirez et. al, 2017). During the conflict the local population was caught in the crossfire however, in the presidency of Álvaro Uribe Velez- from 2002 to 2010-, paramilitary forces arrived in the territory and direct attacks to local civilians were *justified* in the fight against illegal groups. This caused a great sense of distrust in military forces and other representatives of the state to this day (Osorio Rendón, 2010). Despite the peace treaty signed in 2016 with the FARC-EP, two military bases remain by the main road and have assumed some tasks around *ecological protection,* which could also suggest a process of eco-militarization (see Molano, 1994; Angel Botero, 2019).

Today the economy in Sumapaz has specialized in potato crops, cattle ranching -meant for cheese production and cow breeding – and occasional extraction of sand or stones for construction purposes, which are compatible with the climatological conditions of the Paramo. (Van der Hammen, Cano and Palacio, 2015; Bogotá city hall, 2004). Nowadays, producers vary from micro livestock holders, who own small plots of land, depend on their cattle and subsistence agriculture with low levels of technology. (Ibid, p. 102) Then, other producers rent large extensions of land,

[4] decree 1110 of 1928, law 200 of 1936

investing large sums of money on technology, agrochemicals, genetic improvements and depend on paid rural work (Ibid, p.103). Despite the warfare's destruction of flora and fauna, the use of landmines abandoned throughout the territory, causing long-lasting environmental damages in the region, the conflict also helped preserve the ecosystem in the sense that prevented companies, industries and people in general from entering the territory. Nonetheless, after the peace agreements with the FARC-EP, the presence of state institutions has increased, the traffic between Bogotá, Sumapaz, and its Natural National Park has grown, but the Sumapaz local city hall is still located in Bogotá city about two hours away. Equally important, the enforcement of new conservation policies resulting from an extractivism boom led the national government to implement a *delimitation* process[5] in key ecosystems. In short, this process draws a line that indicates the area of the Paramo ecosystem that must be protected from any productive activity, including peasant farming. In some places the limit is marked with fences, in others, the line isn't visible, but can be consulted in the maps produced by the Institute Alexander von Humboldt and the Regional Autonomous Corporation of Cundinamarca (CAR) is responsible to watch that these limits are respected. This process has been controversial, in most cases it relates to the verticality of its implementation and the lack of participation from local actors[6]. It should be added that the construction of new roads, urban or suburban expansion and the transit of heavy machines for agricultural purposes is formally forbidden in these areas[7].

The establishment of the NNP's limits come in hand with the process of defining which neighboring or inside areas of the reserve need to halt or transform their productive activities that normally unfold in each place. This uncertainty plus the financial limitations to purchase agrochemicals, or sell their products within a highly liberalized market and extreme climatic events have caused that many peasants who live from subsistence or small-scale farming rely more on cattle for the elaboration of cheese. While some try to adapt to these changes, other alternative socio-economic plans have been put on hold, which is the case of the Peasant Reserve Zones (ZRC)[8]. The ZRC[9] are geographic areas of collective management which intent "(…)*to promote and stabilize the peasant economy, overcome the causes of social conflicts and create conditions to achieve peace and social*

[5] law 1753 of 2015
[6] Law 1450 of 2011
[7] law 1930 of 2018
[8] From Spanish: Zonas de Reserva Campesina
[9] law 160 of 1994

justice in these areas"[10](Decree 1777, 1996). Not only do the ZRC address the historical roots of the conflict, related to land distribution, but it is an instrument of space order that could contain the agricultural frontier, thus forming a protecting belt for ecosystems like Paramos without taking people's livelihoods away. Nonetheless, the ZRCs have been stigmatized during the Uribe Vélez (2002-2010) government (Osejo, 2013), and the current government, which shows a lack of political will to implement and develop the ZRCs. Instead, they favor agribusiness and liberal trade agreements as a central force for economic growth. Besides the promotion of ecotourism as a *sustainable* activity could mean an economic alternative for some to cope with the current changes. However, it's also rejected by many members of the community who argue that the current unregulated flow of tourists also has great environmental impacts and doesn't benefit the communities (Hernandez Osorio, 2017).

Image1 Entrance to the NNP in Sumapaz

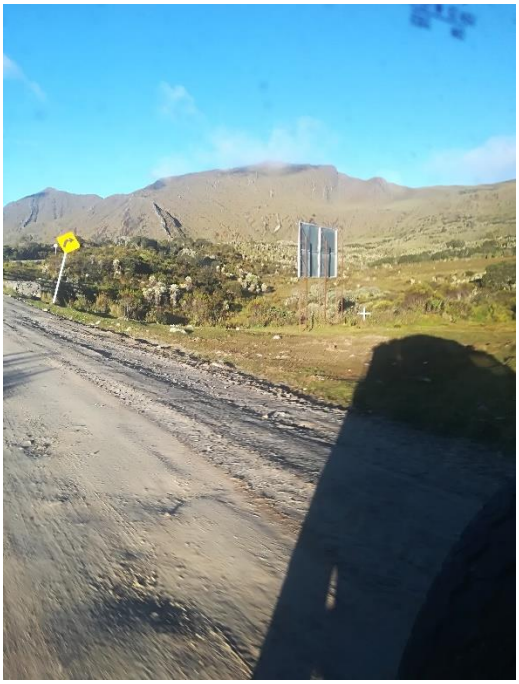

Image 2 Main road after passing NNP entrance

From this section, we draw some contextual and historical elements that can help develop the analysis of the empirical information presented. Among those elements, it should be highlighted the political processes and awareness of the local population, which has been created around the

[10] Own translation

struggles of land ownership, the community's appropriation of the territory and peasant organizations. Another relevant conclusion of this segment should be that the processes of space appropriation in Sumapaz correspond to a "patchwork" of different acts of will, forming a landscape "(…) thwarted by any number of contrary social processes" (Mitchell 2008, p.34), which are the result of different social contexts and functions – warfare, colonial rule, extractivism and so on- that is distant from a single coherent network of trails envisioned by a modern state. Another key element is the enhancement with several development discourses after the peace agreements which include diverse productive projects. From ecotourism to agribusiness, they imply different transformations onto the landscape to mobilize goods and people and deep impacts on people's livelihoods. Lastly, the effective implementation of conservation policies and institutional presence has underlined the particularity and importance of this ecosystem, which has also brought into the light the environmental consciousness and care that many locals show in their livelihoods or in their participation to imagine a future in Sumapaz. The following table sums up some of the historical milestones to frame the chronology of events.

Year	Event
Late 18th century - 1880	First routes are registered in the times of Quinine extraction
20s - 30s	Peasants "open" new pathways in order to live on marginal lands, thus transforming and integrating the ecosystem into productive plots. Intensification of struggles between peasants and landowners who appropriated most of the land in Sumapaz.
40s, 50s	Bipartisan violence and political persecution of liberal and left-wing organizations. During the military dictatorship, marks some of the first paved roads which corresponded to the construction of a jail for political prisoners in Sumapaz.
60s	Guerrillas, like the FARC-EP, are formally constituted.
1977	Establishment of NNP (Natural National Park)
80s	Sumapaz is integrated into Bogota's administration. The local city hall is created and then, located in Bogota´s urban center, two hours away from Sumapaz.
2000s	-Initiative to declare a ZRC in the region starts.

	-Military forces establish their bases in the region. -Paramilitary forces enter the region and military confrontations intensify.
2011	Establishment of delimitation process to implement *new* conservation policies
2016	Peace agreements between the State and the FARC-EP facilitate the entrance of state, economic and civilian actors into the region.
2017	Protest marks rejection towards tourism in Sumapaz by the community.
2018	Delimitation process developed by the CAR

2. Methodology

This thesis takes a stand from natural realism by acknowledging climate change, ecological crisis and the biological differences of ecosystems that constitute the biosphere (such as the Paramo in Sumapaz), thus recognizing their vulnerability to human action. Within this realist perspective, social structures are also included and defined as a "causal mechanism constituted by relationships among social positions" that can explain social "tendencies, strains and forces inherent in the nexus of those relations". (Porpora 1998, p.340). Two main structures concern this work in the emergence of trails and in how they articulate to broader societal arrangements. First, the dominant structure, in relation to Colombia´s position within the global capitalist system, could be addressed as a "developing economy". This structure entails ideological and material features like (1) production of primary commodities, based on mineral and agrarian extractivism for export purposes - lead by legal and illegal actors and (2) liberal policies based on the deterioration of trade conditions, through the technical increase of productivity that results in lower prices and wages. (Gudynas,2017; Perez, 2006) (3) These relations are reproduced in terms of the center and periphery in two scales; Colombia in relation to the global north or developed countries around the globe. On a national level, Bogota represents the "core" in the sense that its economy is largely based on services (60% of the city's GDP- and commerce -representing the 20% of the GDP- which differs from most regions, especially from the Colombian rural side (Portafolio, 2019). A second structure that needs to be addressed is the peasant economy, which is based on (1) domestic production –meaning small scale production- for own consumption and a small margin for exchange (2) workforce based on kinship

or reciprocal exchange of labor, (3) control over its own production and (4) subordinate position in relation to the dominant capitalist system (Cáceres 2003, pp.3-5).

In this study, trails are approached as forms of emergence from these interacting mechanisms. Within this realist view, features that inform the approach to trails are described as "(...) an enduring mark left in or a solid surface by a continuous movement. A line that (…) that is superimposed (…) or formed by the removal of material from the surface itself." (Ingold 2007, p.43). In addition, it could be argued that the question about trails in this work is –in general terms- one about socio-ecological reproduction. Therefore, the social agency is also a relevant ontological element since "(…) it is only through the activities of social agents that social structures are kept in being (reproduced), but individual or collective agency may also modify or transform social structures." (Benton & Craib 2011, p.133).

Infrastructure results from social structures and different mechanisms in which exercise of powers shape the landscape in different ways and attribute different functions, roles, or hierarchy in a system (Sayer, 2000). Although it may sound too general, it brings the epistemological departing point made by critical realism. Repetition isn't necessarily the way to approach social reality as might be for a close system, but the emphasis on the emergence of different powers and mechanisms that come into play can be more appropriate to study social structures (Sayer, 2000). This epistemological consideration poses the extended case approach as an appropriate methodology to answer the research questions. In other words, the examination of a case study offers the chance to depart from the concrete in order to carefully built on the causal power and mechanisms involved (Hoddy,2019). A second consideration is that the case study doesn't seek to create generalization, but adding to the "collective knowledge" around a broad range of contemporary topics like conservation, infrastructure, unequal exchange and so on by exploring the emerging social mechanisms embedded in a particular context that still can share some features with some other cases or issues (Flyvbjerg 2006, p.227).

A case study is appropriate to answer the research questions, given the focus on describing and *enlighten* a topic like trails that is bounded to a range of causes and outcomes yet to be outlined

(Yin 2014, p.19). The Extended Case Method (ECM) approach, responds to the connective nature of trails or lines which connect social agents to different scales. This approach, "(…) *entails mapping out the power-laden interaction between the local, the national, the transnational, and the global. While there should not be any illusion about the power disparity between actors differentially situated in the local-global gradient, every actor is imbued with agency—the ability to influence to a lesser or greater extent what actually happens on the ground."* (Barata cited in Mills et. al, 2010*).* This quote is also useful to address how the approach to the micro and the macro is formulated in the structuration of the ECM (Burawoy, 1998; Yin, 2014). Regarding the micro, interviews and participant observation approaches individual experiences and evaluations from the participants revealed the different implications of trails, productive activities, political struggles and so on for in their individual positions and their families'. Regarding the macro, the access to institution planning or informative reports about the region, previous historical and socio-ecological research complemented interviews and participant observation in terms of outlining the scope of the mechanisms studied on both regional and national scales.

2.1 Methods

The method toolbox included in this study responds to its qualitative nature. The emphasis on how people mediate the contradiction between environmental protection and economic growth in a certain context leads the research to the relations and values they hold in their livelihoods instead of approaching directly the spaces of roads.

The fieldwork that grounds this thesis was developed throughout several visits to Sumapaz. The selection of this place is linked to visits conducted during my internship at the Alexander von Humboldt Institute (IAvH) based in Bogotá. During my internship, from August 2019 to January 2020, I worked with the institution's researchers, this has allowed me to start knowing the territory by conducting short visits. Simultaneously, I contacted local leaders who helped me in my own project. Likewise, the location of Sumapaz, about two hours away from Bogotá city, allowed me to do fieldwork in several short visits from September to December 2019 and a final longer stay in January 2020 for two weeks. The territory is too vast to be studied by a single person, therefore the case was bounded to a segment of the municipality. The location stood out as a relevant parameter to choose this case; its closeness to the NNP and the evident dominance of a single road. Thereby, I

expected that flows of actors, goods and manifestations of the tensions between the accelerated urban flows and *conserved nature* in the periphery, were more *visible* to me as a researcher. Choosing this case is an example of what Flyvbjerg would call an Information-elected selection (2006, p.230) Although it isn't a critical case and some powers remain *dormant,* it tries "to maximize the utility of information from samples and single cases (…) [which] are selected on the basis of expectations about their information content" (Ibid). In this case, expectations concentrated on "singularities" or *hardships* of its location in the "frontline" to a large urban center like Bogota and also the local political processes around the territory's peasant sovereignty.

Participant observation

The use of participant observation consisted mostly of joining some participants with daily activities, local events, in a domestic context or at the workplace. In parallel, I kept a field diary to gather and to organize observations and information. Using this method is fundamental for the extended case method approach since spending continuous and relatively long periods allows people to touch upon different topics, assume diverse roles in different social settings that appear in everyday life (Bryman, 2012). The direct observation of the social settings allows the researcher to "uncover" relations or behaviors which might have been normalized, thus allowing associations and interpretations that wouldn't appear as *obvious* at first sight and explore possible lines for deeper analysis. (Ibid).

Interviews

Within the extended case, semi-structured interviews and participant observation enriched the data collection process. The purpose of using semi-structured interviews was to allow the emergence of actors and categories which are not visible through participant observation (Bryman, 2012). This type of interview can approach different time periods, interviewees' interpretations and free association of processes and relations that can address different scales related to trails, which might not be observable or even thought of as a related topic at a first glance. Although semi-structured interviews can cover a great scope of information, it is also pertinent to point out that the interview still holds a particular focus which makes the method not only an exploratory instrument. (Ibid.) In this case, semi-structured interviews were made with the help of a guideline, in which questions

were formulated to understand a broader context and direct attention to the issue of trails. A second phase of the encounter consisted of spontaneous questions that could deepen on topics emerging throughout the interview (Guber,2011). As a result of these types of interviews, the themes that emerged were built on both literature-based and local categories. Around 12 semi-structured interviews constitute my main source of primary data. Besides, I joined walks which allowed informal conversations with participants and evoked particularities or memories about the tracks and spaces we walked. Casual interactions in Sumapaz, and later in Bogotá city, gave key complementary information.

Interviews were recorded with informed consent, transcribed, coded for analysis and organized in themes. The approach to the subjects was a mixture of snowball and purposive sampling. In the former modality, some initial interviewees suggested -and sometimes helped me contact- other participants that they thought could give meaningful answers to my questions. One of the obstacles during my fieldtrip was the holiday season that kept many people coming in and out of town. Consequently, to add a general purposive sampling (Bryman 2012, p.422). helped me to allocate other interviewees who complied with a two-point based criterion; on one side I tried to approach older persons who might have seen transformations of the landscape and trails in the region, on the other side, I also look for people who expressed to work on their own or their family's business or production.

Analysis of information

The first step for the information analysis was to select and organize the data collected. After selecting the interviews and transcribing them. Comparing statements and references between interviewees, recurrent patterns, local categories and references that could be considered an "extreme" manifestation of the main tensions in the trails, were at the base of the analysis. The themes I used to engage with the different codes emerging were 'productive changes', 'space/time appropriation technologies' and 'institutional-urban centrality'. Bryman suggests that the criteria used by the researcher to assemble themes in qualitative research reflect her or his interests. Although that is the case in this research, the formation of themes was also filtered through its relation to theory and assessing their pertinence to answer the research questions. The analysis was developed in the reading and contrasting of these interview segments, themes, field notes and secondary sources -like newspapers or government documents-, with the main theoretical

references. The emergence of mechanisms, as formulated by critical realism, structured the explanatory levels that the resulting interpretations are able to address (Benton and Craib 2011, pp. 126-127).

2. 2 Limitations of the study and Positionality

The approach of this study on roads and pathways isn't to formulate a typology of roads and their description or association to a particular set of relations shouldn't be taken as one. The description of certain trails is limited to highlight characteristics that inform their relation to the social mechanisms and structures studied. Moreover, this research isn't exhaustive in the relations or values that exist in the case of study, nor in the identification of actors whose interests this study falls short to explore. The purpose of the study is to make a point regarding the different roles of trails in the processes of time and space appropriation, therefore this thesis doesn't pretend to register all possible relations, values or actors that could be related to the research question. Also, the continuous social transformations limit this study to the time in which it took place and doesn't depict the most recent changes after the time in which the fieldwork was done in January 2020.

My entrance into the field was accompanied by former professors from the National University campus in Sumapaz and by researchers from the IAvH which has participated in the Paramo delimitation process. In early January, when most people were on vacation and there were fewer visitors in Sumapaz, I was easily identified as an outsider or mistaken as a new professor coming to teach in town. As well, the company of other researchers from the IAvH suggested to some participants that I was associated with an official institution. However, in every interaction, I tried to reassert my position as a master student who is trying to maintain a critical perspective and respectful attitude with the people I worked with in every sphere. On the other hand, I was conscious and as transparent as I could be, about my relation to the Institute as an intern and the influence that this might have on my own research. Meanwhile, I also had to acknowledge my own limitations to keep a critical position towards the Institution's researchers who accompanied me. Despite working for the IAvH which has a role in some of the environmental conflicts of Sumapaz, the researchers who traveled with me seemed to take distance and a critical approach towards the institution's actions, which in this case is mostly associated with other divisions of the organization.

As a young woman from another region, who comes from an urban context and was introduced to local leaders in rather formal events –like political meetings- I tried to establish horizontal relations and reciprocate people's help beyond a *transactional* exchange. To achieve this, I tried to help with the workload, bring groceries or directly pay to my host to make it up for what I had consumed. Moreover, I assume a position of criticism towards some national economic policies, especially that are contrary to overcome the armed conflict and disregard its environmental roots and impacts.

3. Theoretical Framework

The following image shows the main concepts that support the analysis and interpretations in this study and how do they relate to each other using Sayer's representation of the critical realist view of causation (2000, p.15). In the following paragraphs, the different levels will be presented to establish the theoretical foundations of this study and their explanatory scope in the arguments presented ahead.

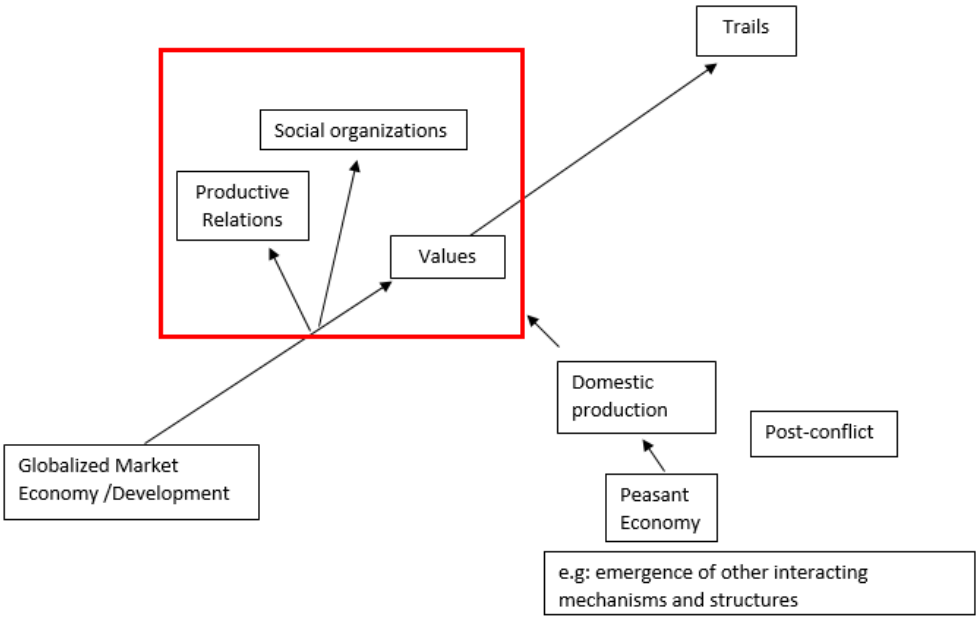

Figure 3. Relations between concepts, by author 2020.

3.1 Development and Economic Growth

The dominant social structure referred to as the Globalized Market economy is the basic level from which different mechanisms emerge, which can be discerned and explained by the features of this broader level. The ecological Marxism has characterized and explores what this structure, based on continuous economic growth entails for the reproduction of capital on the premise of infinite resources on a limited world. Accordingly, the structure of a globalized market depends on mechanisms that enable the appropriation of space and time –translated into resources- to maintain this fiction of eternal growth (Altvater, 2007). Ecological Marxism also states that the acceleration of productivity, circulation and consumption of goods and services are at the core of the contemporary climate and social crisis (Ibid). However, this Marxist understanding also asserts the circulation of diverse symbolical contents, propelling these processes of compression for appropriation. On the one hand, the global market's symbolic components are enclosed in the discourse of Development and contribute to the process of space-time appropriation in at least two ways. First, the understanding of social change under the polysemous paradigm of development which can be used as leverage to enforce diverse economic practices or policies. Second, in the power or negotiation asymmetries that result from the relations of unequal exchange between the center and the periphery within the world system. As Perez Rincon describes it, the industrialized production based in primary commodities entails more intensive use of resources leading to more productivity; this encloses a continuous reduction of prices and therefore, of trading power held by the periphery embodied in developing countries (2005). Development is approached from a critical perspective that sees it as a node of Eurocentric knowledge and technologies to appropriate more resources from the global north to the global south –or from the core to the periphery – and evaluates these diverse political mechanisms according to the *civilizing* aim of economic growth (Escobar, 1999; Ndlovu-Gatsheni, 2012).

The mechanisms that emerge and interplay within the structure described are in this case the concepts within the red square; productive relations, social organizations and values that can, to some extent, configure the role of trails in the processes of time and space appropriation. These mechanisms and their relationship to the next level of causation, trails, constitute the center of this analysis. Trails as produced spaces by human activity (Mitchell, 2008) manifest how productive relations comprise the mechanisms that transform or reproduce the landscape. Drawing from a

Marxist view, labor and productive activities are understood as an interface that mediates social reproduction through a certain use of nature, transforming at the same time people's living conditions. (Haberl et. al, 2016). In other words, productive relations constitute humans' most significant way to relate and transform their environment, therefore the emphasis on productive relations means addressing the type of ecological relations and impacts that entail.

Political Ecology

As a result of the deeply uneven power relations, the political process around the environment becomes a question of "(…) who produces what kind of socio-ecological configuration for whom." (Heynen et. al, 2006). Urban Political Ecology remains relevant in this case despite the apparent category of being a *rural* landscape. According to Swyngedouw and Heynen "There is no longer an outside or limit to the city, and the urban process harbours social and ecological processes that are embedded in dense and multilayered networks of local, regional, national and global connections." (2003, pp.899). In this case, the urban and rural are not taken as opposites but rather constitutive of each other, since the process of time and space compression to reproduce an urban environment, needs of constant inputs from the rural spheres (Arboleda 2015, p. 4). The importance of including analysis of Urban Political Ecology lies in its reflection about built spaces as processes that transform the environment and that are guided by diverse systems of values that operate on different scales (Swyngedouw and Heynen, 2003). In this sense, trails emerge from contesting systems of values that may or may not be part of a global market economy.

The emphasis on values appeals to the ideological struggle that is intertwined in the interaction between the diverse mechanisms of appropriation and social agency. Graeber differentiates between three notions of value, one of them refers to the sociological sense that describes "…what is ultimately good, proper, or desirable in human life" (2001, pp.1-2). Then values can influence more the envisioning of human life since they are "(…) a projection of a system of values" (Ungar, 2014), values can -to some extent- lead the actions and relations of human groups towards nature. Consequently, the frame of political ecology points out the relevance of values as social forces that enable or hinder the reproduction of human-nature relations are not only the result of broader social structures but involve social agency in terms of "what is proper or desirable" that ultimately

participate on the political processes that shape and appropriate trails and their socio-ecological implications.

Nature conservation

The nature conservation policies and the establishment of the NNP are based on two main conceptions of Nature. The first one, is the understanding of conservation of an ecosystem, not as the protection of Nature itself, but as a utilitarian mechanism that secures and makes efficient management of the resources sustaining an economic model (Gudynas 2011, p.274). In this case, the roads and pathways respond to mechanisms that are associated with the global process of "relentless upscaling and intensification of metabolic flows" (Arboleda 2015, p.5), especially in a dense and growing city like Bogota. A second conception departs from the idea of a pristine Nature, thus making its preservation only possible by keeping it away from human presence or influence, which has been a common idea tight to the establishment of Natural Parks throughout the world (Ibid). However, this thesis holds a critical stand towards the latter paradigm, which nowadays is the dominant mechanism of conservation for Paramo ecosystems in Colombia. Rather, this work embraces the idea that the protection of the environment is intertwined with people's well-being and participation (Ungar,2013).

3.2 Trails

Several disciplines have written about trails, roads, paths and their impacts or functions in diverse societies throughout times. In archaeology, the comprehensive introduction *"Making Human Space: The Archaeology of Trails, Paths, and Roads"* (Snead et. al., 2009) presents the reader with the diverse networks of trails on a global scale. Accordingly, they describe the inputs that different cases have added to the scholarship on this topic; they also suggest the importance of a typology to approach the variety of trails built in the landscape. More classic literature regarding the Qhapac Ñan - the Inca trails network- and the Roman roads evidences the permanence and disappearance of trails when they transition into other social systems. The former in the context of cultural heritage (UNESCO and BID, 2006) and the latter one in the context of contemporary states appropriating them as current public goods, in which persistence and accumulated investments on these spaces throughout time could explain them as a continuous source of economic activities (Daalgard et. al, 2018).

Nonetheless, the most spread concept to approach networks of trails might be the term of infrastructure. Literature on infrastructure tends to trace it back to the Marxist's conception. In this case, the concept's analytical strength lies in highlighting social processes which are key to enable the formation of different social organizations and relations. This as well is key to understand the role of trails in the landscape from a political economy perspective, which translates in the movement of "(…) things, including people, livestock, and material goods. Such movement can reflect tribute, trade, and other elements that make political systems work." (Snead et. al,2009 p.13). On the other hand, a more recent scholarship depicts infrastructure as the sustainer of a certain social order to the extent that its role and presence tend to be normalized and forgotten in the background (Hetherington and Campbell, 2014; Kaika et. al, 2000). Other authors refer to infrastructure "as a material assemblage built to support a higher-order project that is at once embedded in and constitutive of social relations" (Carse and Kneas 2019, p.12). In general, a significant amount of literature points out the control embedded in Infrastructure and focuses on the State as an exclusive exerciser of this power to integrate or exclude spaces, people and things that are in it (Jabary Salamanca, 2015; Moyano, 2018; Von Schnitzler, 2013).

The understanding of trails in this thesis departs from the idea that "[they] are the physical axis that concretizes the processes of settlement and articulate social and economic relations which ultimately constitute a determinate region or society." (Botero 2007, p.344). Moreover, the notion of infrastructure here takes from political economy and defines it as an articulation process between different scales through the use of diverse kinds of trails that ultimately reproduce a socio-economic order (Snead et, al, 2009). To be more precise, Infrastructure is understood as a material and political process that connects the pre-existent or emerging trails on the landscape resulting from changing and intertwined social mechanisms –and structures- and enables the reproduction of a particular social order.

An implication of this notion of infrastructure is the political aspect that entails the process of connecting the different trails that may emerge from different mechanisms or structures than the dominant one. As can be seen in the map, other social forces (e. g, peasant economy) come into an

open system causing the reproduction of other values, relations or organizations that end up contesting how this articulation of trails should be done. Contrary to the argument of some scholars (Hetherington & Campbell 2014, p.191), infrastructure isn't naturalized or invisible, nor is it an artifact exclusively controlled by state agents. The present understanding of Infrastructure implies to see it as a field of political struggle to shape and use particular trails to the service of social and economic relations. As mentioned before the political power of infrastructure lies in the process to integrate or exclude spaces and what's inside them. This doesn't only refer to the creation of political borders or adjoining new territories; it also refers to the practices and interventions that make the process of integration effective and conditions pre-existent social relations to adjust or be accessible to the new core or development plan (Serje, 2014). This dimension of infrastructure is the political process of integration, that could be described as the *flattening* of the people that happens in parallel to the flattening of the landscape, thus making them "readable" and functioning for the world system

4. Analysis: presentation of the empirical presentation

Local livelihoods, money and change.

Desechos

The name of these types of trails literally translates "undone". They are lines on the ground, made by the persistent movement of people, uncovering the soil from its vegetation. They could be described as lines on the ground marked by the friction that sweeps the weeds and grass away. Desechos aren't fixed or imposed over nature but they are continuously recreated and marked by the constant movement of people. Their existence is tied to nature's temporality – as they can be easily washed away- and to some extent, are dependent on people's knowledge about the territory to be recreated. It could be said that this is a way in which the collective and individual memory is deposited on the landscape (Mitchell 2008, p.42). A summarized description of these tracks based on fieldwork observations and interviews suggests that: 1) *Desechos* aren't maintained through direct work but just the movement by foot and 2) They are, to a significant extent, the result of domestic economy.

Image 3.. Image of Desechos (on the lower part of the image). On the upper-left side of the picture the main road can be seen.

Desechos evidence domestic activities and relations related to the participants' peasant production that is the based, to a larger or lesser extent, of most locals' livelihoods. Deisy, a young peasant woman shows me some *Desechos* around her house and tells me that they are shortcuts, to visit friends and family instead of using the main road. Participants agreed that these roads are only meant to be used by people. The introduction of cattle, horses or any type of vehicle would remove the vegetation, enlarge the pathway, affect the neighbor's soil as well as take away from their space, by, as Deisy clarified, "breaking the territory". These small-scale pathways seem to be more fit to enable small scale production and exchange between households that results from domestic production. Cheese, food, tools, help with animals, caring for children or other tasks were some of the goods and services that were facilitated by *Desechos* during my fieldtrips. As these trails signal relations based on reciprocity, organic agreements and non-monetary access to goods and services; participants also reported that many D*esechos* have been discontinued by the enclosure of some areas due to environmental restrictions, productive changes, or people's changing livelihoods. The

latter will be explored in more detail forward in this analysis. However, the prohibition of productive activities on the protected ecosystem that encompasses the NNP has reduced, in general, the mobility in these areas. Although, there are frequent infractions to this rule by people who take their cattle in these areas or that doesn't acknowledge the limits or rules of the natural reserve. On the other hand, the emergence of a market economy that has been more prominent in the context of post-conflict has changed economic relations and practices.

If Desechos enable the relatively stable access to resources on a small scale which suggests a lower impact on the environment, the emergence of a market economy with its core based in Bogotá city evidences relevant transformations in Sumapaz. First, the aging of peasant populations followed by the increasing mobility between Bogota and Sumapaz to access services (like medical appointments), trade products, look for paid jobs or monetary incomes in general. Second, various participants point out the increasing access to bigger markets and commodities; many interviewees refer to Bogota as a place where they can easily find products in large quantities. Also, many participants mentioned a generalized struggle fo the population facing a more pressing presence of governmental institutions like Bogotá's city hall, and environmental control agencies like the CAR and the PNN, which as the young Karen – a university student who works with her family at the cooperative Procamsu- puts it, "they bother people because they have a cow but don't give them any solutions" (Interview, at her workplace in Procamsu, Sumapaz).

Development and Working Men

The re-enforcement of conservation policies –by entities like the CAR and NNP-, the introduction of agrochemicals and technologies to modernize agricultural practices –like the Agrarian Bank or Fedegan - in Sumapaz is in tune to the conventional understanding of development driven in the Colombian rural side, which involves a large scale and intense production for exporting purposes (Perez, 2006; Gudynas, 2017). At the same time, the reassertion of urban governance from Bogotá, with a dense population and an economy that concentrates more services and products in contrast to other regions, offers a larger source of goods, commerce and services. Entities and development plans on both scales are based on the construction of well-being based on a monetary economy.

Accordingly, many peasant families have been in a process of proletarianization which hasn't necessarily followed a linear change towards the poverty belts in the city, nor has it meant their complete conversion into cheap work-force (Armijo, 2000). For instance, it was common, during interviews, to find mentions about inhabitants who left to work in the city are now returning to Sumapaz. Many others, refer to their constant movement seeking a job in the city or going back to work on their farms. It was rather common to find that domestic work is complemented, rather than totally replaced, with the access of many men and women to wages. Wilson Rey, a local zoo-technician, has worked for decades with different producers in Sumapaz and told me

> "(…) if one talks to peasants they will say "yes I have my crops and my cows but I'm also a town councilor" or "yes, I have this production in my farm but I also drive the machinery of the city hall, or I'm also a driver for the city hall, or I'm also a driver for the economic development [office], but I'm also a zoo-technician" (Interview with Wilson Rey, 13/01/2020).

It is in this movement between the two spheres, in which trails ensemble different relations and values that people navigate.

The increasing dependency of productive supplies -like agrochemicals, tractors to implement modern forms of production-, goods and services accessible through the market in Bogota and therefore through, wages or monetary exchanges are evaluated by participants in terms of their own time and labor. Both terms – "Laziness" and "Autonomy"- allude to individual and collective productive changes in different ways however, it should be highlighted how they reflect the inhabitants' agency to navigate different spheres of their livelihoods. Laziness was used in reference to the purchase and use of private vehicles. As an interviewee said

> "(…) everyone wants to buy a motorcycle, they're lazy, more than anything else is laziness. [They'd say] It's a bummer to walk to my neighbor's house, I won't go there, I'd rather drive there with the car or motorcycle. And already there are repaired roads, so people rather spend in gasoline then going by foot" (Interviewee Deisy Molina, peasant woman, Animas Bajas in Sumapaz, 03/01/2020).

This term not only was used to describe the increasing distance of people from peasant labor, but it could be argued that the increasing engagement with private vehicles marks a change in people's

productive relations and also their consumption practices, thus transforming their relation to the environment. Although it could be argued that the increase of fossil fuels for such a small population isn't a significant environmental impact, the prevalence of these means of transport brings the prospect of expanding to bigger markets in Bogota, consequently increasing their production and distribution, as the leader of the cooperative Procamsu expressed "[people] ought to get their products where the masses are" and later adds, "(…) what can't be sold in Bogotá can´t be sold anywhere else" (Interview with Auder Molina at his house in Sumapaz, 7/01/2020). Other environmental ramifications are associated with the individualization and acceleration of consumption habits that are accessible through the main road, leaving *Desechos* and other social relations that can be less impactful aside. The term "autonomy" then is interpreted in the sense that "In moral terms, the issue seems to be evident, although frustrating: to own money or favors tends to be associated with moral inferiority and dependency from a third party" (Villareal cited in Jaramillo, 2012). The ability to implement modern technologies or exchange products, in the producers' own time and without debt deadlines, often highlights the importance not only to acquire private vehicles but to adapt their terrains and trails to the crossing of these technologies. Autonomy, however, seems to be a decisive value determining ways of production, including the preference to transition to cattle instead of extensive agriculture.

> "So, the Agrarian Bank wasn't giving any loans or there would be more obstacles. They would ask, what would you want credit for? If you say cattle or rent then it's ok, but then you'd say "sowing", then they'd tell you no, loans for sowing are taking longer, many people are late in their payments, they have to study these loans because the Price of potatoes wasn't good. (…) whenever the loan was for cattle or something it was way easier(..) however, people don't have that many crops anymore and try not to get in debt. If someone gets a loan, it is to buy land or something but people try not to do it anymore". (Alexander Perez interviewed 7/01/2020).

Considering that cattle breeding and cheese making are less dependent on climate events or *proper* roads for transport, it represents a more reliable monetary income for households, although it contradicts the dominant conservation normativity forbidding cattle for its impact on the vegetation and compacting the soil. Moreover, it can be argued that "autonomy" expresses a social agency that seeks to re-appropriate the individual's time and labor over profit.

Taking from various observations and interviews, it seems that the access and use of motorcycles and cars are closer to men's daily activities than women's livelihoods. Women's labor appears to be more closely attached to a domestic context, the daily production of cheese in the kitchen, taking care of the animals and other tasks making them less likely to drive these vehicles. Women's alternatives go to different towns relied many times on male friends, family or acquaintances that could give them a ride. When women's productive activities surpass the household they don't necessarily access vehicles of their own but tend to access transport made available by their workplace which were public institutions in most of the cases. Eva, a migrant woman, doesn't own the land where she lives consequently, she has to divide her incomes from the cheese she produces with the landowner. Nevertheless, the production of knitted accessories has become an extra income that helps her provide for her household. She tells me about her participation in the local networks that the local Botanical garden has been promoting.

> "(…)I liked participating there because you spend your whole life here, every day with the same tasks. Going there to participate, even for a little while, one can rest, share, learn something, just a change of environment. (…) [We can also] commercialize our products, we can sell by ourselves what we produce without the need of a middle man so we can have a profit, we can be autonomous to produce and sell in our own time, not someone else's." (Interview with Deisy Molina, 03/01/2020).

At some point the network, composed mostly by women, wanted to create a project of agricultural tourism, taking small amounts of tourists to know their peasant productive systems in different farms and have themed *ecological* walks using some of these *Desechos*. Although this project hasn't been developing further, Eva's testimony reflected how the market-based exchange relations can generate layers of differentiated access to the territory in this case, represented in gender unbalances to access basic goods and services.

Royal Trails, Horseshoe paths and roads

Royal Trails commonly thought of as the result of the invention and work of the Spaniards at the service of the colonial expansion and trade system however, archeologists suggest they were appropriated from pre-Hispanic structures. (Botero, 2006). This can draw a parallel to the network of trails that connect Sumapaz to Bogota. Participants recall their experiences using royal trails by

mules and horses, to transport and barter the excess of their production to small towns like Pasca or Fusagasuga. On the other hand, the use of Horseshoe paths, which refer to trails that have been dominantly shaped by the passing of horses, mules and other working animals, remain active. A common feature unites these trails in the way some of them were recovered and improved with Bogota's funds, while other trails connecting with smaller towns were left to deteriorate or even disappeared. The main change that these trails reflect is the distancing and reduction of economic relations with towns of a similar scale in contrast with the intensification of political and economic relations with Bogotá. In other words, the changing hierarchy of roads responding to economic forces also present some environmental implications. One interviewee referred to this

> "(…) This trail will take you to Pasca, and from Pasca it will take you to Fusa, because in the old times when there was a colony, people would practically go to Pasca or Fusa because it used to be closer than Bogotá. It was more accessible; it was the main road and would cross over here. (…) When they opened the road, from here to Bogotá, this has changed. Going to Pasca became more complicated because they only built the road to Pasca long time after (…) so it was easier to transport the products by trucks, cars and not by mules. And now in Bogotá, you can get everything, meanwhile in the town of Pasca or Fusa you can't. […] The municipality [of Pasca] doesn't invest with so much money on the roads, and they don't have that many resources anyways, so the transport is more complicated" (Interview with Alexander, peasant/rural worker, Animas Bajas, Sumapaz, 07/01/2020).

Alex's brother, Auder Molina also mentions how this change of trails displaced some animals out of the economic sphere "before it used to be very common and fashionable to ride a horse, packing mules. Now there aren't even mules because we don't have anything for them to transport" (Interview with Auder, social leader and peasant, Animas Bajas, Sumapaz, 07/01/2020). Besides the change in transport technologies, the environmental impact relies on the exacerbation of unequal exchange. Despite the decreasing extraction of potatoes which was an intense activity during 2 or 3 months a year and some interviewees mentioned it managed to fill tens of trucks of potatoes during that time, Wilson Rey recalled that "(…) the development was really local, even some 20, 25 years ago no fungicides were used and there were no roads" (Interview with Wilson Rey, zoo-technician and musician Bogotá city, 13/01/2020). More than the access to markets, Wilson points out the way in which this constant access to cheap and abundant merchandise works as a mechanism of control.

The city hall periodically gives away foodstuffs, tablets for children and other periodical *gifts*. Wilson interpreted this as a way to reassure control over an area that was stateless in times of conflict and now is a key provider of water resources for the city and maybe even other economic prospects like ecotourism. Ultimately, the change of the trails' hierarchy transformed the flows and relations to other cities and integrated Sumapaz into stronger power struggles orbiting Bogotá's city reproduction.

The concentration of economic and political life that concerns and defines the population's livelihoods in Sumapaz is intertwined with broader political implications. The citizens' taxes, local funds and resources for Sumapaz are administrated or watch over by Bogotá government. Furthermore, Sumapaz's local city hall is located two hours away in Bogota city. In part, this could explain the sense of disregard expressed by inhabitants during political meetings that I got the chance to attend. Many of the discussions surrounded the pouring of resources in events, which haven't improved inhabitants living conditions. Another participant, who represented local traders, expressed that they have been asking some maintenance of the roads for several years but "they always propose what we don't need". Final comments allude to the "lack of commitment of official delegates, who don't to come from Bogota" and the actions of Bogota's city hall which according to one attendant, won't leave any peasants left in Sumapaz in the next 10 years. However, the moderator of the meeting makes a declaration regarding the role of Sumapaz in the eyes of the city's administration "Peñalosa's [former city Mayor of Bogotá] position is to say that you are not able to produce food, but to produce environmental services". (Various testimonies in the CLIP meeting in Santa Rosa, Sumapaz, 17/11/2019). The different interventions suggest that Sumapaz political struggles 1) an ecosystem that is portrayed as unoccupied, constitutes the natural counterpart to the city, and therefore with no need to address issues of infrastructure 2) the minimization of people's participation in politics and livelihoods. In official development documents from the RAP-E, the roads of Sumapaz have been projected as centers for biking tourism, a sport that is popular in the Colombian Andes and Bogotá city, but not particularly in Sumapaz. Other testimonies during the political meeting of the CLIP expressed how initiatives to sign tourism deals hold a double-standard to punish city visitors who pollute and break protective measures inside the NNP lagoons where most tours end and that re-enforces the image of Sumapaz only as a natural place and not an inhabited town. In this sense, it could be argued that Sumapaz also represents the

natural, the pristine within Bogota limits. It would seem that cultural representations based on the binary urban-rural, or pristine nature, are increasing to include Sumapaz as this pristine place, detached from urban logics. This way, there is symbolic power that is re-signified in representing Sumapaz as the natural frontier within a *sustainable* city. However, some inhabitants have tried to adapt to these changes, as Wilson Rey tells me other work opportunities have come with these representations for instance, a group of people who are planning to open a business of bottled water and other, like him, who found in peasant music other opportunities to "promote Bogota´s rurality in the city" (Interview in Bogotá city, 13/01/2020).

Fossil fuels and technologies

Roads were the most common reference to trail by participants during interviews and other contexts. In the case of Sumapaz, this category refers mostly to the main road that connects the center of the main towns in Sumapaz –Nazareth and Betania- to Bogotá. Some segments of the road are paved and others aren't, most times this is explained by the NNP restrictions for conservation. This makes the road and accessibility more vulnerable to the hardships of the weather in Sumapaz which can affect the mobility of vehicles. In addition, the term "road-like pathways" (*Caminos carreteables*) is a common expression, that highlights the liminality of some trails, which can be used by vehicles even if they aren't made or adapted for them and maybe just with some contingent adjustments. This shows that infrastructure, as envisioned by modern nation-states, isn't only the product of centralized action, but is also shaped and modified by other social actors. It may also address the hegemonic position of roads in which people relate them to progress, for the community but also for personal purposes, over time the maintenance and construction of roads showed to be a central issue to evaluate the political performance of different governors. Besides the many effects that roads can have or the intentionality embedded in them, there's a margin for these structures to be re-appropriated and re-signified by different actors. For instance, the community's work on trails and common goods was present before institutions showed up. Esperanza Rubiano, who belongs to a family of social leaders, said "Before we had to gather and fix the road ourselves because we didn't have the equipment or the machinery to do that. So, [this event] used to unite the community and social organizations'' (Interview with Esperanza Rubiano at her office in Nazareth, 06/01/2020). Equally important, communities also organized fairs and raffles

to get resources for these types of roads which were considered a “common good”, since everyone would have to transport their products at some point. In addition, other common structures like schools resulted from these communitarian efforts. When institutions started to be more present in the territory these structures and roads passed to Bogotá’s city hall. Therefore, the case of Sumapaz suggests that the infrastructure in the global south can’t be completely explained as the sole result of the nation-state’s political project and control over space but it’s the result of the different actor’s intervention in the landscape.

Middleman and changing economic practices

The re-introduction of national or urban development plans was accompanied by technology and expert knowledge to “recover” the territory. Technology becomes a key shaper of the landscape but also has played a role in the displacement of power from local social actors to other centers. Previously, reciprocity was at the center of a peasant economy as recalled by several interviewees (Interviews with Alexander Perez, Esperanza Rubiano, Wilson Rey, January 2020). Not only modern technologies became more relevant to access a monetary income but they also concentrate more power to transform the landscape. The long distances between Sumapaz and Bogotá, and the restrictions of the NNP, make any other form of transport, other than fossil fuel vehicles, unlikely. Besides, the imagery of the conflict has made walking or crossing this territory by other means suspicious and controlled by the squads of militaries that roam around the main road and its surroundings. I myself was inquired by soldiers that saw me walking alone by the main road and ask me who I was, where was I staying and what was the purpose of my visit, also they told me they just have taken into custody a young man which acts were only described as “walking by himself in the Paramo from Bogota”. This unveils the emergence of different power relations around technology to access the territory.

For instance, power relations stress the exploitation of producers and uneven conditions for trade. Karen, a young student of anthropology and worker at Procamsu, says that bus drivers –in their own interest- charge people whenever they want to send packages with the daily bus that goes from Sumapaz to Bogotá for almost the same amount of money that would cost a ticket for a person, also they have the power to accept or reject such packages. This is just an example of the new productive

prospects that have flourished around the main road and the work implied in enabling material and human flows between Bogotá and Sumapaz, which ultimately have transformed the road in a center of exchange in itself. The owners of technology for production, like tractors, or transport goods and persons have the upper hand when buying, pricing and even bartering products resulting from peasant production. An example of this are cheese traders, who won their own cars and often come from other towns or the city. They are key for peasants whose production is too small to access or hire transport and don't have the means of distribution in the city. Therefore, many would rather go for the trader's consistency who buys their production on a regular basis - than the actual value of the cheese. On this regard, Eva told me "[I sell the cheese] to Dago, he pays 3.800 pesos (0.90 €) for each pound, he doesn't raise the price and I should tell you it's something worthy of selling to another person but Dago doesn't abandon us. Don Dago pays the cheese and leaves the money; he never goes away owning us any money." (Interview with Eva in her house, Sumapaz. 4/01/2020). Another instance that exemplifies the integration of Sumapaz to larger scales through unequal exchange practices conducted in the main road is the case of some traders who drive trucks loaded with foodstuff and merchandise several days a week to sell and barter with locals who –for some reason- can't go to market places in Bogotá. Other participants mentioned the overpricing and bad quality of these products; "First, the cars that bring merchandise are very expensive, super expensive. Let's say that if you have to buy from them, it is because you must since there's nowhere else to buy from. But [the products] aren't in the best conditions, nor do they have the appropriate prices, everything that comes in there is overpriced" (Deisy, peasant woman, Sumapaz 03/01/2020). Eva added that in Bogotá she can buy 170 thousand pesos (40 €) worth of groceries that could last around two weeks. Nonetheless, she affirmed that she can't even buy half of the things with the same amount of money from the trading trucks on the road.

Another aspect regarding the re-distributive nature of technology is exemplified in the set of "new" productive practices that emerge as a response to enable these flows to Bogota. For instance, it is common to find locals who own cars or motorcycles and drive other people around - like some sort of rural taxis - as a complementary source of income. Not only they fill in for the non-existent public transport connecting the different zones of Sumapaz (the only transport available is almost exclusively directed to Bogotá). They also offer transport when people can't catch the daily bus that covers this route or if the bus can't fit all passengers or their luggage. This happens frequently since

people need to transport supplies for their domestic activities which can include animals, like chickens, tools or a broad range of products that are supposed to cover needs for periods of 15 days, one month or more. However, the buses available for public transport are not adjusted to these kinds of needs for rural dwellers. But going back to these occasional drivers, they can also take advantage of the uneven conditions to access the territory. For instance, Eva told me that on her last trip to Bogotá the bus left her stranded midway to Sumapaz because it was so full. So she had to pay an acquaintance to take her back to her house for 70.000 Colombian pesos (16.50 €) while the groceries she purchased for several weeks cost around 80.000 COP (19 €).

Given the extended positive symbolism attached to roads as means of progress, the hardships associated to the lack of roads, not only in Colombia but in Latin America (Harvey & Knox, 2015) and modernization still closely related to the dominant discourses of Development, any action in this direction has the capacity to influence the political capital and relations. In this sense, the "hygienist" practices embedded in this conception of Development, constitutes a form of political performance (Carse, 2019). By *cleaning* the mud, the weeds, fixing landslides and so on, local politicians demonstrate their investment on roads as a result of their management; ultimately this was a constant point of evaluation when I asked about different authorities and their political performance throughout the years. This can be seen on the homepage of the local city hall, which often publishes news about advances on this matter, like the purchase of machinery to keep the roads in a good state during rainy seasons and shows images of the machines removing weeds and controlling the vegetation on the sides.

Image 4. Screenshot of city hall's homepage reporting on the maintenance of the roads.

Re-appropriation?

The appropriation of the technology shaping the landscape has been at the service of several actors and socio-economic relations that sometimes entangle in the transformation of the landscape. For instance, Wilson Rey tells me about how the guerrilla [FARC-EP] actually used machinery sent by Bogotá's city hall to build roads according to their own plans. In other cases, the appropriation of these technologies involved people's participation in defining the trace of the road in order for it to be closer to their houses and facilitate their work. Alexander mentioned it like this,

> "When they were opening the road, they'd send a man in a bulldozer without a surveyor or anything. So at that time, the driver would be the person that would know the terrain best and he'd say let's do it in that direction or this way is easier. At that time, everyone would give permission so that the road could cross their property (…) This is the reason why the road has so many curves because people liked that the road was closer to their house, so more people could benefit from it". (Interview Alexander P, Peasant- Rural worker, Animas Bajas, Sumapaz. 07/01/2020)

This narrative contrasts with the paradigm of efficiency that results from nowadays institutional planning, which tends to be vertical in order to follow broader governance guidelines. Another example addresses the community's strong political awareness, which understands the political power inherent to roads as the assemblers *of* economic projects. An illustration on how the political aspect of trails is contested by the population is the protest of 2017 when community members blocked the main road to stop tourists from entering and polluting the natural reserve -when the NNP failed to do so- and expressed their aversion towards tourism enterprises that don't consider or discuss the effects of their business on the local population (Hernandez Osorio, 2017). By blocking the entrance, they wanted to protect the ecosystem from massive and unregulated tourism, but they also ended up doing a statement about their own economic project for Sumapaz and the integration of environmentalist values into their practices.

Another strategy to face the transactionality and the use of technology prompted by the uneven exchange is the emergence of local cooperatives. Although limited, they have been a form of social organization to tackle the exchange. *Procamsu* is a cooperative formed mostly by members of the same peasant family, who collect, produce dairy products to sell by the main road and distribute them in the city. The cooperative's understanding of the road as a place that channels trade made them move their location to a house right by the main road. The cooperative gathers milk, wild berries and cheese from local peasants and, according to some associated interviewees, they offer better prices. As well, the cooperative's workers reported an improvement in their incomes and sales of products they bring from the city, after they moved to the side of the road. Nevertheless, one of the cooperative's main tasks is establishing networks with small shop owners in Bogotá in order to secure, as much as possible, the distribution of their products in Bogota which, to some extent, has been achieved through a network of regular costumers that helps to build stability for the members involved. The cooperative also assumes transport as a shared matter, motorcycles tend to be enough to mobilize the scale of products handled by the cooperative. On the other hand, the organization got a motorcycle which was adapted to fit larger amounts of milk and products from the local members of the cooperative, however it also showed to be useful in the spontaneous transport of people and neighbors which, during my time in the field, was a common practice. This cooperative also integrated environmental values into their organization's mission and production.

Even if traditional ways of production can be considered sustainable, the concern to address environmental issues is at the center of the cooperative's discourse:

> "The first [objective] is to benefit from local products or the local fruits, plus the dairies, to use fruits like the blackberry (…) which are local products and can have a surplus value through the process to make the jam, sweets, syrups. Then, we can commercialize them and by trading them, it can be shown that there´s an environmental alternative so that we can take care of the trees which give us these fruits in parallel to cattle ranching. Not extensive cattle ranching anymore, but some cattle breeding that is more passive, with the issue that there are some fragile territories, so we have to take care of them." (Interview with Auder Molina in his house, Sumapaz, 07/01/2020).

Nonetheless, it is also relevant to point out that cooperatives aren't exempt from the contradictory pressure to grow their production, enlarge their "business", and on the other hand, preserve these values at the core of their discourse while complying with the conservation measures in the region. However, to face collectively this contradiction seems to facilitate or stabilize people's livelihoods regarding the distribution of products, of work, risks or benefits. To sum up, it could be interpreted that cooperatives emerge as a form of social organization that integrates values reflecting on the peasant production, the relevance of environmental care and generates processes of *communing* work to ease the pressure of monetarization and unequal exchange that is more heavily experienced on the individual level (D'Alisa et. al, 2015). However, they also appear to be a response that embraces the role of roads as organizers of the space that is settled on entrepreneurial relations to the territory.

Image 5. The Cooperative in their new location by the main road. It is common that many official vehicles stop to buy refreshments and snacks, representing another regular source of income.

5.Discussion

The empirical information presented above informs the present discussion around two main arguments. First, is that the study of trails in the production of a regional scale could be formulated as a fetishist infrastructure (Arboleda, 2015; Kaika et. al 2000). By this, it's argued that state-driven infrastructure highlights the ecosystem –and its water resources- as pristine nature, while the population is reduced into one-dimensional representations – a romanticized peasantry, armed conflict actors, victims, consumers and so on. As a consequence, the process of monetization is obscured as a main space-time appropriation mechanism that increases the pressure on individuals to adopt resource-intensive productive practices. The second argument to formulate is the contrast of the visibility of infrastructure on a local scale, where the access to technology on roads exacerbates the unequal exchange, and its invisibility in the regional and national socio-economic projects that are sustained by this uneven exchange (Kaika et. al,2000). The relevance acquired by infrastructure is expressed in its centrality for daily local relations, being also at the center of political and symbolical struggles, but also the place to contest hegemonic or dominant socio-economic projects for a *developing economy* (Coleman, 2014; Von Schnitzler, 2013).

First, the idea of a fetishist infrastructure results from the efficacy of the existing infrastructure to maintain the material flows of a regional socio-economic order while obscuring "all the complex relational mechanisms on which such flows rely" (Harvey & Knox 2015, p. 5). The integration of natural landscapes for conservation in the Global South is in line with global financial actors promoting "market-based strategies" and small governments, insofar they are also operative landscapes in the reproduction of capital and continuity of economic growth within a *green capitalism* (Hetherington and Campbell 2014, p.192; Goldstein, 2018). Highlighting the pristine nature of Sumapaz also obscures –or justifies- the *small* government during the conflict, which preserved the ecosystem to a large extent. The limited investment in infrastructure and the state´s selective appropriation of pre-existing trails is a manner of power reassertion over the landscape in the form of stewardship (Mitchell, 2008). In this sense, the adjustment of a developing economy to the *green spirit* of capitalism is based on the idea that "It is no longer merely the state's role to impose itself on the landscape, erasing the natural, but rather to marshal the productive forces of nature and of the unruly people who live in its midst." (Hetherington and Campbell 2014, p.193). The context of post-conflict allows the re-integration of Sumapaz into a regional political project accentuating the wilderness or pristine nature and concealing the trails and the local practices around them –as the collaborative tasks of construction and maintenance- for this "unmarked nature" constitutes the "hidden" economic potential embedded in Sumapaz (Serje, 2014). Consequently, the development of such non-modern, local "organizational practices" onto the lines of the landscape are punished by the state's environmental agencies like the CAR or NNP (Carse 2019, p. 103).

The exaltation of the ecosystem isn't just a control mechanism renewed by a new wave of sustainable development to renew the power exercised over this space with projects like ecotourism, which often showed to be vertically driven by investors, government institutions and other "external" actors and "rendered [the local population] invisible" (Arboleda 2015, p.5). What can be produced in the landscape (Mitchel,2008) has been dramatically limited and sanctioned by the current conservation model. This, for the inhabitants, seems to be contrary to a hegemonic view of progress in the Colombian rural side, where upscaling and modernization of agriculture configure the project for "development" on a national socio-economic project (Perez, 2006). Considering this, different actors seem to maintain the expectation, "promises, hopes and fears" that may come with

a more modern road network that could integrate them to that progress. On the other hand, it could be argued that it appropriates the future of the community by eclipsing and limiting other socio-economic projects like the ZRC (Hetherington & Campbell 2014, p.193). At the same time, this underlines social agency in the interpretations and practices generated by the expectation of change in relation to trails and their flow in Sumapaz. Therefore, the terms of "laziness" and "autonomy" can be interpreted as evaluations held by people in response to productive changes revealing what is wanted or "what is good", which remains heavily marked by peasant labor, resistance and territoriality (Silva Prada, 2014). The *reduction* of people also responds to the understanding of their well-being as the access to wages and money, insofar the integration to a developed center like Bogotá implies a "consumer-driven lifestyle" that accelerates people's individual access to markets, goods and services (Kaposy, 2014; Rosa, 2003). Then, it could be said that these evaluations also reflect the individuals' aim to re-appropriate time when they have access to private vehicles or commodities of all kinds that can be acquired with increasing immediacy, stressing the role of monetization as an individual mechanism of space-time appropriation with delocalized environmental effects.

Monetization then is revealed as the main mechanism that enables the exaltation of the "untouched" ecosystem, by locking-in people's labor to the main road and the circulation of money attached to it. The growing tendency to work in road-related jobs –drivers, machinery operators and so on- as well as the tendency to rely on positions or trade located in –or coming from- Bogotá, controls to some extent the local labor and performs as an organizational artifact that reduces the dispersion labor throughout the territory and concentrates it around the road (Larkin,2013). In addition, the *environmental disengagement* attached to the process of monetization in Sumapaz may have long term implications. The growing reliance on monetary incomes doesn't immediately alienate people from agriculture nonetheless, it enhances actors with more modern production practices and financial actors that insert them in the dynamics of money (Goldstein 2018, p.33). When it comes to the *secondary* trails and routes (*Desechos*, Horseshoe and royal pathways to other leading to other towns), the dis-continuity of their use in some cases –and even disappearance- reveals differentiated access to the territory. Here it's argued that women's central role in domestic production – the basis of the peasant economy- stresses unequal access to vehicles and flows of money channeled in the road's connection to the economic *core* in Bogotá. Nonetheless, it is also

suggested that in these different productive activities, the emergence of differentiated access to the territory, and knowledge about it, are held by women. The idea that "(…) in a globalized territorial regime the hierarchy established among the different trails as lines and their technology prioritize the metrics that give more relevance to speed (…) without having to suffer the "accidents" or "events" of the territory" (Mezoued et. al, 2018). This resonates with the idea that women's role and the use of *Desechos* in their daily tasks not only can make them experience such "events" in the territory but can be also appropriated on a larger extent, when not transformed or shaped, by women (Ingold, 2000).

The second main argument of this discussion lies in the idea that the visibility of infrastructure responds to the accentuation of unequal exchange on a local scale in relation to a larger socioeconomic project. Furthermore, the visibility of infrastructure also responds to the symbolism embedded in the political constructions of *Development* in the global south (Harvey and Knox, 2015). Such exposure unveils infrastructure's power to ensemble different societal arrangements, thereby underlining its part in political struggles but also becoming, literally, a "political terrain" where these struggles are made visible by the population (Von Schnitzler, 2013). As previously mentioned, the channeling of monetary flows in the road that connects Sumapaz and Bogota entails a clear hierarchy of trails. However, such integration of monetary flows into people´s livelihoods is mediated by the control of the technology which "(…) represents an unequal exchange of resources between different economic segments of global society" (Hornborg 2016, p.115). If monetization is a mechanism that appropriates space and time on the interpersonal level, then technology could be addressed as the mechanism that distributes such unbalances in the production of scales, favoring the *developed* centers (Ibid). The empirical data suggests that dependency on trucks, vehicles, access to gasoline to transport people's products or get basic goods and services in Bogota's urban center gives the upper hand to the actors who can access and control these means of distribution. This underlines the fact that "(…) technology is explicit, objective, context-independent, and (…) can be transmitted by teaching in contexts outside those of its practical application" (Ingold cited in Hornborg 2016, p. 12-13). This can be extended to other types of technologies that have been implemented in Sumapaz, like tractors or other technological inputs for modern agricultural practices. The adjustment of trails to mobilize this technology implies upscaling and shaping them, just as horseshoe pathways were shaped by the passing of working animals. Then, it is argued that

such structures enable the dialectic use of resource-intensive technology that is restricted under conservation policies and promoted by the market at the same time. Besides, the uneven responsibilities imposed and assumed by the local population to take care of the ecosystem are intertwined with fragmented governance (Arboleda, 2015). This means that the emergence of financial actors that come along with the process of monetization –for instance the Agrarian Bank- and the pressure to increase monetary incomes –to access basic needs through markets or pay debt acquired to get vehicles- which is met at the expense of the transformation and appropriation of the ecosystem, in ways that are contrary to the formal institutional efforts of conservation.

The last point of this second argument is about the forms of re-appropriation of the dominant network of roads, the trails and technology underline how the social agency operates to navigate the iniquities associated with the emergent mechanisms. One of the clearer examples of people's reflexivity about the prevailing hierarchy of the main road is the performance and blocking that took place there as a way to reject ecotourism. What Same and Gibas call "entrepreneurial governance" (2018, pp. 6-8) is expressed in the promotion of conditions for other productive activities–like a bottling water company or hostels- that are held as compatible with the nature conservation. This type of *governance* has gained hegemonic status but has also met resistance in the collectivist and political reassertion of peasant causes and governance. For instance, the community's use of machinery to trace a road that would benefit everyone at the community at the expense of the efficiency of a straight line, exposes other societal arrangements to plan or design the road as a common good. The protest against ecotourism by blocking the road and the previous communitarian construction of trails illustrate how trails are used to vindicate other views on collective well-being where the value was located in the time and mobility of people instead of the markets' temporality (Silva Prada, 2014). In other words, the political power of trails lies in its capacity to disrupt the established socio-economic when people are being reduced or made invisible and also evidences the power that has been displaced from people onto technology and to Bogotá city as the political and economic center of Sumapaz.

To conclude, it should be clarified that this thesis doesn't see the isolation of people as a solution, doesn't idealize peasantry nor condemns technology. This work intends to examine the different mechanisms from which different types of trails and especially roads emerge and its socio-ecological

implications. A first conclusion is that the fetishism of infrastructure is expressed in at least two ways that answer either to the preeminence generate value (e.g, domestic production, communitarian work on roads and so on) or to "establish the conditions under which value can be realized" (Mitchell 2008, p.35) (e.g, machinery renters, gasoline vendors, water resources) in the landscape. The former one is related to the envisioning of roads as of "the promise" of being connected and benefited by the monetary and technological networks of the city (Kaika et. al, 2000). The second form of fetishism around infrastructure, lies in highlighting the power of Sumapaz as a landscape where exchange value can be generated, which includes de "representational value" of an untouched ecosystem that makes the city more sustainable (Ibid, p. 130). However, the text showed how the connection and integration to these large-scale urban centers was possible by implementing monetary and technological mechanisms, that had effects on people's livelihoods like generating uneven access to the territory –especially women – and commodities, which ultimately stand for the acceleration of the time and space compression process related to roads (Kaposy, 2017; Rosa, 2003). Finally, the implementation of technology is intertwined with this distribution of resources, but also with the redistribution of power to transform the environment which is displaced onto the use of productive machinery that enables the reproduction of this urban-political order (e.g, bulldozers on the road) and mediates the power to establish relations between Sumapaz and Bogota where the decision-making process concentrates (Arboleda, 2015; Swyngedouw, 2007; Snead et. al, 2009).

6. Bibliography

Alejo Garzón, F. (2011) *Implicaciones políticas y sociales que impone el actual modelo de asistencia social en la cultura política: El caso de la Localidad 20 de Sumapaz*. Pontificia Universidad Javeriana.

Altvater, E. (2004) 'Is there an Ecological Marxism?', *DEVELOPMENT STUDIES AND POLITICAL ECOLOGY IN A NORTH SOUTH PERSPECTIVE*, (5), pp. 2–25.

- (2007) 'Conceptualising globalisation: fossil energy, global finance and the labour market, 1(Summer 2007), pp. 5–14.

Angel Botero, C. (2019) *Paz en otros términos: pensando relaciones entre el conocimiento tecno-científico, prácticas militares y no-humanos*. Bogotá D.C. Available at: http://hdl.handle.net/20.500.11761/35395.

Arboleda, M. (2016) 'In the Nature of the Non-City: Expanded Infrastructural Networks and the Political Ecology of Planetary Urbanisation', *Antipode*, 48(2), pp. 233–251. doi: 10.1111/anti.12175.

Baquero Monroy, J. A. (2013) 'Imaginarios y zona roja en el Sumapaz', *Cambios y permanencias*. Universidad Industrial de Santander.

Barata, D. (2010) 'Extended case method', in Mills, AJ, Durepos, G & Wiebe, E (eds), Encyclopedia of case study research, SAGE Publications, Inc., Thousand Oaks, CA, pp. 375-376, viewed 18 April 2020, doi: 10.4135/9781412957397.n140.

Botero Páez, S. (2006) 'Elementos para leer un palimpsesto: indígenas, caminos, piedras, mulas y caballos en Colombia', *Boletín de Antropología*, 20(37), pp. 265–287.

- (2007) 'Redescubriendo los caminos antiguos desde ColombiaLa Colombie : un point de départ pour la redécouverte des vieux tracés routiersRe-discovering the ancient ways from Colombia', *Bulletin de l'Institut français d'études andines*, 36(36 (3)), pp. 343–352. doi: 10.4000/bifea.3505.

Benton, T. and Craib, I. (2011) *Philosophy of Social Science. the philosophical foundations of social thought.* Palgrave MacMillan.

Bryman, A. (2012) *Social research methods*. 4th editio. Oxford: Ofxord University Press.

Burawoy, M. (1998) 'The Extended Case Method', *Sociological Theory*, pp. 4–33.

Carse, A. and Kneas, D. (2019) 'Unbuilt and unfinished: The temporalities of infrastructure', *Environment and Society: Advances in Research*, 10(1), pp. 9–28. doi: 10.3167/ares.2019.100102.

Coleman, L. (2014) 'Infrastructure and interpretation: Meters, dams, and state imagination in Scotland and India', American Ethnologist, 41(3), pp. 457–472. doi: 10.1111/amet.12084.

D'Alisa, D., Demaria F., Kallis, G. (2015) 'Degrowth. A vocabulary for a new era'. Routledge

Dalgaard, C.-J. *et al.* (2018) 'Roman Roads to Prosperity: Persistence and Non-Persistence of Public Goods Provision', *Centre for Economic Policy Research (CEPR)*, 2473(Discussion Paper No. DP12745), pp. 1–50. Available at: https://ssrn.com/abstract=3130184.

Daza Rincón, J. C. (2019) *De la defensa de la tierra a la del territorio: Transformación en las relaciones con el Páramo y giro eco-territorial en las comunidades campesinas del Sumapaz*. Universidad Nacional de Colombia.

Escobar, A. (1999) 'Antropología y desarrollo', *Maguaré*, 73(14), pp. 42–73.

Flyvbjerg, B. (2006) 'Five misunderstandings about case-study research', *Qualitative Inquiry*, 12(2), pp. 219–245. doi: 10.1177/1077800405284363.

Forsyth, T. (2001) 'Critical realism and political ecology', in Lopez, J. and Potter, G. (eds) *After Postmodernism: an Introduction to Critical Realism. Continuum studies in critical theory.* London:

Athlone Press, pp. 146–154.

Goldstein, J. (2018) '1. Non-disruptive Disruptions: Cleantech and the New Green Spirit of Capitalism', in *Planetary Improvement*. Cambridge, Massashussets: The MIT Press, pp. 17–35.

Gómez Ramírez, L. and Ruiz Soto, J. P. (2017) 'El Duda: historia viva entre la llanura y el páramo', *El Espectador*. Available at: https://www.elespectador.com/colombia2020/territorio/el-duda-historia-viva-entre-la-llanura-y-el-paramo-articulo-856207.

Graeber, D. (2001) *Toward An Anthropological Theory of Value. The False Coin of Our Dreams*. New York: Palgrave MacMillan.

Guber, R. (2011) *La etnografía. Método, campo y reflexividad*. 1a ed. Buenos Aires: Siglo Veintiuno.

Gudynas, E. (2011) 'Imágenes, ideas y conceptos sobre la naturaleza en América Latina', in Martínez, L. M. (ed.) *Cultura y Naturaleza. Aproximaciones a propósito del bicentenario de la independencia de Colombia*. Bogotá D.C: Jardin Botánico de Bogotá José Celestino Mutis, pp. 268–293.

- (2017) *Postextractivismos en Colombia: entre la violencia y la paz*, *Palabras al Margen*. Available at: https://environmentalevidencejournal.biomedcentral.com/articles/10.1186/s13750-017-0095-x (Accessed: 6 May 2020).

Haberl, H. *et al.* (eds) (2016) *Social Ecology. Society-Nature Relation across Time and Space*. Switzerland: Springer. doi: 10.1007/978-3-319-33326-7.

Van der Hammen, M. C., Cano, C. and Palacio, D. C. (2015) *CARACTERIZACIÓN SOCIOECONÓMICA Y CULTURAL DEL COMPLEJO DE PÁRAMOS CRUZ VERDE-SUMAPAZ*. Bogotá D.C.

Harvey, P. and Knox, H. (2015) *Roads. An anthropology of Infraestructure and Expertise*. Ithaca and London: Cornell University Press.

Hernandez Osorio, C. (2017) *Después de la guerra, Sumapaz enfrenta el turismo*. Available at: https://lasillavacia.com/historia/despues-de-la-guerra-sumapaz-enfrenta-el-turismo-61355 (Accessed: 20 February 2020).

- (2018) *La zona de reserva campesina en Sumapaz, un papayazo para Duque*. Available at: https://lasillavacia.com/silla-cachaca/la-zona-de-reserva-campesina-en-sumapaz-un-papayazo-para-duque-67491 (Accessed: 20 February 2020).

Hetherington, K. (ed.) (2019) *Infrastructure, Environment, and Life in the Anthropocene*. Durham and London: Duke University Press.

Hetherington, K. and Campbell, J. M. (2014) 'Nature, infrastructure, and the state: Rethinking development in Latin America', *Journal of Latin American and Caribbean Anthropology*, 19(2), pp. 191–194. doi: 10.1111/jlca.12095.

Hoddy, E. T. (2019) 'Critical realism in empirical research: employing techniques from grounded theory methodology', *International Journal of Social Research Methodology*. Routledge, 22(1), pp.

111–124. doi: 10.1080/13645579.2018.1503400.

Hornborg, A. (2016) Global Magic. Technologies of Appropriation from Ancient Rome to Wall Street. 1st edition, Palgrave Studies in Anthropology of Sustability. 1st editio. Edited by M. Brightman and J. Lewis. Palgrave MacMillan. doi: 10.1057/9781137567871.

Ingold, T. (2000) The perception of the Environment. 1st editio, Psychology Applied to Work: An Introduction to Industrial and Organizational Psychology, Tenth Edition Paul. 1st editio. London and New York: Routledge.

Ingold, T. (2007) Lines: a brief history. New. ed. Routledge. Available at: https://search.ebscohost.com/login.aspx?direct=true&db=cat07147a&AN=lub.1800153&site=eds-live&scope=site (Accessed: 11 May 2020).

Jabary Salamanca, O. (2013) *When settler colonialism becomes ' development ' : ' fabric of life ' roads and the spatialities of development in the Palestinian West Bank*. Center for Development Studies. Birzeit University.

Jaramillo, P. (2012) 'Deuda, desesperación y reparaciones inconclusas en la Guajira, Colombia', Antípoda. Revista de Antropología y Arqueología, (14), pp. 41–65. doi: 10.7440/antipoda14.2012.03.

Kaika, M., Swyngedouw, E. (2000) 'Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks', International Journal of Urban and Regional Research, 24(1), pp. 120-138. doi: 10.1111/1468-2427.00239.

Kaposy, T. (2017) 'Petroleum ' s Longue Durée : Writing Oil ' s Temporalities into History', in Wilson, S., Carlson, A., and Szeman, I. (eds) Petrocultures. McGill-Queen's University Press Chapter, pp. 389–405. Available at: https://www.jstor.org/stable/j.ctt1qft0q7.25.

Larkin, B. (2013) 'The Politics and Poetics of Infrastructure', Annual Review of Anthropology, 42(1), pp. 327–343. doi: 10.1146/annurev-anthro-092412-155522.

Legrand, C. (1988) *Colonización y protesta campesina en Colombia*, *Centro Editorial Universidad Naional de Colombia*. Bogotá D.C: Universidad Nacional de Colombia.

Mitchell, D. (2008) 'New Axioms for Reading the Landscape: Paying Attention to Political Economy and Social Justice', *Political Economies of Landscape Change*, pp. 29–50. doi: 10.1007/978-1-4020-5849-3_2.

De Marchi Moyano, B. (2018) 'Presentación Dossier Caminos', *Revista Transporte y Territorio*, 18, pp. 2–14.

Marulanda, E. (1989) 'APLICACION Y EFECTOS DE LA LEY 200 DE 1936 EN LA REGION DE SUMAPAZ', *Anuario Colombiano de Historia Social y de la Cultura*, (16–17), pp. 183–204. doi: 10.15446/achsc.

- (1991) *Colonización y conflicto: las lecciones del Sumapaz*. Edited by R. I. I. de E. P. y Universidad Nacional.

Mezoued, A. M., Amcha, K. and Declève, B. (2018) 'El espesor del camino, visto a través de dos proyectos de transporte en Argelia', *Revista Transporte y Territorio*, 0(18), pp. 188–201. doi: 10.34096/rtt.i18.4933.

Molano, A. (1994) *Trochas y fusiles*. Edited by Debolsillo. Bogotá D.C.

Molano Barrero, J. (2011) 'Los páramos en la vida y la obra de Ernesto Guhl Nimtz', *Boletín Cultural y Bibliográfico*, 46(81), pp. 51–67. Available at: https://publicaciones.banrepcultural.org/index.php/boletin_cultural/article/view/179.

Moreno, M. L. and Romero, C. (2018) *El Batallón de Alta Montaña Sumapaz*, *Recorridos por los paisajes de la violencia en Colombia.* Available at: http://www.centrodememoriahistorica.gov.co/micrositios/recorridos-por-paisajes-de-la-violencia/sumapaz.html (Accessed: 24 February 2020).

Ndlovu-Gatsheni, S. (2012) 'Coloniality of power in development studies and the impact of global imperial designs on Africa', *Australasian Review of African Studies*, 33(2), pp. 48–73.

Osejo Varona, A. (2013) *Zona de Reserva Campesina: política pública y estrategia para la defensa de territorios campesinos*. Available at: http://www.indepaz.org.co/wp-content/uploads/2013/04/Zona_de_Reserva_Campesina_Politica_publica_y_estrategia_para_la_defensa_de_territorios_campesinos.pdf.

Osorio Rendón, L. C. (2010) *Seguridad democrática vs seguridad ciudadana. Un estudio de caso Sumapaz*. PONTIFICIA UNIVERSIDAD JAVERIANA. Available at: http://www.javeriana.edu.co/biblos/tesis/politica/tesis352.pdf.

Paez Lugo, E. A. (2018) *ANÁLISIS MULTITEMPORAL, PROCESO DE ZONIFICACION Y REGIMEN DE USOS DE LOS COMPLEJOS DE PARAMOS DELIMITADOS A ESCALA 1:25.000 EN LA JURISDICCION CAR.* Universidad Distrital Francisco José de Caldas.

Pérez-Rincón, M. A. (2006) 'Colombian international trade from a physical perspective: Towards an ecological "Prebisch thesis"', *Ecological Economics*, 59(4), pp. 519–529. doi: 10.1016/j.ecolecon.2005.11.013.

Restrepo, E. (2018) *Etnografía. Alcances, Técnicas y Éticas*. Primera ed. Edited by F. E. F. de C. Sociales. Lima: Universidad Nacional Mayor de San Marcos.

Porpora, D. V. (1998) 'Four concepts of social structure', in Archer, M. et al. (eds) *Critical Realism. Essential Readings*. London and New York: Routledge, pp. 339–355.

Portafolio.(2019) *Producto interno bruto de Bogotá supera al de tres países de la región* Available at: https://www.portafolio.co/economia/producto-interno-bruto-de-bogota-supera-al-de-tres-paises-de-la-region-532324 (Accessed: 17 May 2020).

Rosa, H. (2003) 'Social Acceleration: Ethical and Political Consequences of a Desynchronized High-Speed Society', Constellations, 10(1), pp. 3–33. doi: 10.1111/1467-8675.00309.

Samec, T. and Gibas, P. (2018) 'Urban Political Ecology of Worth and Value: Enacting Allotments in Media Discourse', Space and Culture, pp. 1–14. doi: 10.1177/1206331218806169.

Sayer, A 2000, 'Key features of critical realism in practice: a brief outline', in Realism and social science, SAGE Publications Ltd, London, pp. 10-28, viewed 6 April 2020, doi: 10.4135/9781446218730.n2.

Serje, M. (2013) 'El mito de la ausencia del Estado: la incorporación económica de las "zonas de frontera" en Colombia', *Cahiers des Amériques latines*, 71, pp. 95–117. Available at: http://cal.revues.org/2679.

Silva Prada, D. F. (2014) 'ACERCA DE LA RELACIÓN ENTRE TERRITORIO, MEMORIA Y RESISTENCIA. UNA REFLEXIÓN CONCEPTUAL DERIVADA DE LA EXPERIENCIA CAMPESINA EN EL SUMAPAZ, *Análisis Politico*, 81(May-August), pp. 19–31.

Snead, J. E., Erickson, C. l. and Darling, J. A. (2014) '1. Making Human Space: The Archaeology of Trails, Paths, and Roads', *Landscapes of Movement*, pp. 1–19. doi: 10.9783/9781934536537.1.

Swyngedouw, E. (2007) 'Technonatural revolutions: The scalar politics of Franco's hydro-social dream for Spain, 1939-1975', Transactions of the Institute of British Geographers, 32(1), pp. 9–28. doi: 10.1111/j.1475-5661.2007.00233.x.

Swyngedouw, E. and Heynen, N. C. (2003) 'Urban political ecology, justice and the politics of scale', *Antipode*, 35(5), pp. 898–918. doi: 10.1111/j.1467-8330.2003.00364.x.

UICN (no date) 'Comunidades de los páramos'. Available at: https://www.iucn.org/sites/dev/files/content/documents/hoja_informativa_paramos.pdf (Accessed: 20 February 2020).

Ungar Ronderos, P. (2013) '"De buenas intenciones está empedrado el camino..." Reflexiones a propósito de la delimitación de los páramos en Colombia', *Ecología política*, 46, pp. 15–19. Available at: http://about.jstor.org/terms.

Veeduría Distrital (2018) Sumapaz: Ficha Local. Bogotá D.C. Available at: https://veeduriadistrital.gov.co/sites/default/files/files/NotasLocales/Ficha Localidad Sumapaz.pdf. (Accesed: 18 May 2020).

Von Schnitzler, A. (2013) 'Traveling technologies: Infrastructure, ethical regimes, and the materiality of politics in South Africa', Cultural Anthropology, 28(4), pp. 670–693. doi: 10.1111/cuan.12032.

Laws

- Ministry of Environment and Sustainable Development (2018) "*Resolución 886 de 2018", Diario Oficial No. 50.603,* 24th may 2018, p.25
- The Congress of Colombia (2015) "Law 1753/*National Development Plan", Diario Oficial No. 49.538, 9th June 2015*
- The Congress of Colombia (2011) *"Law 1450/Por la cual se expide el Plan Nacional de Desarrollo, 2010-2014.", Diario Oficial No. 48.102*, 16th June 2011, p*. 444-641.*

- Congress of Colombia (1994) “Law 160”, *Diario Oficial No. 41.479,* 5th August 1994
- The Congress of Colombia (1995) “*Decree 1777*”, *DIario Oficial No. 42800* October 1st, 1996

GIS data soruces

Instituto Desarrollo Urbano (2018). Proyectos en Ejecución (Projects in execution). Available at: http://opendata.idu.gov.co/dataset/proyectos-en-ejecucion# (Last accessed: 24/05/2020).

Appendix 1

#	Participant	Ocuppation	Place of interview	Date
1	Deisy Molina	Peasant, ocassionally works as a cook	Her house. Animas Bajas in Sumapaz	03/01/2020
2	Eva	Peasant, rural worker and craftswoman	Her house, Animas Bajas in Sumapaz	04/01/2020
3	Alirio Quiroga	Driver	His House in Nazareth; Sumapaz	05/01/2020
4	Carlos Alberto Carrillo	Peasant	Porch of his house in Nazareth, Sumapaz	6/01/2020
5	Salomón Romero	Butcher and cattle breeder	In the central square of Nazareth	6/01/2020
6	Esperanza Rubiano	Community’s aqueduct coordinator and activist	Her office in Nazareth	6/01/2020
7	Alexander Pérez Molina	Peasant and rural worker	His house Animas Altas, Sumapaz	7/01/2020
8	Auder Molina	(Procamsu) Cooperative’s manager and social leader	His house in Animas Altas, Sumapaz	7/01/2020
9	Karen Tatiana Perez	Student and cooperative’s worker	At the cooperative (Procamsu)	8/01/2020
10	Edward Molina	Cooperative´s manager, peasant	At the Cooperative (Procamsu)	9/01/2020
11	Jenny García	Cooperative’s worker, peasant	At the cooperative (Procamsu)	9/01/2020
12	Wilson Rey	Zoo-technician, musician, social leader.	In a bakery near Sumapaz city hall in Bogotá city.	13/01/2020

Appendix 2.

Interview guide
1. Description of the interview's context. Date, time, place or other relevant events during the interview
2. Participant's characteristics - Name - Age - Gender - Place of birth - Residence - Occupation
3. Sociodemographic - How long have you been living in this sector? - Are you originally from Sumapaz? Where do you come from? How did you arrived in this area? Do you live here all year long? - Is there other persons living with you? Do you have more relatives that live in the area? -Has more people arrived to the town? From where? Since when? Why? -Has been people leaving the town? To go where? Since when? Why? -Do you travel regularly to other municipalities or towns? Where? How often? What motivates you
4. Productive Activities -Are there any members in your household that help you in your daily tasks? -Have you changed of occupation in the last years? What did you do before? What was the reason for this change? -How much time do you assign to each task in everyday life? Does that change throughout the year?
5. Historic aspects -What does elder people say about the way the first inhabitants arrived to Sumapaz? Where did they came from? What brought them to Sumapaz? - How was the territory before? How is it now?

5. Changes in Infraestructure - What types of trails are there in Sumapaz? What roads are there in Sumapaz? - Which are the bussiest trails in Sumapaz? Why? -Which are the trails you use the most? What for do you use each trail? -What changes in infrastructure have you seen in the last 10 or 20 years? - How did it change? Who changed it? Was there a reason? - Are there trails that are less used now? Which ones? Why? -Do you think that some trails may have had an impact on the area? Which trails? What kind of impacts? - Has any change on trails impacted your work or daily tasks? How? - Has any change on trails facilitated or made more difficult the access to certain goods or resources? - Are there any trails that have changed your routine or tasks? How?
6. Organizations -Are there any productive organizations in the area? What do they do? Do you participate anyhow? -Does any local or national institution have projects you know about in the area? - Are there any groups or organizations that take part in the maintenance of trails? -Are there any self-organized groups that have built trails? With what purpose? - Are there any ongoing debates about roads or trails in general? -Have local forms of organization for common projects changed in the area? -Are there any new organizations or persons involved in issues concerning trails or roads in Sumapaz?
7.Conflicts **-** Have you ever observed any change in farms caused by the construction of infrastructure? - Have there been any conflicts concerning the road that you know about? And around other type of trails? Are any conflicts that are taking place to this day? -Have there been any changes on how people access or use natural resources related to changes in the infrastructure? What changes have you been able to see? - How was the access to roads and trails in times of the conflict? - Are there any issues concerning inhabitants' access to transport?

- Are there any debates or issues about the transport of goods and merchandise in Sumapaz?
8. Future changes - Exist any proposals around the creation, use or maintenance of trails or roads in Sumapaz? - Are there any proposals to improve people´s mobility and the circulation of their products? Who are leading them? - Which trails should be improved? Why? - What do you think is the future for Royal Roads? And Desechos? And Horseshoe pathways? - Do you think that trails have change Sumapaz in any way? How? -How do you envision Sumapaz in the future?