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Socio-Environmental Vulnerability in Formal and Informal Peri-Urban Bogotá and Soacha, Colombia

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Caught Between Spaces:
Socio-Environmental Vulnerability in Formal and Informal Peri-Urban Bogotá and Soacha, Colombia

Sandra C. Valencia

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Abstract

The world is rapidly urbanizing. To contribute to the understanding of the socio-environmental changes brought about by urban sprawl and densification, this thesis examines wellbeing and vulnerability in low-income peri-urban areas in and around Bogotá, Colombia. For that purpose, I develop a typology of peri-urban settlements that includes four main settlement classifications: agriculture-based, informal, formalized, and state-subsidized housing. Inhabitants of agriculture-based settlements, which includes a community of Muisca indigenous people, have become legally and physically marginalized and are the most negatively impacted by peri-urbanization, as their key resources, land and water, are increasingly degraded. Inhabitants of informal settlements are often exposed to a variety of social and environmental stressors and face significant difficulties in accessing basic services, such as water and sanitation, while, at the same time, have grasped the opportunity to build new homes in the peri-urban landscape.

Both in the development of these settlements, and as a method to pressure the state, I show how collective action has been a central strategy for claiming access to basic services and formalization programs. In response, the state has increasingly recognized the rights of informal dwellers. This recognition has been realized through formalization policies, improved access to basic social and physical services, and the introduction of subsidized housing to counteract informality and housing deficits. However, some projects have been developed in areas exposed to environmental hazards, and are characterized by their deficient and low quality physical and social services. Further, I show that the speed and quality of formalization is contingent on institutional capacity, geography and social mobilization, yet another indication that peri-urban areas are complex areas full of contradictions and challenges, but also opportunities.

Key words: peri-urban area; urban-rural interface; peri-urbanization; vulnerability; wellbeing; socio-environmental change; informality; formalization; political ecology; Bogotá; Soacha; Colombia

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Socio-Environmental Vulnerability in Formal and Informal Peri-Urban Bogotá and Soacha, Colombia

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To my parents, Mario and Claudia

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Abstract

The world is rapidly urbanizing. To contribute to the understanding of the socio-environmental changes brought about by urban sprawl and densification, this thesis examines wellbeing and vulnerability in low-income peri-urban areas in and around Bogotá, Colombia. For that purpose, I develop a typology of peri-urban settlements that includes four main settlement classifications: agriculture-based, informal, formalized, and state-subsidized housing. Inhabitants of agriculture-based settlements, which includes a community of Muisca indigenous people, have become legally and physically marginalized and are the most negatively impacted by peri-urbanization, as their key resources, land and water, are increasingly degraded. Inhabitants of informal settlements are often exposed to a variety of social and environmental stressors and face significant difficulties in accessing basic services, such as water and sanitation, while, at the same time, have grasped the opportunity to build new homes in the peri-urban landscape.

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Abstract in Spanish (*Resumen*)

El mundo se está urbanizando rápidamente. Para contribuir al entendimiento de los cambios socio-ambientales que han traído el crecimiento y la densificación de las ciudades, esta tesis analiza el bienestar y la vulnerabilidad de las personas que habitan en las áreas periurbanas alrededor de Bogotá, Colombia. Para tal fin, se desarrolla una tipología de los asentamientos periurbanos, que incluye cuatro clasificaciones principales: aquellos que están basados en la agricultura, los asentamientos informales, los formalizados y la vivienda de interés social subsidiada por el Estado. Los habitantes de los asentamientos basados en prácticas agrícolas, en los que se incluyen indígenas del Cabildo Muisca de Bosa, han sido legal y espacialmente marginalizados y son los que más sufren los impactos de la periurbanización, pues sus recursos fundamentales, como agua y suelo, se degradan cada vez más. Por otro lado, los habitantes de los asentamientos informales a menudo están expuestos a una variedad de factores de estrés social y ambiental y enfrentan grandes dificultades para acceder a los servicios como el agua y el saneamiento básico pero, al mismo tiempo, han aprovechado la oportunidad que ofrecen los terrenos periurbanos para construir nuevas viviendas.

Este trabajo muestra que tanto en el desarrollo de estos asentamientos, y como método para presionar al Estado, la acción colectiva ha sido una estrategia central para reclamar el acceso a los servicios básicos y programas de formalización. En respuesta, el Estado ha ido reconociendo cada vez más los derechos de los habitantes informales. Este reconocimiento se ha materializado a través de políticas de formalización, la mejora en el acceso a los servicios básicos, como agua y saneamiento, y equipamientos públicos, como salud y educación, y la construcción de viviendas subsidiadas para contrarrestar la informalidad y el déficit habitacional. Sin embargo, algunos proyectos se han desarrollado en zonas expuestas a amenazas ambientales y se caracterizan por el deficiente acceso y la baja calidad de los servicios básicos y equipamientos públicos. Adicionalmente se muestra que la velocidad en la formalización y la calidad con la que se lleva a cabo dependen de la capacidad institucional, la geografía y la movilización social. Esto expone la complejidad de las áreas periurbanas, que están llenas de contradicciones pero que a la vez, representan múltiples oportunidades.

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Hasse, my companion through life. Thank you for your support, patience and company during the ups and downs of this journey. The many long nights writing were possible and enjoyable with you by my side. I am so happy a curious girl once decided to ask a brilliant and talented Swede to join in the tennis lesson. Thank you for the dancing wake me uppers, your shoulder, the cabins, your guitar. But above all thank you for your love and friendship.

I dedicate this work to my parents, my life heroes. I am who I am because of you. Don't worry I'll relax and sleep now, you can too.

Lund, April 2016.

List of Abbreviations and Words in Spanish

Abbreviations

CAR	*Corporación Autónoma Regional de Cundinamarca* – Environmental Authority of Cundinamarca Department
EAB-ESP	*Empresa de Acueducto, Alcantarillado y Aseo de Bogotá- ESP* - Bogotá's water and sanitation company
IDEAM	*Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia* – Colombian Institute of Hydrology, Meteorology and Environmental Studies
IDIGER	*Instituto Distrital de Gestión de Riesgos y Cambio Climático* – Bogotá Disaster Risk and Climate Change Institute
IGAC	*Instituto Geográfico Agustín Codazzi* – Colombian Geographical Institute Agustín Codazzi
INURBE	*Instituto Nacional de Vivienda de Interés Social y Reforma Urbana* – National Institute of Social Interest Housing and Urban Reform (* no longer exists)
IPCC	Intergovernmental Panel on Climate Change
JAC	*Junta de Acción Comunal* – Community Action Board (neighborhood level organization)
NGO	Non-governmental organization
PUA	Peri-urban area
SENA	*Servicio Nacional de Aprendizaje* – National Learning Service
SISBEN	*Sistema de Identificación y Clasificación de Potenciales Beneficiarios de Programas Sociales* – System of Identification of Beneficiaries of Social Programs

UN	United Nations
UN-HABITAT	United Nations Human Settlements Program
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
VIS	*Vivienda de Interés Social* – Social Interest Housing (state-subsidized housing)
VIP	*Vivienda de Interés Prioritario*- Priority Interest Housing (state-subsidized housing for most vulnerable population)

Words in Spanish

Cabildo	Indigenous Council
Comuna	Urban district (administrative division. Applies to the municipality of Soacha)
Junta de Acción Comunal	Community Action Board
Localidad	Borough (administrative division of the municipality of Bogotá)
Rebusque	Livelihood strategy of getting by through different activities
Reciclador	Recycling waste picker: Person who collects and recycles material for a living
Vereda	Rural settlement (administrative division)
Vallado	Canal (human-made canal used for irrigation or sewage disposal)

1 Introduction

Aim and Scope of Research

This thesis investigates the wellbeing and vulnerability of populations in low-income peri-urban areas in the Global South. It does so through an analysis of the changes in wellbeing and the vulnerability of peri-urban populations to multiple socio-environmental stressors under the premise that peri-urban areas (PUAs) (also known as the urban-rural interface) are areas undergoing a transition, typically (but not exclusively) from rural to urban. During the transition rural and urban ecological, physical, economic, and social characteristics coexist, interact, and overlap, producing a mosaic landscape characterized by different land uses, activities, populations, and institutional arrangements.

The overall research question in this thesis is thus:

How does peri-urbanization as a place-constituting process shape the wellbeing and vulnerability of its population, and what can we learn about peri-urbanization by identifying vulnerability and wellbeing in peri-urban communities?

The specific research sub-questions are:

i. How do peri-urban inhabitants experience the socio-environmental change that accompanies urban sprawl and densification?

ii. How can we identify and understand the main settlement types and emerging socio-environmental processes in peri-urban areas, seen as transition zones?

iii. What are the socio-political processes beyond peri-urban areas that contribute to their formation and dynamics?

I explore these questions in an investigation of low-income peri-urban areas in the borough of Bosa in Bogotá municipality and the neighboring Soacha municipality. The research is qualitative and is focused on the wellbeing and vulnerability of peri-urban populations from their own perspective. I chose the community level, to better understand peri-urban socio-environmental dynamics and to complement existing urbanization and vulnerability literature that tends to focus on the household level

or the municipal level (see for example, Davila et al. 2006; Moser 2007a; O'Brien et al. 2004; O'Brien, Quinlan, and Ziervogel 2009).

In the thesis I will show that the wellbeing and the vulnerability of peri-urban dwellers is closely linked to the peri-urbanization process and their location in an area of socio-environmental transition. I identified four main settlement types in the studied areas that reflect different stages of peri-urbanization, namely: agriculture based, informal, formal (including formalized and self-constructed housing), and large-scale state subsidized housing. Given the heterogeneous landscape, different peri-urban groups experience distinct vulnerability paths during the transition process. While the peri-urban landscape is comprised of diverse activities and actors (such as industry, mining, social service infrastructure, and waste management facilities, to name a few), and since I am interested primarily in the perspective of the inhabitants of peri-urban areas, I have chosen to focus my research on the abovementioned settlements and their populations.

Thesis Structure

The thesis is structured around the main peri-urban settlement types identified. In chapter 2, I introduce the key concept of peri-urban areas, and in chapter 3 I present guiding theoretical frameworks including urban political ecology, socio-environmental vulnerability, wellbeing and justice. In chapter 4 I develop my research design, introduce the study areas, and reflect on my role throughout the research process. In chapter 5 I examine the historical, environmental, and political processes that have contributed to the peri-urbanization of the study area. In this chapter I also discuss the history of the Muisca indigenous groups, who are descendants of the first settlers of Bogotá's plateau (*Sabana de Bogotá)* and inhabitants of current peri-urban areas in Bosa, Bogotá.

Chapter 6, 7, and 8 constitute the core of the thesis. In these chapters I present the empirical findings from the identified settlements, structured in terms of the wellbeing and vulnerability frameworks introduced in chapter 4.

Chapter 6 is an analysis of the wellbeing and vulnerability of the populations who live in areas where most of the population has agriculture-based livelihoods. While my analysis focuses on the neighborhood and rural district level, when I examine these agriculture-based areas I give special attention to the Muisca indigenous group living in Bosa. The Muiscas have been particular impacted by peri-urbanization and thus far largely neglected in urbanization policies and academic work.

Much of the peri-urbanization process has taken the form of informal settlements. In chapter 7, I examine this form of peri-urbanization starting with a

conceptualization of informality and then by exploring the development of informal settlements in peri-urban areas, policy changes with respect to formalization, as well as current challenges and opportunities.

In chapter 8, I explore the wellbeing (and constraints) of settlements that started informally but have since formalized, as well as settlements that started formally both through self-construction and through large-scale state-subsidized housing projects. In this chapter, I scrutinize the implementation of formalization processes and state-led initiatives to counter low-income housing deficits and informal peri-urbanization. I highlight that while the transition has meant increased social services (such as health and education centers, and public transportation), the rapid increase in population has meant insufficient capacity of these services and thus deficiencies in availability and quality of provided services. In chapter 9 I propose a typology for peri-urbanization, and to conclude, in chapter 10, I provide some final reflections.

2 Unpacking Peri-Urban Areas

An Urban World

The world is increasingly urban. About one century ago 20% of the global population lived in urban areas, while at present over 50% do so. The UN-HABITAT (2015) has estimated that another 1.5 billion people will be incorporated into the urban population between 2010 and 2030, and that by 2050 75% of the world's population is expected to live in cities. The fastest growth in the past 30-50 years has occurred in Latin America and newly industrialized countries in East and South East Asia (Simon 2008b; UN-HABITAT 2015). The Latin America and the Caribbean (LAC) region is the most urbanized region in the world with around 80% of the population residing in urban areas (UN-HABITAT 2015). About 70% of the world's gross domestic product (GDP) is produced in urban areas, in LAC it accounts for 60%-70% (BID 2011). At the same time, LAC is the region with the highest income disparity and two thirds of the urban population live in poverty (BID 2011; UN-HABITAT 2015).

Early urban historians conceptualized the city as a "single entity, a geographically discrete place and a physical artifact" (Miraftab and Kudva 2015:24). Cities are, on the one hand, places where societies produce and reproduce social and economic activities, cultures and identities, and spatially articulate power relations, while on the other, they are the most human-dominated complex socio-ecological systems impacting and being impacted by the natural environment (Lampis and Fraser 2012; Miraftab and Kudva 2015; Seto, Sánchez-Rodríguez, and Fragkias 2010). Trade-offs and opportunities between urban areas and the 'natural' environment depend on the urbanization process, which varies according to different qualities that characterize the process including its rate and scale, the spatial configuration of land, and the resulting urban forms (Seto et al. 2010).

Seto et al. (2010) argue that we are in a new era of urbanization and current urbanization processes present different characteristics than previous periods. These characteristics of contemporary urbanization include: scale (bigger cities in physical extent, population, economic importance, and environmental impacts); higher urbanization rates; changing loci of urbanization (from Europe and Latin America in the 1950s to Asia and Africa); more physically expansive; increasingly

specialized urban function with resulting effects on urban labor, lifestyles, and the environment; and reinforcing feedbacks between the above characteristics. In countries of the Global South in particular, social inequality and marginalization are also playing a part in the urban spatial configuration.

A number of challenges have been recognized in urban areas such as climate change (both the contribution of cities to greenhouse gas emissions and their vulnerability to climate change impacts); the increasing inequality and limitations in access to income, opportunities, services, and infrastructure; the continued growth of informal settlements reinforcing other forms of inequity; increasing levels of unemployment; commodification of land through mechanisms such as land use planning and land expropriation, with real estate developers, housing finance corporations, and foreign capital often directing the process (Mukherjee 2015; UN-HABITAT 2015).

Peri-Urbanization

Given the increasing urban population, urban land must expand upwards and/or outwards. As urbanization continues spatially outwards, new areas are developed at the urban-rural interface (Seto et al. 2010). The growth of the city into new territories is an inescapable effect of the urbanization process (Allen, da Silva, and Corubolo 1999). This process will be referred henceforth as peri-urbanization.[1]

Peri-urbanization entails the process whereby urban development impacts nearby areas (usually rural and smaller neighboring municipalities) producing significant changes in the social, economic, physical, and ecological structures (Aguilar 2008; Allen 2003; Webster and Muller 2004; Webster 2011). This process is ongoing and as such is difficult to define in static terms. Webster (2002) attempted to provide a more concrete definition of what constitutes an area undergoing peri-urbanization in the East Asian context with respect to labor. He provided specific percentages of the distribution of labor force in manufacturing activities versus the primary sector. While the percentages may not be the same in different contexts, a point that seems to be replicable across countries in the Global South, is that an area can be defined as undergoing peri-urbanization when the proportion of employment in the primary sector (e.g., agriculture) is decreasing, while that of employment in manufacturing and service sectors is increasing. Webster also presents important characteristics of the peri-urbanization process that apply beyond the East Asian context. These characteristics include: changing local economic and employment structures from

[1] Similar concepts to peri-urbanization exist such as suburbanization and exurbanization. Both terms refer to urban sprawl driven by residential development and are usually applied in the European or North American context (Hoggart 2005; Leaf 2008; Webster and Muller 2004).

agriculture-based to manufacturing and service oriented (this changing employment structure also involves population commuting daily to other areas for work); rapid population growth (which is often not captured in government data); changing spatial development patterns; increasing land costs driven by land speculation and the inflow of investment (Webster 2002).

The dichotomy between urban and rural is problematic because peri-urbanization is relational and affects the dynamics between the city, the newly developed areas, and the surrounding territory (Simon 2008b). With increasing peri-urbanization, the need to understand the prevailing socio-economic and physical dynamics, drivers of change, institutional arrangements in these transition zones, and the implications for the local population and ecosystem is ever more important (Qviström 2007; Simon 2008b; Webster 2011).

Relevance and Research Gaps

An important, and often relegated, aspect of the current urbanization process and a result of peri-urbanization is the appearance of what is referred to as the peri-urban area (PUA) or the peri-urban interface. Previous research has placed little attention to the dynamics of these PUAs. Simon (2008b) explains the lack of research about PUAs by the fact that they are ill-defined and considered short-term transitional zones. As areas of rapid change, data collection is complicated and very little information exists on population and other variables. Most analyses rely on proxies from urban and rural data instead. There are also insufficient analytical and management approaches tailored to the particularities of PUAs (Allen et al. 1999; Simon 2008b; Thapa, Marshall, and Stagl 2008). This thesis aims to complement existing peri-urban literature, and thereby contribute to filling these research gaps.

Understanding Peri-Urban Areas

> [The peri-urban is] a graveyard for the countryside and a cradle for the city, whereas the intermediate phases of landscape and life are being ignored. (Qviström 2007:270)

The definitions of PUAs and the processes that take place in these areas are multiple. There are also several terms used interchangeably in the literature to describe this type of areas. Table 1 provides an overview of the different terminology and its applications. PUAs are zones of rapid change and transition, most commonly (but not exclusively), from rural to urban. As an area in transition both rural and urban physical, economic, and social characteristics coexist and interact, producing a mosaic landscape with multiple land uses, activities, populations, and institutional

arrangements (Allen, Dávila, and Hofmann 2006b; Allen 2003; Bocz 2012; Webster 2011). Adriana Allen and Julio Dávila have written extensively on PUAs and describe them as the interface where urban and rural activities meet (Allen and Dávila 2000). Similarly, Seto et al. describe PUAs as "hybrid landscapes: a juxtaposition of traditional and rural with modern and urban" (2010:177). Given the context of this thesis, I do not consider suburbs PUAs as has been done in the European and North American contexts (Ravetz, Fertner, and Nielsen 2013; Simon 2008b).

Table 1. Most common terms similar to peri-urban areas

Term	Sample of scholars (and publications) who use term	Usage of term and additional information
Desakota systems	Mcgee 1991; Pelling and Mustafa 2010; The Desakota Study Team 2008	The term *desakota* comes from Indonesian: *desa* (village) and *kota* (city). It was coined by urban geographers in the 1990's (Mcgee 1991) in reference to Asian PUAs; in later years it has also been used in African and Latin American contexts.
Metropolitan periphery	Bontje and Burdack 2005; Taaffe, Krakover, and Gauthier 1992	Used in both Global North and South countries; used significantly in Europe.
Peri-urban areas	Agrawal et al. 2003; A. Allen, Dávila, and Hofmann 2006; Allen 2003; Kombe 2005; Lanjouw, Quizon, and Sparrow 2001	One of the most common terms. It is used particularly in research centered on countries in the Global South.
Peri-urban hinterland	Aguilar and Ward 2003	Used particularly in the Global South country context, the example is from Mexico.
Peri-Urban Interface	Adell 1999; Brooks 2003; Mandere Mandere, Ness, and Anderberg 2010; McGregor, Simon, and Thompson 2006; Tacoli 1998	Used particularly in the Global South country context. One of the few books with a peri-urban focus uses this terminology (McGregor et al. 2006).
Peri-Urban Landscapes	Gockowski et al. 2003; Williams et al. 2005	Used in both Global North and South, used in Europe particularly in geography-related research.
Urban periphery	Clonts 1970; Leeds 1996; Wacquant 1993	Used in research centered in both the Global North and South. "[T]he periphery signifies a relationship of interdependence in an apparatus of domination but it also refers to a specific topographical location: the peripheral neighborhoods of the urban poor" (Roy 2011:232)
Urban-Rural Continuum	Micciolo et al. 1991	Used in medicine literature
Urban Fringe	López et al. 2001; Heimlich and Anderson 2001	Used in Global North and South country context, in both physical geography and urban planning
Urban-Rural Fringe (also Rural-Urban fringe)	Carrión-Flores and Irwin 2004; Treitz, Howarth, and Gong 1992; Weaver and Lawton 2001	Often used in cited papers related to land use mapping. Simon describes it as the "outer edge or transition zone between urban and rural areas" (2008b:170); used mostly in Global North country context.
Urban-Rural Interface	Simon 2004	Most cited papers using the term relate to physical geography research
Wildland Urban Interface	Radeloff et al. 2005; Theobald and Romme 2007	Mostly used for research related to fire risk, forestry, and planning

PUAs are spatially and structurally highly dynamic and heterogeneous (Mbiba and Huchzermeyer 2002; Seto et al. 2010). They are difficult to clearly define spatially because their spatial extent and location are constantly shifting, and they often surpass administrative boundaries (Simon 2008b). They are therefore better described based on the processes occurring rather than by spatial boundaries. Examples of defining characteristics of PUAs found in key readings on peri-urban issues (namely, Allen et al. 1999; Allen 2003; Mbiba and Huchzermeyer 2002; McGregor et al. 2006; Seto et al. 2010; Simon 2008b; Tacoli 2003; The Desakota Study Team 2008) include:

i. Changing land uses and thereby a mixture of agricultural, 'natural', and urban ecosystems;

ii. Changing land and resource rights (often reduced access to natural resources such as land, water, and firewood), and administration (e.g., unclear administrative boundaries and jurisdictions);

iii. Arrival of people who have moved from the inner city and are already integrated to the urban economy;

iv. Highly heterogeneous and ever changing social and economic composition, often leading to competing interests without the adequate institutional arrangements to address them: e.g., conflicts among traditional and new dwellers over the use of natural resources and the management and ownership of land;

v. Increasing pressure on the environment due to urban expansion and the transformation of land into residential areas, as well as unsustainable use of renewable and nonrenewable resources;

vi. Emergence of industrial zones and informal activities such as mining of construction materials;

vii. Increasing (but often inadequate) access to urban infrastructure, services, and markets;

viii. Increasing exposure to urban pollution, such as air pollution and solid and liquid waste.

PUAs are where rural-urban flows of people, goods, natural resources, and waste are most intense (Allen 2003). Complex assemblages of internal and external processes drive this dynamism. The social, economic, cultural, and environmental heterogeneity of PUAs provides both opportunities and challenges to their inhabitants and the surrounding areas. The heterogeneity provides, for example, increased levels of socio-economic and cultural diversity, while simultaneously

becoming the loci of increased conflict and competition over access to resources and services (e.g., water and sanitation) (Allen 2003; Thapa et al. 2008). In many countries in the Global South, peri-urbanization is occurring with poor governance and inadequate planning. This can result in poor housing standards, deficient access to public utilities (such as water and sanitation), and residing populations at risk of being impacted by natural and anthropogenic environmental hazards (Hardoy, Mitlin, and Satterthwaite 2001).

As described by Hough (1990), the peri-urban is a battlefield between rural activities predestined to disappear and the expanding city, where in between only placelessness exists. Adriana Allen describes it differently, but in a way that is equally illustrative:

> The peri-urban interface constitutes an 'uneasy' phenomenon, usually characterized by either the loss of 'rural' aspects (loss of fertile soil, agricultural land, natural landscape, etc.) or the lack of 'urban' attributes (low density, lack of accessibility, lack of services and infrastructure, etc.) (Allen 2003:136).

In a similar manner, the PUA is constituted through its subordination to the city, whereby the PUA serves as provider of resources needed by the city and as a receiver of the waste and externalities produced by the city (Mukherjee 2015). Hence, PUAs are often considered marginal to the city (Ranganathan and Balazs 2015).

From an environmental perspective, PUAs are characterized by the appropriation of natural resources and a reduction of ecological services (Allen et al. 1999; Mukherjee 2015). PUAs often include open spaces that serve as dumping areas for urban waste, impacting the local environment and population (Norström 2007). An important distinction is whether the areas are upstream or downstream of rivers. Downstream areas are generally less desirable, as they receive water pollution from the inner city and are at higher risk of flooding (Tacoli 2003). At the same time, PUAs still provide a variety of ecosystem services to its resident and neighboring urban centers. Air and noise pollution, for example, can be lower than at the urban core. The availability of agricultural and idle fields allow for higher rates of water infiltration than impermeable urban surfaces, and the agricultural land is also a source of food for neighboring areas.

With respect to labor, the common dichotomy of urban (industrial and service) and rural (agricultural) activities may not be applicable to PUAs. PUA's households may have members who commute towards the city center for employment, while others may commute towards rural areas to be employed in agricultural areas (Seto et al. 2010). Institutionally, the provision of services and infrastructure in PUAs is influenced by a variety of policies and agencies with overlapping mandates and jurisdictions, which are often contradictory and fragmented. Furthermore, in many

cities new housing developments (both formal and informal) are built beyond the official urban boundary in areas designated as rural under land use plans (Tacoli 1998). The inverse can also be the case, as I will show in my study areas, wherein the rural designation is removed from land use plans in areas where rural-activities (such as agriculture) still dominate the landscape. It should be noted that land use changes in PUAs are not exclusively the product of urbanization; the de-agrarianization of rural areas and the promotion of industrial decentralization can be drivers of the process as well (Allen et al. 1999).

Temporal and Spatial Considerations

As areas of change (or transition zones), there is a time component that limits the spatial and social delimitation of PUAs. An aspect that does not come up sufficiently in existing literature relates to the speed of change in PUAs. The fast change that characterizes these fringe areas implies that if a particular location was analyzed in the past, the concurring rural and urban characteristics may have been evident at the time of study; however, a few decades, or even just a few years, later the urban aspects may have taken over, leaving the rural aspects almost absent. Moreover, the rate of change is not the same for different aspects of the peri-urbanization process. As noted by Wilson (2010), transportation and retail may respond quickly to a rise in demand given by increased population. In contrast, changes in infrastructure (e.g., hospitals, schools) may be slow. Economic restructuring, for instance, may occur at in-between speeds. Peri-urbanization should therefore be seen as a process with varying spatial and temporal scales.

In addition, peri-urban literature emphasizes the co-existence of urban and rural characteristics with little mention of areas that are neither urban nor rural. In my view, these are areas at the fringe of the city where land has been left idle for years (with the prevision that they would become urbanized or driven by de-agrarianization of rural areas) and should also be included in the PUA concept. Accordingly, several of the areas I studied are characterized by these qualities.

Consistency 'Disclaimer'

For the purpose of consistency, I will mostly use the concept of peri-urban areas (PUAs) throughout the thesis. However, in some of the study areas the term peri-urban interface may be more appropriate. That is especially the case for the subsidized housing and formalized areas of Bosa and Soacha, as the neighborhoods themselves are considered urban but they are located at the interface between the consolidated urban area and the rural area. Simply put, they border a rural area; an area with large green areas and agricultural fields, and low population densities. My

choice of research areas aims to highlight the different levels of peri-urbanization that exist, which I will explain further in chapter 4 when the study areas are introduced.

Peri-Urban Areas as Socio-Environmental Transition Zones

Following the above analysis of the concept of PUAs and based on my empirical research, I propose that PUAs are better understood as socio-environmental transitions zones.[2] In this section, I will delineate the conceptualization of a socio-environmental transition zone and argue for its usefulness.

The concept of a transition zone is used in multiple fields, including ecology and urban studies. By definition, it is an area where temporal change leads to spatial variation (Griffin and Preston 1966). In ecology, a transition zone refers to two adjacent ecosystems that overlap, like water and land or forest and grassland, Similar concepts have developed in ecology such as ecological boundary, ecotone, ecocline, edge, boundary, interface, critical transition zone, and biogeographical transition zone (Yarrow and Marín 2007). The importance of these different concepts is that they aim to help conceptualize and analyze flux in and across a heterogeneous space. In ecology, however, the focus has been on the biophysical processes in heterogeneous spaces, with less attention given to the human influence on these processes.

In urban studies of the early and mid-twentieth century, particularly in the United States, the transition zone referred to an area bordering a city's central business district and separating it from the homogenous land use patterns that surrounded it (e.g., homogeneous industrial and residential areas). This transition zone was characterized by a mix of distinct land use types. The zone normally contained several land uses typical of the city, combining both commercial and non-commercial uses, and continually changing as a response to the forces of urban growth (Griffin and Preston 1966; Mazzanti 1986). The transition zone was considered a problematic area (Pacione 1977), as presented neither the advantages of a central business district, nor the conditions for residential living. However, the expectation was that over time transition zones would develop into business-industrial districts. Where conversion to a more homogenous area or where absorption by activities that supply the business district did not occur, it could mean

[2] The idea of the term socio-environmental transition zone was jointly developed with Chad Boda, with whom I am preparing a paper about the socio-environmental transition zone concept, where its application is not limited to PUAs.

that economic investments in the area did not pay off or the area was not as economically vibrant. The areas of mixed and often incompatible land uses generally would tend towards stagnation and deterioration (Griffin and Preston 1966; Vargas Maretto, Oliverira Assis, and Augusto Gavlak 2010). Griffin and Preston (1966) claimed that the transition zone received little specific research attention and the limited number of studies that can be found seem to confirm that statement. As an area embedded in the city, studies (e.g., Griffin and Preston 1966; Mazzanti 1986; Pacione 1977) predominantly dealt with economic and infrastructural issues, whereas ecological aspects were basically absent.

Conceptualizing PUAs as socio-environmental transition zones brings attention to the environmental (biophysical), socio-economic, and political processes that exist in PUAs both as they drive the transition and are resultant of it. In that respect, PUAs are 'interface landscapes' where the urban meets the rural. At this interface, urbanization in the form of urban sprawl implies a gradual shift from rural-like to urban-like characteristics, and a socio-environmental transition whereby the social, economic, physical, institutional, and environmental characteristics of the area are changing.

It can be argued that socio-economic and political processes emerging from local, regional, national, and global levels (like economic policies that drive urban expansion) are the main drivers of urban expansion and the actual transition. At the same time, socio-economic and environmental dynamics are interrelated. The environment influences socio-economic processes such as settlement patterns. Concurrently, human modification of 'natural' landscapes produces changes in biophysical processes, which influence socio-economic dynamics. The relation between waterbodies, settlement patterns, and hydrological hazards illustrates this iterative process. Throughout the world, people have settled close to waterbodies, such as rivers, as they are a source of water for consumption and irrigation, food, transportation, and recreation. At the same time, populations modify these waterbodies through alteration of their watercourses, by polluting them or restoring them, for instance. These kinds of alterations have impacts on nearby populations through changes in the exposure to floods (the hazard can be reduced or increased through human modification of watercourses) and health impacts.

It is important to highlight that within these dynamic processes, drivers of change are not constant. External circumstances (e.g., political changes) can alter the drivers of the transition, and thus the transition process itself. Similarly, as the transition occurs internal conditions change. These changes can also modify the internal driving forces of the transition.

Conceptualizing PUAs as socio-environmental transition zones brings into focus the dynamic and transitory character of these areas. The socio-environmental changes in these dynamic zones have spatial and temporal dimensions. The peri-urban area

is constantly changing internally at the same time as its geographical extent may be changing; change is occurring in and across space. The geographical space where a peri-urban area is located is often changing within the currently peri-urban area and, as urbanization continues to exert pressure on the landscape, the peri-urban area moves spatially into new territories.

The temporal dimension relates to the duration and rate of the transition. To fully understand the impacts of the transition, it can be important (and even necessary) to investigate the socio-environmental characteristics of the landscape prior to the transition and, once the transition is completed, the characteristics of the resulting urban landscape. When studying these changes, it can be useful to understand the historical processes that have shaped the landscape where a peri-urban area has emerged. It is also useful to study areas that went through the peri-urban stage and have now consolidated as urban areas (and thus can no longer be called peri-urban) to better understand how the transition has taken place in the past, as a potential indicator of what the future may hold, *ceteris paribus,* for those areas currently in transition. However, it should be recognized that the heterogeneity of socio-environmental conditions that coincide during the transition mean that a number of potential pathways through the transition and many 'resulting' configurations are possible.

Furthermore, it could be assumed that the peri-urban area is a transitory stage in a particular geographical location. As a transitory phase, the concept will not always be useful to the same geographical location. Once the transition is completed, other concepts that help better understand the resulting socio-environmental landscape may be needed. Finally, bringing focus to the socio-environmental transition requires an analysis of how the transition is managed by institutional arrangements, as well as analyses of whose voices are heard, and who benefits and who losses during the transition.

In sum, PUAs should be considered as highly dynamic socio-environmental transition zones, where a variety of landscapes, socio-economic, institutional, and cultural identities are convening in both harmonious and conflicting manners driven by internal and external economic, political, and environmental drivers and flows. As the zone progresses in its transition, new socio-environmental configurations emerge with increasing diversity. Over time, this diversity tends to fade and particular characteristics, generally urban characteristics, dominate.

3 Theory

As argued in the previous chapter, peri-urbanization is a process of socio-environmental transition. The transition is spatially grounded (Harvey 1989) and it is the result of a historical-geographical and socially mediated transformation of nature (Harvey 1996; Heynen, Kaika, and Swyngedouw 2006). As a socially mediated process, the transformation of nature involves a variety of socio-spatial relations, in which actors with different interests and objectives interact in asymmetrical relations of power. The asymmetrical relations of power are a product of historical-geographical conflicts and power struggles connected to class, ethnicity, gender and bureaucracy (to name just a few) (Harvey 1989, 1996; Heynen et al. 2006; Swyngedouw and Heynen 2003). Power, as argued by Rutherford and following Foucault, is not possessed, but exercised everywhere through "countless sites, practices, agents, discourses and institutions" (Rutherford 2007:296). In peri-urban areas (PUAs), the heterogeneity of actors that drive and are affected by the transition (e.g., those who live in the area prior to peri-urbanization and those that settle in it), as well as the heterogeneity of livelihoods sustained by those actors that often mean conflicting interests, lead to an interplay of power at multiple levels, including the local level (among peri-urban dwellers) and at regional level (e.g., between the core of the city and PUAs). Furthermore, as the transition extends geographically multiple jurisdictions come into play creating administrative ambiguities, and leading to additional power struggles and conflicts (Simon 2008a).

Lefebvre (1991) argued that every society with its particular modes of production and reproduction, produces its own space. Space is produced through what Lefebvre called the spatial triad: the perceived physical space which is produced through daily routines; the conceived or mental space abstracted by scientists and planners; and the lived or social space used and described by inhabitants (Lefebvre 1991). The production of the peri-urban space is an instrument of state control through which the state exercises political power (Lefebvre 1991; Merrifield 2006; Parker 2004). However, the control of the state is never absolute, partly because it is subject to contradictions between different state levels and jurisdictions. It is also continuously contested by individuals and groups that experience, conceive of, and use that space (Cash 2014; Swyngedouw and Heynen 2003). It can be said, in short, that the production of space taking place through peri-urbanization occurs through the exercise of social, economic and political power (Kaika and Swyngedouw 2012).

The power dynamics that entangle actors and institutions that are part of peri-urbanization lead to uneven consequences of the process, where some groups can better reap the benefits of the socio-environmental transition, and others are negatively affected. These uneven consequences have different gradients. It can be the case, for instance, that for some of the peri-urban population, certain aspects (e.g., material conditions) of life improve during the transition, while others deteriorate.

I am interested in investigating who produces what kind of socio-environmental configurations and for whom (Heynen et al. 2006), and in the process whose voices are being heard and whose ignored (Kaika and Swyngedouw 2012). That is to say that I am interested in exploring the differential consequences of peri-urbanization, the drivers of the process, and the actors involved at multiple levels, including the local level, and the higher socio-economic and political structures that influence the process. As a thesis in sustainability science, one of my aims is to bridge the gap between problem-solving and critical research approaches (Jerneck et al. 2010). I will do this by using concepts that can contribute to problem-solving, while taking a critical stand to understanding the socio-economic and political structures that contribute to the constitution of uneven socio-environmental conditions in PUAs. Given the above, political ecology, particularly urban political ecology, is well suited to analyze PUAs and the process of peri-urbanization. Thus I will use urban political ecology as the overarching framework of this thesis (see Figure 1). From the problem-solving side, I draw on frameworks, which I use as instrumental; namely vulnerability and social wellbeing. These frameworks help me distill the dynamics at play in PUAs. I also critically analyze the findings from my vulnerability and wellbeing examinations. To do so, that is to help me make sense and critically question why certain conditions result in certain outcomes; I draw on the social and environmental justice literature, as well as on Harvey's accumulation by dispossession notion. I will start this chapter by introducing political ecology and go on to explain its relevance to my research. Following that, I will present the other key concepts and frameworks that guide this research, namely, vulnerability, wellbeing, justice and accumulation by dispossession.

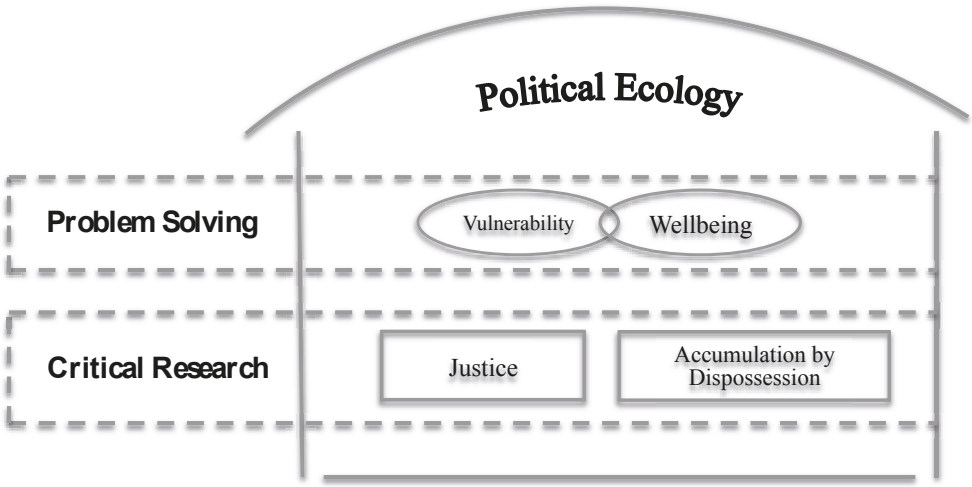

Figure 1. Theoretical Framework

Theoretical framework for understanding peri-urbanization through critical and problem-solving research.

Political Ecology

Urban political ecology literature is inspired by the work of scholars like Piers Blaikie, David Harvey and Neil Smith (Cook and Swyngedouw 2012). It is known for taking a critical predisposition, where specific urban environmental problems are linked to larger socio-economic and environmental processes through uneven power relations (Heynen et al. 2006; Keil 2005; Ranganathan and Balazs 2015). In that respect, political ecologists are advocates for a complex analysis of how politics, human agency, and discourses influence socio-environmental change and natural resource control and management (Bryant 1998; Moffat and Finnis 2005). Urban political ecology recognizes that there are uneven power relations in the control and manipulation of the material and social conditions that make up peri(urban) areas (Heynen et al. 2006). The uneven power relations are reflected in the ability of one actor to control the access and use of resources of another (Bryant 1998:86).

My conceptualization of peri-urbanization earlier in the introduction of this chapter drew on the literature of urban political ecology. To emphasize, urban political ecologists understand (peri-)urbanization as an intense socio-environmental process by which nature is transformed through the application of socio-economic and political power (Kaika and Swyngedouw 2012; Swyngedouw 1997). This transformation generates new socio-environmental settings with unique spatial,

temporal, social, political, and material characteristics. To understand peri-urbanization one must recognize the logics of power embedded in the process that lead to highly uneven socio-environmental peri(urban) landscapes (Heynen et al. 2006; Leff 2003; Swyngedouw and Heynen 2003; Ulloa 2011). In countries of the Global South, PUAs are often associated with areas that are physically and politically marginal compared to the core city (Allen et al. 1999; Ranganathan and Balazs 2015). Urban political ecology is a useful theoretical framework, as it provides an integrated and relational approach (Heynen 2013) that allows me to unravel the shaping socio-environmental processes that shape those uneven landscapes, where some actors are privileged and others marginalized (Swyngedouw 1997).

Heynen, Kaika and Swyngedouw (2006) have brought attention to the failure of urban social theory of the twentieth-century to take into account ecological and biophysical processes. Urban political ecology addresses this gap by recognizing the intrinsic and co-deterministic relation between environmental and social change (Swyngedouw and Heynen 2003). The co-deterministic relation between environmental and social change stems from the acknowledgement that the way humans organize society determines the way in which they transform nature, and in turn, that nature conditions the way societies are configured (Toledo 2008). Furthermore, an underlying assumption of political ecology is that politics and the environment are thoroughly interconnected (Bryant 1998; Leff 2003). This co-determination and interconnectedness imply that the political, social, and economic cannot be separated from the ecological when working to understand peri-urbanization (Quimbayo Ruiz 2014; Ranganathan and Balazs 2015; Swyngedouw 1997; Ulloa 2011). With this in mind, political ecology provides a lens through which access to land, safe water and sanitation and to both natural and social resources (e.g., education) in PUAs can be explained as rooted in social and political factors (Douglas 2006) and manifested, for instance, in the struggles of poor populations to access water and cope with living in areas of flood risk.

Political ecology strives for the 'denaturalization' of nature and for the 'ecologization' of social relations (Leff 2003). The dual conceptualization (of the socio-political of nature and the ecological of society) also helps us move beyond the epistemological duality between the natural and social sciences, towards an interdisciplinary understanding of socio-environmental dynamics (Armitage et al. 2012). It also highlights how aspects such as location, scale, timing and duration are determining factors of social and environmental phenomena (Toledo 2008). That being said, in this thesis I adopt what Forsyth (2001) has called a realist political ecology approach, wherein I recognize that the way societies transform nature is a political process, as is the way we discuss about environmental issues (e.g., environmental degradation). This recognition of the politics of environmental change is combined with a realist biophysical approach to issues such as water and

air pollution, or changes in rainwater infiltration through reduction of permeable surfaces, just to name a few examples relevant to PUAs.

From Urban Political Ecology to Peri-Urban Political Ecology

Urban political ecology is well suited for my research, as in most cases, PUAs are transitioning towards urban characteristics. The fate of peri-urban landscapes is likely that they will be absorbed by urban areas and adopt urban characteristics (which has been shown to be the case in my study areas as I will demonstrate throughout the thesis). Urban political ecology could therefore be more relevant to this study than political ecology approaches that focus on rural issues (e.g., Escobar 2006; Perreault 2013; Toledo 2008). However, urban political ecology has been criticized for its 'metodological cityism', referring to an almost exclusive focus on the traditional city that excludes processes that are not limited to the city (Angelo and Wachsmuth 2014; Heynen 2013). By focusing on PUAs where the processes occurring there are a result of both urban and rural dynamics, the boundaries between rural and urban are blurred, and by recognizing that peri-urbanization often occurs beyond municipal boundaries, I aim to overcome this methodological cityism. Similar to the findings of Simon (2008a), reviews of academic literature explicitly concerning peri-urban political ecology draw very limited results (a few examples include, Douglas 2006; Freidberg 2001; Moffat and Finnis 2005; Ramírez Hernández 2009; Ranganathan and Balazs 2015). Consequently, an aim of this thesis is to contribute to the political ecology debates bringing PUAs to fore of the discussion, through what could be called peri-urban political ecology. Next, I will explore a few concepts and premises of political ecology that are particularly relevant for my thesis.

Urban Metabolism

Urban and peri-urban areas are created and maintained through exchanges of natural resources (like water and energy), commodities, and the main elements that make life possible. The concept of urban metabolism is used in political ecology to refer to these exchange processes or flows and the relations of power embedded within them (Castán Broto, Allen, and Rapoport 2012; Kaika and Swyngedouw 2012; Marvin and Medd 2006). Rooted in Marxist historical materialism, the concept of metabolism was intended to tackle the material exchanges between human society and nature, and the dynamics through which humans mediate and regulate socio-environmental change and evolution (Castán Broto et al. 2012). For Marx, socio-natural metabolism is the foundation through which "the natures of humans and non-humans alike are transformed" (Swyngedouw 2006:25).

When the concept is applied to peri-urbanization, peri-urbanization can be understood as a socio-spatial process of metabolizing nature (Keil 2005). The concept of urban metabolism brings attention to the socio-environmental metabolisms of consumption, production and exchange of energy, water, food, wastes, money, labor, etc. that shape urban and PUAs (Heynen 2013; Keil 2005; Swyngedouw 2006). These metabolic flows are both embedded in and help shape core-periphery power relations across multiple levels, like urban-peri-urban and urban-rural power relations (Castán Broto et al. 2012). The influence of power relations on socio-environmental metabolic processes can produce an array of uneven socio-environmental landscapes that both improve or hamper socio-environmental conditions (Heynen 2013; Kaika and Swyngedouw 2012).

The concept of urban metabolism has been used to understand socio-economic inequalities in the distribution of resources, reflected, for instance, in infrastructure networks. Water infrastructure networks, for example, reflect the power dynamics behind the governance of water flows, where powerful actors dominate the extraction and distribution of such flows (Alfonso Piña and Pardo Martínez 2014; Castán Broto et al. 2012; Delgado-Ramos 2015), as Swyngedouw has shown in his research on the history of urbanization of water in Guayaquil, Ecuador (Swyngedouw 1997), for example. At the same time, the domination of urban flows may be challenged and subverted by individuals and groups (Castán Broto et al. 2012). I will use the concept of urban metabolisms to analyze the management and distribution of resource flows, particularly water and waste (both solid and liquid), the mechanisms of domination of those flows, and the daily practices of peri-urban dwellers to challenge that domination.

Scale, Agency and Structure

Local communities both form part of and are influenced by wider political and economic structures (Bryant 1998). As argued by Swyngedouw and Heynen (2003), socio-environmental processes bring about dynamic and nested spatial, biophysical, and governance scales. These scales are constantly contested and restructured. Continuing to use water as an example, the appropriate scale at which to manage water resources (the watershed versus local administrative boundaries, national or international levels) is an issue open to contestation by different actors. Designating a particular water management level, for example, comes about through social and political negotiations and can lead to significantly different socio-environmental conditions (Swyngedouw and Heynen 2003). Another example is waste management, and the question of whether it should be the municipality, private sector, or individuals such as waste pickers (*recicladores* in the case of Colombia) who are in charge of the process.

Studying PUAs requires recognizing that peri-urban dwellers' agency is embedded in complex socio-political processes that emanate from different levels, from the local to the global (Lampis 2013). It is therefore important to combine local-level perspectives of society-environment interactions with analyses of the wider political and economic structures that influence these interactions (both facilitating and constraining them) (Bryant 1998), and explore the power relations that intertwine people's everyday lives and wider socio-economic structures (Leff 2003; Ulloa 2011). Since PUAs are highly dynamic and urbanization implies a constant change of actors, policies, and scale contestation, a historical-geographical perspective (Swyngedouw and Heynen 2003) is needed to grasp the past, present, and possible future socio-environmental configurations of PUAs. I attempt to explore the relations between agency and structure in the constitution of PUAs through a historical-geographical approach with the frameworks that I explain next.

Vulnerability

This thesis is concerned with exploring the wellbeing and vulnerability of the populations who live in PUAs and the uneven socio-environmental consequences of peri-urbanization. The initial entry point of the research was to understand the vulnerability of populations to multiple environmental and socio-economic stressors, particularly given that most vulnerability and risk research focuses on urban, rural, or sectoral analyses, but peri-urban landscapes have received little explicit attention (examples of research with an explicit focus on PUAs that have used disaster risk, vulnerability and/or resilience frameworks include: Beilin, Reichelt, and Sysak 2015; Douglas 2006; Eakin, Lerner, and Murtinho 2010; Pelling and Mustafa 2010; Thapa, Marshall, and Stagl 2008).

The key to understanding vulnerability arises from the analysis of social and biophysical aspects of the multi-level dynamics that populations are exposed to (Adger 2006). Vulnerability analyses in political ecology stress the socio-political aspects that make communities and individuals differentially exposed, sensitive and adaptive to certain socio-environmental stressors (Turner and Robbins 2008; Wisner et al. 2004). Yet, as noted by Dietz (2013) few works actually look at the political aspects of vulnerability and adaptation. I will attempt to bridge this gap by bringing into the analysis the political ecology concepts introduced earlier, as well as theories of social and environmental justice. As part of the analysis, I will also pay attention to the role of the state in reinforcing or reducing the vulnerability of peri-urban populations.

Furthermore, to fully understand the vulnerability of populations, it is important to analyze the multi-dimensional aspects that create, reduce, or reinforce vulnerability.

This involves analyzing not only the symptoms (or manifestations) of vulnerability but also the root causes. It is often the case that the measures and policies designed to reduce vulnerability address the symptoms, rather than addressing the root causes. Addressing the root causes of vulnerability may require structural changes of great significance, which would need strong political will and longer time commitments than the common political periods (of a few years). In that sense, they would require questioning our very basis of society, which is something many (even most people, and especially those holding significant power) may not be willing to do. An understanding of the root causes of vulnerability, and how they manifest across temporal and spatial scales is, at the least, a first step. In this thesis, I attempt to understand vulnerability in PUAs at the community level, through analysis of the perspectives of peri-urban dwellers embedded in reflection on the wider socio-economic and biophysical processes that influence their vulnerability.

Operationalizing vulnerability is not an easy task, and thus I searched for a framework that would allow me to have a comprehensive understanding of everyday life in PUAs as experienced by its inhabitants that included consideration of both the opportunities and challenges they faced. I was also interested in understanding how peri-urbanization has influenced everyday life conditions. In order to do so, I drew on the social wellbeing framework as developed by the Research Group on Wellbeing in Global South Countries (Gough and McGregor 2007) (I will introduce the framework in detail later in this chapter). From the comprehensive understanding of wellbeing, I was able to distill the stressors peri-urban populations are facing, their sensitivity to those stressors, and their capacity to cope and respond. Applying the wellbeing framework made me interested in inquiring about the subjective and relational aspects of wellbeing, beyond my initial ideas of what the vulnerability analysis would entail, and thus the thesis became not only a thesis about vulnerability but also about wellbeing. The wellbeing framework is useful to explore life in PUAs with all of its nuances and contradictions, recognizing that the realities of low-income PUA populations are complex, diverse and dynamic (Chambers 1995). I will start by conceptualizing vulnerability as it will be used in the thesis. I will go on to introduce the wellbeing framework, and the livelihoods frameworks that will be complement the analysis.

The Vulnerability 'Hype'

As noted by Lampis and Fraser (2012) vulnerability, in the most general terms, refers to the susceptibility to harm. However, the concept of vulnerability has been extensively used in a variety of fields in the past few decades, including poverty and development (Chambers 1995), disaster risk management (Wisner et al. 2004) and within the climate change adaptation community (Adger 2006; O'Brien et al. 2009).

The variety of fields has meant diverse starting ontological and epistemological approaches, as well as an array of associated terminology; terminology that is not necessarily clearly defined nor differentiated, and that may be used differently across groups. Some of these terms include the concept of vulnerability itself, to other defining concepts such as hazards, risk, exposure, sensitivity, adaptive capacity and resilience (Brooks 2003).

Furthermore, the concept of vulnerability is often used very loosely in a variety of contexts. It is not uncommon to find that policy and development planning documents make reference to vulnerable populations without actually defining what 'vulnerable population' means and how this categorization came to be. In this type of document (national, regional and urban development plans in Colombia are examples) the poor, particularly children, women head of households, the elderly and informal settlers living in poverty, are considered vulnerable populations (e.g., Concejo de Bogotá D.C. 2012; Concejo Municipal de Soacha 2012). This type of generalizations is problematic. First, as Cannon et al. explain, vulnerability is

> [N]ot the same as poverty, marginalization, or other conceptualisations that identify sections of the population who are deemed to be disadvantaged, at risk, or in other ways in need. Poverty is a measure of current status: *vulnerability* should involve a *predictive* quality: it is supposedly a way of conceptualising what may happen to an identifiable population under conditions of particular risks and hazards [emphasis in original] (Cannon, Twgg, and Rowell 2003:4).

Second, while vulnerability and poverty research has recognized that there is a link between poverty and vulnerability and that the poor have been historically most at risk from natural hazards (Adger 2006), it has also found that even the poorest households have strategies to cope with risk (Moser and Felton 2007; Moser 1998). Using such a one-size fits all approach poses the risk of stigmatizing the poor, of limiting the understanding of the dynamics of life in poor areas, and hiding the differentiated vulnerability among population, as well as the root causes of vulnerability. Policy formulations aimed at supporting vulnerable populations without an explicit delineation and thorough understanding of who is vulnerable to what and why, can lead to ineffective social policy that does not address the actual problems or policies with unintended consequences.

This section aims to clarify how I will use the concept of vulnerability throughout the thesis. The aim is not to come up with yet another vulnerability framework or another comprehensive review of the multiplicity of vulnerability and risk frameworks that have been developed over the past few decades. For more comprehensive reviews of vulnerability and risk frameworks see, for instance, Adger 2006; Brooks 2003; Füssel 2005; IPCC 2014; Lampis 2009. Instead, I will draw on a few existing frameworks that I have deemed suitable and useful to understanding vulnerability in the highly dynamic PUAs. In this section I provide

some reflections regarding vulnerability research, in order to clarify the concepts that I intend to use, and present the frameworks that have served as sources of inspiration and contemplation. I will start by explaining how I understand and will use vulnerability throughout the thesis.

Key Concepts

Vulnerability

Vulnerability is the degree to which an individual or a community is susceptible to be adversely affected by a stressor (Adger 2006; IPCC 2014). Vulnerability is determined by the exposure and sensitivity of populations to stressors, and the adaptive capacity (or lack thereof) to deal with them. Vulnerability includes more than the likelihood of being injured, and also includes the livelihoods, capabilities, and constraints people have to cope and respond to those stressors (Cannon et al. 2003; Chambers 1995). Exposure, sensitivity and adaptive capacity are a product of the biophysical, geographic, social, economic, political and cultural context of the individual or community analyzed (IPCC 2014; Turner, Kasperson, et al. 2003).

Vulnerability is dynamic and multi-dimensional. It is the interactions across multiple dimensions (social, institutional, political, environmental) and multiple levels (from the individual and the community to higher social and political structures) that determine vulnerability (Adger 2006; Ensor et al. 2014; IPCC 2014). Given the dynamic nature of vulnerability, what is vulnerable at one point in time is not necessarily vulnerable at another (Adger 2006). This is particularly relevant in PUAs, since they are areas undergoing a rapid socio-environmental transition.

Stressors

A stressor is defined as a stimulus that causes stress (Merriam-Webster 2015). There are two kinds of stressors: shocks: infrequent, abrupt with direct impact (e.g., flashflood, economic crisis) (Scoones 1998); and stress: continuous, slowly increasing pressure or more prolong with more subtle impacts over a longer period of time (e.g., changes in water availability due to climate change, increased demand for public utilities) (Turner, Kasperson, et al. 2003). Stressors include those micro- and macro-level events, trends, policies and processes that manifest at the individual, household and community level affecting the wellbeing of populations (Bunce, Rosendo, and Brown 2010; McDowell and Hess 2012).

Hazard

The IPCC (2014) defines hazard as: “the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure,

livelihoods, service provision, ecosystems, and environmental resources." The term hazard has been traditionally used to refer to biophysical events (Brooks 2003; Wisner et al. 2004). In this thesis, I am interested in both biophysical and socio-economic events that may adversely impact the peri-urban population; therefore, I will use the term stressor when referring to both biophysical and socio-economic sources of stress. I will use the term hazard to refer solely to biophysical hazards (e.g., physical manifestations of climatic variability or change, such as droughts and heavy precipitation events) (Brooks 2003).

Exposure

Exposure refers to the presence of populations in places and settings that could be adversely affected (IPCC 2014) and relates to the degree of stress upon the analyzed population (O'Brien et al. 2004).

Sensitivity

Sensitivity is the degree to which a system (in my case, the peri-urban population) may be affected, either adversely or beneficially by stressors (IPCC 2014). Sensitivity depends on the specific characteristics of the population (Lampis and Fraser 2012).

Adaptive Capacity

Adaptive capacity refers to the set of resources that individuals, households and communities have and the ability to use those resources to adjust to potential damage, to take advantage of opportunities, or to respond to the consequences of materialized stressors (Ionescu et al. 2008; IPCC 2014; McDowell and Hess 2012). Adaptive capacity is highly dynamic and the ability of populations to respond to stressors is determined by processes at different scales (including processes operating both within and external to the PUA). The ability to use the available resources and take action does not necessarily translate into effective coping or adaptation. The effectiveness of coping and adaptation strategies may be influenced by obstacles operating outside the control of affected populations (Brooks 2003). It is also worth making a distinction between coping and adaptation. Coping refers to small responses, which allow populations to protect themselves in the face of a stressor. Adaptation, in contrast, involves larger and longer- term adjustments (IPCC 2014).

Impacts

When stressors are realized or materialized they become impacts. These impacts can take the form of disasters or smaller consequences. The recurrence of the materialization of small stressors can result in cumulative impacts with consequences as adverse as those of a disaster.

Different Conceptualizations of Vulnerability: Biophysical vs. Social

There have been several efforts (see, for example, Adger 2006; Brooks 2003; Füssel 2005; Lampis 2009) to clarify the ontological and epistemological differences between the concepts of risk and vulnerability as used by different research communities. One of these efforts includes the work by Nick Brooks (2003) that addresses the discrepancies by differentiating between biophysical and social vulnerability. I will argue against this differentiation, but I present it below as it can be a useful way to clarify some of the concepts and foci of different research agendas. I then follow with a justification of my divergence from this approach, and explain how I intend to conceptualize vulnerability in the remainder of the thesis.

Biophysical Vulnerability

The biophysical vulnerability approach comes mostly from disaster risk management literature. The approach focuses on natural hazards and their impacts, but the role social systems may play in the extent of different impacts is often limited or overlooked. Notably, the focus is on the exposure to a hazard rather than on the ability to respond and cope with the hazard. Biophysical vulnerability assessments can be considered to be rooted in a positivist epistemology (O'Brien et al. 2007). Within this approach, vulnerability is a function of the nature of a physical hazard (or hazards), the extent of the exposure of a human system to that hazard, and the sensitivity of the studied system to the impacts of the hazard. This approach is referred to as biophysical to highlight the physical component of the hazard and its impacts, and a social component that can intensify or moderate the damages from the impact (Brooks 2003). This approach is concerned with the result of the projected impact of a hazard event on a particular exposed unit, and thus it is also often referred to as outcome vulnerability (O'Brien et al. 2007).

Social Vulnerability

The social vulnerability approach comes from a more critical tradition of disaster risk management research with a political ecology lens (Wisner et al. 2004) as well as from poverty research (Barrientos 2007; Sen 1987). This literature underscores how social and political processes determine the impact of so-called natural hazards (Fraser 2014). It emphasizes the role of political, social and economic factors in molding the processes, outcomes and responses to biophysical hazards and is also referred to as context vulnerability (O'Brien et al. 2007).

Brooks (2003) suggests that social vulnerability can be considered a determinant of biophysical vulnerability since an impact results from the interaction of a biophysical hazard with social vulnerability. While Brooks recognizes that socio-economic factors contribute to determining the vulnerability of communities to a range of hazards, including non-climatic ones, I find that considering social

vulnerability a determinant of biophysical vulnerability can limit the vulnerability analysis to biophysical hazards alone, leaving aside potential socio-economic stressors.

Furthermore, Brooks (2003) argues that separating social and biophysical vulnerability helps to see the compatibility between approaches that emphasize the term risk[3] (usually from the disaster risk management community) and the ones that emphasize vulnerability (usually the climate change adaptation community). I concur with Brooks' position that basically both communities are looking at similar processes, namely, trying to understand how stressors can cause harm to humans and the factors that determine the level of harm. Separating the concepts, as argued by Brooks, can shed light onto the equivalence of terms, such as considering the term sensitivity as equivalent to social vulnerability. I would argue leaving the dichotomy aside, but to avoid confusion being very explicit about what the terminology used means.

One highly recognized model that follows the social vulnerability approach is the Pressure and Release (PAR) model developed by Wisner et al. (2004).[4] The PAR model aims to explain the way in which 'underlying factors' or 'root causes' construe everyday life, and can result in 'dynamic pressures' that can lead to 'unsafe conditions' for particular groups. When a hazardous event occurs where these root causes have made a particular group vulnerable to the hazard, the group is at risk to disaster. The progression of vulnerability from root causes to dynamic pressures to unsafe conditions in the PAR model provides a sense of movement. I introduce this model because it underscores how vulnerability is constantly being produced, reinforced, and reduced through factors emanating from different temporal and spatial scales. As I will argue throughout the thesis, understanding vulnerability in PUAs requires recognizing the influence that multi-scalar temporal and spatial factors have on the vulnerability of peri-urban populations. In other words, it is necessary to understand the wider socio-economic and political structures in which PUA communities are embedded.

The PAR model has been recognized (Adger 2006; Turner, Kasperson, et al. 2003) for being comprehensive because it retains the physical hazards aspects of the natural hazards research tradition, while incorporating the underlying political economy drivers of vulnerability. It has, however, been criticized for failing to provide a systematic perspective on the mechanisms of vulnerability (Adger 2006). It also has been criticized for being too linear, missing the feedbacks beyond the

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[3] Risk to a social system is determined by the probability of occurrence and severity of a particular hazard and the potential consequences if the hazard occurs (Brooks 2003; IPCC 2014).

[4] The first edition of the book at Risk where the PAR model was introduced was published in 1994, the second edition published in 2004, and tried to address some of the criticisms received after the first edition.

system of analysis, and providing too little detail on the causal progression of the hazard (Adger 2006; Fraser 2014; Turner, Kasperson, et al. 2003). The linearity could be argued to be partly addressed by the 'access model' also developed by Wisner et al. (2004) to complement the PAR model. The access model looks at the trajectory of vulnerability at the micro-level as an iterative process (Wisner et al. 2004). However, the macro-scale linearity is not fully addressed. To these critiques, I would add the limitation of the model because of its focus on natural and biological hazards[5] and disasters. Focusing only on natural and biological hazards can obscure the fact that populations often face socio-economic, biological, and physical hazards simultaneously (Lampis and Fraser 2012). The focus on disasters (and on the hazard trigger events that cause them) can also dismiss the smaller, slow onset hazards that may not result in a disaster but have significant cumulative impacts on everyday life and wellbeing.

Socio-Environmental Vulnerability

While ontological and epistemological differences remain between biophysical and social vulnerability, socio-economic and biophysical processes are most often intrinsically interrelated across spatial and temporal scales, and thus maintaining the dichotomy can be counterproductive. As noted by O'Brien et al. (2009), key to understanding vulnerability is identifying how different stressors interact. This is not to say that biophysical and social vulnerability frameworks do not recognize the intrinsic relation between biophysical, socio-economic, and political processes, but maintaining the dichotomy may mean missing some of the iterative ways in which these relations take place (Fraser 2014).

Given the above, I find it more suitable to take a less dualistic approach. I will refer to the vulnerability framework that I will use for the remainder of the thesis as socio-environmental vulnerability. Referring to socio-environmental vulnerability is intended to bring attention to the interrelation between socio-economic, and ecological and biophysical processes that determine the vulnerability of peri-urban populations. Removing this duality underlines the fact that societies depend on the earth's ecosystems, their biophysical foundation and ecosystem services for the economic and social development of humans. At the same time, the ecosystems of today have been used and modified by humans throughout history, in ways that also affect their capacity to sustain their functions. It is important to highlight that in this thesis I am mostly concerned with the vulnerability of populations, and the focus of the analysis is on peri-urban communities and their wellbeing, rather than on the ecosystems. Yet, this should not be misunderstood as a disregard of the interdependent relation between people and the 'natural' (i.e., biophysical)

[5] Biological hazards include epidemics, diseases of plants, and insects and other animals that can transmit diseases (Wisner et al. 2004:168).

environment. Understanding this interdependence is key to understanding the vulnerability of peri-urban populations.

I concur with Lampis' statement that we should aim for vulnerability studies "guided by empirical findings rather than pre-conceived ideas on vulnerability" (Lampis 2009:37). In that respect, the socio-environmental vulnerability framework I propose to use is not meant to be a 'how to recipe', but rather to inform guiding 'principles' of the analysis. In addition, the importance of 'placed-based' analyses has been advocated by several authors (Cutter, Boruff, and Shirley 2003; Turner, Kasperson, et al. 2003). This thesis has been carried out at specific geographic locations and with a particular unit of analysis, the community level, as the entry of enquiry. Therefore the socio-environmental framework shares some similarities to what Cutter et al. (2003) refer to as place vulnerability, in the sense that it is the socio-environmental vulnerability of populations located in a particular geographical location that I am interested in. Their framework also integrates biophysical and social vulnerability.

Turner, Kasperson, et al. (2003) propose, however, an even more comprehensive vulnerability framework in sustainability science that brings further attention to several key issues that, I argue, are important to fully grasp the complexities of vulnerability in peri-urban areas. Thus, I draw on this framework most significantly.

Turner, Kasperson, et al.'s framework takes a coupled human-environment system as the focus of analysis, and underscores the synergy between social and biophysical subsystems and the multi-scalar processes (spatial, temporal and functional) that affect the system. This framework is appealing because of the elements that they recognize must be included in the analysis. Elements, I contend, that are key for analyzing vulnerability in PUAs. These elements include, consideration of multiple interacting socio-economic and environmental stressors; explicitly linking the system of analysis (in my case, peri-urban populations) and other scales; recognizing and analyzing differential vulnerability within the system; and the consideration of the role informal and formal institutions play both as stressors and as structural factors affecting the system's sensitivity in the form of root causes and dynamic pressures (Turner, Matson, et al. 2003; Wisner et al. 2004).

To operationalize the socio-environmental vulnerability framework, considering its key elements, I will use the social wellbeing framework as developed by the Research Group on Wellbeing in Global South Countries (Gough and McGregor 2007). To explore the link between peri-urban populations and other scales, as well as the role formal and informal institutions play in determining the vulnerability of peri-urban populations, I will draw on the political ecology concepts mentioned earlier, as well as on theories of justice and the notion of accumulation by dispossession, as will be explained later in this chapter.

Wellbeing

The social wellbeing framework, particularly as conceptualized in Sara White's (2010) paper will serve as an instrumental framework throughout the thesis to deconstruct what life entails for peri-urban dwellers. Under this conceptualization wellbeing is formulated as encompassing both 'doing well', 'feeling good', 'doing good' and 'feeling well'. 'Doing well' refers to the material dimensions commonly included in measures of standard of living. 'Feeling good' conveys a subjective dimension that considers people's perceptions of their quality of life and levels of satisfaction. 'Feeling well' refers to the importance of good health and of being satisfied with a person's place in the world. 'Doing good' reflects the importance of the moral dimension in people's lives, whereby wellbeing is also about 'living a good life' based on a collective understanding of how the world is and should be (Gough and McGregor 2007; White 2010).

As highlighted by the aforementioned elements that encompass wellbeing, this conceptualization aims to move beyond traditional utility-based and quality of life measures (e.g., income and poverty line) (Armitage et al. 2012). It provides a wider lens to understand wellbeing by identifying three key dimensions:

i. The subjective

ii. The material

iii. The relational.

An important appeal of this conceptualization is for the inclusion of the relational dimension that recognizes how people's behavior, motivations, and sense of satisfaction are influenced by relationships with others, which is embodied in the 'feeling good, 'doing good' and 'feeling well' aspects (White 2010). Wellbeing is to be understood both as a desired state, and, most importantly, as a process. Through this process, the three key dimensions are interdependent and constantly influencing each other. Wellbeing is also dynamic, and thus understandings of wellbeing change over time and space.

Wellbeing can also be seen as a social process that happens in the dynamics between different levels, like between the individual and the collective, the local and non-local, and the collective and the state (White 2010). Since the level of analysis of this thesis is the community level (I will explain the unit of analysis in the following chapter), I am particularly interested in the collective dimensions of wellbeing as well as the way wellbeing is mediated and constituted within multi-scalar relationships. Therefore, the three dimensions of wellbeing will be considered mainly as they relate to collective wellbeing, though I recognize both that wellbeing happens in relationships between the individual and the collective, and that what

may be positive for a community may not be so for every individual and vice versa (Armitage et al. 2012).

The subjective dimension of wellbeing relates mostly to people's perceptions, cultural values, ideologies, and beliefs. It helps structure the other dimensions by giving them meaning and value. People's perceptions of their own lives have a significant effect on everyday and long-term decisions. With respect to vulnerability, people's perceptions can influence their perceived stressors, and their ability and willingness to cope (Adger 2006). The material dimension of wellbeing relates to aspects such as physical and financial assets, income levels, employment opportunities, and the availability of public utilities and infrastructure. In the analysis of the empirical material that will be presented in chapters 6, 7, and 8, I have also considered issues related to environmental quality, such as water and air pollution, as part of the material dimension. The material dimension is influenced by the subjective, through people's perceptions and satisfaction with particular material conditions. The relational dimension includes two spheres: the social and the human. The social includes aspects such as social and community relations, community formation, organizations people belong to (like sports groups, gangs, political groups, and religious groups), relations with the state, and the mechanisms people have for collective action, as well as violence and crime. Again, this sphere is influenced by the subjective through people's perceptions of and experiences in the community. The human sphere captures aspects such as people's capabilities (like education and skills), health, as well as household and community composition (including gender and age distribution). White (2010) argues that the subjective aspect of this sphere involves community aspirations, fears, levels of satisfaction, trust among community members, and sense of belonging or isolation. I contend, however, that these subjective elements are better captured in the social dimension, as issues such as trust among community members and sense of belonging influence community relations and collective action.

Within the wellbeing framework, the subjective dimension is embedded in the relational and material dimensions to highlight that wellbeing develops from the interplay of objective and subjective aspects of people's lives. The result is an objective and subjective analysis of the material, social, and human dimensions of wellbeing. I will utilize these three resulting dimensions to explore wellbeing in selected PUAs. As I hinted at earlier, I do not concur with some of the aspects that White includes under each dimension, for instance including access to services and amenities under the social dimension. I suggest those aspects fall better under the material dimension. Similarly, I propose that environmental resources are also part of the material dimension, rather than the social. As mentioned before, these dimensions are interrelated and compartmentalizing one aspect of life in one dimension may seem to reject this interrelation. However, for purposes of structure and clarity, as I analyze empirical material using this wellbeing framework, I will

move through my analysis by discussing different aspects of peri-urban life categorized by the dimension where I believe they fit most appropriately.

Wellbeing frameworks have been criticized for missing aspects related to ecological processes and power relations, and for not explicitly addressing the relation between agency and structure (Armitage et al. 2012). Armitage et al. (2012) complement the wellbeing conceptualization by bringing the natural environment into the picture, wherein 'being well' includes being in harmony with others and the surrounding environment. However, even with the recognition that wellbeing is linked to the 'natural environment' the conceptualization does not mean that wellbeing will lead to environmental sustainability. I intend to utilize political ecology, justice, and the socio-environmental framework discussed in the previous sections to address the limitations of the wellbeing framework raised by Armitage et al. (2012).

It must be highlighted that wellbeing analyses must be contextual. This relates to the relational and subjective aspects of wellbeing, but also to the material since culture influences both people's needs and perceptions. Peri-urban areas may add an additional level of complexity to the three different dimensions of wellbeing. As a transition zone, the dimensions (the material, human and social) that contribute (or hinder) wellbeing in PUAs may be particularly dynamic. Furthermore, the peri-urban population is highly heterogeneous; including migrants and long-term (or traditional) inhabitants. Perceptions of wellbeing, therefore, may vary significantly among individuals of the same community and may be dependent on the their former context. For example, recent migrants from remote rural areas who migrate in search of better opportunities in an urban setting may expect and value a development of the area that may be quite different, even conflicting, from the vision of a person who has lived in the area for decades and has to face (willingly or unwillingly) the changes brought about by peri-urbanization.

Given the above, time and space are important aspects of wellbeing analyses. As recognized by White (2010), people's reflections on the past and their aspirations for the future influence their perception of the present. Correspondingly, their perception of the present impacts how they would reflect on the past and future. Moreover, people's perceptions of their own wellbeing and the ability to attain it is highly dependent on their geographical location.

To further disentangle the three dimensions of wellbeing, and to facilitate the operationalization of vulnerability, I will use vocabulary developed in the livelihoods literature, including: capitals, resources, assets, entitlements, capabilities, and constraints. The wellbeing framework builds on the foundation of the livelihoods approach (among others), and thus complementing it with "a close cousin" (White 2010:162) seems appropriate. The livelihoods frameworks can also contribute to highlighting the understanding of wellbeing as a process that changes over time and space. I will introduce the livelihoods framework in the next section.

Livelihoods Frameworks

Livelihoods frameworks have been constructed for development and poverty studies as critiques to conventional monetary conceptualizations and measurements of poverty (Chambers 1995). These frameworks brought to the debate insights on the opportunities and limitations populations have in accessing and managing a complex portfolio of tangible and intangible assets, and enhancing their capabilities to make life more meaningful. Further, they helped draw attention to the diversity of experiences that exist among those living in poverty within communities and within households (Bebbington 1999; Lampis and Fraser 2012).

In this thesis, livelihoods are understood as the means to make a living, and include the capabilities and assets, as well as the constraints and stressors people confront to make that living (Chambers 1995; McDowell and Hess 2012). Assets include both the material and social resources people and communities have (Bebbington 1999; Chambers 1995). Bebbington (1999) underscores that assets "are not simply *resources* that people *use* in building livelihoods: they are assets that give them the *capability* to be and to act" [emphasis in original] (p. 2022). Assets can contribute to making a living, making life meaningful, and to challenging the structures that control the use and transformation of resources (Bebbington 1999; Scoones 2009). In that respect, assets can contribute beyond a source of income, they can also be a source of economic and political power. The main assets that populations use and transform to make a living vary across space and time, and across different groups of people (Bebbington 1999). Capabilities can strengthen the ability of people and communities to be agents of change, make claims, question, debate, negotiate on issues they are entitled to, and live a life they value (Bebbington 1999; Sen 1999).

In general terms, under the livelihoods frameworks vulnerability refers to the susceptibility of not being able to sustain a livelihood (Adger 2006) and explores what prevents people from accessing assets and achieving capabilities (Lampis 2009). I draw on three livelihoods frameworks, which I will explain below, to further disentangle the material, human and social dimensions of wellbeing. The livelihoods frameworks will also help me extract from the analysis the different stressors peri-urban populations face and their sensitivity to those stressors. I should point out, however, that livelihoods frameworks have been criticized for not fully accounting for biophysical dynamics (Adger 2006). I hope to address this shortcoming by giving sufficient attention to the biophysical dynamics influencing the livelihoods of peri-urban dwellers.

Sustainable Livelihoods

Amartya Sen's (1987, 1999) research is one of the foundational works on capabilities and entitlements. The Sustainable Livelihoods Framework is considered a successor to the capabilities and entitlements research agenda, where vulnerability

was understood as a failure of entitlement (Adger 2006). A sustainable livelihood consists of the capabilities, assets and activities that jointly contribute to the means of living and the wellbeing of individuals and communities (Bebbington 1999; Scoones 2009). In other words, a livelihood is sustainable when it can cope with stressors, and maintain its assets and capabilities, without undermining the natural resource base (Scoones 2009). This framework was developed mainly as a rural framework (Tacoli 1999). It can be considered a complement to hazard-based approaches as it explores the link between vulnerability and wellbeing, mainly at the individual level.

While livelihoods frameworks are primarily concerned with agency and action (Scoones 2009), the Sustainable Livelihoods Framework also recognizes the importance of transforming structures and processes operating at different levels (e.g., global, national). These structures include the public, private, and civil society sector, and the processes that impact transformations include legislation, policies and culture (Tacoli 1999). These transforming structures influence the access and management of resources and the capability to be and act (Bebbington 1999). This aspect is in line with the political ecology lens that underscores the interrelation between agency and wider socio-economic structures. To put it another way, populations are agents who try to manage a complex portfolio of assets to live their everyday lives and make a living. Their agency and the access to assets are, however, constrained by wider socio-economic and power structures (Archer 2010). At the same time, through their agency, populations influence those structures (Ifejika Speranza, Wiesmann, and Rist 2014). Understanding transforming structures, Tacoli (1999) argues, is especially important in PUAs, as the changing institutional roles, material conditions, and relations between different groups can lead to growing social polarization.

Asset Vulnerability and Asset Accumulation Frameworks

Caroline Moser has contributed to the livelihoods urban research agenda with two frameworks. The first one, the Asset Vulnerability Framework, defined vulnerability as insecurity and sensitivity in the wellbeing of individuals and communities, as well as their responsiveness in the face of ecological, economic, social, or political shocks (Moser 1998). Moser's Asset Accumulation Framework (Moser 2007b) emphasizes how the poor mobilize assets across generations. With respect to vulnerability, it addresses how in a post-disaster situation (or post materialization of a hazard), households protect and reconstruct their asset-base. From Moser's frameworks, I will draw on the idea that vulnerability is linked to the assets available to populations and their ability to manage them as well as her analysis on how community level phenomena can influence individual and household wellbeing.

Cecilia Tacoli (1999) has analyzed the opportunities and constraints of low-income groups in peri-urban areas through contrasting different livelihood frameworks. At the time of writing, the different livelihoods frameworks were fairly recently developed and thus Tacoli argued that there were insufficient applications. Since then, a significant number of studies have been conducted using the different livelihoods frameworks, and critiques of these frameworks have also emerged. Some of the critiques include the underplay of power relations in accessing assets (de Haan and Zoomer 2005), and the focus on the individual and household levels underestimating the influence of community level strategies in individuals and household's livelihoods, as well as the influence individual decisions and strategies have on community-level processes (Brocklesby and Fisher 2003). In this thesis, I apply the different frameworks mentioned at the community level, in an attempt to capture a meso-level between the large-scale processes (e.g., national and regional) that influence access to assets, and the individual and household strategies used to combine the available assets to make a living and cope with stressors.

Social Capital

An important component of wellbeing is social capital. Social capital relates to access to informal and formal social structures and networks (Bebbington 1999), and to the norms and institutions that provide or limit access and entitlement to other assets and to representativeness (Tacoli 1999). In their work in Colombia and Guatemala, McIlwaine and Moser (2001) identify different types of social capital, namely; structural, cognitive, productive, and perverse, that are useful to deconstruct the concept and apply it to peri-urban settlements. Structural social capital refers to social organizations and formal networks of trust, cohesion, and interpersonal relationships. Cognitive social capital refers to the invisible and informal norms and values related to attitudes, beliefs, and ideas that manifest through routines and elements of trust, collaboration, and altruism among community members. These two categories are intricately linked and manifest through different levels, from the individual to the community and society.

Productive social capital relates to the organizations, networks, and activities that generate favorable outcomes both for its members/adherents and for the community at large. Perverse social capital, on the other hand, relates to networks, organizations, and reward systems that support criminal activity and through which members/adherents can have positive benefits with negative outcomes for the wider community. Perverse social capital is commonly exercised through force, violence, and illegal activities. These four types of social capital are interrelated (McIlwaine and Moser 2001). I will use this particular categorization of social capital throughout the thesis. A key contribution of this categorization is the inclusion of perverse social capital. Most research on social capital focuses on the positive aspects of it (e.g., on the positive outcomes it has for individuals and communities), for example,

the benefits of social cohesion and trust. In areas with high levels of insecurity and organized crime, the perverse social capital element becomes important. I will not discuss perverse social capital directly, but rather through the impacts it has on peri-urban inhabitants, particularly the effect it has on building productive social capital in the community.

Violence

As I will show in chapters 6, 7, and 8, in most of the areas I studied one of the main stressors was violence. I will follow McIlwaine and Moser's definition of violence in this thesis:

> [The] use of forceful acts motivated by the conscious or unconscious desire to maintain or obtain political, economic or social power (McIlwaine and Moser 2001:966).

Based on that definition, violence can take different forms, including social, economic, political, and institutional. Social violence is often gender-based and includes intra-family violence (e.g., intimate partner-violence or child abuse), physical and psychological abuse, ethnic violence and territorial or identity-based violence, turf violence (e.g., hooligans), and communal riots. Economic violence is usually linked to an economic necessity or motive (e.g., thefts, street crime, muggings, or violence linked to drugs and kidnapping). In Colombia, when referring to economic violence, the word insecurity (*inseguridad*) is often used instead, as violence is usually connected with political violence (Moser 2004). Political violence is exercised to gain or hold political power (e.g., the armed conflict between the state, guerrillas, and paramilitaries or political murders) (Moser and McIlwaine 1999; Moser 2004). Institutional violence is committed by state institutions such as the police, judiciary (e.g., extra-judicial killings by police), and state officials as well as groups operating outside the state but that may be directed to perpetrate the crime by state actors (e.g., social cleansing) (Moser 2004).

How Vulnerability, Wellbeing and Livelihoods Come Together

The socio-environmental transition from rural-like to urban-like characteristics occurring in PUAs is manifested through changes in spatial attributes of the landscape, in the function and quality of the peri-urban ecosystem, and in the social, cultural, and economic characteristics of the population. That is to say that in PUAs, the livelihoods of the population are also in transition. Through this peri-urbanization transition, certain assets and capabilities are being destroyed, deteriorated, or becoming unavailable, while others (often new ones) are becoming available (Tacoli 1999). Natural assets, for example, are sometimes transformed into physical assets or become constraints. Constraints often arise when the use and

transformation of assets by one group negatively affects another group. An example, which will be discussed in detail in later chapters, is the transformation of agricultural land into urban expansion for construction of informal and subsidized housing. The tradeoffs can arise from within the peri-urban landscape, but may also be a result of pressures from the countryside or the city. An example of this is the city's use of the peri-urban as a source of materials and resources (like water, construction materials, and food), but also as a sink for its solid and liquid waste.

The socio-environmental transition entails, as will be shown in the following chapters, that peri-urban populations face changing socio-economic and environmental stressors, but also have a changing portfolio of assets and capabilities to respond to and cope with these stressors. It should be emphasized that vulnerability results both from factors that are under people's control and beyond their control (Downing et al. 2006). I will highlight during the analysis how wellbeing and vulnerability are influenced by the interaction of peri-urban communities with the state, private sector, and civil society within and beyond the peri-urban.

In chapters 6 through 8, to better understand how the socio-environmental transition takes place and is experienced by peri-urban dwellers, I start with an examination of the different dimensions of wellbeing, namely, the material, human, and social. Within these dimensions I consider both objective and subjective aspects. One cannot fully separate the objective from the subjective, but I suggest that the objective emanates from people's experiences (which are as real as they are subjective), statistics and data that corroborate those experiences, and my own observations and measurements (e.g. with GPS) (which are also tainted by my own subjectivity). The subjective is highlighted through people's perceptions of and opinions on their own life experiences. I draw on the livelihoods concepts mentioned above to distill what life entails for peri-urban communities and how it is changing through the socio-environmental transition. From this examination of wellbeing, I identify the main stressors that the population of these settlements face and discuss them from a vulnerability perspective. I will also draw on additional concepts throughout the thesis, such as informality, but I will introduce them when they are pertinent to the analysis. The conceptualization of informality, for example, is introduced in chapter 7.

In understanding peri-urbanization and the underlying structures embedded in the process, one must recognize the link between power, recognition, distribution, and representation. Consequently, I make use of literature on justice, particularly social justice (Fraser 1998, 2009) and environmental justice (Bullard 1999; Martinez-Alier et al. 2014; Schlosberg 2013; Schweitzer and Stephenson 2007), which I will introduce next. In addition, I find Harvey's (2004) 'accumulation by dispossession' a useful notion to help explain the socio-economic processes that have influenced

the development of uneven geographies of PUAs. I will introduce this notion after the introduction of justice.

Justice

Escobar (2006) notes that new forms of cultural difference are constantly being created. However, he points out that diversity is normally believed to generate conflict rather than just and equal pluralistic societies. In diverse PUAs it is then imperative to consider processes of inclusions and exclusions in accessing opportunities and resources, and how power operates in the constitution of these areas. As I will show in the thesis, peri-urbanization has contributed to consolidate the socio-spatial segregation of the study areas. Fraser (1998) contends that socio-spatial segregation is rooted in the political economic structure of society, and can result in socio-economic injustices, which often manifests through social and economic marginalization and deprivation. Recognizing that power operates through mechanisms of recognition, entitlement, and representation (Islar 2012), one must consider the 'politics of place' that include consideration of the interrelations among place, difference, justice, and politics (Escobar 2006) to understand whose voices are being heard, whose are being ignored, and whose are being silenced in the process of constituting PUAs. In accordance, theories of justice are relevant to understand the peri-urbanization process and its differentiated socio-economic and environmental impacts.

I am interested in theories of justice that are applicable not only to individuals but also to groups, and where justice is conceptualized beyond the traditional conceptualizations of justice as a matter of distribution (Schlosberg 2007). Instead I seek to understand justice that considers distribution, recognition, and representation, following Fraser's understanding of justice (1998, 2009). I am also interested in environmental justice, such as the share of environmental burdens (e.g., pollution) and benefits (e.g., clean drinking water) among populations. I therefore also draw on that literature. As argued by Escobar (2006), it is necessary to promote the equalization of economic, environmental, and cultural distribution. Along those lines, proponents of a wider conceptualization of justice such as Schlosberg emphasize the need for non-individualistic, inclusive, and broader understandings of justice (Islar 2012; Schlosberg 2007). Such an understanding of justice engages with social practices, rules, norms, and policies that determine the relations of power within society (Islar 2012). The proponents of a broad and multifaceted approach to justice do not argue for a replacement of distribution over other elements, but rather on combining several concerns; namely, distribution, recognition, and representation (Schlosberg 2007). I will go on to discuss these three elements.

For years, notes Schlosberg (2007), studies on justice followed John Rawls' conception of justice defined as the distribution of goods and the best principles to distribute those goods. John Rawls' *A Theory of Justice*, is concerned with 'justice as fairness', which could be understood as the rules that govern a just distribution of goods, rights, and liberties (Islar 2012; Schlosberg 2007). However, while distributional theories of justice consider recognition and representation as preconditions to distributional justice, Fraser argues that representation and recognition cannot be assumed, and instead need to be considered as a separate, complementary issue (Fraser 1998; Islar 2012). Rather than arguing redistribution and recognition as antitheses, where claims are either about redistribution or about recognition, Fraser (1998) sustains that justice requires both redistribution and recognition, and also representation (Fraser 2009; Schlosberg 2007). Not all misrecognition is a byproduct of maldistribution. That is, maldistribution does not necessarily entail misrecognition, although it does contribute. I therefore, as part of my analysis, need to go beyond the distribution of rights and goods, and examine patterns of cultural value. Similarly, not all maldistribution is a byproduct of misrecognition, and misrecognition does not directly entail maldistribution, even if it contributes. Thus, it is important to understand how economic mechanisms that are relatively decoupled from cultural value patterns operate and impede what she calls 'parity of participation' in social life (Fraser 1998). Parity, for Fraser, means the condition of "being a *peer*, of being on a *par* with others, standing on an equal footing" [emphasis in original] (Fraser 1998:12). For Fraser (2009), the most general meaning of justice is parity of participation. I would extend this to Schlosberg's (2013) understanding of justice, which not only entails equity, recognition, and representation but generally, the basic needs and functioning of individuals and communities.

Furthermore, I concur with Fraser's argument that neither recognition nor representation can be assumed in the world, and thus both issues need to be considered in conjunction with those of redistribution. At the same time, virtually any claim for redistribution will have some intended or unintended effects on recognition. The inverse also applies. Recognition impacts distribution, especially in highly economically unequal contexts, where recognition measures cannot succeed without redistribution (Fraser 1998, 2009). Peri-urbanization often implies changes in entitlements to land and water resources, for instance, which can lead to including some, while excluding others from accessing these resources. In that regard, the struggles that emerge from changing entitlements to resources are linked not only to matters of distribution, they also represent struggles over representation and recognition (Islar 2012; Schlosberg 2007).

Lack of recognition, as argued by Islar (2012), is manifested in political and social aspects of everyday life through different mechanisms that degrade, ignore, or devalue particular groups. Accordingly, the form recognition justice must take

depends on the mechanisms of misrecognition that need to be redressed (Fraser 1998). In other words, the recognition needed by misrecognized people depends on what they need in order to be able to participate as peers in social life, and the nature of the obstacles they face on the way to achieving participatory parity. We should, therefore, not assume that the needs are the same in every context (Fraser 1998).

With respect to representation, representation includes political voice and democratic accountability. It also addresses questions about the (in)justice of boundaries and frames, that is; who is included and who is excluded. As Fraser, explains, when political space is unjustly framed, those that fall outside what is considered to 'count' are denied political voice. In other words, representation injustices can arise when the political voice of some are compromised, impairing their ability to participate as peers in society. Fraser also refers to meta-political injustices, which arise when the division of political space into bounded polities works to misframe the source of distribution, recognition, and representation injustices (Fraser 2009:147). This is relevant for peri-urban areas, as the claims of peri-urban dwellers may not be limited to the peri-urban per se if/when injustice is rooted in structures and processes beyond PUAs.

Parity in representation requires what Agarwal calls (2001:1624) active and interactive participation in decision making processes. Active participation includes expressing opinions, whether or not solicited, or taking initiatives. Interactive participation refers to having voice and influence in a group's decisions, and thus it is an empowering participation. Agarwal argues that the determinants of participation include rules of entry into a group (or the appropriate body where a decision is made), including the criteria defining membership in a group; social norms that define who should attend and speaking at meetings and how people should behave; social perceptions of people's ability to contribute to various tasks; entrenched territorial claims; personal endowments and attributes (educational levels, property status, marital status, age, etc.); and household endowments and attributes (which define where different groups fall in structural hierarchies of class). Participation, however, is not sufficient in itself to guarantee equity in distribution, recognition, or even equity in representation (Agarwal 2001; Arnstein 1969; Fraser 1998). Projects and policies that claim participation must be questioned with regards to who is being included and who excluded. Excluding some can worsen power relationships and further disempower the marginalized (Agarwal 2001).

Environmental Justice

As I have argued earlier, in PUAs socio-economic attributes of the areas are changing, as are their physical and environmental attributes. These changes are

significantly affecting biophysical and ecological processes. It is then relevant to analyze the manner in which environmental 'goods' and 'bads' are distributed in society, and the structures under which the decisions to make such distributions are made (Leff 2003; Martinez-Alier et al. 2014; Ulloa 2011). Environmental justice literature explores environmental distribution issues, and the embedded struggles for representation and recognition. On this subject, Schlosberg (2013) argues that environmental justice academics and activists extended the concept of social justice into a new realm of distribution, recognition, and representation (or lack thereof); that of environmental disadvantage many communities are subjected to. Environmental justice is meant to capture the idea that different groups experience differential access to environmental quality (Schweitzer and Stephenson 2007). Furthermore, Schlosberg (2007:54) sustains that that the term 'environmental justice' is defined in a variety of ways by different groups, illustrating that the term is broad, integrative, expansive, and inclusive, capturing a variety of understandings of justice itself. It is not only the concept of 'justice', which is broad within environmental justice movements and theory, but also the concept of 'environment'. In environmental justice, the environment is conceived beyond the 'wilderness' or the 'big outside', and is conceptualized as 'where we live, work and play' and the environmental conditions in which people are immersed in their everyday lives (Schlosberg 2013:38–39).

Schweitzer and Stephenson (2007) argue that few environmental justice studies have been situated within the larger context of urbanization and urban research. My analysis contributes to that research gap, as I am situating the issue of environmental justice within the governance and management of resources in PUAs and the impacts peri-urbanization has had on the environmental qualities of PUAs. I am also linking environmental justice to political ecology debates of urban metabolism and the conceptualization of peri-urbanization as a social process of transforming and reconfiguring nature (Castán Broto et al. 2012). Similarly to Schlosberg's (2007) use of environmental justice, in this thesis I am mainly concerned with intragenerational distribution, recognition, and representation issues, without dismissing the importance of intergenerational issues.

It must be noted that literature on environmental justice focuses significant attention on environmental movements (Bullard 1999; Martinez-Alier et al. 2014; Schlosberg 2007, 2013), and, in the Global South, on the so-called 'environmentalism of the poor' (Guha 2000; Martinez-Alier et al. 2014) Environmentalism of the poor, also called 'environmentalism of the people' refers to non-violent activists' interventions by poor or marginalized populations to defend their livelihoods against resource extraction and against the violence exercised upon them. Martinez-Alier et al. (2014) assert that people who are poor fight against what Harvey calls accumulation by dispossession (Harvey 2004). I should note that in the study areas there has been little of what could be called environmentalism of the poor, in the sense of organized

movements of people living in poverty defending their livelihoods and fighting against the environmental injustices they are confronted with. While a strong environmental movement is not yet mobilized, as I will argue in this thesis, many of the environmental struggles of peri-urban dwellers in the study area are a result of environmental injustices.

Accumulation by Dispossession

David Harvey's accumulation by dispossession will be a useful concept to understand the mechanisms through which injustices, particularly related to distribution and the environment, take place, as well as some of the macro drivers of urban growth in the study areas. Accumulation by dispossession is a broadening of Marx's 'primitive accumulation'. Primitive accumulation refers to the historical processes of separating the means of production from the producer, as a precondition for capital accumulation (Merrifield 2011; Perreault 2013). Through this process, land, the basic resource for agricultural production, is expropriated from the agricultural producer (Marx 1976 cited in, Merrifield 2011). Primitive accumulation is normally understood as the enclosure of common lands and their subsequent transformation into profitable investments by a growing elite (Merrifield 2011). To re-evaluate and show the continued relevance of predatory practices of primitive accumulation, Harvey substitutes the term for 'accumulation by dispossession'.

Accumulation by dispossession can take place in a vari ety of ways and during any historical period. Harvey argues that many of the same processes characteristic of what Marx described as primitive accumulation are still relevant today, and some have even taken a stronger role than in the past. Some of these processes, which are also relevant for this thesis, include: commodification and privatization of land and the expulsion of peasant populations; conversion of common and state property rights into private property rights; commodification of labor power and suppression of alternative forms of production; and appropriation of assets, including natural resources (Harvey 2003, 2004, 2007; Spronk and Webber 2007). New processes have also emerged, such as the displacement of rural and indigenous communities from areas rich in biodiversity and water resources, as well as the growing depletion of the global environmental commons (e.g. land, air and water) resulting in the commodification of nature and environmental services (Harvey 2004; Kaika and Swyngedouw 2012; Martinez-Alier et al. 2014). Market liberalization, argues Harvey, does not produce a harmonious state in which everyone is better off. Instead, it produces increasing levels of social inequality (Harvey 2004). Harvey argues that the processes of dispossession are ongoing and structurally necessary

features of capitalism; that the dispossession of livelihoods or commons, for example, is necessary for capital accumulation (Harvey 2003; Perreault 2013). Furthermore, Harvey (2004) sustains that the state plays a critical role in promoting and legitimizing these processes.

As noted by Perreault (2013), Harvey's reformulation of Marx's primitive accumulation provides a useful way to analyze the dispossession of rights to land, water, and other natural resources. Furthermore, Perreault argues that nature's materiality plays an important, but under-theorized, role in processes of primitive accumulation. He then proposes an extension of Harvey's accumulation by dispossession to include an analysis of the way nature is involved in processes of accumulation, or what could be referred to as dispossession by accumulation. In that respect, he argues through the case of Bolivian Altiplano farmers faced with increasingly polluted resources from nearby mining activities, that dispossession of livelihoods has been, to some extent, the result of various forms of accumulation, including accumulation by contamination. Accumulation by contamination includes the accumulation of pollutants in farmland and waterbodies, and the accumulation of water rights (and expropriation of customary rights through water pollution) (Perreault 2013). Accumulation by contamination results in environmental injustices that show the differentiated impacts of metabolizing nature, where it is often marginalized populations who experience the negative impacts (Martinez-Alier et al. 2014; Perreault 2013; Schlosberg 2007). Similar processes of accumulation by contamination occur in low-income PUAs. These processes will be discussed through the lens of urban metabolism and environmental justice throughout the thesis, and particularly in the closing analysis in chapter 10.

4 Research Design

In this chapter I introduce the research approaches that have guided this thesis. I start by clarifying the ontological and epistemological positions I take. I then introduce the research methods employed, including an introduction to the case study, data collection, and analysis methodologies. I will reflect on the above choices throughout the chapter, including their limitations. I will conclude the chapter with a reflection on my positionality.

Philosophy of Science/ Research Approach

This research is influenced by critical realism since this particular philosophy of science attempts to reconcile the dialectic between positivism and social constructivism (Archer et al. 2013). As a thesis embedded in the interrelation between environmental, socio-economic, and political processes illustrated through the process of peri-urbanization, it is only coherent to adopt a philosophy of science that allows me to acknowledge the reality of biophysical processes as well as the social and political constructions that affect how those processes are experienced and interpreted by different groups. As I will show below, critical realism is consistent with the (realist) political ecology (Forsyth 2001) theoretical framework presented in the previous chapter.

Critical realism was developed from Roy Bhaskar's transcendental realism, which recognizes that the theory of being (ontology) is distinct from the theory of knowledge (epistemology, or what should be acceptable knowledge) and criticizes the epistemic fallacy which denies this distinction (Archer et al. 2013; Bryman 2008). To that end, it reconciles ontological realism, epistemological relativism, and judgmental rationality. Ontologically, realism recognizes that there is a 'world' ('reality') that exists independent of our knowledge of it that is not merely a product of thought. On the other hand, it rejects the correspondence theory of truth by distinguishing between the world and our claims of knowledge about that world (Carolan 2005). In that respect, epistemologically it accepts that only a part of the world is available to us, and thus that we should not fall into the 'epistemic fallacy' and confuse what we think and learn about the world with what the world is. That

is, we should not fall into the belief that our knowledge might provide accurate and complete insights into reality (Forsyth 2001).

Critical realism attempts to understand what produces social change, recognizing the role of agency while highlighting societal structures (Prowse 2008). In order to do so, critical realists argue that researchers should avoid judgmental relativism, and instead should be able to make generalizable claims that help understand that change. At the same time, as researchers, we should acknowledge that those claims are influenced by our own subjectivities and the meanings we give to action, and thus we should also stay away from epistemic positivism (Prowse 2008; Sayer 2004). A critical realist approach is well aligned with realist political ecology as proposed by Forsyth (2001), as realist political ecology recognizes a biophysical reality separate from human experience that cannot be uncovered in an absolute way, while acknowledging the social and political construction of how that reality is understood and communicated.

Sayer (1997) raises an important caveat to common critical realist approaches. He warns that critical realism can downplay the difficulty and contestability of normative judgments. Critical realism underscores that explanations gathered through empirical evidence enable us as researchers to make judgments on a situation and that those explanations indicate to us what critical standpoint we should take. Instead of downplaying our normative judgments, Sayer calls for an open-ended moral debate. Even with thorough empirical evidence, normative judgments will be made when deciding what the problem is, what ought to happen, and where responsibility ought to lie. The degree of interconnection of many societies means that a small change can have multiple unintended, even damaging, consequences. Thus, finding alternatives that would benefit diverse groups is increasingly difficult (Sayer 1997:483–485).

I can relate to Sayer's call for recognizing our normative judgments, yet I would like to highlight that our normative positions are not static and are influenced by the research process itself. Through this research journey I have reflected on my normative judgments, and I have found myself changing my views on who may be responsible for the current situation of peri-urban dwellers (e.g., the local, national state, the dwellers themselves), as well as on who should be responsible for taking action towards improving their wellbeing, and debating what such an action would look like. In an area as complex and dynamic as the peri-urban area (PUA), there are no single causal explanations, and solutions are even less clear as they often come with benefits for some and drawbacks for others. In that sense, I have taken a reflexive approach to science, engaging in a dialogue of mutual learning with research participants, and additional 'dialogues' with local and 'higher' level processes, as well as with theory (Burawoy 1998; Popa, Guillermin, and Dedeurwaerdere 2014). It is through these dialogues that my own views have been

shaped and reshaped during the research process (Brydon-Miller, Greenwood, and Maguire 2003). While my own normative judgments have influenced this research, I have tried to give voice to peri-urban dwellers themselves and let their judgments surface over my own. My attempts to do this include letting participants choose the most important stressors in their lives, and analyzing those, as well as adding direct quotes throughout the text to highlight research participants' perspectives on different issues.

Methods

> As social scientists we are thrown off balance by our presence in the world we study, by absorption in the society we observe, by dwelling alongside those we make 'other' (Burawoy 1998:4)

This research is a qualitative research based on a case of peri-urbanization in low-income areas of the Global South. I have selected Bogotá in Colombia as a case study through which I study the socio-environmental impacts of peri-urbanization on peri-urban populations. Doing qualitative research has allowed me a more detailed view of the participants' perspectives through observation and detailed interviewing (Silverman 2005). My research is based on the extended case study method as presented by Burawoy (1998), whereby reflective understanding is brought to an ethnographic study by building on theory, moving between the 'micro' and the 'macro', and connecting the present, the past, and anticipating the future (Burawoy 1998:5). I cannot claim, however, to have done ethnography given the limited periods I spent in the field. I will explain my research methods further below in this chapter. I do take, however, an ethnographic approach to writing (Bryman 2008) in the sense that I describe in great detail what life entails in PUAs, in the hope that this thesis becomes a journey for the reader through the PUAs of Bogotá.

Consistent with the extended case study method, I combine local processes with macro processes by linking observations and interviews to historical and macro social forces that have contributed to shaping the 'local' (Burawoy 1998; Prowse 2008). I therefore combine ethnographic methods (including in-depth interviews and observations) with an ethnographic writing approach, where I focus on people's insights from their everyday lives, with statistical information and analysis of local and national policies. Delving into the details of life in PUAs serves to help understand the complexity of the socio-environmental transition taking place in PUAs, providing analytical insights into the issue of peri-urbanization applicable to similar settings (Silverman 2005), while also recognizing that issues are very context dependent and certain aspects are relevant only in certain circumstances (Byrne and Ragin 2009).

Study Areas

To study peri-urbanization in Bogotá, I selected the borough (*localidad*[6]) of **Bosa** in the southwest of the city, as well as the neighboring municipality of **Soacha** (see Figure 2) as study areas. A quick drive through Bosa (especially if done through the highway (*autopista sur*), which is the southern exit of the city (and connects the city with the south and southwest parts of the country), would give the impression that the borough is a consolidated urban area; this is corroborated by the current land use plans which designate the whole borough as either urban or an urban expansion zone. However, as this thesis will illustrate, many neighborhoods in Bosa are located at what could be identified as the urban-rural interface (see Figure 3). In addition, some areas (even if they represent a small portion of the borough) still present rural-like characteristics, with low population densities, as well as agriculture and cattle raising being the main livelihoods strategies of the population. Soacha was chosen as a case to study the extent to which PUAs are also present beyond the administrative limits of a municipality and the implications of this.

I selected Bosa and Soacha as study areas because the areas have experienced significant urbanization. I will introduce the extent of this growth in the next section, and cover it in detail in chapter 5. From the start of my thesis I have been particularly interested in exploring hydro-social relations through looking at access to water and sanitation, waterbodies as a resource for irrigation and flood control, and water as a stressor (e.g., in the cases of extreme precipitation events and floods). Given this interest, Bosa and Soacha were also appealing because of their interesting hydrological features, including several rivers and wetlands crossing and bordering the areas. In addition, the politics of access to water between the municipality of Bogotá and Soacha were especially contentious when I started to explore potential case studies in 2012. At that time, the mayor of Bogotá had just declared that provision of water by the city's utility company should prioritize Bogotá (even though several other municipalities, including Soacha, benefit from those services).

[6] *Localidades*, translated roughly as boroughs, are an administrative subdivision of the municipality of Bogotá. The municipality of Bogotá is divided into 20 boroughs.

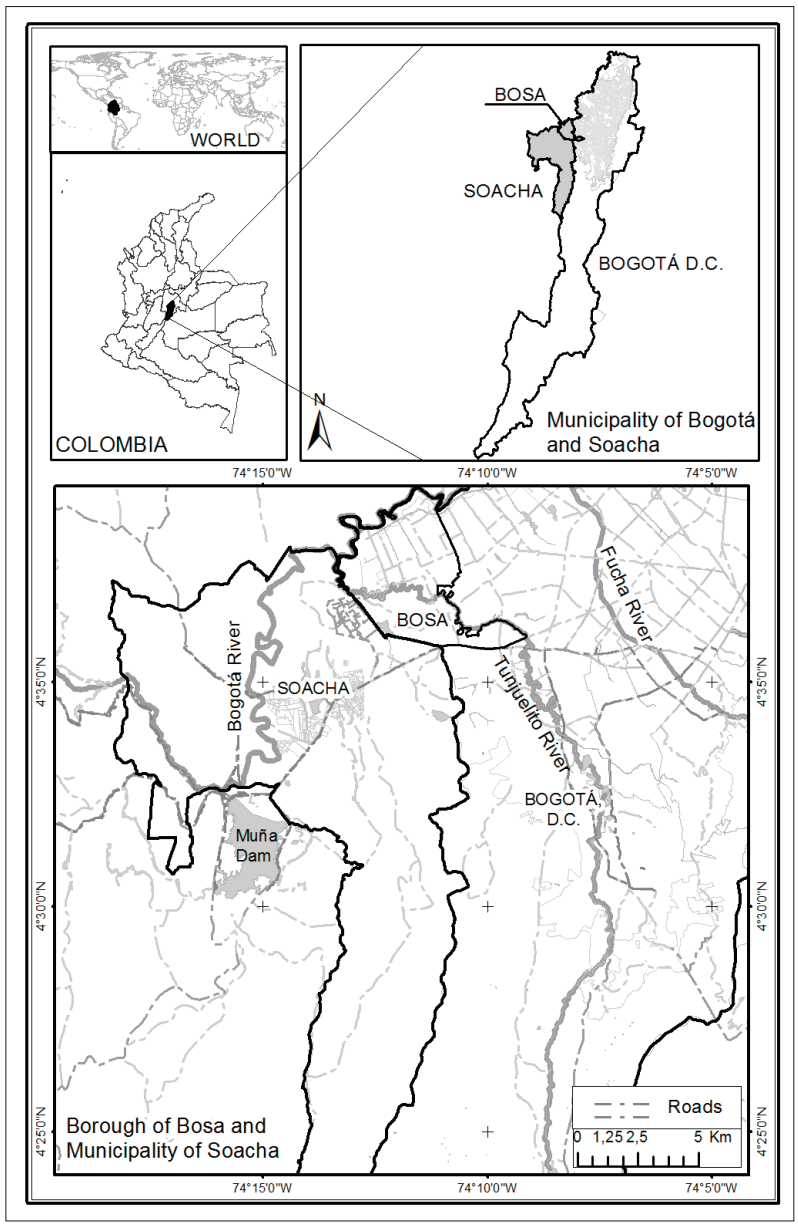

Figure 2. Maps of Colombia, Bogotá and Soacha

Lower box depicts the borough of Bosa and the Municipality of Soacha. Also note the Bogotá and Tunjuelito Rivers crossing and bordering both areas. Source: Cadaster of Bogotá database and IGAC database 2016. Map developed by Karem García.

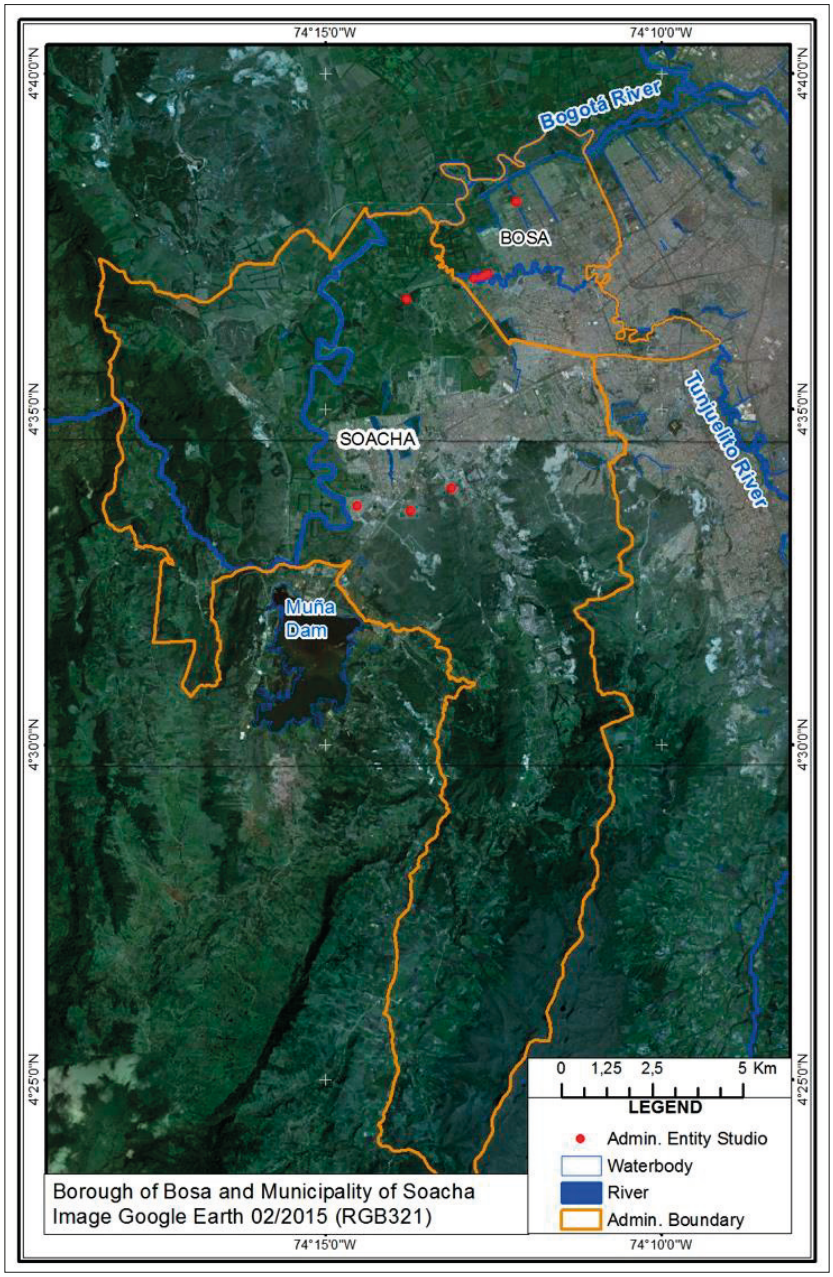

Figure 3. Satellite image of borough of Bosa and Municipality of Soacha

The gray patches represent built-up areas, while the green and brown areas represent farmland and idle land. The red dots show the selected field sites. Source: Google Earth, 2016 CNES/Astrium, DigitalGlobe. Date of image: 01/02/2015; Cadaster of Bogotá database 2016 and IGAC database 2016. Map developed by Karem García.

The research I present and analyze through this thesis is based on fieldwork in Colombia between March and May 2013, and between April and June 2014. I also conducted shorter exploratory fieldwork in Medellín and Bogotá in September and October in 2012, which I used as a first step to refine my research questions and choose my study area. I chose the community level, in this case the neighborhood (or rural settlement, when applicable) as my analytical unit of study.

Community Level as Unit of Analysis

First, it is important to clarify what I mean by 'community' and 'community level'. With community I refer to both a territorial or geographic notion and a relational notion (McMillan and Chavis 1986). Community in broad terms refers to an aggregate of people who share common activities or beliefs and are bound by geographic or relational factors (Brint 2001). Throughout most of this thesis, the concept of community relates to a geographic notion, where community refers to a group of people who live in a shared geographic location, a neighborhood or a *vereda*. I may also use interchangeably the concept of neighborhood and community. A neighborhood in Colombia is an administrative subdivision of an urban area of a municipality. Neighborhoods vary in size but are identifiable units; the identification is usually done based on shared physical characteristics and boundaries, which can include morphological or spatial changes (López Gil 2014). As I am studying peri-urbanization, the concept of neighborhood does not apply to all the study areas. In particular the areas that are still considered rural in land use plans, the official administrative designation refers to *vereda* (rural district).

In addition, while most field sites are defined by the official neighborhood/*vereda* administrative division, there are a few exceptions, as I will present in detail during the respective chapters. The neighborhood in San José II in Bosa serves as an example (I will introduce and analyze the area in chapter 6). The official delimitation (i.e. as depicted in the municipal land use plans) and name of the neighborhood differ from those the inhabitants of the area use. Furthermore, the selected field site in San José II does not include the whole neighborhood, but rather a section of the neighborhood where people share not only a geographic location with identifiable boundaries, but also where many share a common livelihood, agriculture. The community level then refers to processes taking place at the level of that geographic location, be it a neighborhood, a *vereda*, or a section of a neighborhood.

The geographic notion of community does not exclude that such a community may also share a belief, practice, or identity. At the same time, when referring to the geographic notion of community, it cannot be assumed that members of that community share a sense of community as proposed by McMillan and Chavis

(1986). In their theory of sense of community, McMillan and Chavis (1986) suggest four key elements, membership, influence (a sense of mattering and making a difference to a group), fulfillment of needs, and shared emotional connection. These elements allude to relations of trust and social cohesion, and thus they require some level of social capital. As I will discuss in later chapters, several of the study areas show signs of limited productive social capital (McIlwaine and Moser 2001), and thus there is not necessarily a strong sense of community. In the peri-urban transition zone, relations of trust and social cohesion are not static, instead they are being built or eroded through the peri-urbanization process. To that end, I will discuss in the analysis of the empirical material how peri-urbanization has influenced social capital. As noted by Brint (2001), concepts such as social capital share some similarities to the relational notion of community (McMillan and Chavis 1986), as they emphasize the existence of social structures and ties, as well as the motives underlying social relations.

I will also use the notion of community as relational (McMillan and Chavis 1986), when referring to particular groups that share an identity, activity or belief, and where group relations are not necessarily limited to the geographic units of neighborhood or *vereda*. The Muisca indigenous population is such an example. Muisca indigenous population in Bosa can self-identify as indigenous and join the *Cabildo* Muisca of Bosa (indigenous organization). The community of Muisca indigenous population refers to the group of people who belong to the *Cabildo*. In this case, community has both a geographic and a relational connotation. Geographically the community is located in Bosa, but is not limited to one neighborhood alone, and the indigenous identity is one of the underlying motives of interaction. I will talk about the Muisca indigenous population in more detail in chapters 5 and 6.

Relevance of the Community Level

The community level can be considered a 'meso' level between the household level and larger units of analysis such as the borough or the municipality. I consider the community level an appropriate level to understand the socio-environmental dynamics of peri-urbanization, which are driven by multi-scalar processes but are manifested in changes on the landscape and the livelihoods of the population. The community level brings attention to collective processes of neighborhood formation and development. This unit of analysis is also used to reflect both the collective imaginaries of the territory as well as the experiences of individuals whose everyday lives give meaning to these territories (Escobar 2000).

By using the community level, I hope to complement and enter in dialogue with the urbanization and vulnerability studies done at the household and individual level (e.g., Lampis 2009; Moser 1998) and those at the municipal, regional, and national level (Dávila et al. 2006; e.g., IDEAM et al. 2014; O'Brien et al. 2004). Focusing

the research at the meso level may seem, at times, to miss the bigger picture or fail to acknowledge the importance of macro-level societal structures. However, guiding theoretical frameworks, such as political ecology and critical realism, as well as particular analytical choices help recognize that these macro-level structures are ever-present, facilitating and constructing communities' everyday lives. My theoretical grounding also acknowledges the way that actions of people's everyday lives both reinforce and transform these structures (Archer 1996; Prowse 2008). Furthermore, as noted by Burawoy et al. (2000), in order to sharpen the abstractions of globalization theories into more meaningful conceptual tools it is important to study concrete, lived experiences.

A final point about how I understand and utilize the concept of community is that, while the concept groups individuals, it is important to recognize that within groups there are power relations at play, inequalities in status, and conflicts. These relations affect levels of participation and the influence members can exert on the community, and vice versa the community on its members.

Colombia

In 1993, Bushnell wrote "Colombia is the least studied of the major Latin American countries, and probably the least understood" (Bushnell 1993:vii). More than a decade later this statement still holds true. Colombia is a highly urbanized country with about 74% of its population concentrated in urban settings (UN-HABITAT 2015). As recognized by Lampis and Fraser (2012), research on urban dynamics in Colombia has focused on urban violence, poverty, migration, the provision of public services, access to housing and land, and urban institutions. Research integrating urban social development, livelihoods, poverty, and the environment, however, is very limited. Contributing to filling this gap is one of the aims of this thesis.

As I will explain in chapter 5, Colombia's fragmented geography has played a major role in shaping the development of the country. The Andes mountain chain splits into three separate *cordilleras* that branch off from each other just north of the border with Ecuador and run more or less in a north-northeasterly direction and influence hydro-climatic conditions as well as economic and infrastructure development, and human access (Bushnell 1993; Montenegro 2006; Poveda, Álvarez, and Rueda 2011). Colombia's equatorial location combined with its fragmented geography, atmospheric circulation patterns from the neighboring tropical Pacific Ocean and Caribbean Sea, and strong land-atmosphere feedbacks constitute complex hydro-climatological features (Poveda et al. 2011). These features include a bimodal annual precipitation cycle marked by rainy seasons between April and May, and September and November, and drier conditions between December and February, and June and August. Topography plays an

important role in rainfall patterns, with strong variability even within limited spatial areas (Poveda et al. 2005, 2011).

Furthermore, global and regional scale climate processes influence rainfall patterns in Colombia. El Niño Southern Oscillation (ENSO) is the main mechanism dictating interannual climate variability, influencing regional scale processes such as the CHOCO jet and land-atmosphere feedbacks. I will not cover in detail the hydroclimatic dynamics over the Colombian territory as it falls outside the main scope of this thesis (for more information see, for instance, Poveda et al. 2011; Steinhoff, Monaghan, and Clark 2015). In general, El Niño, the warm phase of ENSO, produces drier than normal conditions and more prolonged dry seasons in the Andes of Colombia, and thus in the Bogotá metropolitan region. In contrast, La Niña, the cold phase of ENSO, produces wetter than normal conditions and more prolonged wet seasons (Poveda et al. 2011; Steinhoff et al. 2015). As will be shown later in the thesis, these climatic patterns have direct impacts on the vulnerability of peri-urban populations of the study areas. In particular, the impacts of wetter conditions and prolonged wet seasons under La Niña will be illustrated in chapters 6 and 8.

Bosa, Bogotá

Bogotá is the political capital and the main economic center of Colombia. It has a population of about 6.8 million within city limits or 7.7 million with inclusion of the metropolitan area (based on the last census in 2005). The city has experienced significant growth in the past 100 years in all cardinal directions (Thibert and Osorio 2013). Approximately 23% of Bogotá's urban area consists of informal settlements that house approximately 2.5 million inhabitants (Secretaría Habitat, 2009). In the south and southwest of Bogotá, about 90% of settlements started informally (Dávila et al. 2006).

The borough of Bosa, located in the southwest of the city, has experienced significant growth, consistent with the trend in Bogotá. The borough has an estimated population of 613,000 consisting primarily of low-income households, with classifications of strata[7] 1 and 2 assigned to the bulk of houses (Secretaría Distrital del Hábitat 2011). The borough has grown significantly over the past four decades, and the growth has been rapid and messy (Alcaldía Mayor de Bogotá D.C.

[7] 1 is the lowest socio-economic level out of 6 according to Colombia's stratification system. Stratification is assigned based on neighborhoods' outdoor infrastructure (including outside appearance of houses) and accessibility to public utilities and services (DANE 2013).

2015). To illustrate this, one can look to population growth: in the 1990s the estimated population of Bosa was around 200,000 inhabitants (Durán Bernal 2005), and has since more than doubled with current estimates at about 508,828[8] (Alcaldía Mayor de Bogotá D.C. 2015). Most of the boroughs growth has been through informal settlements (Alcaldía Mayor de Bogotá D.C. 2015). Consequently, Bosa is one of the boroughs in Bogotá with the highest number of informal areas (Secretaría Distrital del Hábitat 2007). Population growth is expected to continue and by 2050 the population is estimated to reach over 1 million (IDEAM et al. 2012a:42–43).

Soacha

As noted by Roy (2009), 21st century cities make a fool of census jurisdictions. The conurbation of Soacha to Bogotá provides a clear example. The municipality of Soacha, which borders Bogotá to the south, has experienced significant growth over the past 25 years, mainly due to migration and forced displacement. Annual population growth of the municipality continues at high rates, with a growth rate in 2009 of 4.8%. This growth rate is much higher than the national average (1.25%) and of Bogotá's (1.48%). As a result, 79% of the population of Soacha come from other parts of the country, and only 21% were born in the municipality (Alcaldía de Soacha and PNUD 2009). Immigration includes migrants from other parts of the country and low-income residents of Bogotá searching for cheaper housing. Many workers who commute to Bogotá daily reside in Soacha.

Soacha has an estimated population of 489,000 (DANE 2015b), however this estimate is based on the last census in 2005, and is at present considered to be highly underestimated. The population is expected to continue increasing in the next decades, with projections suggesting that the population will reach over 1,800,000 by 2050 (IDEAM et al. 2012a:42–43). The latest land use plan recognized that the municipality is one of the municipalities in the country with the most physical, spatial, and environmental disorder (Alcaldía Municipal de Soacha 2000). The municipality is divided into 5 urban districts (*comunas*), with 381 neighborhoods, and 2 rural districts (*corregimientos*)[9]. Approximately 41% of the 381

[8] It is worth noting that the official website of the Municipality of Bogotá that gives an overview of Bosa has 2 different estimates for the population: first it puts the population at 508,828 inhabitants, further below it estimates 501,460 inhabitants (Alcaldía Mayor de Bogotá D.C. 2015). The National Statistics Office (DANE) did the last official census in 2005. The population of Bosa then was calculated at 495,283 and the population for 2015 was projected at 646,833 (Secretaría Distrital de Planeación de Bogotá 2009).

[9] In contrast to Bogotá's division into *localidades*, other municipalities, such as Soacha, use *comunas* as municipal administrative divisions of urban areas that include several neighborhoods. Rural areas within the municipality are referred to as *corregimientos*. *Corregimientos* are composed of several *veredas* (or rural settlements). Soacha has six *comunas* and two *corregimientos*.

neighborhoods are informal. A majority of these settlements are located in high-risk areas and present the highest poverty rates of Soacha's urban area (Alcaldía de Soacha and PNUD 2009).

Data Collection and Analysis

Data Collection

Through the research process I have attempted to be consistent with my chosen unit of analysis; the community level. I designed my fieldwork accordingly. In 2013, I visited about 20 neighborhoods in Bosa and Soacha and conducted 59 semi-structured interviews with neighborhood leaders as well as local government officials of the borough of Bosa and the municipality of Soacha. All interviews were conducted in-situ. A combination of purposive and snowball sampling (Bryman 2008) was carried out, whereby local leader interviewees were selected based on their leadership roles in the neighborhoods (usually members of the board of the community action boards– *Juntas de Acción Comunal*[10] - JAC) or as founders of the neighborhoods. I also conducted narrative walks (Jerneck and Olsson 2013) with community members to better understand the socio-environmental dynamics of the areas visited. In addition, I conducted what I would refer to as 'narrative drives', where, given the spatial extent of Bosa and Soacha, I would drive with a community leader through different neighborhoods and areas they deemed relevant to get a better sense of the areas based on the topics I told them I was interested in exploring.

During the interviews, and narrative walks and drives I focused on questions related to how settlements had been founded and developed, with a particular temporal focus on the period between the 1980s and present. I asked questions about how the settlements accessed water and sanitation during early stages to present, how the legalization of areas that started informally had taken place, and the main challenges they faced today in their everyday lives. To local government officials I mainly asked about the general contextual history of the areas, and the development of the areas and the policies that had accompanied these developments. By meeting with officials, I also gained access to reports and maps that are not easily found online.

Fieldwork in 2013 helped me become familiar with these large areas, build contacts with local leaders and inhabitants, and help me narrow down the areas that I would

[10] Juntas de Acción Comunal – JAC: Community action boards at the neighborhood level, which have a board elected by popular vote and works on a voluntary basis (National Decree 1930/1979). For a more thorough description see Hataya (2007: 149).

focus on during my next fieldwork period. Table 2 summarizes the research process during fieldwork in 2013. Many of the neighborhoods visited in 2013 can no longer be considered part of the peri-urban landscape, as they have been completely absorbed by and integrated into the city. However, most neighborhoods that have been absorbed by the city, if not all, share a similar settlement pattern, where settlements were built on former farmland or idle land. Early settlers recalled stories of the existence of dairies and crops either within the settlements or right next to them. The development patterns and processes characteristic of these neighborhoods that were once peri-urban are useful to understand the changes Bosa and Soacha have undergone in the last few decades and, without being too deterministic, the changes that may be ahead for current peri-urban informal settlements.

Table 2. Summary of research process during fieldwork March- May 2013

Data collection	**Fieldwork 2013 – Bosa (Bogotá) and Soacha**
What	- Development of study areas from 1980s to present: landscape and access to water and sanitation - Main actors, drivers of change
Who	- Community leaders: Members of JAC, founders of settlements or early settlers - Government officials of Bosa, Soacha, regional and national level (e.g., IDEAM, CAR, IGAC) - Academics and representatives of NGOs
How	- Narrative walks and drives - *In-situ* semi-structured interviews - Participant observation
Data analysis	
How	- Policy document analysis - Identification of salient themes; focus on patterns in neighborhood formation, access to water and sanitation, formalization process - Contrast of settlement processes in Bogotá and Soacha - Identification of particularly vulnerable groups and areas; identification of key constraints to wellbeing and main stressors

Being introduced to community leaders was initially thanks to personal contacts established through a friend or relative's co-worker or acquaintance. I also contacted key local government officials (such as the persons in charge of housing planning in Soacha and Bosa) who gave me the contact information of community leaders in different neighborhoods. The initial contacts in Bosa and Soacha quickly snowballed into introductions to community leaders (usually representatives of the JAC) and invitations to meetings where community leaders would be present. Such meetings included a meeting of all presidents of the JACs of Bosa, a meeting of the local environmental board of Bosa, and a meeting organized by the police in Soacha with residents of different neighborhoods. All of these meetings were sites of participant observation. During these meetings I would normally introduce myself and ask for the contact information of as many attendees as I could, with whom I

would later follow up to request an interview. Both Bosa and Soacha are recognized as being areas with high levels of insecurity, thus arriving to neighborhoods with a local inhabitant was very important and recommended by residents themselves for safety reasons.

I recorded all interviews when authorization was given (only one decision maker in Soacha did not consent to be recorded) and took notes during the interviews. I also took photos and videos, and recorded the paths I took during the narrative walks and drives with a Global Positioning System (GPS). I also marked the position of every interview with the aid of the GPS. I made a photo fieldwork diary where I added comments to the pictures I had taken, describing the persons met, the location, and a summary of the issues discussed. I organized the pictures daily by location. After fieldwork, I transcribed the interviews and notes. As people described places and changes to the landscape in the recordings, having the photo fieldwork diary was extremely useful to relate descriptions with images and videos. Marking the paths and key locations with a GPS and transferring them to Google Earth has also been very useful and allowed me to recap my steps from a bird's-eye view, reflect on the landscape features of the areas visited and their surroundings, and connect them to people's accounts of their everyday challenges and opportunities.

Throughout this thesis, I have included a variety of images from the field. I consider that often there is no better way to illustrate the encroachment of the city into farmland, or the strategies peri-urban dwellers have adopted to build their neighborhoods and transform the landscape, than with a photo. Therefore, this thesis is full of pictures that I took throughout the research process. Unless otherwise noted, I took all pictures and developed the figures that accompany this text. Karem García, a cadaster engineer, developed most maps in this thesis. I also use direct quotes in the text to give voice to the research participants and let their words illustrate the issues at hand. In the quotes derived from interviews I provide the first name of the respondent, but to maintain anonymity I do not provide a last name (I requested authorization from participants to do so). Quotes from focus groups discussions do not include names as they were not recorded in the written or audio records.

Following analysis of the data from fieldwork in 2013, I identified that the study areas (Bosa and Soacha) have four main types of settlements, which make up the PUA, namely:

> i. Agriculture-based settlements (primarily 'rural'): Settlements with predominantly rural-like characteristics where the bulk of the population relies on agriculture as their main livelihood strategy;

ii. Informal settlements: Settlements without formal land titles and/or constructed outside of the judicial, administrative, financial, and technical norms (Dávila et al. 2006);

iii. Formal settlements: These include areas initially rural or informal, which consolidated as urban over time and were legalized by the government. It also includes areas that were granted approval to develop as urban neighborhoods, and construction of houses and utilities was done partly by house owners.

iv. State-subsidized housing: Large-scale state-subsidized housing developments intended for low-income populations.

These settlement types are not exclusive or absolute. The four described settlements share their location at the interface of the consolidated urban areas and the open fields characteristic of the rural areas, and are in the midst of socio-environmental transition.

I went back to Colombia in 2014, to explore what life in PUAs entails for the populations of these different settlements from the perspectives of wellbeing and vulnerability at the community-level. Table 3 summarizes the research process during my field visit in 2014. To be consistent with my analytical unit, I chose to carry out focus groups in settlements that represented the abovementioned types. Focus groups involve the process of understanding and negotiating different perspectives that exist within a group of people, and can help provide insights into community perspectives and dynamics that surround a set of specific issues (Reed and Payton 1997). Focus groups can also be an effective method for exploring the complexities associated with people-place relationships (Skop 2006:121).

To contrast the experiences of the inhabitants of Bosa and Soacha, I decided to select one neighborhood/community per settlement type in each of the study areas. I selected the field sites for the focus groups through purposive sampling (Bryman 2008) based on my findings and experience from fieldwork in 2013, analysis of maps and satellite images, as well as guidance from local leaders and local government officials in charge of planning. I conducted eight focus groups, four in Bosa and four in Soacha. Figure 4 shows the location of the focus groups[11], and Tables 4 and 5 briefly introduce the neighborhoods/areas selected. I provide a more detailed introduction to the areas in other chapters, as shown in tables 5 and 6.

[11] A similar map can be found on the inner back cover of the book to help the reader better locate the field sites throughout the thesis.

Table 3. Summary of research process during fieldwork April – June 2014

Data collection	**Fieldwork 2014 – Bosa (Bogotá) and Soacha**
What	- Environmental, social, economic, and political dimensions of life in PUAs from 1980s to present - Main socio-environmental changes and drivers of change - Most pressing stressors, impacts of materialized stressors and coping strategies
Who	- Inhabitants (particularly community leaders of selected settlements) - Members of *Cabildo* Muisca of Bosa - Government officials of Bogotá (at municipal level and at borough level, i.e., Bosa), Soacha - Academics and representatives of NGOs
How	- Focus groups - Individual questionnaire at the beginning of focus group - Narrative walks and drives - *In-situ* semi-structured interviews - Participant observation
Data analysis	
How	- Policy document analysis, analysis of hydrogeological, hydrological, and risk maps - Iterative analysis of: * Main factors contributing to and hindering wellbeing * Dynamics of vulnerability: exposure to stressors, sensitivity, capacity to respond, and responses to impacts; root causes of vulnerability

It is important to underscore, that since these settlements are part of the socio-environmental transition taking place through peri-urbanization, they are under a constant process of change and thus are not static. Consequently, since these areas are undergoing fairly rapid change, the conducted research can only claim to cover a 'timeslice' of what has happened in the past 3-4 decades in these areas (from the 1980s to mid 2010s). As changing areas, and given expected population changes, it is also important to recognize that what could currently be considered peri-urban will most likely be 'absorbed' by the city in a matter of years, or decades at most.

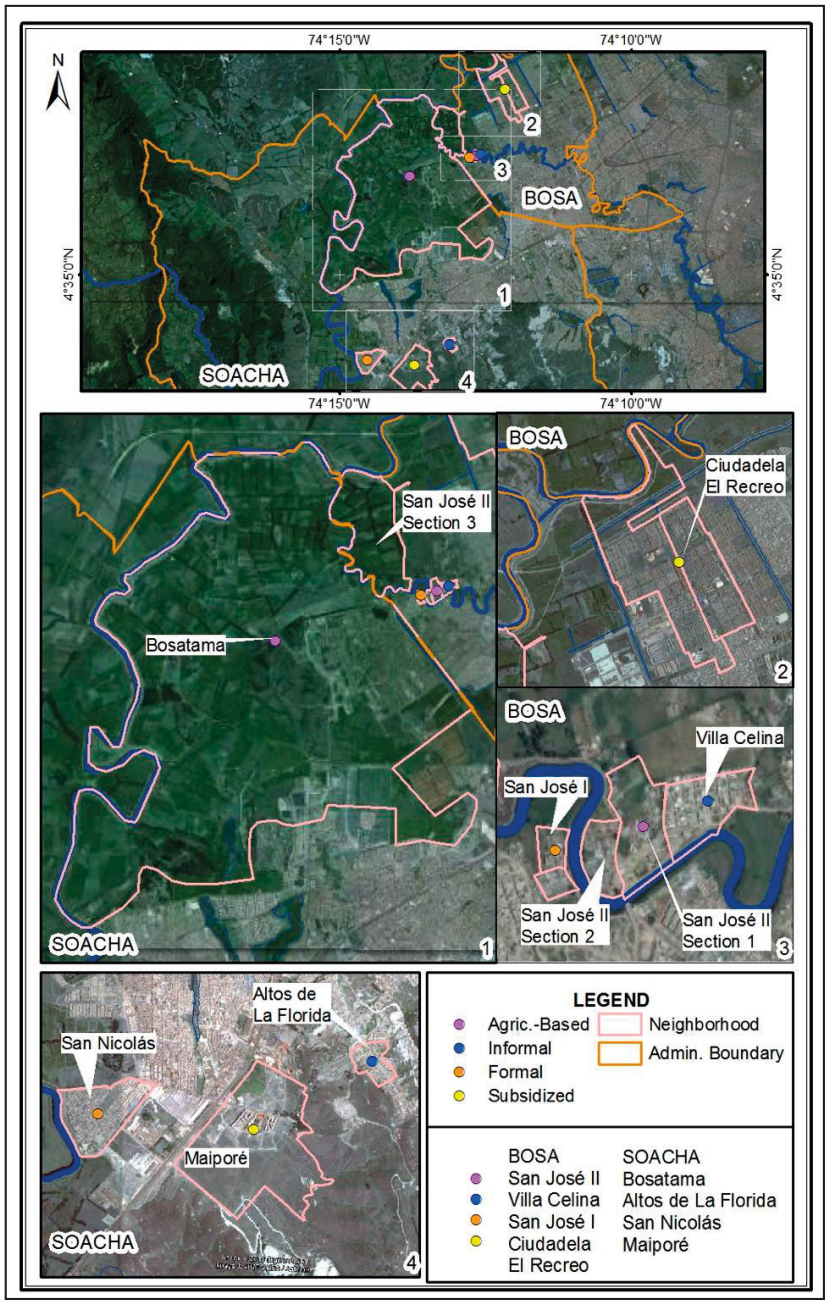

Figure 4. Settlement types and selected field sites

Polygons and points mark selected field sites in Bosa and Soacha. Source of satellite image: Google Earth, 2016 CNES/Astrium, DigitalGlobe. Date of image: 01/02/2015; Cadaster of Bogotá and IGAC database 2016. Map developed by Karem García.

Table 4. Selected field sites for focus groups in Bosa, Bogotá

Type of Settlement	Neighborhood/area	Description of areas	Chapter
Agriculture -based	San José II	Borders Tunjuelito River; in some land use plans appears as San Bernardino XXV. Residents of Bosa often refer to it as the *vereda* (rural settlement) of San José II. I identified 3 distinct areas in San José II. The focus group took place in one of these areas (to the west), where most of the households are agricultural. About 15 families live in this area.	6
Informal	Villa Celina	Adjacent to Tunjuelito River. Borders eastern section of San José II. Approximately 250-300 live in neighborhood.	7
Formal	San José I	Borders Tunjuelito River. To access neighborhood, a squatter settlement (called Rincón de San José) must be crossed.	8
Subsidized	Ciudadela El Recreo	Near Bogotá River. Ciudadela El Recreo has many housing developments. Focus group took place in the housing development called Reservado 3, which is one of the developments located closest to the river.	8

Table 5. Selected field sites for focus groups in Soacha

Type of Settlement	Neighborhood/area	Description of areas	Chapter
Agriculture-based	*Vereda* Bosatama	Delimited by the Tunjuelito River and the Bogotá River. It borders a large subsidized housing development project called Ciudad Verde. This area used to be part of the *vereda* (rural settlement). It also borders Bosa.	6
Informal	Altos de la Florida (sectors I, II, III, El Retiro)	Located on a hill. The neighborhood has 4 sectors: I, II, III and El Retiro. Part of the neighborhood is located higher than 3000 m above sea level (which is considered the limit to urbanization due to the protection of high mountain ecosystems).	7
Formal	San Nicolás	San Nicolás has several sectors. It borders the Bogotá River. The sectors started for the most part formally, with plots subsidized by the former urbanization institute of Colombia (INURBE). Many of the houses were self-constructed, water and sanitation infrastructure also were initially constructed by inhabitants. At the time of fieldwork they had an area in San Nicolás that was a squatter settlement on the river's protected floodplain. Families living there were evicted later in 2014 and houses torn down.	8
Subsidized	Ciudadela Colsubsidio Maiporé	Maiporé housing development currently has 3 areas. Focus group included residents of 2 (Ambalema and Barichara). Area is at a foothill, borders *autopista sur* (higway) and the El Vínculo and Cola de Tierra Blanca wetlands (part of the Tierra Blanca wetland).	8

Throughout the research process, I constantly reflected on my role and position in relation to the research participants. While my research is not participatory action research in the strict sense of the concept, I applied certain principles and methods from these approaches (Brydon-Miller et al. 2003; Streck 2014). I wanted the research process to be participatory and democratic, and whenever possible to reduce the vertical power relation between me, as the 'researcher', and the 'participants'. One strategy I took was to involve community leaders in the organization of the focus groups. I consider 'community leaders' as those inhabitants who are members of the JACs, and usually held the role of president or secretary. In a few areas, local politicians or government officials in charge of community participation directed me towards inhabitants who were particularly active in matters related to the neighborhood (e.g., participating in meetings with the municipality or making claims to government officials on behalf of the community). I also considered early inhabitants of the community who have been active in the development of the community to be community leaders. Early inhabitants include inhabitants who had lived in the area for several decades, either before peri-urbanization reached the area, or as founders of the area (and thus agents in the peri-urbanization process).

In most cases I visited a research area first and agreed with a community leader or a few residents on the time and place of the focus group, then left invitations with the community leader. The community leader took the lead in inviting other residents to participate in the focus groups. While I believe this process empowered community leaders as representatives of their communities and active participants of the research, it also comes with biases that should be recognized.

The time of the focus group influenced who was able to participate. Most focus groups took place on a Saturday, in the evening or early in the morning to try to accommodate the schedules of the residents and avoid conflicts with working hours. In the agriculture-based areas, for instance, the focus groups were scheduled so that they would not conflict with milking times. Even when working schedules and local dynamics were taken into consideration, participation was not guaranteed. We had to cancel the first attempt at a focus group in Ciudadela El Recreo in Bosa because only two people came to participate.

Furthermore, given that community leaders were in charge of inviting participants, inhabitants with animosity towards community leaders may not have participated, meaning that their opinions may not be reflected in the research. At the same time, I argue that participation of members of the JACs together with other inhabitants of the areas helped build a neighborhood/area-wide perspective on some of the most important issues in each area beyond the household level.

The number of participants in focus groups varied from about 5-20 participants. In most focus groups there was a higher presence of women. At the beginning of each

focus group, participants were asked to fill out a short questionnaire.[12] The questionnaire was intended to grasp some individual experiences that may be lost due to group dynamics. During the focus groups, participants were asked to identify the most pressing issues that most influenced their everyday lives with respect to the environment, access to basic services (e.g., water, sanitation, electricity), society, and the economy.

I guided the focus groups by posing questions and then creating mental models in the form of causal flow diagrams on large pieces of paper, inspired by the methodology described by Bunce et al. (2010) and Stein and Moser (2014). Mental models, such as causal flow diagrams, help explore linkages and feedback loops among complex issues (Bunce et al. 2010). A research assistant (or, in some cases, research assistants) helped me take notes, pictures and videos. I asked the research assistant to highlight in their notes issues that consumed a considerable amount of the discussion, and whether there was agreement or disagreement among participants. All focus groups were also recorded. During focus groups, I tried to revisit the topics discussed and the causal relations noted on the large papers to confirm I was representing the group's views appropriately. At the end of each focus group participants were asked to select 2-3 priority topics raised. The topics with the most 'votes' were then discussed in relation to potential solutions and ways forward. All focus groups were recorded.

Data Analysis

Data analysis of the material from both fieldwork trips included several steps. First, I transcribed all fieldwork material, including recordings, notes, questionnaires from the focus groups, and transferred all GPS data points and paths into maps. As a native Spanish speaker all interviews and focus groups were done in Spanish. I translated to English as I transcribed the material. While transcribing, I also included in Spanish quotes, expressions, or words, which had particular cultural connotations not easily translated. After transcribing, I analyzed all material in an iterative process. I began by organizing the data using different themes in mind, then found recurring patterns and highlighted unique issues. Then, I filtered the data and narrowed the scope to the most salient issues and themes. The material was then analyzed again with these themes in mind while moving between theory, research questions, and empirical materials. I did not use any qualitative data analysis software. Instead, I created my own databases using large Excel tables with different tabs wherein I would explore the data through different analytical lenses.

[12] A few participants were illiterate. In those cases the research assistant or I helped them fill out the questionnaire by reading the questions and writing down their answers.

As the empirical material was very rich, a challenge I encountered during analysis was that of simplifying and focusing on the most salient features without losing the contrasting voices present within different groups and without underplaying the complexity of the issues at hand. One of my main interests in pursuing this PhD was to understand the multidimensional complexity of peri-urbanization as it relates to vulnerability; with consideration of the temporal, spatial, and agency-structure dynamics that underline the processes occurring in PUAs, and that have an indirect and direct effect on people's wellbeing. In academic articles dealing with PUAs and with vulnerability to multiple stressors, I was often left with the impression that given a word-limit and the need to focus on specific issues, the complexity was acknowledged but not necessarily clearly illustrated through empirical evidence. I recognize that this thesis deals with a significant amount of detail and specificities about the case study. This is done with the conscious intention to provide empirical evidence of both the heterogeneity of PUAs and the interrelation between different socio-environmental stressors.

When coding focus group data, I focused on the content of what people had said and the topics discussed rather than on who said it (Reed and Payton 1997). When disagreements over a topic occurred, I noted them but I did not specify which participants disagreed. I concur with the argument made in Reed and Payton (1997) that interpretation of focus group data was only possible because of prior in-depth qualitative research. In my case, the in-depth interviews, and narrative walks and drives I conducted in 2013 and 2014 prior to the focus groups, and the analysis of policy documents and reports, were crucial to my understanding of the issues discussed during the focus groups. This is the case because previous research gave me background knowledge helpful for understanding the context of focus group discussion.

Because of my previous research, I brought with me a prior understanding of the areas, how they were organized, how the JACs work, and some of the issues the areas were facing with peri-urbanization, to give some examples. This is not to say that some form of data is 'better' or 'truer' than another, or that complementing interviews with focus groups and vice versa is a sort of triangulation. Instead, it is about recognizing that different methods provide different forms of data developed in particular contexts that can help uncover unique aspects of a given research topic. In that respect, previous qualitative and participatory research facilitates more significant interpretation of focus group data (Reed and Payton 1997).

In parallel and iteratively, through analysis of the empirical data, I analyzed policy documents, reports, and maps related to urban planning, informality, access to utilities and services, formalization processes, hydrometeorological hazards, hydrology, and hydrogeology maps. This analysis included a review of national and

municipal reports, official documents, and legislation within the time frame of 1980-2015 in relation to informality and formalization policies.

Reflections on Research Process

On My Positionality

Bryman (2008:405) citing Van Maanen and Kolb (1985) maintains that "gaining access to people, organizations and places is a combination of strategic planning, hard work and dumb luck." I can closely relate to that statement when I reflect on my research process. While those factors were certainly influential, it has not only been those three that have facilitated (and at times hindered) my access to people. I was born and raised in Bogotá, but left the country to attend university. As is often the case with life one thing led to another, and between university degrees and work opportunities I have not lived in Colombia for an extended period since 2000. I was privileged to grow up in a middle-high income area in the North of the city, during which time my knowledge of Bosa and Soacha was limited to the occasional passing through on my way out of the city heading towards the lower, warmer altitudes.

All the above gave me a position both as a local and an outsider in Bosa and Soacha. Overall, this mixed position helped grant me fairly easy access to the areas and the population. I was grateful for how extremely receptive and open residents were to my research and to sharing their experiences with me. Many saw my affiliation with a European university as an opportunity to communicate abroad their struggles. However, this view was also seen at times with the hope that I could bring aid funding, an expectation I did not want to create and thus one I tried to eliminate. I was also only able to do fieldwork for limited periods of time, which created a feeling of both being present and absent. In the communities I studied, being physically present is important to build trust. Further, it was my experience that keeping in touch is done in person and by phone, and less so through the Internet. In that sense, having done at least two rounds of fieldwork was very important for the participants, as people expressed how much they valued that I had come back, though I must recognize that the periods in between were long (about one year). As is often the case in qualitative research, additional fieldwork could have been beneficial to further clarify some issues and to have time to move from identifying problems to jointly coming up and designing solutions with community members.

I chose to be very clear with the participants that while I hoped my research would be a process of knowledge co-production that they could benefit from as much as I would, I was not associated with any NGO or funding agency and thus did not have access to any funds. I also chose not to take a particular stand regarding the conflicts between several of the communities I visited. I think this has been an important first step to build mutual trust and recognizing that trust needs to go both ways. Participants needed to get to know me to feel comfortable that I did not have a

hidden agenda, that I was not taking sides in the conflicts, and that I was not making false promises. For me, it was also important to feel that people were being honest and their responses were not influenced by anticipation of funding, for example. At the same time, I constantly questioned whether my research would contribute in any way to the communities I studied. I was initially comforted with the idea that "'the capacity to aspire' itself needs to be developed in people who are used to managing in very harsh environments, asking them about their dreams and then beginning to work out how at least some of them might be achieved may in itself be significant" (White 2010:170). While this is just my own palliative, I was gladly reassured, but mostly humbled, by the expressions of gratitude from focus group participants who would thank me for organizing an event during which they learned more about their neighborhood, about the views of their neighbors, and helped build a sense of community.

I must also recognize that my position as a researcher gave me the privilege to access different sources of knowledge, from local inhabitants and policy makers, to technical and policy documents. Furthermore, through my research at the community level I can substantiate opposing arguments on reports based on studies done at a higher level (e.g., municipal level) that may have come to misguided conclusions by excluding issues on the ground. An example of this is a climate change vulnerability analysis done for Bogota's metropolitan region (IDEAM et al. 2012a, 2012b, 2014), which found that, based on quantitative analysis of socio-economic indicators at the municipal level, the municipality of Soacha has the institutional adaptive capacity to adapt to the impacts of climate change. As I will show in this thesis, evidence indicates the opposite; the municipality of Soacha has a very limited institutional capacity to deal with current conditions, even less with additional challenges brought forth by climate change.

Reflecting on the focus groups, I was generally satisfied with the process in each focus group. However, as I conducted them, I also learned how to better structure them, what had worked, and what had not. Thus, while I tried to maintain standardization (Skop 2006) across the different groups, I made minor adjustments to improve the process. For instance, after the first two focus groups I shortened the questions from the questionnaire. I also made some adjustments to how I introduced myself, as well as the topics of discussion. I learned from participating in a focus group organized by an NGO that it was useful to have a short introduction of the concepts. So, from the fourth focus group onwards I gave a short introduction to what I meant by vulnerability and risk. In these introductions I used the concept of risk (*riesgo*), as it was easier to graphically explain than the concept of vulnerability, and its elements of exposure, sensitivity, and adaptive capacity.

I also thought it was important to explain what I meant by risk, as risk can easily be confused with insecurity. I learned this lesson, after talking to a community leader

in Soacha who was going to help me contact other community leaders. After I had explained the purpose of my research I realized that he had understood it as insecurity (economic violence) and thus he invited me to a meeting organized by the police of Soacha where they were going to report on the security situation of the municipality. Along the process, I also realized that clarifying that my research was at the PhD level meant very little and could confuse locals, as the word *doctorado* (PhD) could be associated with a medical doctor or a lawyer. I would therefore normally introduce myself as a university student doing research for my thesis (if asked at what level I would then explain my position as a PhD candidate). Also, being a student was received more openly than researcher. In a few places I got the feeling that researcher created some mistrust of how the results of the research would be used, and it could be misinterpreted that I was a member of an NGO or a government entity.

Instability in Regulations

Things change quickly in Bogotá and Soacha, especially with respect to policies. Municipal policies are often as transitory as the peri-urban space. During this PhD research, a new land use plan (POT) (Alcaldía Mayor de Bogotá 2013) was put into place by then mayor Gustavo Petro. This POT was then contested, blocked, and put into hold. During most of my fieldwork the 2013 POT was on freeze and thus the previous one from 2004[13] was effective (Alcalde Mayor de Bogotá 2004). However, for the few months that the 2013 POT was effective (August 26, 2013 to March 27, 2014) new projects were created, projects that were supposed to be respected and continued. This confusion meant that most people, from local politicians to peri-urban dwellers, were unclear of which land use plan regulations applied to them. While writing my thesis, a new mayor has been elected and taken office (Enrique Peñalosa). Peñalosa is the same mayor who led the original formulation of the POT currently in effect (POT 2004); therefore the 2013 land use plan that was frozen is not going to be put into place. I have decided to remove most discussion regarding the implications of the POT 2013 in Bosa from my analysis, because it is now mostly a source of confusion and has become irrelevant. However, this example serves to demonstrate that things are indeed transitory and it is often difficult as a researcher to keep track of changes and to decide what cut-off date should be given to the analysis of policies and reports. Most of my policy analysis was done in 2013 and 2014, which I have complemented with the analysis of key policy changes in 2015 and early 2016.

[13] Enrique Peñalosa approved the POT currently in effect during his first time as mayor in 2000. Some changes and specifications were made in 2004 and thus I will refer to the 2004 POT for the remainder of the thesis (Alcalde Mayor de Bogotá 2004).

5 Development of Peri-Urban Areas: Peri-Urbanization in the Study Area

> As Marx suggests, there can be no human history without the environment, because human history has been made possible only through the metabolization of the environment through human action (Heynen and Robbins 2005: 5)

This chapter explores how peri-urbanization takes place and the drivers of peri-urbanization at different temporal and spatial scales. As Mukherjee (2015:44) points out, the patterns and processes of urbanization in countries of the Global South have been shaped to such an extent by their colonial history that the realities of today cannot be understood without an analysis of that legacy. In that respect, I start this chapter by looking at the legacies of pre-colonial and colonial times in the configuration of the territory. By way of a brief introduction to the history of the country and political, environmental and socio-economic processes at play, as well as patterns of land occupation, I will explore factors that have helped make Colombia a highly urbanized country. I then look at what the configuration of the territory in Bogotá and surroundings has meant for early inhabitants of the area, namely the Muisca indigenous group. To that end, I look at the historical process that their traditional indigenous territory has been confronted with, including marginalization and dispossession. I then examine the opportunity for recognition by adoption of the Constitution of 1991 (wherein the rights of indigenous people are recognized), what this has meant for the strengthening of this indigenous community, and the challenges the community is facing today. I then broaden my analysis and explore the factors that have contributed to making Latin America a highly urbanized region, with emphasis on the drivers of urbanization in Colombia. I also delve into the urbanization process in Bogotá starting in the mid twentieth century (the period that presented the highest urbanization rates).

This chapter is a journey through time and space through Latin America and Colombia's pre-colonial and colonial history to recent peri-urbanization processes in Bosa and Soacha. As Germán Palacio (2001a), one of Colombia's most recognized environmental historians, states, Colombia is a complex territory, equinoxial, tropical, mountainous, surrounded by seas, crossed by a great deal of rivers, and with immense biodiversity. This geographical complexity has interacted with economic, social, and political forces and has shaped the history of the country.

Pre-colonial and Colonial History

Colombia is the fourth largest Latin American nation with an area equal to the sum of France, Germany, and the United Kingdom combined. It is also the third most populous, with approximately 48 million inhabitants (DANE 2015b). Colombia is one of the most diverse territories in the world, which makes its geography one of the most fragmented[14] (Montenegro 2006). Geography has played a major role in shaping the development of the country. The equator crosses the southern part of the country, meaning that temperatures vary with altitude but are relatively constant. The Andes in Colombia split into three separate cordilleras that branch off from each other just north of the border with Ecuador and run more or less in a north-northeasterly direction and are part of determining temperature, climate, and ease of human access (Bushnell 1993; Skidmore and Smith 2005)

Bogotá's plateau or high plain (known in Spanish as *Sabana de Bogotá*) has been inhabited for at least 10,000 years (Boada Rivas 2013). The *Sabana de Bogotá* is located on the Eastern Cordillera of the Andes mountain chain at an elevation of 2550-2600 masl (meters above sea level) (Helmens and van der Hammen 1994) (see Figure 5). This area has played a central role in the development of the country (Palacio 2001b). The *Sabana de Bogotá* has been an attractive area to settle throughout history because of its flat topography, soil fertility, availability of water, and moderate climate (Delgado Rozo 2010). Early inhabitants were nomadic hunters and gatherers. The fauna (e.g., deer, guinea pigs, and armadillo) and flora (e.g., fruits and grasses) were sparsely distributed which is presumed to have influenced the early small-size groups. About 3,000 years ago larger settlements started appearing in a few areas of the *Sabana de Bogotá.* Archaeological records of larger sedentary household clusters have been found from the early Herrera period (400 BC-200 AD). In the late Herrera period there was a significant increase in population who tended to integrate spatially. Social hierarchy and wealth differences can already be seen in this period, with social hierarchy reflected in the distance from the central places where political power was concentrated. It was at this time that Bogotá started becoming the focus of political power. The following period is denominated the Muisca period (1000-1600 AD) (Boada Rivas 2013). The Muisca indigenous group (also known as Chibchas) dominated the eastern highlands of Colombia (*Altiplano Cundiboyacense*), including the *Sabana de Bogotá* area (Bushnell 1993; Cabildo Indígena Muisca de Bosa 2007; García Jimeno 2005; Skidmore and Smith 2005) until the Spaniards arrived. During the Muisca period, Bogotá continued to gain importance in the local Muisca chiefdom

[14] Geographical fragmentation is measured by the probability that two randomly selected individuals live on the same eco-zone (Montenegro 2006).

controlling other districts and displaying complex social and political organization (Boada Rivas 2013). It could be argued then that the *Sabana de Bogotá* has, throughout most of its inhabited history, tendencies of sedentary cluster settlements through which the landscape has been modified while societies were being developed; and that spatial segregation has been present even early on, and only intensified over time.

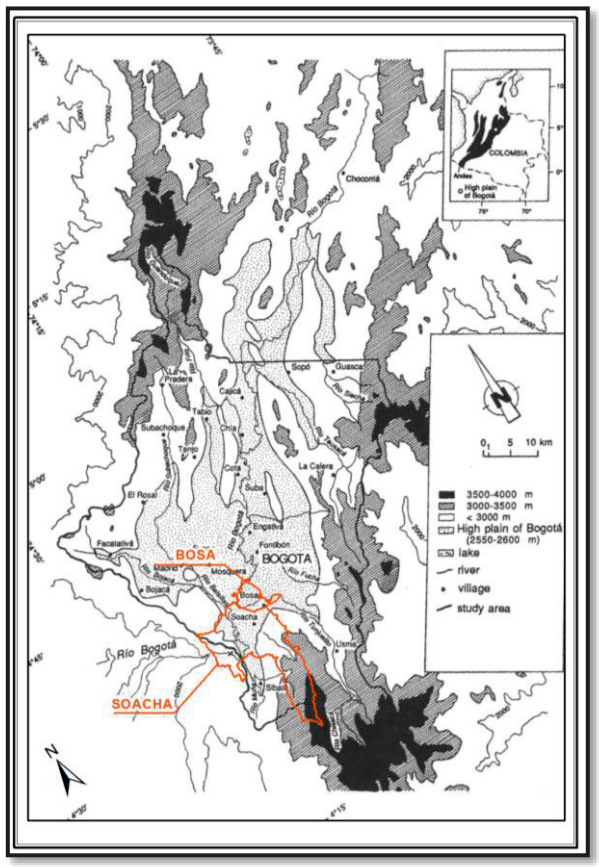

Figure 5. *Sabana de Bogotá* in Eastern Cordillera, Colombia

Source: (Helmens and van der Hammen 1994:45). Map modified from original by Karem García.

An aspect worth noting is the relation between the indigenous population and the rivers and wetlands of the *Sabana de Bogotá*. The Bogotá River crosses the *Sabana de Bogotá* and records indicate that during the rainy season, large parts of the floodplain would be inundated for days or even months. As a consequence, the Muiscas built raised fields, ridges, and canals that covered most of the *Sabana de Bogotá*, including what is today Bosa and Soacha. With the arrival of the Spaniards,

the agriculture system changed and the raised field agricultural systems disappeared for the most part (Boada Rivas 2013; Santiago Villa 2012). However, as will be seen throughout the thesis, the study areas still have canals (that allude to their pre-Columbian heritage), which are important features of the peri-urban landscape both as a resource and as a source of conflict.

Geology and Landscape Modification

Indigenous and colonial historical accounts of the flooded land highlight the importance the geology of the *Sabana de Bogotá* has had on the configuration of the socio-environmental landscape for its early inhabitants, which I will briefly describe next. The oldest rocks of the *Sabana de Bogotá* formed over 65 million years ago during the late Cretaceous period and are part of the *Guadalupe* group (K2) of marine origin (see Figure 6). The hills of the study area, particularly the southern hills of Soacha, are formed by rocks from the *Guadalupe* group and are composed mainly of sandstones (de Bermoudes and Velandia 2010). The lower flatlands (foothills) of the *Sabana de Bogotá* (and of the study area) are part of the *Sabana* formation (Q1sa), which was formed between one million and 30,000 years ago (during the late mid-Pleistocene) and include lacustrine sediments composed mostly of clays. As its composition indicates, this area used to be a lake, which began disappearing about 40,000 years ago and dried completely about 30,000 years ago (due to gradual decrease, erosion, drainage of the lake through the floodplains of the Bogotá River, and a reduction of annual precipitation). The lake, however, left behind a series of wetlands. The floodplains of the study area, meaning the floodplains of the Bogotá River and its affluents in Bosa and Soacha, notably the Tunjuelito and Soacha Rivers, are the lowest areas of the flatlands and are part of a younger formation (formed during the Holocene) called the *Chía* formation (Q2ch). These floodplains are composed mostly of clays (lacustrine and fluvial sediments) (Helmens and van der Hammen 1994; Valencia Cuesta 2011).

The geological characteristics of the study area are particularly important because they have influenced the settlement history and the relation inhabitants of different periods have had with the land and its waterbodies. The lacustrine soils, for instance, contribute to highly fertile soils, which have attracted agricultural activities from the *Muisca* period to present (Delgado Rozo 2010). At the same time, the clay characteristics of the flatland soils imply that the soils have little permeability, influencing the vulnerability of populations to floods during periods of high precipitation, as well as limiting natural groundwater recharge (de Bermoudes and Velandia 2010; Santiago Villa 2012). Furthermore, the flooded lands (and the risk of flooding) has ignited the alteration of waterbodies through the development of

hydraulic systems, including canals and river embankments from pre-colonial times to today.

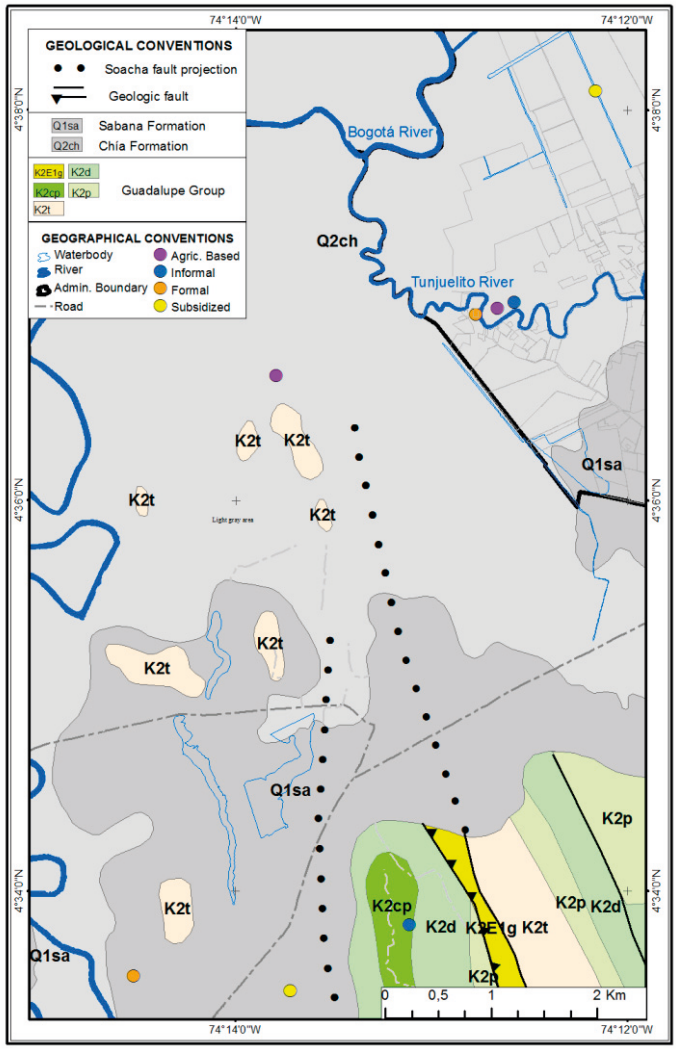

Figure 6. Geological map of study area

Note that this is just an extract of the geological map of the *Sabana de Bogotá.* Map modified from original by Karem García. Source: INGEOMINAS 2005.

Modification of the Landscape during Colonial Period

Let me return to the arrival of the Spanish colonizers to the country in the late fifteenth and early sixteenth centuries. During the Spanish colonial period, Bogotá

became the center of political power and capital of the viceroyalty of New Granada. The Muiscas (as well as the other indigenous groups in the country) resisted the Spanish conquerors fiercely. Around the Muisca territory (on the eastern highlands), indigenous people survived in greater numbers than other parts of the country (Bushnell 1993; García Jimeno 2005; Skidmore and Smith 2005). The population was decimated from about three million indigenous people when the Spaniards arrived to a total population of approximately 1.5 million (including Spanish, Mestizos and Africans) around 1740. The decimation of population was a result of war, mistreatment of indigenous by Spaniards through strenuous work (such as mining), and epidemics (Márquez 2001). As a center of political power, the eastern highlands continued to experience an increased population and continued transformation of the landscape. Through the colonial period, settlements were divided between Indian villages (*pueblos de indios*) and colonial cities. Initially, the colonial city of Santafé (that would become Bogotá) was built higher on the foothills of the eastern mountains of the Bogotá plateau than nearby Indian villages, somewhat isolated from the Bogotá River. Near the junction of the Bogotá and Tunjuelito Rivers, the Indian village of Bosa was founded in 1539 (Rojas, De Meulder, and Shannon 2015).

The Spaniards brought exotic species and foreign methods of agriculture that modified ecosystems. During this period, significant land use change, where forests and agricultural fields were converted into fields for cattle, took place. Former Muiscas areas were cultivated with foreign species (wheat and barley) or converted into fields for livestock. Márquez (2001) asserts that about 80% of transformation of the country's ecosystems are a result of clearing of land for cattle raising. The foundation of the *hacienda* (large landholdings), where cattle raising and cropping of new species took place, is considered one of the causes of the destruction and transformation of the wetlands of the *Sabana de Bogotá*. To dry up the land and avoid floods during the rainy season, embankments were built along the rivers (Santiago Villa 2012). The use of river embankments to control floods and the drying up of wetlands to make alternative uses of land are practices that continue to this day.

The economic and social institutions imposed during colonial times (such as the *encomienda* system*, hacienda*, and the *mita*) established the concentration of land control and resulted in violent settlement and occupation patterns, largely based on the exploitation of indigenous labor and natural resources. These were arguably processes of accumulation by dispossession (Harvey 2004), resulting in recognition and redistribution injustices (Fraser 1998). During the three centuries of colonial domination, Bogotá and a few other Colombian cities (namely; Cali, Medellín, Cartagena, Santa Marta, Popayán, Pasto, Tunja and Pamplona) consolidated as the main urban centers and concentrated commercial and political activity (DANE 2015a). By the thirteenth century, about 44% of the country's population lived in

the eastern highlands. According to the 1778 census, the *Sabana de Bogotá* region had a population of about 70,000 inhabitants (of which approximately 21,000 were white and 56,000 were of other ethnic origins) (Delgado Rozo 2010). The consolidation of the network of cities continued during the post-colonial period throughout the nineteenth century. Up to that point, however, the rest of the country was predominantly rural with a low population density, and remained relatively isolated from the network of cities. This was, in part, thanks to the geography of the country, which limited communication. In 1938, for instance, the urban population was still less than half of the total national population. It was during the twentieth century, especially its second half, that Colombia went through a massive urbanization process that involved regional reconfiguration around four major urban centers (Bogotá, Medellín, Cali and Barranquilla) (DANE 2015a), as it will be explained in the section of contemporary urbanization later in this chapter.

Dispossession of Indigenous Territory

I will now go back in time to discuss how the original settlers of the *Sabana de Bogotá*, the Muiscas, have experienced the socio-environmental transformation of the area, particularly around the study areas. I highlight this group because, despite the multiple processes of dispossession and marginalization, descendants of the Muiscas still live in Bosa and reside in what could be considered its peri-urban areas (PUAs). In fact, right where the growing city meets the countryside, a community of Muisca indigenous people is currently struggling to regain and maintain their indigenous identity, i.e., is fighting to claim recognition (Fraser 2009). As was presented earlier in this chapter, the Muiscas were the first settlers of the *Sabana de Bogotá*. The Muiscas occupied the fertile valleys of the Bogotá, Funza, and Blanco Rivers and the headwaters (upper watershed) of the Suarez River. The Muiscas have, across generations, been farmers, goldsmiths, potters, and weavers. Before the arrival of the Spanish colonizers, their economy was mostly based on agriculture and involved the use of the hillsides to develop irrigation canals (Cabildo Indígena Muisca de Bosa 2007). With the arrival of Spanish colonizers, a large of part of the indigenous population was killed or displaced, while some remained in the *Sabana de Bogotá* but were discriminated against and mistreated. Many indigenous people lost their land through both violent and non-violent processes, such as state policies that dismantled the collective tenure of land, a mechanism that weakened the social capital of the community (Cabildo Indígena Muisca de Bosa 2007), illustrating processes of accumulation by dispossession (Harvey 2003).

Dismantling of Indigenous Reservations

Indigenous reservations were established upon arrival of the Spanish colonizers. After independence, these indigenous reservations started being dismantled in 1850, as the National Government issued laws that sought to end indigenous reservations and with them any trace of collective land ownership. For instance, Law 22 of June 1850 designated Province Chambers in charge of distributing, assigning, and selling indigenous reserves. In the case of Bosa, the reservations that had been formed around 1600 were dissolved between 1869 and 1886 and the land was declared 'vacant'. Two complementary dynamics contributed to the loss of land by indigenous communities. First, the indigenous community did not manage to achieve consensus or unanimity over the extinction of their reservations: while some of the indigenous community members decided to maintain the collective ownership of land, others were 'persuaded' by the idea of being individual owners and thereby pushed for the land to be declared vacant. Second, ranchers and big landowners showed interest in getting hold of the land. As a result, many indigenous people, who had become individual owners of plots that were part of the former reservation, ended up selling their plots at a low price after a few years (Dirección General de Asuntos Indígenas 1999).

Durán Bernal (2005)[15] highlights how indigenous people who did not sell their land eventually lost fragments, or sometimes all of it, because of lawyers, clerks, and surveyors who charged them a portion of the land when they were hired to carry out land partitions, legalize inheritances, or develop a map of the plot. In other cases, they would steal the land through judicial tricks. Those who sold or lost their land found themselves forced to integrate into the local economy as workers or as tenants of the new farms. Others moved to the city looking for working opportunities. In the years following the dissolution of the indigenous reservations, the city of Bogotá saw an increase in poverty and despair, as the city became the main refuge for indigenous people who sold their land at a loss and who could not find work as peasants in the new cattle raising large estates (Durán Bernal 2004, 2005; Panqueba Cifuentes 2005).

The farms in Bosa were cultivated via different modes of exploitation after the dissolution of the reservation. While indigenous farmers had farmed the land for subsistence, the new landowners implemented large scale farming of crops such as potato and barley, or ranched cattle for meat and dairy products, reducing the

[15] I should note that the works of Durán Bernal are one of the few published works about the Muiscas of Bosa that are easily accessible. I was unable to find much additional, and not even members of the Cabildo (indigenous council) Muisca of Bosa had access to other publications. I complemented the information with other available documents (that I cite in the thesis), but also through interviews with members of the elder council of the *Cabildo* (I will introduce the Cabildo later in this section).

amount of labor needed. The control of land and economic resources by the large-scale landowners also bestowed them political power in the municipality of Bosa throughout the end of the 19th and 20th Century (Durán Bernal 2005; Panqueba Cifuentes 2005).

Constitutional Recognition of Indigeneity

Before the Constitution of 1991, indigenous people were referred to in the Constitution as 'savages' (*salvajes*) (e.g., Congreso de Colombia 1890). In 1991 the government of Colombia approved the International Labor Organization (ILO) agreement 169 of 1989 about indigenous and tribal peoples. Correspondingly, in the Constitution of 1991 the Colombian government recognized the ethnic and cultural diversity of the country, and established several mechanisms to protect and defend the rights of indigenous and afrocolombian peoples. Specifically, public policy regarding indigenous people includes a commitment to the following principles (Cabildo Indígena Muisca de Bosa 2007:Bogotá Accord 359 of 2009):

> i. Ethnical and cultural diversity and integrity
>
> ii. Interculturality and multiculturality
>
> iii. Collective representation protected and respected by the government
>
> iv. Autonomy
>
> v. Participation, consultation and agreement: Right to prior, informed and concerted consultation (*consulta previa*)
>
> vi. Ethnic equity: Reestablishment of rights of indigenous people so they can access the same services as the rest of the population based on their specific needs and ethnic rights. The exercise of these rights implies the recognition of their own conception of wellbeing and quality of life.

The new relevant decrees and laws (Asamblea Nacional Constituyente 1991:Art. 68, 171, 246, 330; law 21; law 691) promote the right to fair employment, to subsidized health and social security (unless covered through another option such as labor contract or pension), education and media, and land. In theory, new legislation should establish, as a minimum, equal rights for indigenous people. Subsequently, many indigenous groups have requested recognition and official registration as indigenous groups. According to the 2005 Census carried out by the Department of Statistics (DANE), which included questions about membership through self-recognition in an ethnic group, 1,392,623 people recognized

themselves as indigenous, a number that constitutes 3.4% of the country's population (DANE 2015a).

The government has recognized the need to recognize indigeneity as a complex identity that should be self-identified by members of indigenous communities themselves, rather than by prescriptive delineations from the national government. As was exemplified in the dissolution of indigenous reservations, throughout Colombian history indigenous people have faced brutal discrimination and have had to adapt to the colonial political circumstances. As noted by the Indigenous Affairs Office[16], as a consequence to the discrimination indigenous people have faced, they have often had to take on attitudes similar to *mestizos,* such as clothing, and they are thus not always easy to distinguish. Along those lines, the Indigenous Affairs Office has stressed that there is a need to get away from the notion that indigenous are exotic people who live far away and dress in traditional, rudimentary clothing, and recognize that there are indigenous groups who exist in urban settings (Dirección General de Asuntos Indígenas 1999).

An important aspect of the process to gain state recognition as indigenous is the self-identification as indigenous, which is tied to the self-consciousness that the community has with respect to their own identity. The self-identification is complemented with a sociocultural self-study (*autoestudio sociocultural*) in which indigenous leaders gather 'proof' of their indigenous identity through documents and other materials that demonstrate their current indigenous identity, including governing structures and cultural traditions of the group. If there were still doubt after the process of sociocultural self-study, representatives from the government would visit the community to do participant observation of daily life, workshops, walks, and interviews (Dirección General de Asuntos Indígenas 1999).

Ethnogenesis of the Muisca Community

The ethnogenesis, as Durán Bernal (2005) has appropriately called it, of the Muisca community came about in the 1990s because of the need of the indigenous community to clearly establish the limits of their property and legalize their land titles. Indigenous groups started to realize that the Constitution of 1991 could grant special protection to the indigenous community, and thus provide more benefits than communities organized through the regular community action boards (*juntas de acción comunal*). It was soon after that Julio Espinosa Caro, a lawyer who was advising the community on land titling, noticed that the land was once part of the

[16] The comments regarding indigeneity are based on the cited document (Dirección General de Asuntos Indígenas 1999), which is the official concept that the Indigenous Affairs Office made to recognize the existence of indigenous groups in Bosa (see more below).

former *resguardo* (indigenous reservation). After this, Caro suggested that the community establish a *Cabildo indígena* (indigenous council) and start the process of self-recognition as indigenous as well as the fight to be recognized as indigenous community by the state (Cabildo Indígena Muisca de Bosa 2007; Durán Bernal 2005).

On January 3, 1999, the community (led to a great extent by young members of the community) organized the first meeting of the *Cabildo Indígena Muisca de Bosa* (Muisca Indigenous Council of Bosa), which was held with about hundred attendees. In this meeting, the community elected traditional authorities, including a governor and the elder council (composed of elder community members, *consejo de mayores*). This meeting was the initial step stipulated by the legislation in the process of being considered 'indigenous': to self-identify as an indigenous community (Cabildo Indígena Muisca de Bosa 2007; Durán Bernal 2005). That same year, the *Cabildo* submitted an official request to the Indigenous Affairs Office (*Dirección General de Asuntos Indígenas)* of the Ministry of Interior to be recognized as a *Cabildo*.

The *Cabildo* is a public entity whose members are members of an indigenous community, and are elected and recognized by the community. The *Cabildo* maintains the traditional socio-political organization and functions to legally represent the community, exercise authority, and perform the functions and duties attributed by law, their customs, and the law of each community (Accord 359 of 2009) (Cabildo Indígena Muisca de Bosa 2007). Because of this organization, indigenous groups are allowed to legislate and govern based on their cosmogony and apply its own jurisdiction as long as it does not violate the Constitution. These norms are usually known through daily practices and are thus not written, but instead are implied in the expected ethical and moral behavior of the community (Cabildo Indígena Muisca de Bosa 2007).

As part of the request to be recognized as a *Cabildo*, indigenous leaders submitted a package of documents to confirm their indigeneity. The package included a socio-cultural self-study (*autoestudio*) of the indigenous community of Bosa, support from the already recognized *Cabildo* of Suba (Suba is another borough in Bogotá), the articles of incorporation of the *Cabildo*, a 1-page document identifying the characteristics of the community, and several deeds of ownership of the former indigenous reservation. As part of the process, the Indigenous Affairs Office also visited the community and participated in workshops. After revising the documents and based on the research process, the agency concluded that the information they had was sufficient to recognize the existence of cultural elements (objective and subjective) that show Muisca roots and an ethnic identity that is contemporary and present (Cabildo Indígena Muisca de Bosa 1999). The *Cabildo* Muisca of Bosa is not the only indigenous community in Bogotá, and at present the municipality of

Bogotá recognizes the existence of 5 urban indigenous *Cabildos*. I argue, however that the Muiscas indigenous group, more than an urban community is a peri-urban group, both resisting and adapting to the encroaching influence of the city.

Muiscas of Bosa Today

Because of the process of soliciting recognition from the state, a documentation of the territory where the Muisca indigenous community of Bosa live and their daily practices and particularities has been created. The Muiscas are a mainly rural community, settled on the area between the mouth of the Tunjuelito River and the Bogotá River in the former rural settlements of San José II and San Bernardino. A few families are also located in adjacent neighborhoods such as Villa Emma, Concepción, and El Potrerito, neighborhoods which were built at the expense of the traditional territory of this community (Dirección General de Asuntos Indígenas 1999).

Together, approximately 3000 people are part of the indigenous community (see Figure 7). The following criteria has been defined by the *Cabildo* to recognize its indigenous members: 1- have a last name that is traditionally Muisca (e.g., Tunjo, Chiguazuque, Neuta, Garibello); 2- share a community life, which requires living within the limits of the ancient indigenous reservations; 3- by tradition, the person must have some sort of right to the premises and plots currently occupied by the family and the premises must have been part of ancient indigenous reservations; 4- extended families should have traditional ties to the land, through the possession, occupation, or usufruct of plots; 5- the partners (civil partners) of an indigenous person are regarded as indigenous by adoption, as long as they live in the community; 6- the children of marriages between indigenous people and "outsiders" are regarded as indigenous (Cabildo Indígena Muisca de Bosa 1999).

Figure 7. Members of the *Cabildo* Muisca of Bosa

Member of the Elder Council and myself at *Cabildo's* headquarters

Based on the accounts of members of the *Cabildo, i*ndigenous families have access to plots of land of different sizes regardless of where they live. These plots are mainly used to grow corn, though vegetable and potato crops are sometimes cultivated. Some people also raise cows and sheep, and have chickens. The production is both for consumption and for sell to *Corabastos* (whole sale food markets). Current land holdings of indigenous families is estimated to about 100 hectares distributed over 120 land titles (Durán Bernal 2005). Due to urbanization, many people have needed to work outside of their plots in construction. Community-based work and reciprocal work is still very common, whether it is to harvest, sell crops, or to build houses (Cabildo Indígena Muisca de Bosa 1999). It is important to note that even though the *Cabildo* was recognized in 1999 as a rural community in the rural settlements of San Jose and San Bernardino, the rurality of both areas was removed in the POT of 2000, with complete disregard to Muisca cultural identity and livelihoods.

While the community recognizes and values its descent from pre-Hispanic indigenous peoples who, at the time of arrival of Europeans to the Americas, had a complex civilization, the contemporary indigenous of Bosa stress that their current identity is not that of the past. Their identity is linked to their everyday life as

farmers and residents of a PUA, rapidly encroached by the city. The culture they currently reproduce is the product of evolution and transformation, unwanted and desired, which the Muisca people have undergone throughout history (Dirección General de Asuntos Indígenas 1999). A statement by the *Cabildo* illustrates this point beautifully:

> Today we express ourselves in Spanish, but our dreams continue to speak Muisca - *hoy nos expresamos en castellano pero nuestros sueños siguen hablando Muisca* (Cabildo Indígena Muisca de Bosa 1999)

The Cabildo as a Sociopolitical Organization

During the process of soliciting state recognition as 'indigenous', the community decided to reinstate the *Cabildo* as the space to exercise authority and self-government. The *Cabildo* became institutionalized on January 3, 1999. The *Cabildo* also institutionalized the authority of the community elders through the formation of the Elder Council as the advisory body of the *Cabildo* (Dirección General de Asuntos Indígenas 1999). Though the document recognizing the presence of indigenous peoples in Bosa states that members of the community have decided to leave aside other forms of community organization such as the community action board (*Junta de Acción Comunal* - JAC) and instead give tasks and competencies to the *Cabildo*, this is not the case today. Instead, based on my discussions with *Cabildo* members, several leaders of the *Cabildo* are also leaders or active members in the JACs in the areas where they live, as the JAC is a more direct channel to local authorities at the borough and municipal levels.

With the background of the ethnogenesis of the Muisca indigenous community of Bosa, I will continue to highlight this community as a key actor in peri-urban Bosa throughout the thesis. I consider them a key actor, both because they are one of the populations most negatively affected by peri-urbanization, but also because they are actively working and organizing themselves to better cope with peri-urbanization and its impacts. As I analyze the wellbeing (and constraints to wellbeing) of peri-urban populations who live in agriculture-based areas in the next chapter, the perspective of the peri-urban Muiscas who reside in these areas will be brought to attention.

Urbanization in Contemporary Colombia and Bogotá

I go back in time again to the mid-twentieth century to analyze how Colombia has come to be a highly urbanized country. Urbanization in Colombia has played a

major role in reconfiguring the landscape and the population distribution. The urbanization of the country during the twentieth century can be explained principally by an increase in communication and transportation systems, the integration of regional markets, the development of a national market, the development of industries in urban centers, and the armed conflict. Three parallel population dynamics have accompanied the urbanization process in Colombia: increased urban population, increased population density, and increased agglomeration of the population in major urban centers. Growth rates have varied by the decade. In 1938, for example, Bogotá's population was less than 5% of its current size (Thibert and Osorio 2013). The 1950s presented the highest growth rate of Bogotá and Soacha (the combined growth was of 6.8%) (Dávila et al. 2006) and Bogotá reached its first million of inhabitants around 1957 (DANE 2015a). Since the 1970s, urban population growth has continued but at a lower pace. By 1975, 60% of the country's population lived in an urban area. The urban population grew to 71% by 1993, and then 76% by 2005 (when the last census was done) (DANE 2015a). Growth has slowed down but continued since the 1990s with rates of about 2.1%.

At the same time, the primacy of Bogotá with respect to the rest of the country (and major cities) has been increasing recently (Lampis and Fraser 2012). Bogotá has about three times the population of the second largest city, Medellín (Lampis 2013). While Bogotá has been, and continues to be, the main political, administrative, and economic center of the country, its dominance over the other major Colombian cities is less pronounced than in other Latin American countries. As opposed to other Latin American countries where up to half of the population would concentrate in the capital, in Colombia, by the end of the 1990s, only about 29% of the population was concentrated in the four major cities (Lampis and Fraser 2012).

Drivers of Urbanization

In Bogotá, urban growth took both a population and spatial dimension (i.e., expansion of urban land). The latter has occurred in all cardinal dimensions. While drivers have varied in different periods, in general terms, the growth of the city has been driven mainly by:

i. Natural increase of population

ii. Amalgamation: Amalgamation refers to the incorporation of several surrounding towns, including the town of Bosa, into the capital district of Bogotá in 1954

iii. Migration: Migration has occurred from rural areas (rural-urban), from smaller urban centers (urban-urban) and from the core of the city to the outskirts (urban-periphery and urban-peri-urban)

iv. Armed conflict: Which has led to involuntary migration away from affected rural areas towards urban centers (DANE 2015a; Gilbert 2004; Salazar Ferro 2001; Silva and Guataquí 2005; Thibert and Osorio 2013).

Rural-Urban Migration and Violence

It is well known that rural-urban migration is a major contributor to urbanization in countries of the Global South (Tacoli, Mcgranahan, and Satterthwaite 2015) and a variety of factors, in many cases economic (Harris and Todaro 1970), drive this migration. In Colombia, political violence has played an important role in pushing populations out of the countryside (as had been the case in Peru) (Álvarez-Berríos, Parés-Ramos, and Aide 2013). Colombia is the second most unequal country in Latin America with regards to income distribution, after Brazil. Furthermore, it is a country with historical patterns of exclusion rooted in the structure of land tenure; where 1.1% of landowners control over 55% of all arable land (Escobar 2004). Land struggles over the unequal and exclusionary distribution of land are at the root of the political violence and the more than 50 year-old armed conflict.

Castells argues that the structural violence in Colombia is a result of the marginalization of a large part of the population by the rich, who have never been opened to integrate the lower-income population, except through controlled populist politics (Castells and Calderón 2003). The largest population growth rates of Bogotá occurred between 1940 and 1970 (Thibert and Osorio 2013), and can be explained in part by the large migration of peasants (about 3 million) who escaped the political violence and land struggles in the countryside during the period called *La Violencia* (the violence) between 1946 and 1965 (Álvarez-Berríos et al. 2013).

It was as a result of this large influx of the rural population that in 1954 President Rojas Pinilla (the only military dictator in Colombia during the twentieth century) (Gilbert 2006) decided to annex six surrounding towns, including Bosa, to accommodate the increasing population. The amalgamation of these towns into the municipality of Bogotá was accompanied by the designation of Bogotá as a 'Capital District'. Both the amalgamation and the designation of Bogotá as a Capital District are evidence of the unequal relations of power between the capital city and neighboring municipalities.

According to Gouëset (1998), the decision to make Bogotá a 'Capital 'District' was influenced by World Bank economist Lauchilin Currie, who persuaded President Rojas Pinilla that the economic growth of the country depended on the growth of its cities, particularly Bogotá, which serves to show the influence international actors

have had on the governance approaches taken by the Colombian state. The Capital District designation gave the city more autonomy, whereby its growth was not centrally controlled, as was the case of other Latin American cities at the time. Accordingly, Thibert and Osorio (2013) argue that the prerogatives of the Capital District, with its autonomy, indicate that Bogotá was being managed under a liberal regime even before the neoliberal shift of the Latin American region in the 1980s.

Involuntary or forced migration from rural areas to urban areas was not limited to the *La Violencia* period, and continued throughout the 1980s, 1990s, and 2000s, with more than 3.5 million migrants fleeing the violence of rural areas and arriving to urban areas between 1985 and 2006 (Álvarez-Berríos et al. 2013). An estimated 625,000 displaced people have arrived to Bogotá and Soacha between that same period and account for over 8.5% of the population of both municipalities (de Geoffroy 2009).

Several studies (de Geoffroy 2009; Silva and Guataquí 2005) have shown that displaced rural populations often arrive with limited education, as well as traumas from the displacement and lost of property, and thus have a harder time integrating into the urban economy than those who migrate for economic reasons alone. Furthermore, de Geoffroy (2009) argues that the social marginality of displaced populations is exacerbated by spatial marginality, as they often settle in peripheral areas of the city, either informally or through state-subsidized housing programs. The PUAs that I will discuss in chapters 7 and 8 are home to a large number of displaced populations, in particular Soacha (Carvajal 2012). Cheaper land values, decreasing availability of land in Bogotá, and less control from the municipality of Soacha help explain these settlement patterns (Dureau 2002), and corroborate de Geofrroy's thesis that their marginalization is both social and physical, as the informal settlements in Soacha are commonly located on isolated hillsides, often on areas at risk of landslides.

Political-Economic Regimes Influence on Urbanization

While Lefebvre, Castells and Harvey have political, theoretical and methodological differences, Brenner et al. (2012) argue that they share the understanding that the socio-spatial organization, governance systems, and patterns of sociopolitical conflict of cities must be understood in relation to their role as strategic sites for commodification processes of production, circulation, and consumption. In Bogotá, these commodification processes have taken place under different political-economic regimes from the 1950s to today, from import-substitution industrialization (ISI) from the 1950s to the 1970s, to neoliberal policies from the 1980s onwards (Thibert and Osorio 2013).

The interventionist policies that promoted domestic industrialization and tertiarization of the economy gradually increased the economy and population

primacy of Bogotá over other Colombian cities, as economies of scale and concentration of financial, educational, and international communications services became pull factors for both industry and populations migrating from the countryside (both voluntarily and involuntarily) (Dureau 2002; de Mattos 2006; Thibert and Osorio 2013). The concentration of industries in cities provided substantial employment opportunities in the city and attracted large numbers of the rural population (Rodgers, Beall, and Kanbur 2011).

More recent rural-urban migration can be explained more by push than pull factors, including the concentration of land ownership, the intensification of the armed conflict, the liberalization of the economy in the 1990s (DANE 2015a), and the limited access to social services in the countryside (Rodgers et al. 2011). Bogotá receives the highest number of immigrants in the country, who come mostly from nearby regions or those better connected to the city (Lampis 2013).

Densification and Expansion

The rural-urban migration was accompanied by urban-rural migration from high and middle-income families who migrated particularly towards the northern peripheral areas and northern surrounding municipalities looking for housing in gated communities away from pollution, congestion, and crime in the city. According to Thibert and Osorio (2013), both types of migrations were for the most part not mediated by the state. In the 1970s, Colombia underwent reforms similar to other Latin American countries, which led to the gradual deregulation of land markets and decentralization of planning. These policies included significant changes with respect to land use planning; from centralized comprehensive planning with strict density restrictions to the devolution of certain planning functions to the municipal level and the introduction of individual lot zoning (Thibert and Osorio 2013).

Similar to other Latin American countries, throughout this period, the average income of middle classes increased as did the share of women in the labor force (de Mattos 2006). Both aspects, combined with deficient road infrastructure, resulted in a demand for different types of housing, like individual houses and apartments, particularly for middle and high-income families who also started moving to the northern center of the city. The deregulation of land markets and reduction of density restrictions led to a rapid redevelopment of the northern center of the city and an increase in apartments. Land speculation and redevelopment of core areas of the city lead to the gentrification of low-income areas whose populations were displaced towards the periphery (Dávila 2005; Dureau 2002; Thibert and Osorio 2013). So, during the 1970s and 1980s the city of Bogotá experienced both a process of densification and expansion within its municipal borders and beyond (Dureau 2002).

Deregulation of land and increasing demand for housing in the core of the city led to a rent gap. The rent gap derived from the disparity between value of the land that housed low-income population and low-density neighborhoods of houses, and the potential land value of redeveloped and densified land for middle and high-income population (Dureau 2002). As Dureau (2002) maintains, while in 1979 migration was responsible for 49% of the growth of the city, only 22% is responsible in 1990; making intra-urban mobility the main factor explaining the demographic dynamics of the city. To illustrate, in 1991, 181,000 households (out of the 1.3 million households in Bogotá) changed housing but only 49,000 new houses were built that year (Dureau 2002). The rent gap and housing deficit pushed low-income populations to the peripheral areas of the city, where land values were not only lower but also where low-income population had the opportunity to build their own homes (Preciado Beltrán 2009; Salazar Ferro 2001; Thibert and Osorio 2013).

In addition to the deregulation of land markets, the expansion was mediated by geographical limitations (or, arguably, opportunities) and by a competition of tax incentives from surrounding municipalities to attract industries and housing developers. In that regard, it is important to note that, while the rich were migrating towards the north, the poor migrated towards the south and southwest of the city and surrounding municipalities. Growth towards the west is argued to have been limited by the establishment of large greenhouses by the cut-flower industry in western municipalities such as Madrid as a result of the tax cut incentives of the municipality (Dureau 2002; Thibert and Osorio 2013). The eastern hills provided an initial geographical limit to the expansion in that direction, as areas on the flatlands were preferred for urban development. The hills, however, started being urbanized as land availability decreased and costs increased on the flatlands. Table 6 describes the main peri-urbanization developments pre-1980s to present.

As noted by Dávila (2005), there are contrasting views on the impacts of the absence of a rigid land use plan in the municipality of Bogotá during the 1970s. While Mohan (1994) sees it as positive because it allowed for the fast growth the city needed to meet the increasing housing demand, del Castillo and Salazar Ferro (2001), who share a similar view to Dureau (2002), see that this deregulation left the development of the city to the market and to private speculation without guaranteeing the minimum functions of the city (housing, transportation, and land) for residents. Based on my analysis of how peri-urbanization has taken place in Bosa and Soacha that I will show throughout the thesis, I concur with the latter view.

Table 6. Peri-urbanization in the south and southwest of Bogotá: Pre-1980s - present

Peri-urbanization in the south and southwest of Bogotá			
Pre 1980s	- From 1960s rural areas close to Bogotá start losing population to the municipalities' main towns and Bogotá. - Population grows at faster rate between 1950 and 1970. - Bogotá becomes polarized between north (higher income) and south (lower income).	Peri-urbanization characterized by 3 different types of settlements: - High-income settlements mainly concentrated in the north and northeast of the city; - government subsidized housing and low cost housing projects started (especially from the late 1970s); - Informal settlements for low-income population.	- Informal settlements are the most common land use occupation method for the 2nd part of the 20th Century. Bosa and Soacha are common areas for these developments. The occupation pattern, either through squatting or pirate urbanization, is the same for Bogotá and Soacha. - By the end of the 1970s, more than 50% of Bogotá's urban area is composed of informal settlements.
1980s-1990s	- Peri-urbanization driven by deficit of availability of large areas for new developments within the core of Bogotá. - Between 1970 and 1988 the spatial size of Bogotá increases.	- By 1985 55-65% of the population was born in Soacha and approx. 45% had immigrated from Bogotá. - Most of the large informal developments occur in Soacha. About 63% of the growth of Soacha's urban area is informal.	During this period, 330 new informal settlements were developed in Bogotá, occupying an area of about 1300 hectares.
1990s-2000s	- The development of informal settlements equaled that of formal settlements during this decade in Bogotá. - Bogotá increases spatially, mostly informally, towards the south and southwest (in areas such as Bosa).	- Informal developers buy plots without considering viability of public utilities provision or if plots are in risk areas. - In Soacha about 36% of settlements have an informal origin.	- In Soacha, the development of formal settlements increases with respect to the informal ones.
2000s-2010s	The large peri-urbanization process towards Soacha has converted the municipality into an extended urban area of Bogotá.	Low-income population that cannot afford to buy subsidized housing rent rooms and live in overcrowding conditions.	Informal plots (measuring 6 m x 12 m) are usually bigger than formal developments.
Sources: (Buitrago Bermúdez and Carvajal Sánchez 2005; Dávila et al. 2006).			

The Neoliberal State and the Configuration of Bogotá's Metropolitan Area

In Colombia and other Latin American countries, the political-economic restructuring period of neoliberal policies starting from the 1980s and 1990s ignited a trend of liberalization, deregulation, tertiarization of the economy, precarization of the labor force[17], and devolution where the subsidiary planning principle has been

[17] Precariarization of rural labor has not been limited to the neoliberal state. State policies to modernize the agricultural system started in the 1950s during which state spending in agriculture increased 50 fold between 1950 and 1972, yet the spending was focused on large-scale export agriculture. Landowners have also kept wages as low as possible (Green 2006). Modernization policies have served to reinforce land concentration,

the norm (de Mattos 2006). De Mattos (2006) argues that one of the impacts of these policies has been a rise in the capitalist urbanization logic, that, while it had been present in the former centralized urban planning approach, had previously been subject to higher regulation. This regime has, arguably, reinforced the structural inequalities in the country, deepening core-periphery power imbalances at the national, regional, and city level, and reinforcing processes of marginalization and dispossession (Dávila 2005; Díaz Mosquera 2008; Díaz-Forero 2013; Gilbert 2006; Thibert and Osorio 2013; Torres Tovar 2005).

At the national level, neoliberal policies have meant an increase in products for export and modernization of agriculture, along with precariarization of rural labor and continued concentration of land in the hands of a few, a process that has continued to push farmers out of rural areas (Escobar 2004). Salazar Ferro (2001) sustains that urban planning in Bogotá has been left more and more in the hands of the private sector (both formal and informal), while the public sector has focused its activity on providing vital infrastructure (such as roads, public services and utilities) and developing regulations. At the metropolitan and city level, I would argue that the socio-spatial organization of the previous period has been reinforced. There has been an increasing income polarization, accentuating social inequality, and new forms of exclusion and socio-spatial segregation.

Along with the deregulation and decentralization policies characteristic of a neoliberal state, there has also been a process of increasing democratization. In that regards, following the argument posed by Baptista (2013), while neoliberalism as an analytical framework can in part explain the peri-urbanization process in Bogotá, limiting the analysis to neoliberalism as a hegemonic concept may limit the possibility to use other, complementary rather than contradictory, concepts that are also useful in understanding the process. Ranganathan and Balazs (2015) sustain that several studies of urbanization in the Global South have shown that neoliberal and global imperatives are articulated with situated social, political, and cultural formations with significant impacts on PUAs. In Colombia, there are several important eventful junctures (Cleveland 2010) that I would argue have also shaped the peri-urbanization process. I will highlight three, namely: the democratization of municipal governance by choosing mayors through popular election from 1988, the formulation of the new Constitution in 1991, and the territorial planning approached approved in 1998 through which municipalities were required to formulate land use plans in a participatory manner. With increasing decentralization and democratization, it could be argued that there has been a transition from governing to governance, where different institutional actors have to coordinate with

unequal wealth distribution and displacement of small-scale farmers, that is through the processes of accumulation by dispossession.

increasing citizen participation to manage metropolitan resources (Allen et al. 2006a).

Informal Urbanization

Urbanization has taken place both formally and informally. Gilbert (2004) argues that informality started to occur at a large scale in Latin America in the 1940s and 1950s, and that the highest growth of informal housing in the region took place when urban planning regulation was strict and before trade, capital, and exchange-rate liberalization in the 1980s and 1990s. While for the rich moving to PUAs has been a matter of choice, for low-income families it has mainly been a matter of necessity due to the lack of affordable housing in the core of the city. This deficit of affordable housing has been one of the main drivers of informality. Informality understood as being those housing solutions constructed outside of the judicial, administrative, financial, and technical norms (Dávila et al. 2006). By 1970, at least 25% of Bogotá's housing had been developed informally (Gilbert 2004). Informal development continued to predominate the city's growth during the 1970s. By the end of the 1970s, more than 50% of Bogotá's urban area is composed of informal settlements (Buitrago Bermúdez and Carvajal Sánchez 2005; Dávila et al. 2006). Low-income households who settle informally normally build their houses progressively. Similar to other parts of the city where mono-family housing units have been converted into high density and tall building complexes, informal areas have also followed a densification trend, where mono-family units are often subdivided into apartments. This pattern taking place in both high and low-income areas is referred to as densification by substitution. This densification has had environmental implications such as reduction of open spaces, increased vehicle congestion, and degradation of pedestrian sidewalks (Salazar Ferro 2001).

High urban immigration rates combined with increasing housing prices and deficient housing policies, which have failed to support the poorest households, have been the main drivers of informality (Lampis and Fraser 2012). Consequently, the poor have had limited housing alternatives, as well as difficultly accessing credit and formal housing projects. These conditions have led to an uncontrolled development of informal settlements (see Table 7), including the transformation of many areas outside of the urban perimeter. It should be noted, however, that Davila et al. (2006) argue that informality is not necessarily a sign of poverty but instead a way to hide and protect wealth, or a way for families in the informal labor market to achieve some sort of economic stability through ownership of land and a house.

Gilbert (2004) analyzes the relation between informality and liberalization in Latin America. First, it is important to understand some of the factors that led to the implementation of liberalization policies in the 1990s. Import substitution industrialization (ISI) strategies of 1930s-1960s did not bring the expected economic growth to Latin America, and the economies of the region stagnated. The

region continued depending on industrialized countries for capital goods (e.g., machinery), the price of primary exports decreased (thus limiting the purchasing power of the countries), and the implementation of technology meant fewer jobs were available (González 1990; Rodgers et al. 2011). During the 1970s, large amounts of foreign capital were available to Latin America which meant an increasing foreign debt (Gilbert 2004; Rodgers et al. 2011). By 1980, however, foreign capital flooded out of the region due to the debt crisis, the upsurge of world oil prices, and poor decisions by policy makers.

As a result, structural adjustment programs were introduced wherein the role of the government in the economy was reduced to supposedly regenerate market forces and bring about economic stability. The policies made the region's countries compete in the global market to sell their primary exports, and thus made countries more vulnerable to sudden fluctuations in the market (Gilbert 2004). In addition, the collapse of old industries and the contraction of public employment brought about an increase in unemployment and informal employment. Moreover, the dominant classes concentrated larger incomes, while the economic growth of the working classes occurred at much lower rates, resulting in an increase in inequality. Higher levels of inequality have been associated with the rise in violence and insecurity in Colombia from the 1990s onwards (Rodgers et al. 2011). Increasing urban unemployment in the region can be attributed, at least partly, to the liberalization of trade, capital flows, and labor markets (Gilbert 2004).

Table 7. Growth of Settlements in Bogotá and Soacha (1980-2000)

	Bogotá		**Soacha**	
	1980-1990	**1990-2000**	**1980-1990**	**1990-2000**
Informal settlements (ha)	1315	2119	339	201
Formal settlements (ha)	2514	1512	201	437
Total growth (ha)	3829	3631	541	638
*Population**	*3 975 086*	*4 931 796*	*99 418*	*222 565*

Source: (Dávila et al. 2006). * Population data from census in 1985 for first period (1980-1990), and 1993 for second period (1990-2000).

Colombia started to liberalize its economy in 1990 under Cesar Gaviria's presidency. According to Gilbert (2004), Colombia was benefiting from its liberalization in the mid 1990s. However, he maintains, the boom and low unemployment had more to do with property speculation, high commodity prices, and drug trafficking profits than liberalization policies. In 1998, the country entered an economic recession, partly as result of the foreign financial instability brought on by liberalization policies, but also by poor government decisions and increased public spending during Samper's government. Owing to liberalization policies, companies could more easily layoff workers. The informal economy could not absorb the increased unemployment either. Consequently, unemployment rates

increased significantly in Bogotá from a low of 6% in 1995 to 20% in 1999 (Gilbert 2004). Increased unemployment and employment in the informal sector, together with increasing land prices, have played a major role in the abundance of informal housing in the city. The persistence of high levels of inequality is manifested in the socio-spatial segregation of the city, making Bogotá a city of high contrasts from orderly affluent neighborhoods to slums (Lampis 2013), with diverging economic and cultural characteristics (Rodgers et al. 2011).

Concluding Remarks

The unique geographic characteristics of the *Sabana de Bogotá*, including its high altitude, mild weather, flatlands surrounded by mountains, rivers and wetlands, and highly fertile soils, make it an ideal location for populations to settle as they have been doing for thousands of years. The relation between the landscape and society has changed through different historical periods, and has been influenced by biophysical, socio-economic and political factors. Areas that for millennia were used as agricultural fields, that became grazing fields, have recently been converted into densely populated settlements. I showed that throughout history, Muisca indigenous populations have experienced discriminatory and marginalization processes displacing them from their territory and misrecognizing their identity. At the same, I showed the opportunities the especial rights granted by the Constitution of 1991 are providing an opportunity to gain recognition of their cultural and territorial rights.

The city of Bogotá and its metropolitan region is now comprised of over 8 million inhabitants (DANE 2015b) and continues expanding through conversion of agricultural areas and idle land. In this chapter, I also argued that macro-economic policies have had a significant influence on different settlement patterns and the growth of the city. The city has grown vertically and horizontally, particularly through the twentieth and twenty-first centuries. The changes have not only been spatial, however. Increasing levels of inequality have contributed to the creation of a highly segregated city, wherein wealth is inequitably distributed between the northern and southern areas, with the low-income population concentrated in the south. Urban growth combined with economic liberalization has led to housing deficits and increases in land prices, which in turn have led to growth of settlements in PUAs. Much of this peri-urbanization process has taken the form of informal settlements for low-income populations. I will discuss the emergence of informal settlements in peri-urban areas and the implications of informality on the wellbeing of the informal peri-urban dwellers further in chapter 7.

6 Farmers and Indigenous Populations in Peri-Urban Areas

In chapters 6 through 8 I investigate the socio-environmental impacts of peri-urbanization on people's wellbeing. I do this by analyzing changes since the 1980s in material, human, and social dimensions of wellbeing. As I mentioned in chapter 4, during my research in Bosa and Soacha I identified four distinct settlement types, namely; agriculture-based, informal, formal, and state-subsidized. Each chapter will focus on analyzing wellbeing in particular settlement types. In this chapter, I focus on agriculture-based settlements[18]. By examining wellbeing and vulnerability in different types of settlements, I will demonstrate the heterogeneity of the peri-urban landscape and its population. Separating the chapters by settlement types runs the risk of underplaying the interaction between the settlements. To try and address this, throughout the chapters I will try to highlight inter-settlement interactions.

The transition from rural-like to urban-like characteristics occurring in peri-urban areas (PUAs) is manifested through changes not only in spatial attributes of the landscape, but also through changes in the function and quality of the peri-urban ecosystem, and in the social, cultural, and economic characteristics of the population. Through this peri-urbanization transition, certain assets and capabilities are being destroyed, deteriorated, or becoming unavailable, while others (often new ones) are becoming available (Tacoli 1999). In the following three chapters I will analyze the changes in assets, capabilities, and constraints in the PUAs in question with a focus on the past four decades.

As will be shown, the socio-environmental transition entails that populations in PUAs face changing socio-economic and environmental stressors, but also have a changing set of assets and capabilities to respond to and cope with these stressors. Wellbeing and vulnerability result from factors that are both under people's control and beyond their control (Downing et al. 2006). I will therefore also look at underlying factors that contribute to and/or constrain wellbeing and vulnerability. To do so, I will highlight the dynamics between peri-urban dwellers, the state, and

[18] Chapter 7 focuses on informal settlements, while chapter 8 explores settlements that started informally and are now formalized, or that started formally either through self-construct housing or state-subsidized large-scale housing projects.

the market, and the influence of these dynamics on the wellbeing and vulnerability of peri-urban dwellers.

Understanding wellbeing in all of its dimensions is a complex undertaking. I am interested in understanding wellbeing through the 'eyes' of peri-urban inhabitants. In addition, being consistent with my unit of analysis -the community- I want to underscore those issues that are relevant at the community level (in this case, the neighborhood or the rural settlement level). This is not to disregard the differential vulnerability within communities. The focus, however, of this thesis is community-level processes, rather than the household or individual level. Evidently, the individual, household, and community level aspects of wellbeing are constitutive of one another. With the above in mind, the following analysis focuses on the salient aspects of peri-urban populations' wellbeing. I determined salience based on the issues that interview and focus groups participants identified as priorities in each settlement type. Unless noted, the information in the following chapters is based on interviews, focus groups, narrative walks, narrative drives, and participant observations carried out with the inhabitants of these areas as well as with local decision makers.

This chapter focuses on the population who live in agriculture-based settlements. I start with an introduction of the 'agriculture-based' research areas. I then carry out an examination of the different dimensions of wellbeing, namely; the material, human, and social in agriculture-based areas. From this wellbeing examination, I identify the main stressors that the population of these settlements face and discuss them from a vulnerability perspective. As previously mentioned, in this context 'agriculture-based areas' are used to refer to areas at the interface between the city and the countryside (or, the urban-rural interface) with predominantly rural-like characteristics. In other words, areas where the landscape primarily reflects characteristics such as agricultural land, barren land, forests, and low-density housing, and inhabitants are engaged mainly in agricultural activities. This category (i.e., agriculture-based) does not necessarily follow land use plans, especially in the borough of Bosa where, as I will explain below, agricultural land uses are no longer recognized.

Setting the Scene of the Agriculture-based Study Areas

I selected the neighborhood of San José II in Bosa, the neighborhood of San Bernardino also in Bosa, and the *vereda* (rural settlement) of Bosatama in Soacha to represent the agriculture-based areas. I selected these areas based on guidance and narrative drives with local decision makers, and analysis of satellite images and maps. The chapter will focus mainly on the neighborhood of San José II and the

vereda of Bosatama. In each of these areas, I conducted a focus group, and all three constituted sites of data collection. I will also draw insights from the San Bernardino neighborhood where I participated in a narrative walk. Further, I conducted a number of interviews at the offices of the *Cabildo* Muisca of Bosa, located in San Bernardino. I start the section by introducing the neighborhood of San José II, after which I will introduce the neighborhood area of San Bernardino. I finish by introducing the *vereda* of Bosatama.

San José II, Bosa
From *Vereda* to Urban Informality

As it was explained in the previous chapter, the municipality of Bosa was annexed to Bogotá in 1954 to accommodate the large influx of rural immigrants who arrived to Bogotá escaping the political violence and land struggles that other rural areas in the country were experiencing. People also migrated to Bogotá in search of better economic opportunities, following a process similar to that described by Harris and Todaro (1970). By the 1960s, Bosa was integrated into the political and administrative dynamic of Bogotá. During the 1960s, most of the population of Bosa lived in rural areas where agriculture was the main economic activity. During the 1970s, 80s, and 90s, Bosa became one of the main locales where immigrants from other parts of the country arrived. New settlements were developed to accommodate the arriving population. Many were developed informally through a process locally known as *urbanización pirata* (pirate urbanization). Pirate urbanization consisted of the subdivision and sale of large landholdings (former *haciendas)*, followed by the construction of houses lacking official permits. Mohan (1994) provides a good explanation of the process and contrasts it to squatter settlements, thus it is worth quoting at length:

> The difference is that these *pirata* subdivision settlements did not result from land invasions: the land has actually changed hands through legal purchases. It is the subdivision itself that is usually illegal. But these settlements are better described as extralegal rather than illegal. Low-, lower-middle-, and middle-income families, having been shut out of the formal housing market, buy lots from entrepreneurs who acquire tracts of undeveloped land and subdivide them without conforming to zoning laws, subdivision regulations, or service provision standards (Mohan 1994:152–153).

Not all of Bosa has been urbanized, however, and there are still a few areas where rural-like characteristics dominate the landscape. On of these areas is the San José II neighborhood. This area is traditionally an agricultural area, and still today many residents of Bosa refer to San José II as *vereda* (a rural settlement). San José II borders the Tunjuelito River. The total settlement has an area of approximately 8.4

ha, divided into 193 plots, with an estimated population of 1042 (Secretaría Distrital de Planeación 2013b).

Based on my fieldwork visits to the area and on how local inhabitants describe the area, I suggest that the neighborhood of San José II is divided into 3 distinct sections (see Figure 8). The first section, furthest to the east, borders the neighborhood of Villa Celina[19] (an informal settlement) and ends where a bridge crosses the Tunjuelito River. According to leaders of the *Cabildo* Muisca, in this first section of San José II, a large portion of the population are indigenous people. The second section begins west of the bridge. There, there are a few streets where mainly *recicladores* (people who collect and sell recycling material for a living) live. The houses in this second section are located within a few meters of the Tunjuelito River, with those closest to the river basically residing partly on the river embankment. I visited a few houses in this section of San José II in 2013. In one house, the residing family shared a one-room space with a horse that pulled the carriage used to carry recycling material. Another house had two floors, on the bottom, pigs were held and the family resided on the second floor. Having animals inside the house is not an anomaly in this area as people's livelihoods depend on these animals and they feel it is too unsafe to leave them outside overnight[20].

The third section of San José II starts a few hundred meters further away towards where farmland remains, and less than two kilometers from where the Tunjuelito River meets the Bogotá River. I organized a focus group in the third section, and thus most of the analysis will draw on insights from participants in this area. In this third section of the neighborhood about 15 families reside, and most of them are engaged in agriculture or recycling. Inhabitants of this area often own a small, usually inherited, plot and work on adjacent land owned by big landowners. Most focus group participants were born in the area or had lived there for more than 25 years. Figure 9 was taken in the third section of San José II. Note in the picture the cattle raising fields on the left and the precarious houses of the inhabitants on the right.

[19] I will talk about Villa Celina in detail in chapter 7.

[20] Bogotá's Mayor Gustavo Petro (January 2012- December 2015) implemented a program to change the use of horses by recicladores for a small subsidized vehicle and thus by the time of writing there are probably few horses left used to pull recycling material in this area.

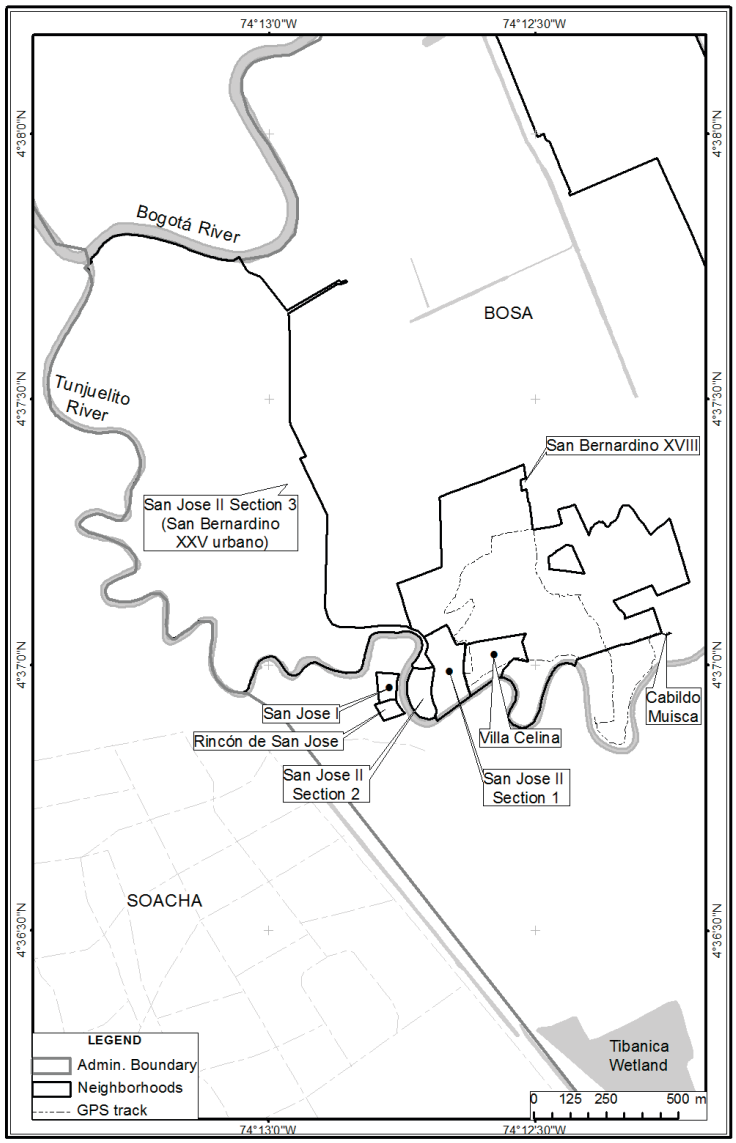

Figure 8. Map of San José II in Bosa

This map shows the three different sections of San José II. Section 3 is the area identified as agriculture-based that will be considered in this chapter. The map also shows the *vereda* of San Bernardino and the neighborhoods of Villa Celina (chapter 7) and San José I (chapter 8). Note that the delimitation of the neighborhoods is approximate and reflects my understanding of how inhabitants describe the areas and the names they use to refer to them. Dotted line shows GPS track of narrative walk with members of the *Cabildo* Muisca de Bosa in May 2014. Map developed by Karem García with data from IGAC, GPS information I provided from fieldwork, and polygons of San José II that I drew.

Figure 9. Agricultural San José II, Bosa

The image shows a part of San José II. About 15 families live in this section and their livelihoods depend on agriculture or recycling, for the most part. I conducted a focus group in this area.

San Bernardino, Bosa
From *Vereda* to a Mosaic of Neighborhoods

The area of San Bernardino is another area often referred to by Bosa residents as a *vereda.* Defining the neighborhood is actually difficult, because San Bernardino used to be a large *vereda,* populated mostly by Muisca indigenous population (according to leaders of the *Cabildo* Muisca), which, over time, was split into several neighborhoods. In 1999, the municipality of Bogotá formalized a part of the *vereda* by recognizing it as a formal urban neighborhood in the land use plan. This formalized area retained the name of San Bernardino, and now has an area of almost 18 ha subdivided into 1093 plots, and an estimated population of 5900 inhabitants. While inhabitants of Bosa still refer to the bigger area as the '*vereda* San Bernardino', officially the former *vereda* is now comprised of several neighborhoods, where both farmland and constructed areas are evident (see Figures 10). I will refer to the *vereda* San Bernardino throughout the text to reflect

inhabitants' depiction of the area. In 2014 I participated in a narrative walk[21] through San Bernardino with members of the community where we visited different parts of the former San Bernardino *vereda,* including the formalized neighborhood named San Bernardino. During the walk we also visited other neighborhoods including Villa Celina (which will be introduced in chapter 7), and San José II (the section that borders Villa Celina).

Figure 10. Agricultural practices in Bosa

Cultivating onions in San Bernardino, Bosa. The grassy hill on the back of the image is the Tunjuelito River embankment.

[21] The walk was organized by the *Cabildo* Muisca of Bosa and an NGO as part of a project on disaster risk management financed by the borough of Bosa. It lasted about three hours and more than 15 people participated.

Bosatama, Soacha
A Shrinking *Vereda*

As mentioned in chapter 4, the municipality of Soacha consists of 5 *comunas* (urban districts) and 2 *corregimientos* (rural districts). In the second *corregimiento* lies the *vereda* Bosatama, which has existed since the creation of the municipality. The Tunjuelito River separates the *vereda* Bosatama from Bosa. The *vereda* also borders the Bogotá River, Ciudad Verde (a state-subsidized housing development towards the south), and the urban districts 1, 2, and 3 of Soacha (Figure 11). The housing development Ciudad Verde that was inaugurated in 2010 and, by its completion in 2016, is expected to offer almost 50,000 apartments, used to be part of the *vereda*. The current land use plan of Soacha (from 2000) designates Bosatama as a sustainable agriculture area (Concejo Municipal de Soacha 2000b). I organized a focus group in Bosatama that was held at the community center that borders the Tunjuelito River and is located on the premises of a former community school (which was shut down in 2011 due to the risk of flooding as I will explain below). Most of the focus group participants had lived in Bosatama for more than 25 years.

Wellbeing in Agriculture-based Study Areas

San José II and San Bernardino in Bosa, and Bosatama in Soacha have experienced significant socio-environmental changes in the past four decades as a result of peri-urbanization. In the following sections, I will analyze those socio-environmental changes and their implications for the wellbeing of the population of these areas, paying particular attention to 'traditional inhabitants'. As I mentioned in the previous chapter, by traditional inhabitants I refer to people who were either born in the area or have lived there for several decades (even generations) and includes both Muisca indigenous and non-indigenous population. As 'traditional inhabitants' of these areas, most of the people I interviewed or who participated in the focus groups currently work in agriculture, have worked in agriculture at some point in their lives, or their families sustained agricultural livelihoods. Some have left agriculture as a result of the socio-environmental changes that have come about with peri-urbanization, as I will discuss in this chapter. The focus of the following analysis is, thus, on the impacts of peri-urbanization as it relates to the wellbeing of populations whose main livelihood activity is agriculture (or was, in the cases where they have changed livelihood strategy within the last generation). Unless otherwise noted, when I refer to research participants in this chapter, I mean the inhabitants of San José II, San Bernardino, and Bosatama. Similarly, study areas in this chapter refer to the abovementioned settlements.

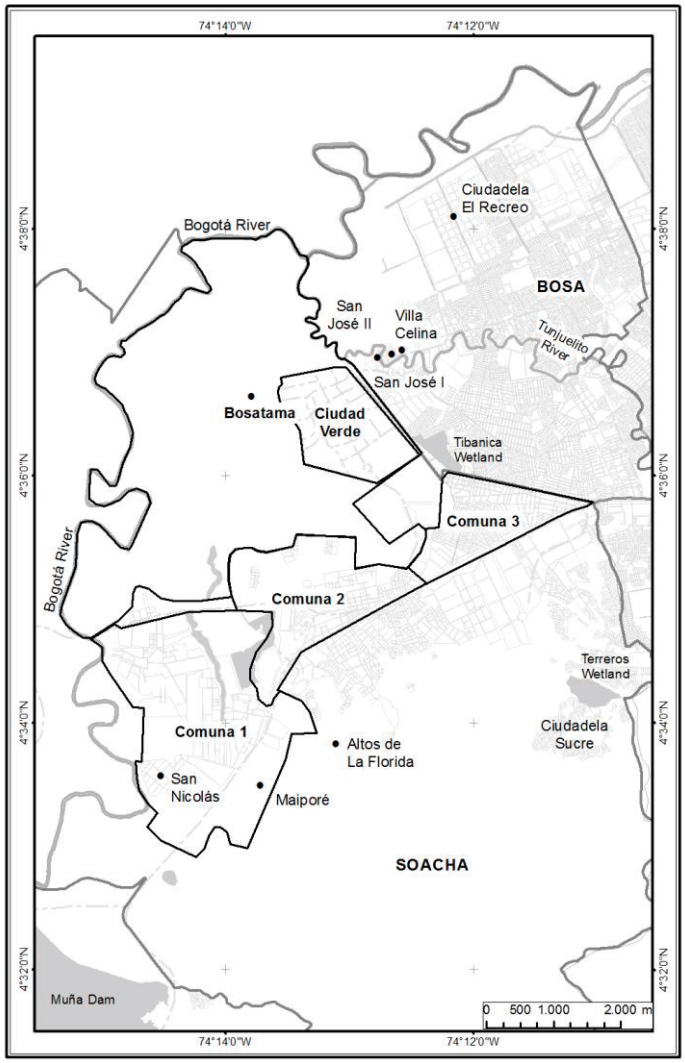

Figure 11. Map of *vereda* Bosatama, Soacha

Map shows location of all field sites. Note location of housing complex Ciudad Verde. Land used to belong to the Bosatama *vereda*. Also note that the *vereda* borders both the Tunjuelito and Bogotá Rivers. Source: Cadaster of Bogotá and IGAC database 2016. Map developed by Karem García.

Material Wellbeing

For populations whose main livelihood has traditionally been agriculture, land and water are key resources. Research participants discussed the changes they have experienced in accessing and utilizing these resources. These changes, as I will explain in the following section, have been influenced by socio-economic and environmental processes at various scales. As physically tangible resources, I consider land and water components of material wellbeing. Access to basic utilities such as water and sanitation are also crucial components of people's wellbeing. I therefore will also analyze the changes in provision and access of populations in the study areas, and the initiatives inhabitants have taken to influence those changes.

Land: A Key Asset Gradually Becoming Unavailable

For populations whose main livelihood has traditionally been agriculture, land a vital resource. Land, for these populations, can be considered both a natural and a productive asset. As a natural asset, it provides the soil needed for cultivation, as well as environmental services like infiltration of water, which can replenish aquifers, reduce surface runoff, and reduce risk of flooding. Land may be covered by forests, which provide humidity retention, reduce soil erosion, and capture carbon. When used for agriculture, land becomes a productive asset that farmers can use to cultivate or graze cattle, thereby generating food for household consumption or for sale as an income generating strategy.

Inhabitants of the study areas have been modifying the landscape since pre-colonial times (as explained in Chapter 5). The modification of the landscape has been a form of metabolizing nature (Castán Broto et al. 2012) to facilitate and improve agricultural production. An important modification of the landscape was the construction of canals. Canals were used both for irrigation as well as rainwater drainage during heavy precipitation events. Canals in these areas have been critical to reduce flood hazards given the low permeability of the soil. A network of canals existed when the areas were entirely rural, facilitating the transport of water from different plots to and from the Bogotá and Tunjuelito Rivers. Proximity to rivers has, therefore, been an asset for generations in areas such as San José II, San Bernardino, and Bosatama. Furthermore, the proximity to the food demand from Bogotá has meant these areas have been one of the city's food baskets for generations. The patterns of metabolizing land and water have changed throughout time. Different groups have dominated these metabolisms and with different priorities. For instance, while for pre-colonial Muiscas land and water did not only have a functional role but also a symbolic and spiritual role, with the changes in property regimes (further explained in chapter 5), in other periods when the

modification of the landscape was dominated by big landowners, it was the functional role of the landscape, both as an agricultural and housing area, that dominated its metabolism (Rojas et al. 2015).

In more recent periods, the uses and interpretations of the land have continued to change (Figure 12). Land use changes need to be understood beyond particular land uses, but also as reflecting broader socio-economic trends, power dynamics within and beyond the study areas, as well as different cultural interpretations and relations of the population to the territory (Beilin and Bohnet 2015; Escobar 2000). In Bosatama, for example, between 1940 and 1965 most of the land was cultivated with corn, barley, and wheat. Then, with the arrival of families who bought large landholdings, the *vereda* was turned into extensive cattle raising fields. Economic liberalization characteristic of neoliberal state (Ferguson 2012), which brought about increasing land deregulation, speculation, and international competition for agricultural products, combined with increasing pressure from Bogotá for urbanization land, increased the price of land (Tovar Martínez 1996) and contributed to a change of main land use from cattle raising to cultivation of vegetables. Traditional inhabitants of Bosatama and San José II recall that starting from the mid 1990s, extensive cattle raising was replaced by the cultivation of vegetables, including spinach, coriander, garlic, celery, broccoli, corn, and barley.

Besides the tangible benefits that this farmland provides to the population in the form of food production and a source of income, there are also subjective aspects through which farmlands contribute to wellbeing. Inhabitants highlighted subjective aspects that contribute to their wellbeing like the open space, cleaner air (compared to the city), little noise, space for their children to play, and the ability to have farm animals. The aspect that was stressed by most respondents in the questionnaire when asked what they liked most about the area was, to use the words of a respondent from San José II, "the tranquility of the countryside." With peri-urbanization, however, the objective and subjective benefits of living in these areas are rapidly disappearing. Similar to the argument raised by Freidberg (2001) in the case of peri-urban communities in Burkina Faso, the livelihoods of the population are both dependent on and threatened by the urban economy. The dependency arises from the city, Bogotá, being the main buyer of the areas' agricultural products. The threat arises from the encroachment of the city on the countryside and from the increasing waste the city produces which these areas often receive, as I will explain later in this section.

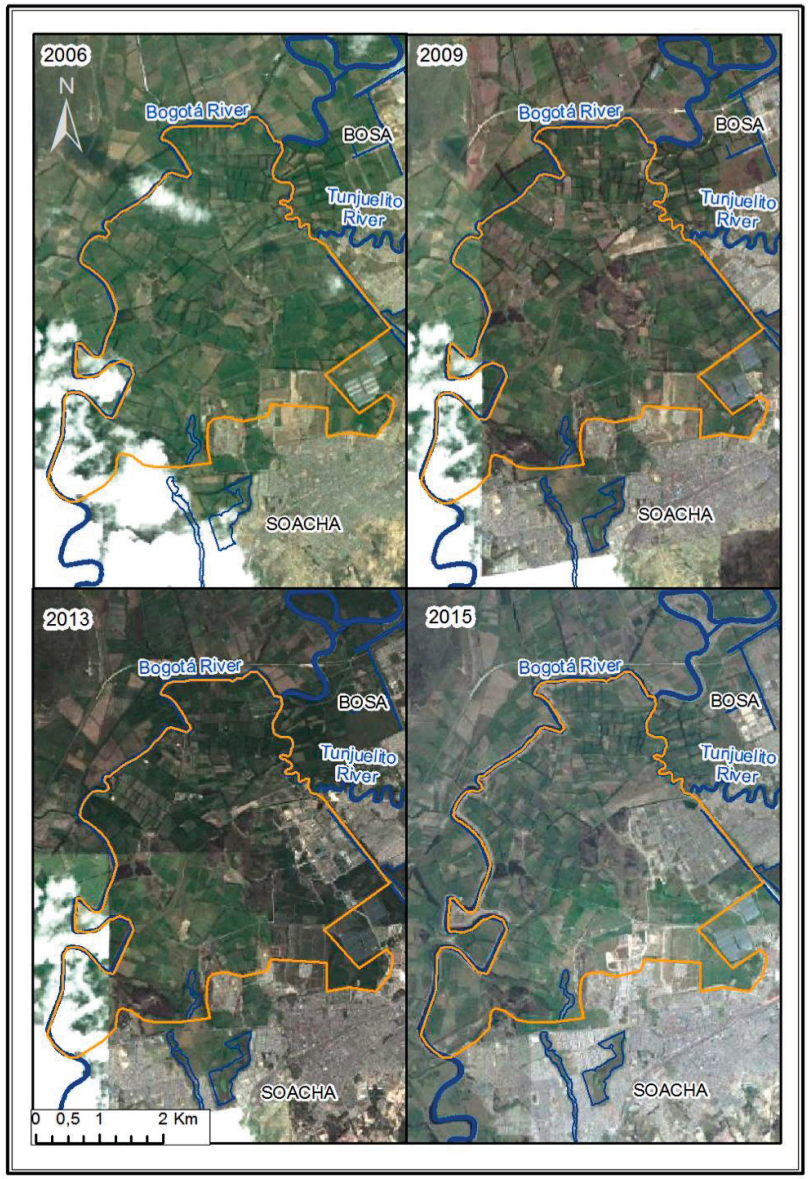

Figure 12. Land use changes around Bosatama, Soacha (2006-2015)

Orange polygon denotes the Bosatama *vereda*. Note Development of Ciudad Verde Housing Project from 2009 to 2015, bottom right of images within Bosatama; bare sand field above Ciudad Verde in 2009. Also note east of the Tunjuelito River in Bosa the area of San José II showing agricultural features. Map developed by Karem García, with data from IGAC data. Source of satellite image: Google Earth, 2016 CNES/Astrium, DigitalGlobe.

Over the past two to three decades, the population that has lived in traditionally agricultural areas, such as San José II, San Bernardino, and Bosatama, has lost access to their livelihood strategies. This loss is the result of a combination of processes at the local level including: the subdivision of land and land squatting, loss of recognition of the rurality of the area in land use plans, private appropriation of land, loss of area to housing development projects, degradation of land, and conversion of land to other uses. These local level processes are arguably responses to wider economic, socio-political, and environmental dynamics. On the economic side, the deepening tendencies of liberalization (as shown in chapter 5) in a context of increasing housing demand have resulted in rent gap market-based mechanisms, through which exchange value undermines use value (Clark 1988; Smith 1987), resulting in legal (Hudalah et al. 2014) and physical gentrification (Janoschka, Sequera, and Salinas 2014). Socio-politically, the gradual loss of livelihoods reflects the social and political marginality (Fraser 1998) of farming communities *vis-à-vis* more powerful state and private actors. The gradual loss of livelihoods also reflects uneven metabolisms of land and water resources, where farming communities receive an unequal load of ecological damages. These wider economic, socio-political, and environmental processes have directly and indirectly affected traditional inhabitants, who feel neglected and misrecognized (Fraser 1998) by decision makers, as it will be shown next.

Dispossession through Land Metabolization

"It is sad to see that everything gets urbanized and the green disappears" (Resident of San José II). This quote is telling of the metabolization of nature (Heynen et al. 2006), or, more precisely, the metabolization of land, whereby agricultural land is converted into other uses (e.g., housing or dumping sites). This metabolism that inhabitants of these traditionally agricultural areas are experiencing can result in legal and/or physical gentrification (Hudalah et al. 2014). One of the major drivers of this metabolization of land is urbanization, as a response to the processes described in chapter 5 (e.g., increasing population displaced by the armed conflict and deregulation policies that have led to rent gaps in the center of Bogotá) (Dureau 2002). The indigenous and non-indigenous farming families who managed to keep their land until today are currently facing pressure from two main sources: firstly, from the district administration who started to buy land in the 1990s to develop infrastructure projects, and subsequently increased property taxes, putting a big burden on the population (Castellanos Puentes 2014; Durán Bernal 2005). Secondly, the arrival of new migrants has resulted in the development of formal and informal housing through the subdivision and sale of plots, as well as squatting of land. The first pressure can be considered a form of accumulation by dispossession (Harvey 2003, 2004), in which the state divorces the producer; the farmers, from the means of production; the land. As I will discuss in chapter 8, the infrastructure projects include state-subsidized housing developed as a response to the housing deficits for

low-income populations and to counter the proliferation of informal settlements (see chapter 7). These measures, however, reflect uneven core-periphery relations where the interests of the city (and urban residents) overrun those of the rural areas and their inhabitants.

Informal urbanization has played a major role in the metabolization of the agricultural land. Informal urbanization has occurred mostly through pirate urbanization and, at a smaller scale, through squatting of land. In the case of pirate urbanization, plots are normally subdivided by the owners and sold to informal developers who sell six by twelve meter plots to families who then build their houses themselves. It is worth noting that the houses that people can build in these spaces are usually much larger than the housing units offered through government subsidized projects. Similar to the case of Mayan population in peri-urban Merida, Mexico (Domínguez Aguilar and Pachecho Castro 2015), the subdivision and sale of plots has been done mostly for economic reasons. In that respect, following a similar process to that stipulated by rent gap theory proponents (Smith 1987), variable and unfavorable prices for agricultural products, combined with higher land value per square meter for housing developments versus land value for agricultural production are two of the main market mechanisms persuading traditional inhabitants to sell part or all of their land. In the original *veredas* of San José II and San Bernardino, this process has become a common occurrence. In 2006, Dávila et al. (2006) estimated that in the southeast and west peripheries of Bogotá, including Bosa, a rural plot could costs between COP$10,000 and COP$12,000 per m^2 (approximately US$3-US$4). When the plot was designated as urban land, the price more than doubled to a cost between $25,000 and $30,000 per m^2 (about US$8-US$10). However, those who do not sell and remain in the area must face the pressures peri-urbanization puts on their land, livelihoods, and culture.

Participatory Exclusion and Land Dispossession in Bosatama

In the case of construction of formal housing developments, original owners may have sold land for the reasons just mentioned or the state may declare the area an urban expansion zone, leaving no option for the owners but to sell their land. In 2010, for example, President Uribe declared the area where the subsidized housing project Ciudad Verde (see Figures 11 and 12) now exists an urban expansion area, ignoring the discontent of local politicians and inhabitants. As focus group participants expressed, the inhabitants of Bosatama were not consulted during the planning and development of the project, and they were not given any financial compensation for the impact the project would have on the *vereda*. Furthermore, while the rest of the *vereda* is currently designated as a sustainable agriculture area, government officials have told inhabitants that it is highly probable that within a decade the area will be converted to an area for urban expansion. The above example, illustrates the lack of recognition (Fraser 1998; Islar 2012) of farmers

resulting from uneven power relations between the state and low-income populations who are increasingly marginalized as a result of peri-urbanization. This example also illustrates uneven power relations between the capital city, Bogotá, and Soacha. As a conurbation of Bogotá, Soacha has been forced (as expressed by a decision maker of Soacha) to develop large-scale state subsidized housing to accommodate low-income populations who work in Bogotá. Increasing numbers of state-subsidized housing projects have been imposed on Soacha by the national government, regardless of the impacts on Soacha's farming population or the institutional capacity of the municipality to adequately absorb the population (I will discuss this further in chapter 8).

The metabolization of land is not limited to housing development. Some alternative land uses include parking lots for public buses, mining of construction material, dumping sites for construction debris, foundries, and tire and trash burning sites. Inhabitants of the study area point out that they have seen an increase in the aforementioned land uses since the late 1990s, when Metrovivienda (a company run by the municipality of Bogotá charged with promoting the construction of subsidized housing) started developing projects in Bosa. Thus, these alternative land uses appear to be a direct and indirect consequence of urban expansion. Beyond the correlation between these alternative land uses and urbanization, these land uses have resulted in environmental impacts, such as increasing air pollution and degradation of land, which affect the local population. It could be argued that the development of these alternative land uses to meet the demands of a growing city are indications of environmental injustice (Martinez-Alier et al. 2014; Schlosberg 2013) where different socio-economic groups experience differential access to environmental quality and unequal sharing of environmental 'bads' (Schlosberg 2013; Schweitzer and Stephenson 2007; Ulloa 2011). The lack of meaningful consultation with inhabitants prior to the development of the project, or, as Agarwal (2001) classifies it, of interactive participation in which the voice of the participants is heard and has an influence in the decision, shows that the farming population of Bosatama has been denied participatory parity (Fraser 1998) in the decision making process regarding the development of their territory.

Muisca Struggles for Participatory Inclusion

While the Constitution stipulates that indigenous communities must be consulted when developments are being planned in areas where they live, the process of prior and informed consent does not always take place effectively or in due time. As leaders of the *Cabildo* told me, one of the impacts of urbanization is that indigenous people have been displaced from their land. Indigenous leaders underscored that, from its origin, the state has not respected the rights of the indigenous community and is to blame for the loss of land of indigenous populations. The history of the Muiscas has been, as *Cabildo* leaders voice, a history of injustices of misrecognition

and maldistribution (Fraser 1998; Schlosberg 2013). They emphasized that this goes further than the establishment of the *Cabildo*, and has happened throughout their history. The leader of the *Cabildo* Muisca in Bosa explained to me their situation in 2013:

> The community has had a strong territorial impact, especially the past 15 years… During Mayor Peñalosa's term, the land use plan (POT) removed the rural areas from Bosa and declared several areas expansion zones. He also stopped the process to declare our land as an indigenous reservation. In 2006 two housing projects were approved El Edén-El Descanso and Campo Verde (through the planning instrument of partial plans – *planes parciales)*… A prior consultation process (*consulta previa*) was supposed to start then. Seven years later the Ministry of Interior has still not carried out the consultation. During the consultation period no developments were supposed to occur, yet five new informal settlements have developed in our territory cramming us even more. Where were the police and the public authorities when the houses started to be constructed? Now there are 300 houses! (Leader of *Cabildo* Muisca*, Bosa)*

Dealing with informal settlements, which are already built and continue to grow rapidly, is very difficult for the *Cabildo* and for any state authority for that matter. Conflicts have arisen between the indigenous population and new informal dwellers over use of the land and its resources. One of these conflicts relates to the Villa Celina neighborhood, which borders San Jose II and will be further explained in Chapter 8. Indigenous leaders claim:

> The state is not concerned if indigenous groups disappear. While there is no control of pirate urbanization, as soon as indigenous people do something outside the law, the state comes and fines them, while illegal settlements are built and nobody stops them. Local politicians (*ediles*) arrive and promise to legalize informal settlements and with corruption and political strings they manage to legalize those settlements (Member of Muisca elder council)

With respect to the district approval of development projects, housing developments on indigenous territory (as is the case of the El Edén-El Descanso and Campo Verde projects) the *Cabildo* recently (2015) won an important legal battle. As has been previously mentioned, in 1999 the existence of the Muisca people in Bosa was recognized by the Colombian state. In 2002, however, this recognition was removed on the basis of the lack of an ethnological study confirming their presence in the area. It must be underscored that the problem was not that such a study concluded that there were no indigenous people in the area. Instead, the problem arose because no ethnological study was conducted by the responsible state agency. As a result of this missing study, the *Cabildo* lost its recognition as an indigenous community. In 2009 their status was re-recognized by the Ministry of Interior. Because of this, between 2002 and 2009, indigenous people in Bosa were not protected by the rights of minorities, and thus prior consultations (*consulta previa*) were skipped.

The urban plan, that included the design of the housing project El Edén-El Descanso (referred to as a *plan parcial*, or partial urban plan), was adopted by the municipality of Bogotá in 2006. The partial plan of Campo Verde was approved in 2011 and currently, 3600 housing units are in the process of being built. In El Edén-El Descanso, since the presence of the *Cabildo* was not recognized in 2011, the district did not carry out consultations with the community prior to its design and approval. In the case of Campo Verde, district authorities claimed that the project was not located within indigenous territory. As a response to both projects, the *Cabildo* sued the state. The plaintiffs stated that the housing projects El Edén-El Descanso and Campo Verde are located in areas considered to be part of indigenous territory (or where indigenous people live as at present they do not have an indigenous reservation). They stated that the process of prior consultation had not been carried out adequately (with meetings being delayed or cancelled, and pertinent district authorities not attending the meetings), and that the partial plans should have not been approved without prior consultation. Further, even after their approval, no developments should have taken place during the consultation process. The plaintiff drew attention to an example wherein during the consultation process a parking lot of public busses was put into operation in the area and a cycling route was built.

The first lawsuit was lost on the grounds that the district did not act wrongly since the indigenous community was not recognized at the time of approval of the projects. The *Cabildo* appealed the decision, and in September 2015 a Bogotá Court ruled in favor of the plaintiffs. The court's decision highlighted that, as a result of the El Edén-El Descanso project, 43 families had been expropriated without consideration to their special protection because of their identity as indigenous people. The Court requested pertinent district authorities to revise and confirm the developments that have been carried out and stop any further developments around El Edén-El Descanso before the consultation process is completed. It also requested that consultations should be completed within three months. In case an agreement is not reached during the consultation process, authorities have three months to assess the impact the housing projects would have on the community, and the measures to mitigate, avoid, and compensate the eventual impact. If during the consultation process, the conclusion is that the project tends to harm the community, the district Ombudsman should take the measures to guarantee the rights of the plaintiffs. In the case of Campo Verde, authorities need to visit the area to verify the presence of indigenous people. If indeed indigenous people reside in the area, district authorities must order all construction to stop. This legal ruling was an important victory for the indigenous community in Bosa, one that confirms the *Cabildo* as an asset for the community, the importance of collective action, and corroborates Muisca people's entitlement to actively participate in discussions and decisions related to the transformations of their land.

The absurdity of a community losing its indigenous identity for seven years because of a missing study is clear. This situation reflects the struggles for recognition (Fraser 1998; Islar 2012; Schlosberg 2013) that ethnic minorities face in Colombia, and, in the case of the Muiscas of Bosa, the particular pressure they face from the encroaching city. But beyond the struggles for recognition of their ethnic identity, one must ask why participation over the transformation of populations' territory is dependent on the recognition of the presence of an ethnic minority. Should the potential implications that the transformation of agricultural land, or any landscape for that matter, into built environment can have on the livelihoods of the population, the environmental quality of the area, and the social dynamics (just to name a few aspects), not be enough reason to consult the inhabitants of the area? While the recognition of the special rights of indigenous groups is an important step to reduce the historical marginalization they have experienced, in the studied PUAs where not all members of the populations can self-identify as indigenous, the lack of effective mechanisms to include the voices of marginalized communities (whether indigenous or not), reflects a need for representation and recognition of all people in PUAs. From a wellbeing perspective, the lack of representation and marginalization has resulted in decreasing land, a key resource for the livelihood of agricultural populations.

State Informalization of Farmers: Rurality no Longer Recognized

In Bosa, the current land use plan (*Plan de Ordenamiento Territorial*, hereafter referred to as POT) (Bogotá Decree 190 of 2004, hereafter POT 2004) does not recognize any rural activities within the borough. The change entails that neither San José II nor San Bernardino are recognized as *vereda* or as rural settlements. In other words, according to the current land use plan, there are no agricultural activities (or there should not be) taking place in Bosa. While the municipality of Bogotá has 121,474 ha or about 74% of its total area designated as rural, of the 1929 hectares that constitute the borough of Bosa none are designated as such (Sec. Dist. de Ambiente and Empresa de Acueducto y Alcantarillado de Bogotá 2008). In practice, this means that there is no municipal support for farmers in Bosa and that the land they currently cultivate is meant to (and expected to) be used for other activities, like urban expansion or environmental conservation.

At the same time, San José II and parts of the former San Bernardino *vereda* are not recognized as official urban neighborhoods. That is, the change in land use in the maps did not automatically give a formal urban land zoning to these areas. The area is not even considered urban expansion in the land use plans but has already been declared urban, despite the fact that the features in the landscape show a different reality (as shown in Figures 9 and 10). In practice, this means that these areas have changed from being rural settlements to being considered, for all practical and administrative purposes, informal urban settlements.

The community action board (JAC, the Spanish acronym for *Junta de Acción Comunal*) of San José II requested formalization (in this case, recognition as a formal urban neighborhood) and this request was rejected in 2005 on the grounds of high flood risk from the Tunjuelito River (Secretaría Distrital de Planeación 2013b). As Roy (2015a:9–10) maintains in the case of India, what is designated as urban is so because the state determines it, not necessarily because it possesses urban characteristics. By removing rurality from land use plans, the farming population in Bosa has become invisible. This speaks of the power of land use maps in silencing populations (Gallini 2015), and reflects the lack of recognition these populations face (Fraser 1998; Islar 2012). It has been more than ten years since the POT 2004 became effective, yet the lack of recognition of the farming population to policy makers continues to be reiterated in legislation approved as recently as March 2015 (Bogotá, 2015. Resolution 228). This lack of recognition is not a cultural or gender misrecognition, but rather a political and economic recognition. Through the removal of rurality in the land use plans of Bosa, the farming populations have lost the recognition both of their livelihoods as well as of their historical belonging to the area.

A key point is that, for the traditional inhabitants of this expanding rural-urban interface, changes in legislation and land use planning have meant that they went from being rural dwellers to informal urban dwellers in the eyes of the state, without having moved from the places where many of them were born and raised. Or more precisely, it is the state that has changed the condition of this population from rural farmers to informal urban dwellers. Informality, drawing on McFarlane's work (2012), can be considered a heuristic device that uncovers the shifting relation between the legal and illegal, the legitimate and illegitimate. San José II's residents' current condition of informality impacts the support they can receive from the state with respect to infrastructure, access to basic services, and protection in case of land titling conflicts and resettlement processes. In that regard, informality can be considered a powerful state tool that allows particular forms of intervention over domains, such as resource allocation and service provision (McFarlane 2012; Roy 2005). As Roy (2015b) argues, informality is an integral part of the territorial practices of state power. In the case of Bosa, informality is being used by the state as a powerful tool for legal dispossession. Studies in other parts of Bogotá have shown that land use plans have become powerful tools of state control not only by defining informal versus formal areas, but also by designating particular areas as areas of high risk from different hazards, like landslides, as in the cases studied by Fraser (2014) and Zeiderman (2012, 2015). Drawing on the argument by Baviskar in the case of Delhi, planned urban development as a mode of state-making attempts to transform the relations between populations and spaces, in the process, however, marginal populations are displaced and impoverished (Baviskar 2015).

Land Use Conflicts

The population composition of the agriculture-based study areas (San José II, San Bernardino in Bosa, and Bosatama in Soacha) is not static, and in the past few decades these peri-urban areas have seen the arrival of *recicladores* in search of low-income housing and open land where they can sort recycling material. Conflicts among residents have emerged because trash that remains after the recycling is sorted has been disposed of around the neighborhood or in the river instead of at the trash collection point. This topic is sensitive in several neighborhoods, not only those with predominantly rural characteristics but also in informal and formalized neighborhoods. Some residents told me in private that they fear bringing it up during community discussions because of fear of retaliation. These types of conflicts are corroding trust and collaboration in the community.

Land in PUAs, characterized by its farmland, open landscape, and idle land in proximity to major urban centers, is often the loci for illegal disposal of trash and construction debris from the city and nearby construction sites. Focus group participants in both Bosa and Soacha associated debris and trash on fields and rivers to degradation of land, bad smells, and proliferation of rodents, flies, and mosquitoes. Land compaction in these dump sites caused partly by the passing of heavy trucks that dump the debris has also been connected to changes in infiltration and displacement of water runoff. This concern was raised as a problem in Bosatama, where farms and farmhouses have been affected from increased water runoff, which leads to humidity problems inside the houses.

Evidently, urbanization goes hand in hand with construction of housing, thus it is not surprising then that peri-urban areas are often loci of illegal and legal mining for construction material such as sand and gravel (see Figure 12). The consequences of mining activities were raised primarily in Soacha, and included concerns of dust affecting the health of the population (through colds and eye irritation, for example), increased deforestation, and pollution of surface and groundwater.

Furthermore, an important impact of peri-urbanization that is closely linked to the reduction of agricultural practices in the area is the conversion of former irrigation canals into sewage disposal canals. This is particularly the case in Bosa, where areas such as San José II and San Bernardino have seen an increase in the number of houses. This has taken place either through construction of new informal settlements by pirate developers or because families subdivide the land and build houses for newer generations. As these areas are not formally recognized as urban neighborhoods, the public utility company does not provide them with sewerage systems, and thus inhabitants have had to come up with alternatives to dispose of wastewater. A common alternative has been to utilize the former irrigation canals. These canals have transformed from a natural and productive asset of the land to a physical asset. Given limited alternatives, the conversion of the use of land has been

a livelihood strategy. However, the negative implications (in terms of pollution and health issues) have been so great that I would argue that land has become both an asset and a constraint for the traditional population of these areas.

An additional point to understand how land can be a constraint was highlighted by members of the *Cabildo* during the narrative walk, and relates to the implications of not recognizing rurality in an urbanizing area. Around San Bernardino there used to be several pigsties on land owned by the indigenous population. These pigsties are now forbidden in the area (the prohibition includes any farm animals), and has been enforced mainly on those pigsties that were close to one of the public schools (Kimi Pernia school) because of public health concerns. Besides the loss of the livelihood that these pigsties provided, inhabitants are concerned that leaving the plots vacant provides an opportunity for those who dump trash and construction debris illegally to use these plots. They recounted that other vacant plots in San Bernardino are being used for illegal dumping, which often occurs at night and is very hard to control. It is a lose-lose situation for the owners of the land, since having livestock (such as pigs) on the plots is no longer feasible because of the posed health hazard, but leaving the plots vacant can result in a similar or worse hazard if illegal trash dumping occurs.

Water as a Friend and a Foe

Water is an essential element of life and, when available in good quality and quantity, is also a highly useful resource. But as much as it can be a friend, water can also be a stressor. I will present the different roles water plays in the study areas, both as an asset and a constraint, and how those roles are changing with peri-urbanization. Water as a natural asset will be explored through the role of waterbodies, such as rivers and wetlands, for the provision of services such as irrigation and recreation. Interventions to these bodies of water, through the alteration of their natural course and increased pollution, are converting them from assets to stressors. For example, some bodies of water have become flood hazards.

Throughout the last century, rivers in the study areas have been a source of water for irrigation and drinking water for cattle, and was used for fishing and for recreation (e.g., swimming). With increasing urbanization, rivers have been subjected to human modification. People have built houses over floodplains and, to avoid overflowing, high embankments have been built by government agencies throughout the rivers, thereby altering their natural floodplains.

Pollution of Waterbodies – Accumulation by Contamination

In the past three decades, pollution of the rivers has increased tremendously. Inhabitants claim that pollution of the Tunjuelito River, for example, became

noticeable in the 1970s. Nowadays, all the rivers that pass through Bosa and Soacha are highly polluted, and the level of pollution increases in the regions because of their passage with industrial, chemical, and sewage waste (Alcaldía Municipal de Soacha 2000; Comisión Ambiental Local 2012) (see Figure 13).

As previously mentioned, the land use plans of Bosa do not include recognition of any rural areas. One reason policy makers give to explain why the rurality in Bosa was removed is precisely because the rivers are polluted and, because of this, argue that agricultural activities should not be practiced in this area. However, no support (technical nor financial) has been given to the families that still depend on agriculture to subsist, or those that had to find alternative sources of income (as is the case of many who live in San José II and San Bernardino). The families whose income raising strategies still depend on agriculture continue to rely on the river as a source of water. People in Bosatama and San José II who still work in agriculture underscored that, while they do notice the difference in the quality of products grown with polluted water, markets do not. Therefore, they are still able to sell their vegetables. Cows in their dairy farms also drink water from the local rivers and farmers believe this to be the cause of cows getting sick with liver fluke (*mariposa de hígado* or *fasciola hepatica*) (Mateus 1983; Thomas 1982).

Farmers have tried finding other local sources of water such as groundwater, but as previously mentioned, in Bosatama they found that wells are contaminated as deep as 120 meters. Given the high pollution levels of the rivers, the water used for irrigation could be considered wastewater (granted that the pollution is not only from sewage but also industrial and chemical waste). Use of wastewater for irrigation is clearly not unique to Colombia. According to estimates by Raschid-Sally and Jayakody (2008 in Thapa et al. 2008) around 200 million farmers worldwide irrigate with wastewater an estimated 20 million hectares. Irrigation with wastewater can have advantages through increased crop yields (Thapa et al. 2008), but as an unregulated and unrecognized activity, no support has been given by the state to these farmers to assess the implications of using this highly polluted water on crops or whether water treatments could mitigate the problems.

	Mesuring points	Total Suspended Solids (TSS) *Mean (ton/day)*	Chemical Oxygen Demand *Mean (ton/day)*	Biochemical Oxygen Demand *Mean (ton/day)*
Tunjelito	La Regadera	0.0162	0.02597	0.00469
	Doña Juana	223.3	26.10	8.07
	Puente Independencia	125.39	169.82	71.80
	Isla Pontón San José	183.67	277.48	94.22
Bogotá	Upstream from the Torca canal	29.11	38.4	5.51
	Puente Cundinamarca	106.00	270.0	105.98
	San Bernardino	156.33	464.6	170.07
	El Cierre	389.90	710.0	232.31

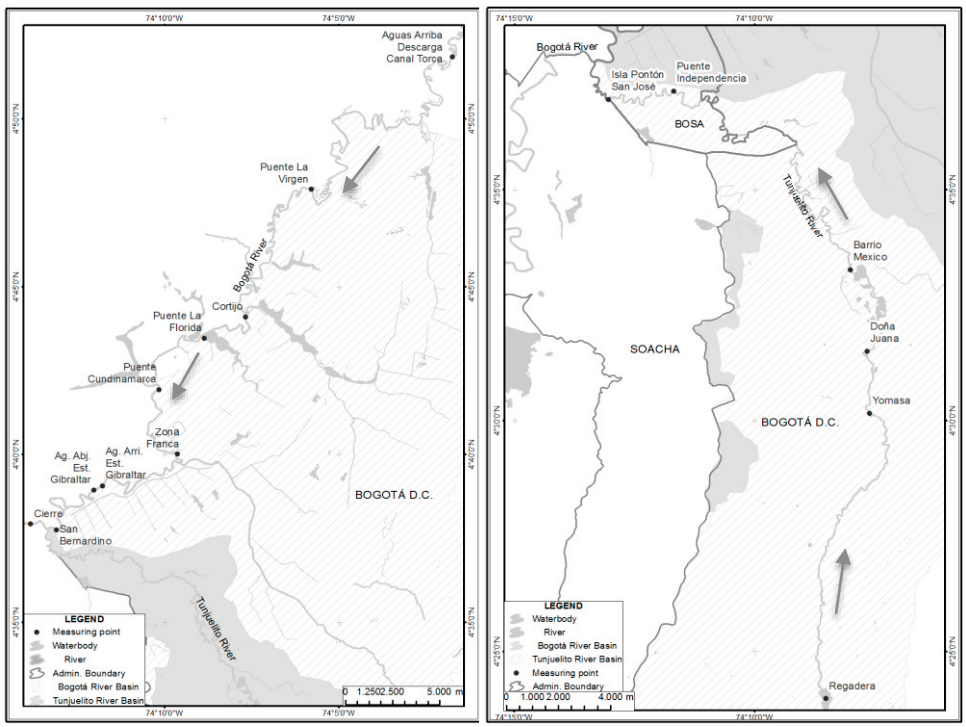

Figure 13. Water quality of Bogotá and Tunjuelito Rivers

Table above: Water quality data at different measuring points along the rivers' watersheds. The measuring points of San Bernardino and Cierre in the Bogotá River are located in Bosa. The measuring points of Puente Independencia and San José in the Tunjuelito River are located in Bosa (The San José measuring point is located close to the neighborhood of San José II). Doña Juana is the landfill for the entire city of Bogotá. Arrows in maps show direction of river flow. Source of data for tables and maps: Sec. Dist. de Ambiente and Empresa de Acueducto y Alcantarillado de Bogotá 2008. Maps developed by Karem García.

Human-induced Hazards through Landscape Alteration

The rural areas considered in my research are located in the lowlands, within rivers' natural floodplains and on terrain with little permeability (INGEOMINAS 2005). Nearby, there are also mountains with increased construction (e.g., that are urbanized), thereby reducing permeable surfaces and meaning that rainwater runoff tends to drain towards the lower areas. In the study area, wetlands have been modified and interrupted to build roads, or have been filled with dirt so they could be constructed upon. Such is the case of the Tibanica wetland that borders Bosatama, and La Isla wetland between San José II and San Bernardino (and is the case for most wetlands in the area). These modified and polluted bodies of water are currently not natural or productive assets that can be used for irrigation, flood prevention (through the capacity of wetlands to absorb and slow down the flow of storm water) (Hey and Philippi 1995), and have instead turned into stressors that pose flood hazards, create land instability (for those houses built over filled wetlands, often with construction debris), and perpetuate health stressors due to their being highly polluted. In San José II, the location of houses on lowlands causes the constant problem of humidity for the homes. The flood hazard that inhabitants of these areas are exposed to will be discussed in more detail in the vulnerability analysis section of this chapter.

Accessing Basic Utilities

Deficient access to public utilities, especially water, sanitation, and gas, are often given as reasons why some inhabitants would prefer that the areas be converted into urban areas. Rural areas around the country, in general, have lower coverage of sewerage infrastructure, usually due to the low population density and the distances between houses (DNP et al. 2014). In Bosatama, San José II, and San Bernardino, though houses are not as dispersed, utilities have not been fully provided by the municipality. The deficiency in public utilities in low-income agriculture-based areas shows the uneven distribution of resource flows. Similar to findings of water metabolisms in other parts of the Global South (Castán Broto et al. 2012; Swyngedouw 1997), in Bogotá and Soacha, not having access to resources such as drinking water is not because of resource scarcity. Instead, these deficiencies illustrate uneven core-periphery dynamics of two kinds: uneven relations between urban areas and traditionally rural areas (i.e., the urban core of Bogotá and the traditionally rural areas in Bosa and Soacha), as well as between rich and poor. Populations in the study areas have attempted to subvert these uneven dynamics by finding alternatives to access basic resources. Not all resource flows show the same uneven distribution patterns, however, as it will be seen with the case of electricity.

Drinking Water

In Bosatama in 1972, a groundwater well was drilled to look for water. The water found had a high level of pollution even as deep as 120 meters below ground. As a result, the water utility company of Bogotá provided water to tanks that were distributed throughout the *vereda*. About 20 years ago, the tanks were removed and pipelines were installed to a few farms. The rest of the farms installed their own pipelines and tapped the formal pipeline. The use of the water has not been formalized and there are no water meters, meaning that residents do not pay for the service. The concern of many local inhabitants is that the utility company may shut down the service at any point or, if it connects them formally and installs water meters, may charge them retroactively, as they say has happened in other areas.

Sewerage System

In San José II and parts of San Bernardino, the lack of formal networked sewerage infrastructure is a major stressor with a variety of impacts that the population is already experiencing. In San José II the community installed the sewerage infrastructure themselves. For some houses, it consists of small boxes underground about 20 to 30 meters from each house that collect waste and rainwater which are connected to 10.2 cm hoses installed underground that drain to an open lot. Other houses are located next to a canal that was formerly used for irrigation and rainwater drainage. These houses use the canal to dispose of grey and brown water. Many canals are connected to each other, with some reaching as far as the Bogotá River, over 1 km away. Some of these interconnected canals are still used by the farms to pump water from or back into the Bogotá River; the former as a source of irrigation and water for cattle, and the latter to dispose of rainwater and wastewater.

Some of the consequences of the lack of sewerage include risk of flooding, bad smells, proliferation of mosquitoes and rodents, as well as health problems such as skin irritations and pulmonary diseases. When it rains, the capacity of the hoses to drain the combined sewage and stormwater is not sufficient, and the wastewater returns back to houses and the streets. The canal used by some houses to dispose of the wastewater also overflows during heavy rains. When floods occur, the solution of the community has been to clean the boxes and canals, and hire a pump to drain the flooded water. The community has collected funds to hire a backhoe to clean the main canal that collects rainwater but due to high costs (approximately COP$55,000 per hour, the equivalent of around US$30 in 2014), the houses that use the smaller canal to dispose of their sewage could not afford to dredge it. The smaller canal overflows often, even just after a day of washing. Using the formal irrigation canals as sewage ditches has been a coping mechanism to the lack of utilities and, as long as the areas are not formalized, the state will not provide alternative measures.

With respect to the health impacts from the unsanitary conditions that open sewerage generates, the community highlighted the increased occurrence of

respiratory illnesses due to water and air pollution, bad smells, and rodents. Inhabitants also complained of recurring colds, eye irritation, and digestive illnesses, especially among children and elders. One additional stressor, connected to the lack of formal networked sewerage, is the economic strain that it puts on the population because of the financial resources required to maintain and clean canals, in addition to the costs of the gasoline for water pumps that are occasionally hired to drain the canals. The conflicts that the lack of sewerage has generated between traditional inhabitants and residents of recent informal settlements will be presented in the next chapter. In Bosatama, in contrast, sewage disposal was not highlighted as a critical issue. In the *vereda* most of the population uses septic tanks to dispose of sewage, which are then drained to canals using pumps. The lower population density in Bosatama, meaning that houses are spread over longer distances and the disposal of sewage is less concentrated in particular parts of canals, could help explain the contrasting experiences.

Other Public Utilities

Electricity is a service that works well in these areas and Codensa, the electric utility company, provides service to both Bosa and Soacha. Domiciliary piped gas is not available and is a service that inhabitants would like to have as they now buy gas tanks at a higher cost. Piped gas is one of the services inhabitants feel they would get access to if they were formalized as a neighborhood (in the case of San José II, for example) or converted into an urban area (as in the case of Bosatama). San José II and San Bernardino have trash collection services that generally work well, where respective utility companies provide the services. However, despite trucks collecting trash several times a week, interviewees and focus group participants underscored that several neighbors do not dispose of the trash in the collection points or at the appropriate dates, and instead throw the trash into open fields or the river, increasing pollution and creating a health stressor. In Bosatama, there is no trash collection and, consequently, residents burn the trash and live with the negative health impacts that come with the practice.

Human Wellbeing

Education

People's level of education in these agriculture-based peri-urban areas tends to be low. Of those who completed the questionnaire (a total of 16 respondents from the focus groups including 11 from San José II and five from Bosatama): one person had a university degree, one had a technical degree, one had completed high school, four had not finished high school, five had completed elementary school, and four had not completed elementary school. A few of participants in the Bosatama focus group were illiterate. While the sample is quite small and no statistical inference could be made from the data, these low levels of education are common to rural areas as well as to low-income areas in Colombia (Alcaldía de Soacha and PNUD 2009; Dávila et al. 2006; Forero 2003; Leibovich, Nigrinis, and Ramos 2007). With peri-urbanization, a somewhat counterintuitive process is taking place: more schools are being built both in Bosa and Soacha while, simultaneously, the population is increasing so rapidly that the increased number of schools still does not meet the growing student demand. Bosa and Soacha have more students than the schools can accommodate. Focus group participants and local decision makers alike stressed that the borough (in the case of Bosa) and the municipality (in Soacha) were not prepared to handle the increasing population.

In Bosa, inhabitants of San José II acknowledged that elementary schools are located nearby and that currently most children do attend. Participants were also satisfied with the quality of the education. The secondary school, however, is further away and respondents reported high dropout rates during and after secondary school. In Bosatama, the only elementary school that existed in the *vereda* was shut down after it flooded during the La Niña heavy rains of 2011[22]. There is no secondary school in the rural area, and thus youth must attend schools located outside of the *vereda.* There are also high dropout rates. No longer having an elementary school in Bosatama is an issue of high concern for adults in the community. As a resident voiced it: "just imagine, if we are ignorant, what is going to happen to our children if the school is closed, it is unfair!"

[22] The effects of the La Niña phase of the ENSO (El Niño- Southern Oscillation) cycle in the Andean region of Colombia include wetter-than-average conditions, and colder-than-average temperatures. The phenomenon began in April 2010 and excessive rains (above average) were registered in the Andean region between April and September, and again between November and December. The phenomenon continued into 2011, and was especially prevalent in February, March, and May (Euscátegui and Hurtado 2011).

Health

The health of the population of these areas is closely linked to the increasing environmental stressors that have come with peri-urbanization. In San José II, San Bernardino, and Bosatama, inhabitants stressed their concern over the increase in respiratory and digestive illnesses due to water pollution (like that in the rivers and sewerage open ditches), air pollution (from dust, smoke from foundries, trash burning, burning of charcoal, tires, and rubber, and air particles from nearby mining nearby). Humidity problems in houses related to the location of houses on low-lying land and/or in areas prone to floods further exacerbate respiratory and digestive disorders. The most sensitive to these health stressors are children and the elderly. In Bosatama, focus group participants assigned health issues resulting from increasing air pollution as one of the top three priorities (or critical issues) for the *vereda*. During the narrative walk with members of the *Cabildo*, people recounted that at least a few elders who live in San Bernardino were, at that time, sick in the hospital because of respiratory complications.

Labor

The urbanization process of Bosa and Soacha is not only affecting the natural and physical landscape of the area, but has also changed the economic, social, and cultural dynamics of the community. Of farmers and people subsisting based on agriculture-related livelihoods, a large portion of the population integrated into the urban formal and informal economy as laborers in industries, construction, domestic service, and public transport. As has been mentioned throughout this chapter, most of the population in the areas I have described as rural still works on farms. Some make a living milking their own cows and growing crops for sale. However, given the changes in agricultural practices and decreasing land availability, few have their own gardens for household consumption. Most people work in farms of large landowners either in Bosa and Soacha, and these workplaces are not necessarily restricted to the *vereda* or neighborhood where they live.

In Bosa, people noted that they used to work in vegetable crops in the borough, but no longer do because there are only a few remaining vegetable farms (there are mostly cow farms in the remaining farmland). Instead, people often commute to vegetable farms in Soacha in the *vereda* of Canoas. In Bosatama, people highlighted that there are still good job opportunities in agriculture in and around the area, and that this is one of the strengths of the *vereda*. Income from working in agriculture is not high, though. One focus group participant from Bosatama recounted, “people get by with little but appreciate what they have”, while another participant in the same focus group said “there is work and that is what is most important.” In short,

those working on farms explained that jobs are still available in agriculture, but they all agreed that opportunities had been reduced in the past decades and are concerned that agricultural jobs will soon disappear due to urbanization.

Until recently, Muisca leaders were arguing for access to land for agriculture. They now realize that agriculture may no longer be feasible because the nearby rivers (the Bogotá and Tunjuelito) are too polluted to use for irrigation and the soil is highly degraded. This is an unresolved contradiction for this community, where people are trying to regain and maintain their identity as indigenous, while realizing that traditional livelihoods may no longer be feasible. Also in Bosa, people pointed out that, while they still have jobs, an additional challenge is food price increase. Before, they could grow their own vegetables, but with pollution and reduced access to land this is less viable in the borough.

In Bosa, the 'recently' arrived populace (that arrived in the area in the past 10-15 years) and those who have already changed their jobs to non-agricultural activities work primarily as construction workers in nearby housing developments or with recycling. In general, women stay at home taking care of children or work in high and middle-income households as maids. A few focus group participants work independently or in the informal economy, and underscored the lack of work and lacking social benefits (such as a pension) as limitations of this type of employment. An important point to note related to labor is that transitioning from agriculture to urban-like jobs has been achieved with little or no support from the state. Further, the transition has been mostly to jobs with low remuneration and often connected to the informal economy (e.g., construction), implying limited work benefits and security.

Social Wellbeing

Collective Action

The informal alternatives to sewage disposal in Bosa involve common systems or common areas, such as the former irrigation canals that cross several plots. Maintaining these systems requires collaboration and coordination among residents for purposes such as cleaning, dredging and pumping water out of the ditches. Since many of the families in the study area have known each other for decades, people are accustomed to working together to raise funds for common purposes, such as hiring an excavator to clean the ditches. These informal alternatives to sewage disposal have also brought about conflict with residents of other areas, especially with residents of informal settlements who also use these ditches to dispose of their

sewage. These conflicts will be further explained in the following chapter. As previously mentioned, conflicts have also arisen between traditional inhabitants and new inhabitants or users of the area who dispose of trash improperly (as in the case of the leftovers of the recycling material) or use empty lots as dumpsites.

Inhabitants in Bosatama argue that 15 years ago there was more social cohesion within the community. However, as the land use has changed from cattle raising to industrial agriculture, and new uses have emerged (e.g., dumpsites, mining, parking lots for public buses) the farming essence of the *vereda* has been lost. This, in turn, has reduced the collaboration among inhabitants and their interest in working together. An additional factor influencing the erosion of social capital in Bosatama is the lack of recreational activities available and shared spaces to do sports. They no longer have a football field and they are missing having a sports instructor. As aforementioned, the school was a place where the community could gather. One resident of Bosatama expressed "they removed education when they closed the school, and they took away our recreation; the municipality abandoned us."

Impacts of Urbanization on Security

Focus group participants in San José II note that they remain in the area, despite the challenges, because they know and trust each other, and because the area is still calm, and children can play and run freely. Both in Soacha and Bosa, inhabitants are concerned that urbanization is bringing increased insecurity. They argue that with urbanization "one has to start paying for everything, even security service, now we all take care of each other" (in the words of a resident of San José II). In Bosatama, insecurity has worsened significantly, especially since Ciudad Verde was built. Residents reported that houses have been robbed and cattle stolen. Increasing insecurity combined with changing composition of the population is creating mistrust among inhabitants and reducing collective action.

Representation and Recognition

Both objective and subjective aspects of social wellbeing are related to power, representation, and recognition of these traditionally rural populations in the peri-urban (Fraser 1998, 2009; Islar 2012; Moffat and Finnis 2005). People interviewed or who participated in focus groups shared a feeling of not being included or recognized by any level of authority, from local governments (at the borough level in the case of Bosa) to governments at the municipality and national levels. Focus group participants in San José II felt they were not even recognized by their community action board (JAC), and many did not know who the board members were. This disenfranchisement is evident in the fact that many inhabitants are

unclear about the legal status of the area. This uncertainty came up through focus group discussions and through the pre-focus group questionnaire, where some responses regarding the status of the neighborhood included: informal, in process of formalization, and formal. Since inhabitants do not feel represented by the JAC, residents of this part of San José II have tried to create their own JAC, but the borough did not authorize it since one already exists for the whole neighborhood. In summary, inhabitants recognize the need to better organize as a community and work towards institutional recognition in order to be able to work against displacement or resettlement.

In Bosatama, the lack of representation became evident during the construction of the housing project Ciudad Verde. Through the planning and construction process the community was not consulted nor compensated. The community also described feeling tricked because those that got to see the project's mockup said it did not include sewage ponds that were built right next to their farms and which continue to affect them through the presence of bad smells and pests. Another issue where the community described feeling tricked is related to the closing of the school. At the time of the schools closing, the municipality made an agreement of only one year with Ciudad Verde so that children from the *vereda* could attend the school located there. However, as previously mentioned, the school in the *vereda* was permanently closed and the deal with Ciudad Verde expired. Thus, children now have to go to schools in other parts of the municipality much further away and no plans seem to be in place to build another school in the *vereda* or make new arrangements so that children can attend school in Ciudad Verde or Bosa. These experiences have left residents not only with a sense of powerlessness but also with apathy about the importance to make claims to the state to protect their rights. They are also concerned that when they denounce a problem, such as the illegal dumping of material, because declarations are not anonymous people will face retributions (as some have in the past).

Cultural Identity

Members of the *Cabildo* underscored that their lack of power is not a recent phenomenon. Disenfranchisement goes as far back as colonization and has continued throughout the history of the country. They highlight how their cultural identity has been corroded and their land stolen. As an example, an elder of the *Cabildo* told me that 50 years ago, the state forbid indigenous people to drink *Chicha*, a fermented corn-based alcoholic drink traditional to the group. As a response and adaptation mechanism to this cultural segregation, many community members changed their livelihoods from farming to urban-like activities, mainly in construction works. To avoid discrimination, many were forced to leave behind their

indigenous identity and take on that of farmers, and more recently of urbanites. In his research about the Muiscas of Bosa, Durán Bernal (2005) notes that urbanization has also included a cultural transformation in Bosa whereby the rural population who maintained agriculture based livelihoods has, in many aspects, integrated into an increasingly cosmopolitan city. This integration went hand in hand with the increase in shopping and amusement commercial establishments, such as bars and billiards. Despite the cultural miscegenation (*mestizaje)* (Durán Bernal 2004) of the indigenous population who has inhabited Bosa, the population was not absorbed completely by the urban culture and dynamics. This can be seen in the persistence of indigenous practices today such as the vegetable agriculture economy and the group endogamy. Certain cultural traditions remain such as playing the popular game of *Tejo* or *Turmequé*. Durán Bernal (2004) argues that the indigenous identity of traditional inhabitants of Bosa has managed to survive despite the pressure by the state and the Church to silence the culture (e.g., through official education and evangelization, respectively), as well as the negation of the indigenous identity by members of the community who accepted homogenization through miscegenation.

Since the recognition of the *Cabildo* in 1999, the *Cabildo* has been trying to regain its cultural and spiritual traditions through, for example, health, education, cultural and language programs, as mentioned above. Many families of the area have self-identified as indigenous and have joined the *Cabildo*. There are about 3000 Muiscas in Bosa (Cabildo Indígena Muisca de Bosa 1999), though having indigenous roots and being a member of the *Cabildo* are not synonymous. Joining the *Cabildo* is voluntary and requires, as a first step, to self-recognize as indigenous. As previously mentioned, there are other criteria that need to be met (such as last names) to be part of the *Cabildo.* A woman in her 70s who has lived in San José II all her life told me that, while she is indigenous and several of her relatives are leaders in the *Cabildo,* she and her immediate family have not joined the *Cabidlo* because they do not need to. They feel that other people are in greater need of the resources of the *Cabildo* and therefore do not want to utilize these resources themselves. This was the perspective of my respondent despite the fact that she and her family have significant issues with the neighboring informal settlement of Villa Celina; their house has been flooded with wastewater several times when the sewage ditch that separates the neighborhoods overflowed. Others with Muisca last names and relatives in the *Cabildo* are unsure whether they qualify to join but feel that joining would help them receive better representation from the borough authorities. It is an interesting point that several people in Bosa see the *Cabildo* as a source of power and representation. In Bosatama, people do not consider themselves indigenous. They feel that if the *vereda* loses its rural status on land use plans, people will not only lose their source of livelihood but also their identity as farmers. In Bosatama, they do not have an institution, such as the *Cabildo*, that can represent them in

seeking protection of the law, for the continued conservation of their livelihood and identity.

Vulnerability of Farmers and Indigenous Populations

Thus far, I have explained the changes to different dimensions of wellbeing that dwellers in areas in the earlier stages of peri-urbanization have been experiencing over the past few decades (or in the case of the Muisca indigenous population, for centuries). As areas in an early stage of peri-urbanization, rural characteristics still dominate the landscape. These characteristics include low population density and natural resource based livelihoods. In this section, I will investigate what these changes mean with respect to the vulnerability of the population. To do so, I will examine the main socio-environmental stressors the population is exposed to, how sensitive the population is to these stressors, the affects they have had when stressors materialized into impacts, and the adaptive capacity of the population.

I am particularly interested in exploring those stressors that are collectively experienced as a way to explore, from a methodological point of view, possibilities for analyzing vulnerability at the community level. This is not to say that the impacts of the stressors will not impact households differentially. Different households will have varying abilities to cope with the stressors depending on a number of factors, including family composition and individual family members' income raising strategies. Critical life events (e.g., loss of employment, illness, loss of family member) (Lampis 2009) households may have experienced and their ability to cope with those events will also impact their adaptive capacity. I focused my research on community processes, and thus I will not address individual households' critical life events. The questionnaire at the beginning of the focus groups included questions regarding the most critical life events people have experienced in the past five years and how they coped with them. I have taken the responses to that question into consideration, but they will not be the focus of my analysis. I am interested in exploring what insights can be gained from analyzing vulnerability at the community level, while, throughout the process, recognizing the limitations that such an analysis may have.

Table 8 summarizes the main social and environmental stressors identified by focus group participants in San José II and Bosatama. The table also presents those issues that emerge from the interrelation between environmental and socio-economic processes. Following, I will analyze the stressors that focus group participants identified as most critical. These stressors were the loss of agricultural livelihoods, the risk of eviction, flood hazard, limited access to education and school dropout, and health stressors.

Table 8. Main stressors in San José II, Bosa and Bosatama, Soacha

Area	Main environmental stressors	Main socio-economic stressors	Interconnection between environmental and socio-economic issues
San José II, Bosa	• Flooding from Tunjuelito river • Water shortage/drought – lack of pastures for cows and crops • Flooding (into roads and houses) during heavy rains • With urbanization, less green areas, more pollution from cars, and dirtier river	• Loss of agricultural livelihood • Risk of eviction/displacement • Drinking water insufficiency due to increased users from same connection hose • Lack of sewerage system • Conflict among new and old inhabitants (e.g., over disposal of trash and sewage)	• Health: respiratory and digestive illnesses from river pollution and improper sewage and trash disposal • Moving away from agriculture as main livelihood strategy, could mean adopting a livelihood less sensitive to climate risks
Bosatama, Soacha	• Flooding from Tunjuelito river • Drought: not enough water for irrigation • Pollution: burning of trash, rubber, charcoal, tires, foundry, polluted rivers, wastewater ponds from adjacent neighborhood, increased traffic • Humidity constantly affects houses • Trash/debris from dumping sites (*escombreras*)	• Agricultural livelihoods threatened with urbanization • Education deficit: no schools in area • Health: no health centers in area and poor service in municipality • Increasing insecurity with urbanization • Lack of spare time activities for youth, also to create sense of community (social capital)	• Health issues: from humidity, river pollution, dust, smoke from foundries and from burning trash

Loss of Agricultural Livelihood

For those whose main livelihood strategy is agriculture, the main stressor they face is the risk of losing that livelihood. In the case of the inhabitants of Bosa, whether they live in San José II, San Bernardino, or any of the few areas where there is still sufficient land to practice agriculture, they have now lost their formal entitlement to practice agriculture since the land use plans have erased all rural areas from the map. These areas are currently designated as urban expansion or as areas for environmental protection. The pollution of the rivers that are used to irrigate these lands and the unsanitary conditions of pigsties are the main excuses policy makers use to justify the elimination of this livelihood. In Bosatama, the designation of *vereda* for agriculture remains, though in a decimated area, in the land use plans (shrunk since Ciudad Verde housing project was built on land that used to be part of the *vereda*). However, the future of the *vereda* in Bosatama is unclear, as signals are being sent by local and national politicians of the intention to convert the area to urban expansion. As Baviskar (2015) argued for the case of urban expansion in

Delhi, urban development planning attempts to transform the relations between populations and spaces, and, in the process, displaces and marginalizes sections of the population. The encroachment of the city into these territories, as illustrated in Figure 14, is a visible reminder of these changes and the likely displacement to come for agricultural populations.

Figure 14. Buildings versus cows (Soacha)

The drivers of this change have been discussed in chapter 5 and in the land section of this chapter, and, to recap, relate to the liberalization of the Colombian economy, which opened agricultural competition to the global market place and reduced protective measures (e.g., subsidies) making agriculture overall less profitable and riskier (Forero 2003). The impacts of the liberalization of agricultural trade have been felt in all rural areas of the country, from the remote ones to those in the *Sabana de Bogotá*. Consequently, immigration from rural to urban areas has been a continuous trend, aggravated by the country's armed conflict[23] (Preciado Beltrán

[23] Note that Colombia has the second largest internally displaced population in the world, after Syria based on May 2015 data (IDMC and NRC 2015).

2009; Silva and Guataquí 2005). Locally, many landowners in and around Bogotá have gradually opted to convert farmland into idle land for land speculation or subdivide and sell it for housing development. Moving away from agriculture can be considered an adaptation strategy in response to trade liberalization, the increased housing demand from migration, and the increasing housing costs in the core of the city. The point I want to make here is that structural economic and political dynamics have translated into decisions by actors in PUAs and beyond (i.e., dynamic pressures) that, in turn, become stressors for the local population who now struggle to maintain their agricultural livelihoods. In other words, the stress farmers at this urban-rural interface are experiencing of gradually losing their agricultural livelihoods is beyond their control. The loss is not only of an income opportunity, but also of a way of life, which inhabitants describe as including green, open spaces that people value for their children to play, the quiet and fresher air that farmland offers, and the social relations built over decades of sharing a common livelihood and sense of community with neighbors.

For households whose entire income depends on agriculture, the sensitivity to the stress of gradually (or at times abruptly) losing their agricultural livelihood is high, especially because the support of the state has been minimal. As an adaptation strategy, people have sold their land and/or looked for work in farms in neighboring municipalities (such as Sibaté and Mosquera) or in "urban" sectors such as construction, security, and domestic work. An important aspect of shifting livelihoods to work in the urban economy is that people have moved away from a climate sensitive sector and its corresponding risks (e.g., loss of agriculture from drought, excessive rain). At the same time, social mobility has been very low in these areas and the shift of labor activities has been usually to low paying jobs. The state could reduce the impact of these stressors and increase the adaptive capacity of the population by, for example, facilitating relocation to other rural areas, providing vocational training, or facilitating access to education to enable integration to the urban economy.

Risk of Eviction or Displacement

The inhabitants living at the edge of an expanding urban center face an uncertain future with respect to the tenure of their land. San José II has been designated a high-risk area due to its proximity to the Tunjuelito River. Several houses of the area are located less than the required minimum of 30 meters from the river embankment. Their location within an area declared as high risk increases the chance that dwelling families will being evicted from the area or resettled. Residents are not willing to resettle from the area where they were born and grew up. People I spoke to especially reject the idea of being resettled to a subsidized housing

project, which they refer to as "matchboxes." Another main reason for their concern is related to costs: in the apartments they feel they would have to pay for everything from administration to security, as well as for costly utilities. Furthermore, their children would not be free to go out and play without supervision. Many people said that they would rather consider resettling to a nearby rural area. Several state agencies (including the risk agency IDIGER and the Office of Habitat) have carried out censuses to identify the number of people who would need to be resettled. As these censuses have occurred in several occasions and over the span of several years, residents no longer believe anything will come of the results.

Without state support or other external assistance (like that of an NGO, for example), the ability of the inhabitants of San José II to cope with this stressor is quite limited today. Since the area is declared high risk, the price of the land is depreciated and thus they cannot afford to sell the land and move elsewhere. The inhabitants of the area where the focus group took place are also themselves unclear of their status. They feel that the JAC does not represent their interests and only represents the interests of those who live east of the bridge (that crosses the Tunjuelito River). They once attempted to organize their own JAC but the municipal authorities did not accept it, as the area is considered part of San José II, which already has an established JAC (composed of residents east of the bridge). When asked what alternatives they saw to the risk of eviction, residents of this area agreed that the first step is to organize themselves as a community to gain institutional recognition. They recognize that it would be easier if they had external support to organize and make a claim to the state for clarification about their condition/status, plus a beneficial solution. Because this area is considered part of the former Muisca reservation and several residents self-identify as indigenous, many feel the *Cabildo* could be an institution that would help them get organized and represent them to the state. They have noticed the *Cabildo* is fighting for the rights of San Bernardino so they believe in the possibility that the *Cabildo* can represent them as well. It is worth underscoring that residents recognized their limited adaptive capacity because of their lack of voice and representation when dealing with the authorities. The sense of powerlessness and the gradual decline of social capital as a result of conflicts between traditional and newer residents are exemplified by the need for external support to organize themselves.

An external entity that is respected by the community, such as the *Cabildo*, could legitimize the need to join efforts and help them agree on what the inhabitants are willing to accept (and reject) within the community if resettlement does materialize. In that respect, the *Cabildo* could also legitimize the community externally and enhance the capability of the community to discuss and negotiate their prospects with the state, and become agents of change themselves. The recent victory of the *Cabildo* via legal proceedings regarding the developments in San Bernardino (Campo Verde and El Edén-El Descanso) should be interpreted as a sign of the

increasing capacity of the *Cabildo* to defend the rights of the population. The legal victory does not guarantee, however, that the state will effectively control the continued development of informal settlements in the area, or that economic powers will not prevail and housing projects will not be carried out in the end (with or without the approval of the community). Still, it is an important first step that could further empower the *Cabildo* and those not yet part of the *Cabildo* to collectively claim their rights.

In the case of Bosatama, the risk of displacement is less imminent as the area is still declared a zone of sustainable agriculture in the land use plan. However, as previously mentioned, local state officials have already hinted that within a decade or so this area will be turned into an expansion zone. The inhabitants are concerned that the value of the land is low because it is located in close proximity to highly polluted rivers that also pose flood hazards. This means that in the case of being forced to sell the land, the low price would limit their ability to buy land of equivalent size nearby. Furthermore, the most immediate concern of the residents is that currently they are using the floodplain for agriculture, but at any moment the state could demand that a buffer zone around the river not be used (as is stipulated under current environmental regulation). In addition, even without the pressure to convert the land to a site for urban expansion, the pressure to convert land for other uses is high, such as for dumping sites (*escombreras*), or parking lots for buses, uses that both affect the land negatively. The illegal dumping sites, for example, are highly profitable and residents note that, because of the profitability, officials turn a blind eye to the problems they create for the rest of the *vereda.*

Consistent with rent gap theory (Janoschka et al. 2014; Smith 1987), these alternative land uses exert significant pressure through the degradation of land (as previously explained), which reinforces the incentive to convert agricultural land into use for a more profitable endeavor. Given the economic and political influence of these alternative land uses *vis-à-vis* that of the farmers, the capacity of the farmers to counter these gentrifying forces is limited, and may lead to displacement or the need to search for substitute income raising strategies as coping mechanism. In the words of Harvey,

> [S]urplus absorption through urban transformation has an even darker aspect. It has entailed repeated bouts of urban restructuring through "creative destruction." This nearly always has a class dimension since it is usually the poor, the underprivileged and those marginalized from political power that suffer first and foremost from this process (Harvey 2012:16).

If the way the Ciudad Verde housing project was carried out serves as an indication of the vulnerability of this community to loss of land and displacement, then it could be argued that their ability to counter the gentrification pressures exerted by the current rent gap is limited. The inhabitants' ability to exercise power and voice their

needs and rights could be realized with increased community collaboration, which, unfortunately, seems to be decreasing. Other *veredas* in Soacha have been acknowledged as green belts to control urban sprawl, and similar state initiatives, in parallel with environmental regulation that supports maintaining this area as sustainable agriculture *vereda,* offer possible ways forward that could reduce the risk of displacement of the population.

Flooding

San José II, San Bernardino, and Bosatama are at high risk of flooding from the Tunjuelito and Bogotá rivers based on studies carried out in preparation for the drafting of municipalities' respective land use plans (see Figures 15 and 16) (Comisión Ambiental Local 2012). High-risk areas in Colombia are determined by the flood line produced from the overflow of a waterbody. They are also calculated based on the increased flow of a return period equal or less to 10 years with duration, watermark, flow, and speed with severe potential impacts. A high-risk area has the probability of occurrence greater than 65% of being flooded at least once every ten years during the lifetime of the river embankment (IDEAM et al. 2012b). Current regulation related to risk management does not allow for the development of urban areas within high-risk areas unless risk mitigation actions that guarantee safe housing are put in place (Comisión Ambiental Local 2012). As was described previously, this was the reason given for the rejection of the formalization of San José II as an urban neighborhood.

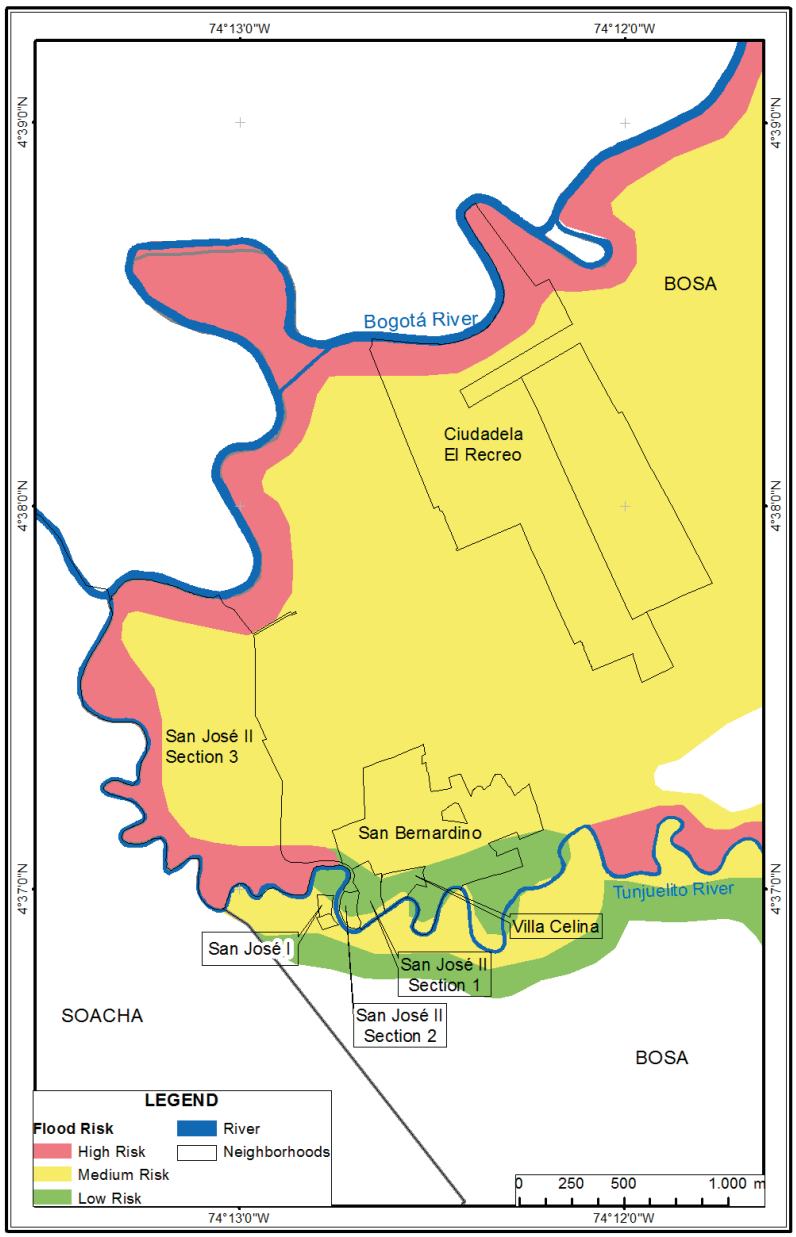

Figure 15. Flood hazard of San José II and San Bernardino, Bosa

Source: (Alcalde Mayor de Bogotá 2004). Note that this map is derived from the land use plan (POT) from 2004. Map modified from original by Karem García.

In San José II, flooding from the rivers has not occurred yet, but residents recount that 13 years ago the level of the Tunjuelito River rose significantly. To avoid overflowing, the community barricaded the embankment with sand sacks and managed to prevent overflowing. Subsequently, Bogotá's water utility company (EAB-ESP), who is in charge of managing the rivers within Bogotá's urban area, raised and improved the river embankment. The water utility company has also, on several occasions, dredged the Bogotá River close to where the Tunjuelito River drains. The measures taken were proven effective on the San José II side, and even during the heavy rains of 2010 and 2011 the river did not overflow. But flood risk in San José II is not limited to the rivers overflowing. Due to the lack of a formal sewerage system, inhabitants now dispose of wastewater into the former irrigation canals, while up to a few years ago they disposed of the sewage into the Tunjuelito River. Sewage is first disposed into small hoses and then, by gravity, drains into the canals on open fields. During heavy precipitation events however, the capacity of the hose is not enough to remove the combined storm and wastewater and it returns through the hoses, flooding roads and houses. The houses located at lower ground levels are particularly affected during these rain episodes.

In Bosatama, the flood hazard from the rivers has already materialized. Inhabitants recall that before both rivers were dredged and the river embankments raised, the Tunjuelito River used to overflow often. Thanks to the improvements, the community had not experienced flooding for several years until the heavy precipitation events during the La Niña event in 2010 and 2011. In 2011, the Tunjuelito River overflowed flooding several houses, farms, and the elementary school of the *vereda*, which borders the river. This was the first time the school was flooded and locals blame the floods on the lack of proper maintenance of dredging.

As a result of the flood, the environmental authority (*Corporación Autónoma Regional de Cundinamarca- CAR)* shut down the school. The school remains closed and officials have told residents that it will not be reopened, as it resides on land now designated as high-risk. After the flood, the municipality wanted to use the school as a detention center for minors but the community did not allow it. As I previously explained, the first year after the flood, the municipality made an agreement with a school in Ciudad Verde that lies in close proximity to Bosatama, that children from the *vereda* could attend there. Right after the school was closed down, however, a few families did not enroll their children in any school. The agreement with the school in Ciudad Verde was valid only for one year, so since the agreement expired parents have been forced to enroll their children in a school in the Despensa district, which is not close given current road networks. Attending school in Bosa would be much closer for children, but because Bosa is part of another municipality, children do not have the option of enrolling in public schools there.

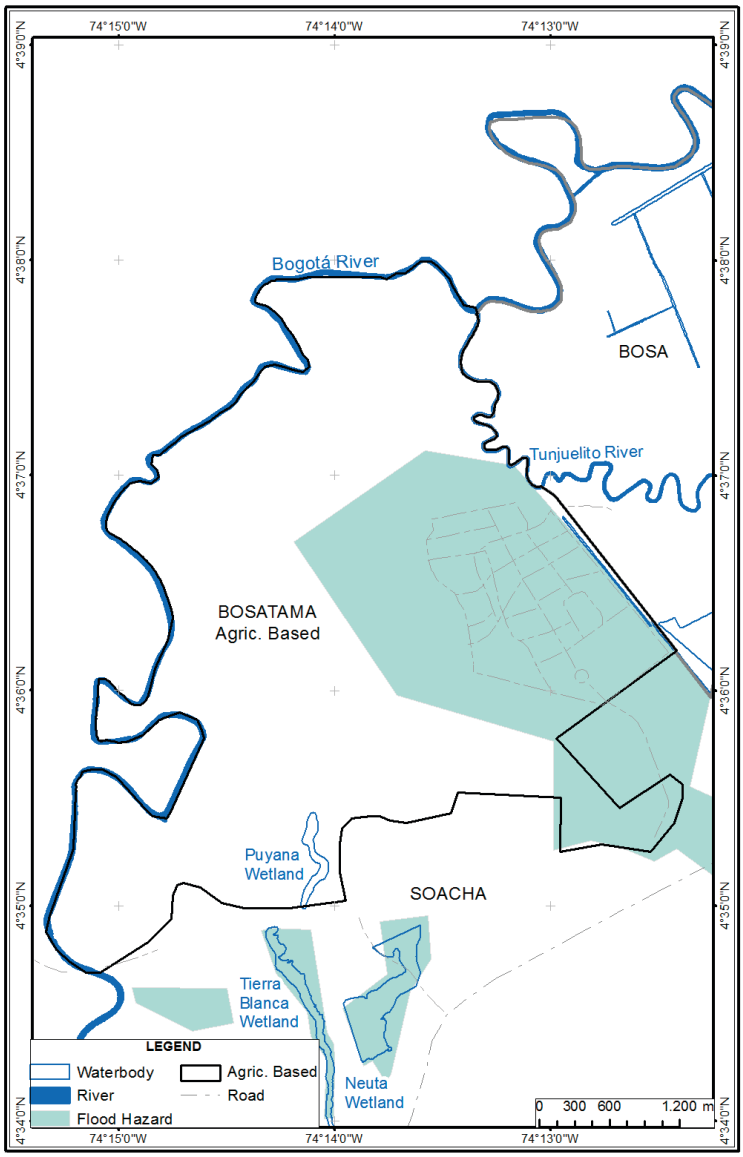

Figure 16. Flood hazard of Bosatama, Soacha

Source: (Alcaldía Municipal de Soacha 2000). This map is an extract derived from Soacha's land use plan. Note the difference in detail and specification between the flood hazard map of Bogotá and Soacha. This serves as an indication of the difference in institutional capacity between the two municipalities. Map adapted from original by Karem García.

When studying the reasons why these areas are now at high risk of flooding, one must acknowledge that there are not only biophysical factors behind risk. First, land use changes brought on by urbanization have led to continued alteration of water bodies. In the case of rivers, the alteration has been done through the construction of high river embankments and modification of riverbeds with the intention to reduce flood hazards. However, increasing the height of the rivers' embankments reduces their natural floodplains throughout the watershed. Consequently, when rivers do not have an option to overflow through their path, especially in the upper parts, the result is increased water levels downstream. Bosa and Soacha are located downstream of both Bogotá and Tunjuelito rivers. The latter, combined with increased wastewater and solid waste contribution (legal and illegal) to both rivers, results in higher flows downstream than would otherwise occur in an unaltered hydrological cycle.

With respect to the capacity to respond and adapt to these events, it is worth highlighting several aspects concerning the agency of the residents. In the past, when flooding has occurred or the level of the Tunjuelito River has increased to levels of concern, the community has shown the capacity to work together and, either reinforced the levees using sand bags or hired a pump to help drain water. Residents acknowledged that this collective work is increasingly hard to coordinate, especially as people are not willing to collaborate on covering the costs of hiring a pump and a tractor to dredge the canals used for sewage disposal. This has resulted in missing maintenance, which, in turn, has lead to mismanaged canals and increased risk of flooding.

In the case of San José II, since houses are located in high-risk areas, based on the census carried out by the habitat and risk management agencies, the long-term plan is relocation for those houses[24]. The terms of a potential relocation are still not defined and therefore the community has the opportunity to negotiate them. Such a negotiation would require strong leadership and unity among the affected families. As the community itself acknowledges, and as previously mentioned, being recognized as members of the *Cabildo* would strengthen their claims as they would be protected by the special legislation for indigenous communities, and any changes would require prior consultation with the community. Since San José II is recognized as one of the areas where indigenous populations reside, such a protection should be possible to claim, and could, as a co-benefit, also protect the newer residents of the area who are not indigenous.

In the case of Bosatama, when water started overflowing near the school, residents asked the principal to let them use the water pump to drain rainwater. The principal

[24] Note that this is not the case for the whole neighborhood, as it is not all areas that have been designated as high-risk. It was, however, the case for the 15 families of the area where the focus group took place.

did not allow them and instead called on firefighters to help. The residents resented such a decision, which inhibited them from using their skills to respond quickly to the situation. They note that as farmers who cultivate and irrigate the land, they are very familiar with using water pumps, and that in the farms that were flooded they used pumps to reduce the damage and drain water to irrigation canals.[25] While several houses still got flooded and the risk remains that a similar situation could occur in the event of another heavy precipitation (for example, a strong La Niña has been projected by the meteorological institute for the rainy season of 2016 (IDEAM 2016), the floods of 2011 demonstrate the capacity and know-how of the population to respond and reduce the impacts of such events. Still, in the long term, houses bordering the rivers may need to be relocated or measures should be taken by the municipality or environmental agency to reduce the hazard. These measures could include increasing the river embankment or purchasing land bordering the river and conditioning it to restore it as floodplain.

Limited Access to Education and High School Dropout

As previously mentioned, the issue of education in these peri-urban areas is somewhat contradictory, and can be interpreted and presented both as an opportunity and as a stressor. With respect to schooling, not having an elementary school in the *vereda*, combined with the limited road network within Soacha increases the risk of children not being enrolled in school. Public schools in Bosa are geographically much closer than those in Soacha, but because they lie in different jurisdictions, children who live in Soacha cannot attend public schools in Bosa. They could attend private schools in Bosa, but not all families can afford it. The municipality's decision to shut down the local school after the floods also had impacts on the community beyond schooling. Through the changes in the type of agricultural production from cattle raising to industrial agriculture, in conjunction with the increase of illegal activities (such as waste dumping), cognitive social capital in the form of collaboration among community members was reduced. Residents state that now there is little support among them and increasing apathy. Not having a local school, a place to meet and play, is further degrading the social capital of the area.

Both in Bosa and Soacha school dropout rates are high. A resident of Bosatama explains it this way: "there are a lot of school dropouts because schooling is not a life project, the children stay helping with the rural chores or find employment outside of the area." It is common in Colombia that children in rural areas drop out after elementary school to help out with agriculture (McEwan 1998). Furthermore,

[25] In this area the irrigation canals are still used solely for irrigation or rainwater drainage, not sewage disposal.

in a society with little social mobility as is the case of Colombia (Andersen 2001), it is not surprising that low-income youth see little benefit in studying. There have been government initiatives to reduce school dropout rates that have taken the form of conditional cash transfers programs such as *Familias en Acción*. While studies have shown that dropout rates have decreased in primary and lower secondary school, upper secondary and university enrollment remains low (Edsand 2007).

Another important aspect with respect to schooling is the variable quality of both private and public education available to residents. When asked, residents considered school quality to be good. Traditionally, however, students from public schools score lowest in standard national tests (called *pruebas saber* in Colombia). Recent district governments of Bogotá have invested significantly in efforts to reduce the gap between public and private schools with promising results (Secretaría de Educación del Districto 2016). The quality of private schools also varies significantly by location and cost in Colombia. Therefore, the variable quality of accessible schools may hinder access to high quality public universities. Private universities, including those nearby (such as Universidad Minuto de Dios in Soacha), are beyond the reach of most rural inhabitants. A positive trend in regard to access can still be noted. As previously mentioned, residents of both Bosa and Soacha emphasized that there has been an increase in the number of schools in the borough and municipality, respectively. Also, younger generations that are currently enrolled in school are very likely to finish elementary school, and more likely to finish secondary school than previous generations.

When residents were asked for solutions to solve the stressors of lacking accessible educational institutions and high rates of school dropouts, several alternatives were formulated. First, inhabitants considered that urbanization could result in new schools being built nearby and bring them some benefits. In San José II, awareness campaigns highlighting the importance of education were also raised as a potentially useful measure to counter dropouts. In Bosatama, residents described it as being imperative that the school is reopened or that a new school opened in the *vereda*. Inhabitants of Bosatama used to have access to secondary school in Bosa, but they can no longer attend. Providing alternatives that are accessible by foot or bicycle could facilitate youth's attendance to school. In Bosatama, residents also proposed that they would highly benefit from agricultural technical programs being offered for adults in the *vereda*.

It is important to recognize that most of the measures suggested fall outside the direct control of the inhabitants, but their recognition of the importance of the problem (this was designated as a priority in Bosatama, for instance), their ability to propose specific measures and sense of entitlement to these types of initiatives can be considered an indication of some sort of adaptive capacity. This population is still highly vulnerable to education-related stressors. In the case of Bosatama,

these are highly connected to the flood hazard, which limits the possibility of building schools in the area. For the rural inhabitants of Bosa and Soacha, their vulnerability is also connected to uncertain life expectations (potential life pathways), where the livelihood strategies of current children and youth may be quite different from those of their parents; and if integrated into the urban economy, education may be even more important to be able to access job opportunities with favorable conditions.

Health Stressors

As previously mentioned, respiratory and digestive health problems connected mainly to the degrading environmental conditions were highlighted as important issues in the study areas. The sensitivity of the population to health stressors is closely linked to its environmental and social conditions including its increasingly urban qualities (and thus connections to increased pollution), to the location of the settlements near polluted waterbodies and areas prone to floods, as well as to sources of pollution that could be argued to be particular to peri-urban areas such as informal dumpsites, and tire and rubber burning. The capacity to cope and respond to these stressors is, in turn, partly linked to access to health services. In that regard, most of the population interviewed had either health insurance through their employers or qualified for state-subsidized health services through SISBEN (the Spanish acronym for *Sistema de Identificación y Clasificación de Potenciales Beneficiarios de Programas Sociales* – System of Identification of Beneficiaries of Social Programs[26]). While having health coverage is an important first condition, residents noted that access to health services was slow and ineffective. As noted by Lampis (2009) in his research in low-income households in Bogotá, having coverage through SISBEN does not guarantee access to effective health services. The insufficiency and low quality of health services was said to be particularly critical in Soacha, where people described that only a few health centers were available, and that of those available all were far away and with often slow and poor service. There are no health centers in Bosatama and inhabitants complained that when they go to the health centers in the municipality they barely get service even in cases of emergencies. Another aspect raised in Bosatama is that there are no health campaigns in the *vereda*.

[26] SISBEN is a state system to identify and select households who are eligible to a variety of social services, based on a range of criteria related to income, standard of living, and unmet basic needs (Lampis 2009). In practice, it applies principally to the health sector and people informally refer to it as if it were the name of a health insurance program.

When asked for solutions to various health stressors, people in Bosatama mentioned the need for awareness in the *vereda*, especially as it related to disposal of trash and burning of all sorts of material. However, one of the main causes of pollution, specifically the pollution of the rivers, was not discussed as part of the solution. The knowledge that the major cause of river pollution occurs upstream and beyond their control can be understood as the reason for leaving this issue undiscussed. Possible solutions that the community did propose often came with a sense of apathy. On one hand, they referred to the need for awareness campaigns at the community level with the support of the municipality or other state actors. On the other, they showed frustration that there were no state initiatives to deal with the health problems of the area. One participant in the focus group exemplified this when he stated: "what is the point of making more claims if they [the municipality] ignore us?"

Muisca medicinal practices were forbidden during the colonial period. However, as part of the recuperation of the indigenous identity, these practices, containing immense cultural, spiritual, and visual significance, are being reintroduced to the community. Traditional medicine in the Bosa Muisca community is mainly based on medicinal plants grown in home gardens. Women have a central role, being the first step for therapeutic treatment of most illnesses (Martínez Medina 2008), both growing the plants and providing the treatment. As Martínez Medina (2008) proposes in his study of one of these medicinal plants (the *ruda* plant), a limitation to the practice of traditional medicine is national legislation regarding the use of medicinal plants, as it sets incoherent regulations based on a western notion of medicine that disregards the local and cultural contexts in which these plants are used. Examples of these incoherencies include the certification of traditional medicinal plants, for which it is necessary to document that active ingredients of the plant have been used for medicinal purposes for three generations or more. In cases in which the use of the plant has been registered through oral tradition (and not written), a competent professional or an indigenous group that maintains the tradition should be consulted. It is also assumed under the legislation that the use of such a plant has remained limited to a particular group and has not been influenced by other groups throughout time. Restricting what is considered "traditional" to things that have remained static and without 'external' influence over time is absurd, especially in the context of a community such as the Muiscas of Bosa who have experienced a constant transformation of their territory and identity throughout history (Martínez Medina 2008).

Concluding Remarks

In this chapter, I argued that traditional inhabitants (who I identified as those who have lived in the area for at least decades, if not generations), such as the Muisca indigenous community, and those whose livelihoods depend on agriculture, are populations most negatively impacted by peri-urbanization and the most neglected by policy makers during the peri-urban transition. Their traditional livelihoods are eroded and the assets they once relied on such as land and watercourses turn into stressors because of squatting, displacement and pollution, for example. I also showed how informality was created in traditionally rural areas through zoning changes in land use plans, regardless of existing practices on the ground. Through this practice of planning, agricultural practices in San José II and San Bernardino in Bosa were rendered illegitimate, and the areas themselves became informal. In the *vereda* of Bosatama in Soacha, a portion of the agriculture-based land was converted into housing developments when the municipality pushed forward urban expansion for the Ciudad Verde housing project without resident consultation or compensation. The cases of San José II and San Bernardino, as well as that of the *vereda* of Bosatama, illustrate what Roy (2012) calls informalization of the state. Informalization of the state occurs through forms of deregulation and 'unmapping' that give the state territorial flexibility to convert land use from one use to another (from rural to urban expansion, for example), thereby giving it the power to make and unmake spatial value. In short, for populations in the agriculture-based areas, peri-urbanization has become a form of exclusion resulting in invisibility and even expulsion, where farmers are forced to either adapt to urban lifestyles or are displaced from their territory.

7 Wellbeing and Vulnerability of Informal Dwellers in Peri-Urban Areas

In this chapter I will analyze the wellbeing and vulnerability of dwellers that live in informal settlements in peri-urban areas (PUAs) in Bosa and Soacha. The chapter will follow a similar structure to the previous chapter, where I first examined different dimensions of wellbeing in selected neighborhoods, then analyzed the main stressors for these populations and their vulnerability to these stressors. I start this chapter with a discussion on what informality means conceptually. I go on to introduce the neighborhoods included in this study and then delve into the wellbeing analysis. Unless noted otherwise, the chapter is based on fieldwork carried out in the study areas in 2013 and 2014.

Conceptualizing Informality

According to Seto et al. (2010) more than 900 million people worldwide live in informal settlements, about 1/3 of the urban population. Given such a staggering number, it is not surprising that a significant amount of research has been conducted not only to understand life in informal settlements, but also to conceptualize informality itself. Informal settlements are referred to in relevant literature, and by their inhabitants, in a variety of ways. In literature, common terms with similar connotations include illegal settlements, slums, shantytowns, squatter settlements, and ghettos. In Latin American research, a Spanish (or Portuguese) word is often used. In this body of research, terms include *tugurios, asentamientos informales, barrios piratas, colonias ilegales, barriadas, poblaciones, villas miserias*, and *favelas* (Foster 2009; Rodgers et al. 2011). In Colombia, residents of these settlements and policy makers refer to them as: informal, illegal, or subnormal. I agree with Holston (2009) and Gilbert's (2007) argument that words matter, and the term slum homogenizes and stigmatizes a global urban population leaving little space for their dignity and vitality. I will therefore avoid using the term slum.

There are two major views on informal settlements in urban studies. One view considers informality to be a manifestation of economic and social marginality, and of concentrations of poverty, a perspective taken in Mike Davis' seminal work, 'Planet of Slums' (Davis 2006). Alternatively, informality is seen as autonomous grassroots manifestations of poor entrepreneurship in the face of deficient state bureaucracy, as in the highly policy-influential work of Hernando de Soto (2000). Both views, however, see the informal areas as the 'Other', an alternative urban system in opposition to the planned and formal city (Roy 2012). The problem with these conceptualizations, as argued by Roy (2005), is that they tend to equate informality with poverty, ignoring that informality can include different degrees of power and exclusion; these conceptualizations can also transfer responsibility for poverty to the poor, while relieving it from the state. There is yet another body of research that considers informality neither an adverse nor a desirable goal (e.g., Roy and Alsayyad 2004). Within this literature, informality is considered a process and an organizing urban logic (McFarlane 2012; Roy and Alsayyad 2004; Roy 2012, 2015b).

Some planners consider informality an issue of land use. With that limited view, questions regarding whom the land belongs to or who utilizes it may become invisible. Viewing informality in terms of who utilizes the land brings important aspects to the fore, such as wealth distribution and unequal access to markets, property rights, and politics that shape urbanization (Roy 2005). In many cities of the Global South, Bogotá being a clear example (see for instance, Montoya Garay 2007; Quimbayo Ruiz 2014), informal urbanization concerns both the wealthy and the poor. Wealthy forms of informality can exercise their political and social power, and demand infrastructure, legitimacy, and formalization by the state. Roy (2012) provides examples from Brazil, India, and the United States of this process driven by dwellers of wealthy informal settlements. In Bogotá's metropolitan area such forms of wealthy informality can be seen in the northern edge and on the eastern hills (*cerros orientales*) in cases where environmental regulations regarding settlements and access to water, for instance, have been bypassed, yet political and social power have allowed them to command services, infrastructure, and even more importantly legitimacy (Alfonso R. 2001; Preciado Beltrán 2009; Quimbayo Ruiz 2014; Ramírez Hernández 2009). In contrast, poor informal developments may remain without state-sanctioned formalization and legitimacy for long periods of time, often indefinitely (as I will elucidate in this chapter). It is in contrasting ways like these that urban (and peri-urban) space is planned, affirming Roy's (2012) argument that informality is also a practice of planning.

Viewing informality as a practice of planning may require an examination of the production of space in the "city at large." In my case, the "city at large" would be the metropolitan region of Bogotá encompassing its neighboring municipalities, including Soacha. My study is geographically focused on the low-income peri-urban

southern parts of this metropolitan region, and it is outside of the scope of this thesis to analyze how the production of space takes place in the economically better-off areas, for instance. Nonetheless, the macro political economy of the region and the country, and the exercise of power of different actors have influenced the production of the peri-urban space. I have attempted to highlight this influence in the previous chapters and will continue to do so, albeit often implicitly or indirectly. In other words, an exploration of how informality is condemned or favored for different classes, social groups, and locations in this metropolitan region will not be the focus of the analysis, aside from the direct impacts in the study area.

In this chapter I will show, by contrasting the experiences of informal peri-urban settlements in Bosa and Soacha, that each settlement presents specific characteristics conditioned by a myriad of environmental, socio-economic, and political factors, such as their location, time of settlement, community leadership, internal agency, and external support, as well as the state jurisdiction under which they fall. The findings are almost exclusively based on the perceptions of people who live in the different communities. In this chapter, I will show that perceptions of wellbeing vary significantly and indicate the presence of both hope and despair, of initiative and lack of it, and of change and stagnation. My aim is that my exploration of informal settlements will bring new insights to the informality debate through the peri-urban focus, the neighborhood level perspective, and via the lenses of wellbeing and vulnerability. I also aim to contribute updated empirical research on informal settlements in Colombia. While substantive research has been done in Bogotá (e.g., Fraser 2014; Gilbert 1997; Hataya 2007; Zeiderman 2012), much of it has focused on the borough of Ciudad Bolivar (one of the poorest in the city), and limited academic research is available about Bosa (a few examples include, Castellanos Puentes 2014; Lampis 2009) and Soacha (a few examples include, Álvarez Rivadulla and Bocarejo 2012; Dávila et al. 2006; Rueda García and Sáenz García 2012).

The Production of Informal Spaces

I should acknowledge that the settlements I selected as informal were considered so based on the narrow understanding of informal settlements as those that have been territorially designated as informal by the state. Most of the settlements that I will talk about in this chapter were, at the time of writing, considered and treated as informal by the state or started as informal and have now been formalized by the state. In this sense, informality refers to those housing solutions constructed outside of judicial, administrative, financial, and technical norms (Dávila et al. 2006). However, it is important to underscore that I understand informality as much more

than a territorial formation. Instead, I concur with Roy (2005, 2012) and MacFarlane's (2012) conceptualizations of informality as a mode of the production of space and a practice of planning; and, rather than an outcome that needs to be regulated by the state, a product of the state itself. Next, I will introduce the areas selected as representative of the informal settlements in PUAs. The chapter will focus on the neighborhoods of Villa Celina in Bosa, and Altos de la Florida in Soacha. I will also draw on the experiences of inhabitants of the neighborhood of Ciudadela Sucre in Soacha.

Bosa: From Town to Borough Via Informality

As I mentioned earlier, the role informality has played in the development of Bogotá is significant. Approximately 23% of Bogotá's urban area consists of informal settlements that house approximately 2.5 million inhabitants (Secretaría Distrital del Hábitat 2009). In the south and southwest of Bogotá, about 90% of settlements started informally (Dávila et al. 2006). Bosa is one of the boroughs in Bogotá with the highest number of informal areas (Secretaría Distrital del Hábitat 2007). Information about the total number of neighborhoods in Bosa varies depending on source (I have found information to be contradicting even within the same source). According to the borough's website, Bosa consists of 280 neighborhoods of which 63% have been formalized, 23% are in the process of formalization, and 14% do not have information with respect to their legal status (Alcaldía Local de Bosa 2013). On the other hand, the District Office of Habitat estimated in 2011 that Bosa had 381 neighborhoods. From 1963 to 2011, a total of 268 settlements have been formalized. That means that, according to the Office of Habitat's data, approximately 70% of the neighborhoods in Bosa started informally (Secretaría Distrital de Planeación 2011), a percentage that is even higher (about 96%) if the borough's total amount of neighborhoods are counted.

During 2013, I conducted semi-structured interviews *in-situ* and narrative walks with local leaders in different neighborhoods throughout the borough, as well as with local government officials. Many of these neighborhoods can no longer be considered part of the peri-urban landscape, as they have been completely absorbed by and integrated into the city. However, most neighborhoods, if not all, share a similar settlement pattern, where settlements were built on former farmland or fallow land. Early settlers recall stories of the existence of dairies and crops either within the settlements or right next to them. The development patterns and processes of these neighborhoods that were once peri-urban are useful to understand the changes Bosa and Soacha have experienced within the last decades and, without being too deterministic, the potential changes that may lie ahead for current peri-urban informal settlements.

Villa Celina, Bosa

I selected the neighborhood of Villa Celina in Bosa as a settlement that is located at the interface between consolidated urban areas and farmland. I visited Villa Celina at least on five times and interviewed community leaders on a number of occasions in 2013 and 2014. In 2014 I organized a focus group with residents. At the beginning of the focus group, participants were asked to fill out a short questionnaire. I also visited Villa Celina as part of the narrative walk with the Muisca indigenous group.[27]

Villa Celina is a neighborhood adjacent to the Tunjuelito River and San José II (see Figure 17). It was established around 2008 on a plot that used to be part of the San Bernardino *vereda*. The owner of the plot subdivided the land into 6 m by 12 m plots and sold them. Prior to selling the plots, the land was filled up with dirt and construction debris to raise the ground level of the area, thus the neighborhood is at a higher level than its western neighbor San José II. This was done to raise the level of the neighborhood with respect to the Tunjuelito River and a canal that separates Villa Celina from San José II. An unpaved road to the south separates Villa Celina from the Tunjuelito River's embankment. To the north, Villa Celina borders a farm, part of which is now used as a bus parking lot. Since its establishment in 2008, more than 300 houses have been built in Villa Celina. According to community leaders' estimates about 250 of them are occupied and house between 280 and 300 families. The population of Villa Celina is mostly young families with children.

The Informal Hills of Soacha

Altos de la Florida

According to 2009 estimates, of 368 neighborhoods in Soacha, approximately 152 (or 43%) are informal. A majority of these settlements are located in high-risk areas[28] and present the highest poverty rates of Soacha's urban area[29] (Alcaldía de Soacha and PNUD 2009). During fieldwork in 2013, I visited and conducted interviews and narrative walks in several neighborhoods that started informally. In 2014, I selected Altos de la Florida to conduct a focus group.[30] Altos de la Florida is a neighborhood located in *comuna* 6 (San Humberto) of Soacha on the high slopes

[27] Note that members of the Cabildo do not live in Villa Celina, but in the adjacent neighborhood of San José II. Also, Villa Celina borders plots of Cabildo members, which are part of the former San Bernardino vereda.

[28] A third of Soacha's territory, where one quarter of the population lives, is exposed to geological faults, landslides, and flood hazards of different degrees of severity. Most of the informal settlements are located on steep hills (Alcaldía de Soacha and PNUD 2009).

[29] 53.8% of Soacha's population lives in poverty, and 20.4% in extreme poverty (Alcaldía de Soacha and PNUD 2009).

[30] As in all the other focus groups, I asked participant at the beginning of focus group to fill out a short questionnaire.

of a mountain in the southern part of the *comuna* (see Figure 18). The neighborhood is composed of 4 sectors: first, second, third, and El Retiro. As is

Figure 17. Villa Celina, Bosa

One of the streets of Villa Celina in Bosa. Note the unpaved road with no rainwater drainage. Behind the building, there are fields belonging to the farm that borders the area. Also, note houses still under construction and the empty lot on the bottom right corner, reflecting that the neighborhood is still under development and growing.

the case in most informal areas, population and household estimates are not precise. According to a report by the United Nations High Commissioner for Refugees (UNHCR) approximately 2,400 people live in 990 households (UNHCR 2015). Community leaders estimate that there are approximately 1,500 plots, of which about 1,000 are inhabited. Community leaders told me that the neighborhood was first established between 20 and 23 years ago (in the mid 1990s).

Several parts of the neighborhood are located above 3,000 masl (meters above sea level), which is considered the sanitary perimeter (*perímetro sanitario*); the limit at which no further urbanization is allowed for environmental protection purposes,

according to urban planning legislation.[31] The population of Altos de la Florida includes migrants from rural areas, migrants from Bogotá and other parts of Soacha looking for cheaper housing, displaced populations, urban guerrillas, and paramilitaries (current combatants and reinserted population). The UNHCR estimates that about 40% of the population are victims of forced displacement, even though only 17% are officially registered in the Victims Register (*Registro Único de Victimas)* (UNHCR 2015).

The neighborhood is known, and appears often in the news, for having high levels of poverty, crime, gangs, as well as drug use. Altos de la Florida is further characterized as being isolated high up in the mountains, with poor infrastructure and limited access to social services.[32] Interestingly, despite these adversities, compared to other focus groups conducted in this study, participants from Altos de la Florida demonstrated a very high level of awareness in regard to their legal situation. For example, they were conscious of the requirements to request formalization and of the risk assessments that had been carried out in the area to determine eligibility for formalization.

Ciudadela Sucre

Ciudadela Sucre, located in the Cazucá *comuna* (*comuna 4)* is an eastern neighborhood of Soacha located on a hillside. Ciudadela Sucre is a large neighborhood composed of 11 sectors. According to residents who settled in the area during its early stages, the neighborhood was established about 30 years ago (during the mid 1980s). Most of the land belonged to one big landowner who subdivided and sold the land at a low price to incentivize urbanization. The last houses in the area neighbor idle land and some quarries. I visited the Villa Nueva Alta and Bellavista sectors in 2013 and conducted five semi-structured interviews and two combined narrative walks and drives. Ciudadela Sucre presents similar issues as Altos de la Florida, with respect to stigmatization and violence, in part due to its isolated location on top of a hill with deficient access.

[31] The sanitary perimeter is set to protect key sensitive high mountain ecosystems such as the *páramo* (Andean moorlands protected because of their important role in water regulation through its vegetation) (Gallini 2015).

[32] To illustrate, the focus group took place at a house at 2,740 masl. This is about 200 meters above the Soacha's main square (2,540 masl), where government buildings are located.

Figure 18. Altos de la Florida, Soacha

Note the city of Bogotá on the back of the image in the valley, also on the back (marked with a red circle) school financed by the UN.

Material Wellbeing

For informal dwellers, wellbeing is highly correlated with having a place to live (which is connected to (in)security in land tenure), and basic needs, such as access to water and sanitation, education, and working opportunities, being met. In a society with a dominant capitalist logic (Harvey 1989; Parker 2004) having these basic needs met is not guaranteed, and it is often the economically poor and socially marginalized who face the biggest challenges in meeting those needs (Swyngedouw and Heynen 2003). In this section, I will analyze the challenges peri-urban informal dwellers have faced in meeting their basic material needs, how they have challenged marginalization and claimed access to basic utilities, as well as the conflicts that have arisen with the state and among peri-urban dwellers as a result. I will also analyze the hazards they are exposed to that are partly a result of the marginal

environments in which they have settled. The issues mentioned in this section derive from priorities identified by interviewees and focus group participants.

Regulation of Spaces: Land Titling and Housing

Lefebvre (1991) argues that every society produces its own space with its specific modes of production and reproduction. The peri-urbanization process in Bogotá and Soacha shows how the production of space is part of a continuously shifting abstraction of the relationship between the formal and informal, the illegal and legal, and the condoned and condemned. It is through informal practices, policies, and planning instruments (such as maps, land use plans, and municipal development plans) that these relationships are formed, negotiated, and resisted between the state apparatus, civil society, and the private sector. It is the state that determines "what is informal and what is not, and which forms of informality will thrive and which will disappear" (Roy 2005:149). In that regard, designating the formal *vis-à-vis* the informal is not only a production and regulation of space, but it is also a form of social differentiation (Roy 2012). The informal peri-urbanization that has taken place in Bosa and Soacha serves as an example of how informality is formed, negotiated, and resisted. It also serves to show how social differentiation and the (de)regulation of space are at the root of the process.

In chapter 5, I examined the macro economic factors that have influenced the urbanization process in Bogotá and its surrounding areas, as well as those that have contributed to social differentiation through socio-spatial segregation and the (de)regulation of space, leading to the high levels of informal housing. These processes include the liberalization of the economy, armed conflict, and forced and voluntary rural-urban migration. Beyond these macro-level factors, it is useful to understand how do individuals, families and communities experience settling informally, how the process takes place, and the implications for their wellbeing.

In contrast to the squatter settlement patterns of land invasion common in other Latin American countries (Mohan 1994), many of the informal settlements in Bosa and Soacha (as well as in other parts of the country) were founded on private lots[33] through what is locally referred to as pirate urbanization (*urbanización pirata*). As explained in the previous chapter, it is common that landowners would either sell their land to pirate developers (*urbanizadores piratas*) or subdivide the land

[33] In the study area, these lots could have had different uses prior to subdivision: agriculture, mining, fallow land, or land that had not been utilized for years, in some cases, waiting for land prices to rise (basically, land speculation, or as it is colloquially known in Colombia, as *lote de engorde*. Note, that while this literally translates to feedlot, the expression is not meant to relate to areas where livestock is fed or fattened up; instead it is more like a financial feedlot responding to rent gaps (Clark 1988).

themselves into smaller plots (the common plot size in basically all of Bosa and Soacha is 6 m by 12 m) and then sell the plots for people to construct houses for their own residence. In a few cases, pirate developers would invade fallow or farmland of large landowners and then sell the plots. In all cases, plots usually come with a false promise of formal access to public utilities such as water and sewage. Buyers had varying degrees of knowledge in relation to the legal status of the land; some bought knowing that the area was informal (i.e., that it did not have the required municipal approval for urban development), while others were tricked into believing the legal issues concerning the area were resolved or soon to be resolved. Established settlements can give the false impression to newcomers that there are no legal problems with the neighborhood. This is particularly the case in areas where some basic services, such as electricity networks and piped water are already available (even if these services are being used informally), and paved roads and parks have been built.

In the case of Altos de la Florida in Soacha, for example, according to accounts of people who had settled in the early stages of the neighborhood, over 20 years ago pirate developers invaded the land where the neighborhood is now located and sold individual plots for urbanization. Since the area is isolated, not easy to access, and parts of the land were left idle, it took almost five years for the landowners to learn of the development of the settlement, and then started judicial procedures to evict the population. Eviction procedures took place and a few families were evicted. Several community action boards (JACs) from the *comuna* got together to stop the eviction. As a result, negotiations started between landowners and those who were living in the premises at the time to agree on a price for the plots. Many are still paying the landowners. In the end, some had to pay twice for the plot, first to the pirate developer and then to the landowner.

Residents of Villa Celina explain that they settled in the neighborhood for economic reasons: the land was cheaper and it gave them the opportunity to own a house. It also gave them more space compared to the apartments in the state-subsidized housing, which were described as being too small to accommodate their families. They told me that a 6 m by 12 m plot could cost about 3.5 million Colombian pesos (about USD 1,750, based on an average 2014 exchange rate). They bought the land from the owners with a sales agreement (*promesa de compraventa*) but without an official land title. Residents claim they did not know the neighborhood was informal and they argue that they have a sales agreement signed by a notary public, which makes the purchase a binding legal agreement.

An important aspect noted by Davis (2006) is that pirate urbanization is, in effect, the privatization of squatting, that operates as an ‘invisible’ real estate market. Pirate developers are allowed to operate through negotiations with the ‘everyday state’ (Ranganathan and Balazs 2015). Low-level bureaucrats who turn a blind eye to

pirate urbanization in exchange for political patronage or bribes exemplify the everyday state. Furthermore, Durán Bernal (2005) notes that pirate developers in Bosa and Soacha have not only become economically powerful but also politically powerful, even holding office as in the case of Rafael Forero, who owned large areas of land and subdivided them to develop several informal neighborhoods including Ciudadela El Recreo. The privatization of squatting could be argued to reflect a new neoliberal political rationality, as stated by Watson (2009), which submits all spheres of society and life to an economic or market rationality.

Housing

Since my analysis, and thus research design, was conducted at the neighborhood level, housing issues having to do with size, crowding, and quality of housing did not come up explicitly during discussions. Issues related to housing or the houses themselves emerged indirectly through discussions of basic utilities. In the questionnaire, when asked about what they would like to change to improve their life satisfaction, most people (in both Bosa and Soacha) stated that they would either like to improve their houses or change neighborhood. Studies in other informal neighborhoods in Bogotá and in Soacha (Dávila et al. 2006) have underscored the overcrowded conditions of many households and the fact that constructions often house more than one family, either because several relatives live together or because the owner has built an additional apartment to rent out as a source of income.

Production of Alternative Spaces: Water, Sanitation and Stormwater Drainage

Settling informally usually involves conflicts related to entitlements to land, access to and use of natural resources, and utilities (e.g., water, sanitation, and electricity). At the same time, the location and precariousness of many of these settlements can lead to increased exposure to environmental hazards such as landslides, erosion, and flooding. Therefore, whether aware or not, informal settlers are subject to many challenges and thus must find individual and collective strategies to overcome them. One of the major challenges faced by informal settlers is access to water and sanitation, which will be analyzed next.

Bogotá is generally recognized as a city with high levels of water provision and sanitation services (Cárdenas Agudelo 2013; Dávila 2005; Gilbert 2006; Ricardo Betancourt 2014). With respect to drinking water, official statistics estimate coverage at almost 99% and for sewerage the coverage is about 98% (Defensoría del Pueblo 2009). In the borough of Bosa, official estimates indicate 100% water coverage and 99% sewer coverage (Secretaría Distrital de Planeación 2011). However, field visits and interviews with local leaders and officials revealed that

official statistics are misleading, as there are still settlements within the borough of Bosa without full access to piped water or sanitation services.

In Soacha, according to a report written by the Municipality of Soacha and UNDP (Alcaldía de Soacha and PNUD 2009), by 2009 about 80% of households had access to networked water and sewerage infrastructure[34] provided by a utility company. In Soacha, the areas where many informal settlements are located present the lowest coverage, such as the *comuna* 4 (Cazucá) where only about 25-30% of households are connected to the water and sewerage network infrastructure.

The above coverage figures highlight how the metabolism of water and wastewater reflects uneven distribution patterns of resource flows in society. As political ecology scholars (Castán Broto et al. 2012; Heynen 2013; Kaika and Swyngedouw 2012) have pointed out, limited access to water is often not a result of resource-scarcity but instead, water infrastructure networks reflect a social and political maldistribution of resources and an uneven production of space. Urban and peri-urban water metabolisms in Bogotá and Soacha have been shaped both by powerful institutions that dominate the networked infrastructure, and by practices of individuals and communities that claim access to that infrastructure. In that respect, for the population who has settled informally in PUAs of Bosa and Soacha, access to water and sanitation networked infrastructure has not come about without struggle. Instead, and similar to many cases around the world (Baviskar 2015; Bayat 2000; Moffat and Finnis 2005; Roy 2012), informal peri-urban dwellers have attempted to intervene in the unequal processes of creating spaces. I suggest that these attempts in the study areas have been done through a similar process to Bayat's (2000) notion of quiet encroachment:

> The notion of 'quiet encroachment' describes the silent, protracted and pervasive advancement of ordinary people on those who are propertied and powerful in a quest for survival and improvement of their lives. It is characterized by quiet, largely atomized and prolonged mobilization with episodic collective action – open and fleeting struggles without clear leadership, ideology or structured organization (Bayat 2000:545–546).

I will elucidate how informal peri-urban dwellers have quietly encroached by explaining how they have gained access to water and sanitation.

[34] I am adopting Swilling's networked urban infrastructure to refer specifically to water and sewerage separately (Swilling 2011). Networked water infrastructure or access to piped drinking water in this thesis refers to the delivery of drinking water to a neighborhood or a household through pipeline by a water utility company. It does not include the installations inside the households required to use the water out of a tap. This is an important caveat because poor households cannot always afford indoor installations.

Informal Alternatives to Drinking Water

Given that formal public utilities (or networked infrastructure) are not automatically provided to informal settlements, new settlers have had to come up with strategies to gain access to drinking water and sanitation. These strategies have been a process of quiet encroachment carried out gradually and, initially, silently and individually. Based on the accounts of community leaders and founders of the settlements I visited, the first residents of each neighborhood would normally need to carry barrels of water from nearby neighborhoods or tanks. In the words of a resident who has lived in an informal settlement in Soacha for over 20 years:

> When I was little, my parents would ask me to go up the mountain to the water tank to fill up barrels with water for the house; sometimes I would get tired of carrying them and would throw them and let them roll down the mountain, but several would explode and I would have to go back up to fill new barrels (Lidia, Ciudadela Sucre, Soacha)

As settlements grew, collective alternatives emerged. Tankers, hired by the community or provided by the municipality, would bring water to the neighborhoods. Alternatively, communities would build their own pipelines and connect them to a common tank or tap on the water utility pipeline of a nearby neighborhood. In Altos de la Florida, there is no networked water infrastructure, therefore residents must buy water from tankers that drive up to the neighborhood about every 12 days. When tankers do not drive up to the area for one reason or another (a common reason is that when it rains the access road gets muddy and slippery), people collect rainwater through canals that are connected to tanks they have installed on their roofs.

In Villa Celina, the neighborhood initially tapped water from a hydrant owned by the city's water utility company (*Empresa de Acueducto, Alcantarillado y Aseo de Bogotá - EAB-ESP*[35]), until representatives of the *EAB-ESP* told them something along the lines of, "even if you bring the water with a bucket, the water is ours and you have to pay for it" (in the words of an inhabitant of the neighborhood). At that point, there were less than 50 houses built in the neighborhood. As a solution the utility company then provided a temporary service called *ciclo I* (I-cycle). The I-cycle is defined as the group of users located in informal settlements that receive a provisional supply from the water utility services and for which the utility charges them (EAB-ESP 2007). According to legislation regarding the I-cycle (Resolution 0194 of 2007), the service is provided only to informal settlements developed prior to June 2003. The I-cycle emerged as a response to the water losses experienced by the water utility company. The policy stipulates that when water losses, resulting

[35] The Empresa de Acueducto, Alcantarillado y Aseo de Bogotá - EAB-ESP- is the main provider of water, sewer, and trash collection in Bogotá and nearby municipalities, including most neighborhoods of Soacha.

from the illegal tapping onto the networked water infrastructure, affect company operations, the utility company will, if needed, request the intervention of local authorities to establish the necessary police measures to control the growth of illegal tapping from informal settlements (EAB-ESP 2007). Besides the measures of police control, the utility company assesses the viability of providing the service to an already established informal settlement.

In cases where the I-cycle service is approved the utility installs temporary pipelines and meters in each house. Despite having developed after 2003, Villa Celina managed to get the I-cycle installed for approximately the first 50 houses of the settlement. Residents themselves paid for the installation of the pipeline and other related expenses, though normally it is the utility company who takes care of most of the costs. Since then, the neighborhood has grown significantly, with more than 280 houses currently being occupied. The original 50 or so households receive a bill, albeit charging a very small amount, for water and trash collection every other month. In the words of a resident "[the amount charged is so little] that, in reality, what they charge for is the printing of the paper." The rest of the houses in Villa Celina tap the water from the installed pipeline but do not pay anything.

While public, following the neoliberal logic of marketization (Brenner, Peck, and Theodore 2010; Peck and Tickell 2012) the water utility company is run under a cost recovery principle (Dávila 2005). The I-cycle policy emerged from this marketization logic to reduce the economic losses of the water utility from illegal tapping. At the same time, the policy can be seen as a form of redistribution, where the municipal state recognizes the right to water, a basic need of the population, regardless of the legal status of the settlement. I suggest, however, that the policy has a major shortcoming, the lack of consideration of the full cycle of water. The I-cycle does not include the provision of sewerage infrastructure. Beneficiaries of the service, therefore, receive drinking water but need to come up with their own solutions for disposing of wastewater. The challenges related with the disposal of sewage will be discussed next.

Informal Alternatives to Sewage Disposal

Disposal of sewage has been, and still is, one of the most problematic issues for many informal settlements. Many of the visited neighborhoods that started informally do not have adequate sewer systems, even though some have been established for several years or even formalized (as table 9 shows). Given the lack of networked sewerage, communities have had to come up with different solutions to dispose of their wastewater. A common solution is to dispose of the sewage, and often of solid waste, in nearby waterbodies. Communities close to streams and rivers that are not connected to the networked sewerage infrastructure have built cisterns in their houses (tanks for wastewater connected to in-house pipeline and toilets) that are then emptied into nearby streams with the aid of water pumps. Jesús, a

reciclador (a person who collects and sells recycling material for a living), described how people in the part of San José II where he lives dispose of the sewage: "Our toilet and sinks are connected to pipes that lead to a cistern. The cistern is then emptied into the [Tunjuelito] River."

While waterbodies, such as the Tunjuelito and Bogotá rivers, are highly polluted by the time they reach these neighborhoods, the disposal of sewage from these neighborhoods becomes one more source of pollution. It is worth noting, however, that in Bosa, for instance, most of the formal networked sewerage also drains into the Tunjuelito and Bogotá rivers without any previous treatment. As Bosa and Soacha are located on the lower-watersheds of the Tunjuelito and Bogotá Rivers, populations of these areas receive a higher share of the pollution of these rivers, in contrast to population further upstream.

Communities that are not located close to waterbodies have often built their own pipelines leading to open canals that connect to the main networked sewerage infrastructure. In many neighborhoods that have now been formalized, the water and sewerage infrastructure was collectively built and paid for by the community. The community-built sewerage infrastructure is often precarious, characterized by inexpensive and less effective infrastructure like low-diameter pipes. Furthermore, in many neighborhoods stormwater and sewage drain through the same canals or use the same pipes. This, combined with the improper disposal of solid waste onto streets and in waterbodies, has caused blockages of pipes during heavy precipitation events, such as the La Niña events of 2010 and 2011. During the heavy rains of 2010 and 2011, several communities had to deal with overflowing pipes resulting in a mix of rain and wastewater that flooded back to houses and streets. For the communities that use water pumps to drain sewage to the river, during heavy rain periods water pumps are often not powerful enough to drain all the combined stormwater and sewage to the river, which also leads to flooding of streets and houses.

Table 9. Current access to water and sanitation provided by public water utility of neighborhoods that started informally

Settlements' access to water and sanitation provided by public water utility				
Neighborhood	**Establishment of settlement (approx.) and legal status**	**Geographic features**	**Drinking water provided by utility company?**	**Sewerage provided by utility company?**
Bosa				
Olarte	Late 1970s – formalized	Borders Tunjuelito River	yes	yes
Palestina	Early 1970s – formalized	On flat area	yes	yes
Santa Barbara	Mid 1980s - formalized	Close to open canals that drain stormwater to river. Flooded in 2010	yes	yes
Brasilia	Late 1980s – formalized	On flat area	yes	yes
Margaritas	Early 1990s	On flat area	yes	yes
Rincón Campestre	Early 1990s – Formalization requested, most plots have land titles. Part of partial plan for housing development Palestina	Next to Tunjuelito River	Provisional Access (I-cycle)	no. Septic tanks drain to river
San José II	Early 1990s (subdivision of land into plots) - informal	Next to Tunjuelito River. Houses within river floodplain. Other houses next to open canal that overflows with heavy rains.	Provisional access (I-cycle)	no. Sewage disposed to open canals or river
Escocia IX	Mid 1990s – formalized	On flat area	yes	yes
La Riviera	Mid 1990s – formalized	Next to Tunjuelito River. Below water level, protected by levee	yes	yes
Santa Ines	Mid 1990s - formalized	On flat area	yes	yes
San José I	Former farm gradually built-up. Formalized in 2000	Next to Tunjuelito River	yes, provisional. Get access through hose, not pipeline	no
Villa Celina	Late 2000s - informal	Close to Tunjuelito River and below river level. Protected by levee.	Provisional Access (*ciclo I).* (+250 houses use service provided for 50)	No. Sewage disposed to open canal bordering San José II

Soacha				
Ciudadela Sucre (Sectors of Villa Nueva Alta and Bellavista)	late 1980s – certain sectors formalized	on slope of hill	Provisional. Access to water utility connection point	no formal access. pipelines built by community, drain to open canal
San Martín	early 1990s – in formalization process	slope of hill	no. Tapped and pumped from neighborhood on valley	no. Pipeline installed.
San Nicolás	Early 1990s – formalized for most part	Next to Bogotá River. Part of it on a small slope	yes	yes (but deficient)
Altos de la Florida, sector 1, 2, 3, El Retiro	Started in mid 1990s – 2 sectors in formalization process, other 2 informal	high part of hill	no. Delivered by water tankers	no. Pipeline built by community. Disposed to open fields
La María	Mid 1990s – most of it formalized, except for houses on wetland	next to wetland and river	yes	no. <15% of houses with networked sewerage
Villa Sofia I	Mid 1990s- formalized	next to wetland Tierra Blanca	yes	yes
Note: Status of neighborhood and of water and sewer access based on fieldwork conducted in 2013 and 2014 (latest information from May 2014) and on information from Secretaría Distrital de Planeación (2013a).				

Not having well-functioning sewerage infrastructure can produce a cycle of increasing marginalization that hampers wellbeing. The lack of adequate infrastructure to dispose of sewage is problematic in itself. The UN declaration of the Right to Water (OHCHR, UN-HABITAT, and WHO 2010), of which Colombia is a signatory, includes the right to sanitation. However, sanitation has often been neglected or taken a backseat in discussions and implementation (Obani and Gupta 2015). The cycle of increasing marginalization results from the implications on the health and the vulnerability of the population caused by a lack of adequate sewerage infrastructure. In the study areas, communities such as Villa Celina, that dispose of their wastewater (and sometimes solid waste) into former irrigation canals or in close proximity to houses, have experienced diseases (e.g., stomach, pulmonary, or skin diseases) related to the unsanitary conditions that result from the concentration of sewage in open canals. These communities are also vulnerable to flooding during heavy precipitation events, and even conflict with residents of other neighborhoods.

Conflicts between Settlements

The disposal of sewage without adequate infrastructure has resulted in conflicts among neighbors. An example of these conflicts is the tension between Villa Celina and San José II in Bosa. The over 280 families residing in Villa Celina dispose of their sewage in a small open ditch (*vallado*) that separates the neighborhood from one part of San José II (what I described in the previous chapter as section 1 of San José II). The residents of that section of San José II dispose of their sewage in the same ditch. Villa Celina was built at a higher level than the ditch (the pirate developers that bought the land filled it with dirt and construction debris to raise its level relative to the adjacent Tunjuelito River, the ditch, and San José II) (see Figure 19). The higher ground level in Villa Celina benefits the residents greatly but does so to the detriment of the inhabitants of San José II and the bordering road. During heavy precipitation events, the ditch overflows, flooding houses in adjacent San José II and the main road (which is unpaved and has no rainwater drainage).

The ditch, which was formerly an irrigation canal, has become a source of ongoing contestation between the two neighborhoods. Furthermore, as a PUA in constant transition, most of the open land behind the areas where the ditch connects to a network of ditches that used to drain into the Bogotá River is designated for the controversial Campo Verde Partial Plan (the planned subsidized housing project mentioned in the previous chapter that is pending consultation with the *Cabildo* Muisca) (Decree 113, Alcalde Mayor de Bogotá D.C. 2011). If the project ends up being developed, the network of ditches will probably be destroyed, leaving over 300 families (from both areas) without their current sewage disposal alternative. In addition, since both neighborhoods are considered informal, pertinent authorities have not intervened to find a permanent solution to this wastewater drainage

conflict. In the past, authorities have installed a pump to drain the ditch only when overflowing occurs.

Figure 19. Sewage disposal conflict between Villa Celina and San José II

Villa Celina is to the right of the canal at an elevated level. San José II is to the left of the canal almost at the same level as the ditch.

Social Mobilization as a Tool to Demand Basic Services

Social mobilization at the neighborhood level has been used by informal dwellers as a tool to pressure authorities to provide water and sanitation services, in particular. It has been a tool to demand redistribution of resource flows (Fraser 1998; Swyngedouw 2009). As noted by Bayat (2000), a key attribute of this quiet encroachment is that, while advances are made quietly and gradually, when need be they gains are defended audibly and collectively. In several of the studied neighborhoods during prolonged periods without water, sometimes caused by technical issues such as broken pipelines or pumps, communities have organized themselves to protest and request government solutions to the crises. Similar social mobilizations have taken place in other parts of Bogotá as well (Hataya 2007), and in many other informal settlements around the world (Davis 2006; Miraftab and Kudva 2015; Moffat and Finnis 2005). Social mobilizations show that while inequalities in power are present, power relations are not immutable. Instead they

can be contested and reshaped through collective processes (Ensor et al. 2014; Rutherford 2007).

In the study areas, several neighborhood leaders revealed how they blocked roads, at different occasions, to protest for their right to access adequate water utility services. Community leaders in Ciudadela Sucre recounted how 10 years ago over 100 people of the community got together to protest the lack of access to water that had lasted over one month. When water was delivered, they received low-quality water for short periods once or twice a week. As a way to pressure the municipality to solve the issue, residents of the neighborhood blocked the main highway that connects Bogotá from the South with the rest of the country (*autopista sur)* and drilled into the water utility pipeline of a nearby neighborhood to install pipes and a pump that would transport water up to their neighborhood (Silva Herrera 2004). A community leader from the neighborhood recalled how the events unfolded:

> Residents of several neighborhoods got together and went down to take over the highway. From ours, everybody participated, even children. The brave men drilled the pipeline. Anti-riot police were sent and they pushed us, beat us. Even my daughters were beaten. Those that participated, we were brave. We said: we will get water by [hook or by crook] (Ines, Ciudadela Sucre, Soacha)

The JACs have been instrumental in leading collective action, both to mobilize community members to jointly buy and install infrastructure, as well as to put pressure on the authorities (e.g., through protests) to provide basic utilities and/or formalize the settlements. From the accounts of local leaders and other relevant studies carried out in Bogotá (Dávila et al. 2006; Hataya 2007; Ramírez Hernández 2009), community mobilization has occurred in moments of crisis when various community members agree on the problem at hand and who is to blame. These mobilizations have been punctual – limited to times of crisis and to the inhabitants of the affected neighborhoods. As recognized by Rodgers et al. (2011), these forms of collective action in informal settlements operate not in opposition to the state, but rather in the absence of it. Similarly, Bayat (2000) points out that the activities of the quiet encroachers are not a deliberate political act, but rather are driven by necessity.

While visiting San Martin in 2013, another neighborhood in Soacha on the upper levels of a hill (the neighborhood is located below Altos de la Florida), over 30 people were out on the streets waiting with barrels for the municipality to provide water (see Figure 20).

> We have been without water for more than two weeks. The community is starting to get restless. I am trying to keep them calm, but if the government does not send water to us soon, the residents will take over the highway and protest outside the City Hall (Community leader, San Martin, Soacha).

Figure 20. Thirst in San Martín, Soacha

Residents of the San Martín neighborhood in Soacha receive water from a water tanker after more than 2 weeks without water supply.

During my visit the municipality sent two tankers and people brought water-filled barrels home. Community leaders spoke about disagreements within the community on how to solve the water issue. Consensus has not always been reached among community members when it comes to the best course of action or the desired outcome (e.g., whether formalizing the provision of the services and thus adhering to a fee-based system is the desired solution). As of 2013, the neighborhood was pumping water from a water utility pipeline in a neighborhood in the valley. Some of the community members were concerned that if the water utility agreed to provide the service to the neighborhood, they would have to pay a high monthly fee. This concern shows the contradictions faced by informal dwellers: their designation as 'informal' has rendered accessing water and sanitation a constant struggle, yet the potential of formalizing provision implies a new challenge, namely, being able to afford to pay for the service. The quiet encroachers are, as pointed out by Bayat (2000), in a constant negotiation and vacillation between autonomy and integration. Integration into the established systems of power can mean access to services, such as networked water and sanitation infrastructure, schools, and healthcare. However,

integration also comes with more control from authorities and costs that thus far may have been avoided. Beyond the dilemmas of integration versus autonomy that may lead to disagreement within communities, it is worth pointing out the temporality of the collective mobilizations. As settlements consolidate and basic services are met (either formally or informally), residents' involvement in community activities may become scarce and more difficult to motivate, a process that has been found to exist in other contexts (see, for instance, Foster 2009; Hataya 2007).

Electricity, Trash Collection, Phone, Gas

Access, or lack thereof, to water and sanitation, arguably the most essential utilities, represent the biggest constraints to wellbeing in the informal areas. The quest of accessing these utilities has ignited social mobilization, conflicts between settlements, and changes in legislation. At the same time, informal dwellers also highlighted the importance, challenges, and opportunities of other utilities.

In Altos de la Florida, focus group participants discussed access to electricity only briefly. They acknowledged that while some houses have formal access to electricity with meters, other houses take it informally from the formal network. People cook with electricity, gas (provided by gas tanks), and wood. In Villa Celina, on the other hand, electricity was discussed as a big problem. They recognized that they take it informally from the electricity network, using a messy network of many visible cables throughout the neighborhood, without a transformer, and connected by wood posts. The main issue residents highlighted with respect to electricity is that the supply is very unstable, and thus potentially damaging to household appliances. They are also concerned that there are rotten wooden electric poles, which pose the hazard of falling. They expressed their frustration about the fact that they have approached Codensa, the electricity utility company, to formalize the service, but the company has declined to install a formal electric network since the neighborhood is informal. They agreed that people are willing to pay. In the words of one of the participants: "Codensa does not want to solve the problem for us, we want to pay but they do not want to charge us."

The network of piped natural gas has increased significantly in the past decades in Bogotá and Soacha, and many households use it for cooking and heating water, as it is the cheapest source (gasNatural fenosa 2015). However, the piped network has not been installed in Villa Celina or Altos de la Florida meaning that people buy gas cylinders, which are generally more expensive (residents of formalized neighborhoods in Bosa who now have piped gas said that buying gas cylinders can cost more than double what they pay for piped gas). An advantage of the peri-urban landscape that participants of both areas underscored was the availability of wood,

which people use for cooking when neither electricity nor gas is available, or they cannot afford to buy gas. People told me that they would go to nearby fields to collect wood. In Villa Celina, for example, people use the bordering farm to make small fires to cook during the weekends (see Figure 21).

With respect to trash collection, both areas have trash collection services, and trucks arrive a few times every week to collect trash from several collection points. In Villa Celina, participants mentioned, while blushing and smiling (acknowledging their own participation in the matter), that the residents are lazy and leave trash in other places than the collection points, or way ahead of collection time. This has become a problem because street dogs break open the bags and spread out the trash, later attracting rodents and flies. They blame this problem on the lack of the population's sensibility to the collective problem they are causing. In Altos de la Florida, the problem was described as being not only the improper disposal of trash in fields, but also the location of nearby dumping sites about 200 meters from the area. The resulting impacts have been unpleasant smells and proliferation of flies, mosquitoes, and rodents.

Residents of Altos de la Florida brought up an issue that was not mentioned in any other area I visited: the issue of telecommunications. They explained that there is no phone network and cellphone reception in the area is very poor, meaning that people had very limited access to telecommunication. Others mentioned that they needed Internet for work or school and that there was only one Internet cafe in the neighborhood, with limited connectivity. Deficient telecommunications have several impacts on the wellbeing of the population, from isolation to limitations in contacting an ambulance or the police in case of an emergency (as a neighborhood with high levels of insecurity, as I will present later in this chapter, this is problematic and arguably a contributing factor), as well as being a limiting element in education and work opportunities for the population.

Figure 21. Weekend outdoor cooking

Villa Celina residents take advantage of empty fields on a bordering neighborhood for some outdoor cooking during the weekends. Wood is collected in the surrounding area.

Marginal Environments: Water and Air Issues

When I asked about environmental topics that concerned the communities, both air and water pollution issues emerged prominently. In Villa Celina, unpleasant odors took center stage in the discussion. The fetid waters from the Tunjuelito River and the sewage disposal ditch were the main sources of this problem. Residents explained that the unpleasant odors are pervasive, and while they are used to them, when the river flow reduces (when floodgates less than one kilometer downstream are closed), the smells become unbearable. The same occurs if river water levels drop significantly; the unpleasant odors increase along with the presence of rodents. Unpleasant odors also come from nearby tire burning and pigsties.

In Altos de la Florida, there are no watercourses flowing nearby, and unpleasant odors are not a critical issue (even though they are affected by dumping sites, and improper sewage and trash disposal). However, inhabitants stressed their concern about air pollution from nearby factory chimneys. They identified a factory in the

valley that pulverizes bones as the most severe source of pollution. Inhabitants also emphasized the charcoal and tire burning, and nearby mining factories as significant sources of pollution. Air pollution was reported to affect health, especially through increased occurrences of colds and eye irritation. They also described that, although they cannot feel it, the highway (*autopista sur*) downhill, in the words of one of the participants, "affects them silently."

The location of Villa Celina downstream of the Tunjuelito River, and of Altos de la Florida close to polluting factories could be argued to be a form of environmental injustice (Martinez-Alier et al. 2014; Schlosberg 2013) where the socio-spatial segregation of Bogotá's metropolitan area has concentrated low-income population in marginal environments, which become increasingly marginal through the multi-level processes that constitute PUAs. On the one hand, the neoliberal logic of privatization, deregulation, and marketization (Ferguson 2012; Harvey 1989) has pushed polluting industries and businesses towards peripheral areas, particularly to municipalities with less institutional capacity and reduced control, such as Soacha (Dureau 2002; Preciado Beltrán 2009), and low-income settlements tend to be located downstream of the rivers receiving the accumulated pollution. On the other hand, the strategies of informal dwellers to compensate for the lack of access to sewerage infrastructure result in increased environmental degradation of the areas, further marginalizing them.

Flood Hazard

The first row of houses along the informal settlement of Villa Celina in Bosa is located about 30 meters from the Tunjuelito River. However, according to flood risk maps from Bogotá's risk management and climate change agency (IDIGER), the part of the neighborhood closest to the Tunjuelito River (about half of the +300 houses) has a low flood risk level. According to the flood risk map, roughly the other half of Villa Celina is considered an area of medium flood risk, though the risk is posed by the Bogotá River not the Tunjuelito River. Hydrologically, this is not surprising given that the Bogotá River is a much larger river with a greater water flow. However, this is an important case that exemplifies people's different perceptions of risk, as the Bogotá River is not even visible from Villa Celina, and thus the population does not consider it a threat. Let me illustrate. Villa Celina is separated from the Tunjuelito River by a fairly narrow, unpaved road, with the distance between the river embankment and the first houses being no more than 30 meters. The Bogotá River, on the other hand, is about 1.5 km away from the closest houses in Villa Celina.[36] Inhabitants do not perceive themselves at risk of flooding from either river, and instead described that the threat that the Tunjuelito River poses

[36] Distances were calculated using Google Earth and land use plans.

relates to the fact that the river embankment is used as a pedestrian path. Particularly when it rains and the main road becomes very muddy, there are concerns that children using the path could fall into the river on their way to and from school.

The population voiced their frustration that the issue of flood hazard from the Tunjuelito River is recurrently mentioned in meetings with state authorities and NGOs. They described that the issue had often been raised when different municipality and NGO organizations organized meetings with the community. Since settling in the area 5-6 years before, they had never experienced flooding from the river, not even during the intense rains of La Niña in 2010 and 2011. They also highlighted how representatives from IDIGER had informed them that they are only at risk from flood events with a 100-year periodic return, which they misunderstood as meaning that they would not be flooded for 100 years. It should be noted that since the neighborhood is informal and does not have a recognized JAC, the risk management institutions had not provided this information in writing, despite several requests from the inhabitants. Further, according to a report from a climate change project carried out for the city of Bogotá and the Cundinamarca department (*PRICC - Plan Regional Integral de Cambio Climático*), 100-year flood events are considered low risk and no preventive or corrective measures are required by the plan (IDEAM et al. 2012b). So while the community is not recognized as living in a high-risk area by the municipality, one of the reasons given by the water and sanitation utility company (EAB) and the electric company for not installing and providing services is because of their location in a supposedly high-risk area. As this example illustrates, and as it has been argued by Fraser (2014) and Zeiderman (2012, 2015) the development of risk maps and resettlement policies and practices are not only technical and procedural processes, but rather processes shaped by relations of power between the state and the community.

Beyond the potential risk the rivers pose to Villa Celina, the lack of rainwater drainage is also an issue that frequently affects inhabitants of the community. The main road, that borders the neighborhood and provides sole access to the area, is unpaved and has no rainwater drainage system. When it rains the road becomes very muddy, making access to and from the neighborhood difficult. During heavy precipitation events the ditch used to dispose of sewage overflows onto the road and the adjacent houses in San José II. When the ditch has overflowed in the past, a water pump has been used to pump the overflow to the Tunjuelito River (the municipality provided the pump on several occasions). Too little rain is also problematic. Residents noted that when it does not rain for prolonged periods, they are affected by dust (mainly from the unpaved roads) and an increase in the number of flies. During these dry periods, they have also noticed an increase in skin illnesses (e.g., dermatitis) and respiratory problems (e.g., asthma) especially in children and the elderly.

Similarly, though Altos de la Florida in Soacha is not located close to any waterbody, during heavy precipitation events the main access road becomes very muddy, meaning that access to and from the area becomes difficult, and the availability of public transportation becomes limited. Heavy precipitation also affects access to water, because tankers cannot visit the area when road conditions are very poor. Since the area is located on a hillside, heavy precipitation also increases the risk of mass movements (e.g., landslides). Dry weather also affects Altos de Florida, especially through the presence of dust from the unpaved roads. In addition, when water tankers do not visit (for various and often unpredictable reasons), residents rely on collecting rainwater and have experienced water shortages during the dry seasons. I should note, though, that residents of Altos de la Florida acknowledged that normally it rains very little in the area. They also have noticed that in recent years average temperatures have increased and rainfall has decreased. Ironically, while we were talking about this during the focus group session it started to rain heavily, and I got to experience firsthand the difficulties of driving downhill on the very slippery, muddy roads.

Landslide Hazard

Landslides have not yet occurred in Altos de la Florida, but inhabitants know landslides are a hazard in the area. Residents described knowing that people have built rudimentary houses on steep and unstable land, contributing to the risk. Landslide hazards also exist because of poor rainwater and wastewater management (meaning that water can saturate and thus loosen the soil), and nearby mining that destabilizes the terrain. The municipal emergency plan of Soacha corroborates the information given by focus group participants regarding the landslide hazard, along with the factors that increase the exposure to this hazard (see Figure 22) (Comité Local para la Prevención y Atención de Desastres 2007). The levels of awareness among community leaders, with respect to their vulnerable situation given the existing landslide hazard, should be highlighted. I cannot extrapolate this level of awareness to the rest of the population, but a well-informed community leadership is, at the very least, an indication of some level of community-level adaptive capacity. Community leaders also informed me that the geological service was conducting a detailed study of the geological hazards of the area, a study that would inform the formalization process and help determine which areas are eligible for formalization.

Villa Celina is not at risk of landslides due to its location on a flat area on the original floodplain of the Bogotá River, though it is potentially at risk of soil instability. The construction of the neighborhood on soil filled with construction debris, as is the case with many neighborhoods that started informally in Bosa (Comisión Ambiental Local 2012), means houses are constructed on potentially unstable soil, especially given the lack of rainwater drainage which increases the risk of soil saturation.

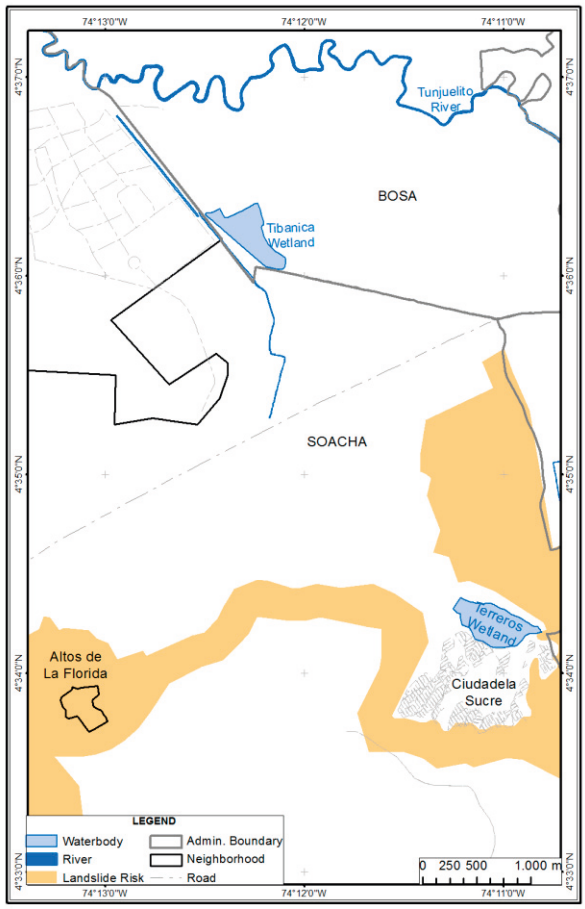

Figure 22. Landslide hazard in Soacha

Map is an extract from Soacha's land use plan from 2000. Note lack of detail in map. Source: (Concejo Municipal de Soacha 2000a). Map adapted from original by Karem García from POT hazard map.

Human Wellbeing

Education

Informal areas throughout the world are known for providing low levels of educational services for their residents, and the study areas are not necessarily exceptional. Of those who participated in the focus groups none had a technical or university degree in either Villa Celina or Altos de la Florida. In Villa Celina, 7 out of 17 respondents of the questionnaire had completed high school. In Altos de la Florida, 2 out of 10 had completed high school. In Villa Celina, a neighborhood consisting mainly of young families with children, participants confirmed that children and adolescents are attending school. Respondents described that some drop out of school but, in general, amongst children and adolescents there are not high rates of school drop out. There are no schools in the neighborhood, but participants said that "children go to school by bus, bike, or walking, no matter how far it is." An important concern for several, however, was the lack of a kindergarten in the neighborhood. Families with small children must either leave the children in the kindergarten of a nearby neighborhood or mothers are charged with the care of children instead of going to work. They recognized this as an important limitation for women to join the labor force and thus contribute to the family's economy.

In Altos de la Florida the situation is different. School attendance is very low, with children generally either not going to school or dropping out early. This was explained partly by the high number of single mothers as well as displaced peoples who come from rural areas where there were few educational opportunities. Inhabitants also blamed a lack of family support as well as family abandonment on the high drop out rates. The United Nations built a kindergarten a few years ago in the neighborhood, and thus young children have a school nearby. To attend elementary or secondary school, children have to travel down the mountain to schools located in the urban core of Soacha. Some children cannot study or do not want to due to fears of being mugged on the way to or from school.

Health

Most of the participants have health coverage through state-subsidized programs that they qualify for through SISBEN. In Villa Celina, people said patients receive rapid, good attention at the hospitals, and that staff from the Pablo Sexto Hospital in Bosa had visited the neighborhood to conduct several health campaigns. Health issues did not stick out as particularly problematic, although several participants identified illness as a critical event over the past 5 years that affected them or a

member of their household. Digestive and pulmonary diseases, a potential effect of the nearby-polluted waterbodies (the Tunjuelito River and the sewage disposal ditch), are also problems that affect the community, especially children. During the dry season, people also experience skin irritation and higher occurrences of pulmonary problems such as asthma as a result of dust from the unpaved roads.

In Altos de la Florida, residents are faced with a similar problem to those in the Bosatama *vereda*: while most people are covered under SISBEN, the problem is accessing care. There is not sufficient health infrastructure, especially hospitals, to meet the demand in the area. Getting a doctor's appointment can take two to three months, exemplified one participant. The deficiency in health infrastructure in the municipality was mentioned as a problem in all of the focus groups in Soacha, and was also acknowledged by municipal authorities. The municipality is in the process of building a new hospital, which is supposed to be completed in 2017.

Labor

The informal economy or job informality is not easy to define. Normally, those who work in the informal sector lack pension rights, social security coverage, work contracts, and environmental safety. Gilbert (2004) argues that, while informality dominates the lives of many people in Latin America, defining it precisely is problematic. He argues that defining informal activities is usually possible, but it is harder to categorize the people involved in such an activity, and people often switch between the informal and formal sector (or do both in parallel). Further, many employed by the formal sector do not receive the privileges that formality is supposed to provide. Informal settlements house a fair portion of people who work in the formal sector (Gilbert 2004). At the same time, the literature on informality has recognized the correlation between informal housing and informal labor (see for example Gilbert 2004). One of the reasons for this is that people involved in the informal market have a harder time accessing credit from formal financial institutions, and thus are marginalized from mainstream urban housing development (Gonzalez 2009; Rodgers et al. 2011). In the areas studied (including those neighborhoods that have been formalized), the levels of job informality are generally high. There is also a correlation between low levels of education and jobs in the informal economy. Livelihoods of people living in informal settlements often involve work in construction or cleaning services (in houses or companies), as well as jobs as security guards, bus drivers, or *recicladores* (people who collect and sell recycling material for a living). *Recicladores* live with some of the lowest incomes, in the most deficient housing conditions, and are, arguably, the most socially marginalized. The peri-urban landscape provides *recicladores* with the space to sort recycling material. However, as was mentioned in the previous chapter, this was

underlined as a source of conflict with other inhabitants, as materials not sold are often disposed of on streets and in rivers, or accumulated on their lots.

In Villa Celina, when asked about the employment situation there was disagreement among participants. Some said it was difficult to find work while others contested this. One person said: “People like to get things for free, but there are jobs, you just have to look for them”, and others complemented, “Anyone who wants to work makes the trip [to the north of the city] and looks for income for food.” Eventually, they agreed that job opportunities were available but normally far away, and that those who worked had to leave early and come back late. In Altos de la Florida, people stressed the high rates of unemployment and explained that those employed are mostly part of the informal economy, what is locally referred to as *rebusque* (getting by through different activities).

Important obstacles to employment that were highlighted in Villa Celina, Altos de la Florida, and in Ciudadela Sucre were the issues of mobility and distance. In Villa Celina, residents explained how buses towards the north of Bogotá no longer pass the neighborhood, making it difficult to travel to other parts of the city. Commuting distances and times are long, which means that people have to leave their homes very early and come back late, thus reducing time spent with family and affecting family relations. In Soacha, similar issues were highlighted. Most people work downhill, either in Bogotá or Soacha, and thus spend significant amounts of time commuting. In Ciudadela Sucre, a resident who worked as a nursing assistant told me she had to leave her house at 4 am to arrive at work in the north of Bogotá at 7 am. She went on to explain that she would not return home until around 10 pm, after taking at least 3 buses each way. Some mornings, buses would be full going downhill and she would have to walk at least 40-minutes, at which point she would still have 2 buses to take. In Altos de la Florida, most people expressed discontent with the fact that job opportunities were limited, underpaid, far away, and involving very long commuting times. There is an informal collective transport system of jeeps that takes people up and down the hill. Inhabitants recognized this as a system that works well: one that runs into the late hours of the night, and that can take people to any part of the neighborhood, including the houses furthest away. This was seen as an important asset in the neighborhood.

Social Wellbeing

Collective Action, Representation and Voice

As I have already discussed in this chapter, social capital has been an important component in the formation and consolidation of informal peri-urban settlements. In this section I will focus my analysis on issues that relate to social wellbeing, especially those related to social capital. To deconstruct the issues related to social capital in the study areas, I will follow McIlwaine and Moser's (2001) social capital typology introduced in chapter 3, namely; structural, cognitive, productive, and perverse.

Leadership, Role of JACs, and Social Cohesion

The community action boards (JACs) are an important component of structural social capital in informal and formalized settlements. Their importance has been reinforced through legislation that requires that any claim to the state be done through a state-recognized JAC (recognition that must be requested from the municipality). An example of such a claim is the request for formalization of a neighborhood. JACs are therefore the main canal of communication between a neighborhood and the state. They have also been the entity in charge of organizing and coordinating actions to solve community-level issues (such as mobilizing people and resources for installing drainage systems, or calling for and organizing protests to pressure the state to provide access to public utilities). Establishing a JAC requires a certain level of cognitive social capital in the form of trust and collaboration. Community leaders, who are usually board members of the JAC, pride themselves in noting improvements in their neighborhoods under their leadership. At the same time, community leaders underscore that mobilizing people, whether it is to meet, work on common infrastructure, or protest, is always challenging. In the case of Villa Celina, people complained about the lack of unity and collaboration amongst neighbors.

One manifestation of this paucity is the situation concerning the JAC. A JAC has been established within Villa Celina; however, tensions and disagreements between board members were evident during interviews and the focus group. Furthermore, the JAC is not yet recognized by the municipality, and residents showed limited knowledge of the procedure to gain recognition. Some blamed lacking leadership for the failure to allocate responsibility for the task. Others said that they had tried asking several state entities for help, but had not received support or guidance to work towards legal status of the JAC. Not having a state-recognized JAC affects the neighborhood in such vital matters as being able to receive a written risk map from IDIGER (the risk management agency) that declares the neighborhood a low-risk

area, request the extension of the *ciclo I* (I-cycle) water provision to the whole neighborhood, or request funds to build a park for children.

The limited cognitive social capital of the neighborhood in the form of collaboration was also apparent when discussing potential solutions to common problems such as water shortages and sewage disposal. Given the shortage of water during peak demand times, particularly weekends, I enquired whether community members had considered setting up some sort of a schedule. Such an alternative had never been discussed and was rejected right away. While I was doing fieldwork in 2014, as part of a disaster risk management project, the borough (*alcaldia menor)* organized a day of cleaning up Villa Celina and San José II (though only the part that borders Villa Celina) that included dredging the sewage ditch and picking up trash throughout the neighborhood and the bordering farm. Several residents went out to observe the cleaning activities led by staff hired by the borough and some residents of San José II. Residents of Villa Celina enjoyed the refreshments and entertainment the borough had provided, but based on my observations few (I would almost dare to say none) actively contributed to cleaning.

Furthermore, most of the solutions to the challenges they themselves identified as critical for the neighborhood were either at the individual/household level (e.g., installing a water tank on the roofs to address water shortages) or depended on state intervention (e.g., connecting the settlement to the networked infrastructure). Upon analysis, including comparison with other informal settlements that have come up with a variety of alternatives to solve collective problems such as water provision and sewage disposal, one possible explanation for the limited productive social capital in the neighborhood is the way it was developed. While in other settlements residents themselves had to build basic infrastructure, in Villa Celina residents explained that when they bought their respective plots a pirate developer had already installed the water and sewerage system, and set up the informal electric network (by tapping onto the formal grid). One particular man took care of all of the basic installations. He had moved out of the area a few years ago, and since then very little work had been done at the neighborhood level.

Productive social capital in the form of collective action has been crucial in most informal neighborhoods for developing basic infrastructure, such as when installing pipes for water and sewerage, making claims to their rights for water through civil unrest, and requesting formalization, for example. Many formalized neighborhoods still rely on the infrastructure that was built while the neighborhood was still informal, even if it is deficient (e.g., as is the case of water and sewerage systems with small diameter pipes, an issue which will be further discussed in the next chapter). In the words of Foster (2009):

> [T]hese settlements demonstrate that the poor are able to organize themselves in order to incrementally build a livable environment in peripheral areas, securing for themselves adequate infrastructure and eventually acquiring legal status. (Foster 2009:320)

In several informal areas (as well as in areas that started informally but have now been formalized) that I visited, Ciudadela Sucre for example, the JAC was mentioned as the first place to turn to when there were community-related problems; from the need for community infrastructure for water and sanitation to security issues. In Altos de la Florida the JACs of the 4 sectors decided to join forces and work together to solve common problems. Focus group participants (several of whom were leaders of the different JACs) recognized this union as one of the strengths of the neighborhood. The partnership was described as having helped community leaders to better understand the community and its needs. Since the union of the JACs, the community has managed to solve several problems (including reducing the issue of invisible frontiers, as I elaborate on below), and have gained increasing legitimacy inside the neighborhood. They have also mobilized the support of NGOs and UN institutions in projects related to urban gardens and healthy housing, for instance. These projects have helped people to get to know each other, and, most importantly, have empowered community leaders. In her research of other informal settlements in Bogotá, Hataya (2007) argued that NGOs could contribute to the conscientization of people living in poverty about their local needs, provide them with knowledge of the legal framework, and offer them 'how-to' strategies for negotiating and claiming their rights to the state. The work of NGOs and UN institutions in Altos de la Florida seems to corroborate Hataya's argument. This resonates with the goals of participatory action research, as advocated by proponents such as Fals Borda and Paulo Freire, where the goal is to give marginal communities:

> the capabilities of critiquing their own praxis of the immediate. Praxis opens doors for the oppressed masses to criticize, problematize, and claim their condition, which will eventually enable them to overcome it (Glassman and Erdem 2014:213).

As I mentioned previously, even though Altos de la Florida is one of the poorest, most isolated areas (located high up on a steep mountain and with limited road access and utilities), the participants of the focus group there were among the most aware and knowledgeable of their situation and status with respect to informality, the procedures to request formalization, and the outcomes of the studies (including risk assessments) that had been done in the area. This shows high levels of productive capital that is a result of good leadership, as well as organized external support (such as from NGOs and UN institutions), which has contributed through leadership training, for example. An example of this productive social capital at work includes the construction of a multi-sport field (including facilities for

football, basketball, etc.) with external funding along with in-kind support from residents (e.g., constructing and painting the field) (see Figure 23, left image). In an interview, a municipal official of Soacha highlighted that both Ciudadela Sucre and Altos de la Florida are receiving significant support from a variety of NGOs. In Ciudadela Sucre, however, NGOs are acting separately and in an uncoordinated manner. Conversely, in Altos de la Florida, NGOs and international organizations (such as UNDP and UNHCR) have coordinated their work, with more effective results.

From interviews with community leaders in different neighborhoods, I would argue that migrating to a new place (in this case a PUA) gives people an opportunity to start afresh. While some people involved in the armed conflict or drug trafficking in their place of origin (be it a rural or another urban area) transfer their activities to the peri-urban context and participate in gangs and criminal bands, others use the migration as an opportunity to recreate themselves. I met several people that were involved in the drug trafficking business, for example, and after migration left these illegal activities and, instead, took a leadership role in the community and helped build the neighborhood's collective infrastructure.

Violence and Insecurity

A major issue in many informal settlements throughout the world is that of violence. Rodgers et al. (2011) maintain that Latin America has seen a steep rise in violence since the end of the Cold War, and that most of its brutality has been concentrated in informal settlements. In most informal settlements I researched one of the main stressors was violence. As I mentioned in chapter 3, I will follow McIlwaine and Moser's typology of violence, namely; social, economic, political and institutional violence to analyze how violence affects the study areas.

Domestic Violence

For more than 50 years, political violence has shaped Colombia through the armed conflict between the state, guerrillas, and paramilitaries. In peri-urban settlements, impacts of the armed conflict manifest in social, economic, and institutional violence. With respect to social violence, issues of domestic violence and turf wars between gangs were an important stressor for inhabitants of most informal settlements. Similarly to the research experiences of Moser and McIlwaine (1999) in different cities in Colombia and Guatemala, during my research the issue of domestic violence was not raised initially by focus group participants. Normally the topic would emerge as a derivative of another topic. In Villa Celina, domestic violence consisted mainly of men who arrived home drunk and beat their wives and children. In Altos de la Florida, domestic violence was identified as a source of

several social issues. Domestic violence through beatings or abandonment was considered one of the reasons why young people drop out of school, join gangs, or get involved in criminal activities. It was also considered a root cause of the high levels of teen pregnancy and drug use. Young mothers leaving children alone at home and using drugs or working as prostitutes was also described as an effect of domestic violence.

Armed Conflict, Insecurity, Invisible Frontiers

As mentioned earlier, not all forms of social capital bring positive outcomes. Altos de la Florida and Ciudadela Sucre are experiencing significant problems with gangs, criminal bands, and drug trafficking and consumption. Bosa and Soacha are considered entry points into the city for the arms and drug trade (Torres Aranguren 2011). Criminal bands and gangs[37] exercise both social and economic violence. Social violence is most common through turf wars, where different gangs control different parts of the territory; this is locally referred to as invisible frontiers (*fronteras invisibles*). Economic violence is perpetrated through muggings and thefts. Both types of violence are interlinked. As stated by McIlwaine and Moser (2001), gang membership is often sought not only because of the desire for economic power, but also because of the need for other forms of power, especially for people who feel disempowered (through domestic violence, for example) (McIlwaine and Moser 2001).

An informal and horrific form of institutional violence that impacts informal settlements and was highlighted in Ciudadela Sucre in particular is social cleansing (*limpieza social*). Social cleansing involves organized, professional killers who target and then murder alleged criminals, drug addicts, prostitutes, and beggars. Similar to the findings by McIlwaine and Moser (2001), residents claim that social cleansings are known to be orchestrated by the police, other state security forces, or even popular militias. Residents in Ciudadela Sucre, for example, stated their concerns about social cleansing, and explained the way it lead to mistrust among neighbors as well as towards external people. In the past, hired killers would make undercover visits to the area for months to identify the targets, and locals explained that it was not unusual for local leaders to be involved in this process. A resident I interviewed told me rumors were circulating that a social cleansing was being planned, and she was extremely concerned that her daughter might be targeted, as some of her school friends were involved in gangs, to the point where she was considering sending her daughter to relatives abroad.

[37] For the distinction between gangs and criminal bands and other perverse social institutions see (McIlwaine and Moser 2001). In short, gangs have a closed internal organizational structure and are involved in delinquency, turf disputes, and drug consumption and trafficking. Criminal bands are groups of delinquents organized to commit crimes and may offer their criminal services to others. Both types of groups consist mainly of men.

While most research on social capital has focused on trust and collaboration, fear, an under-studied topic (Moser 2004), erodes productive social capital in areas with high levels of violence (Watson 2009). In Altos de la Florida, and several other informal settlements, fears of being mugged, assaulted, or killed, were seen as problems both for collective action and also human wellbeing. With respect to human wellbeing, an example previously mentioned is the way children were reported to drop out of school for fear of getting mugged on their way to or from class. Focus group participants also talked about the high occurrence of homicides as a result of gang confrontations and muggings. One participant's son had been killed in the neighborhood a few months before. Fear also creates mistrust among residents and limits people's participation in community activities (e.g., JAC meetings), especially any activities after dark.

In Altos de la Florida, when asked what people liked the least about the neighborhood, almost all respondents answered insecurity and the lack of public utilities. In contrast, in Villa Celina, when asked what they liked the most about the neighborhood, most responded the tranquility of the neighborhood. Further research would be required to fully understand the factors that contribute to one neighborhood being one of the most dangerous in the metropolitan region, while in the other people highlight safety as one of its best attributes (albeit only within the neighborhood, as the borough presents high levels of crime, including thefts, muggings, and rape). Based on my research, I would argue that some contributing factors include population composition, geography, time of establishment, and municipal capacity.

In Bosa, the neighborhood is a small, recently formed neighborhood (less than 10 years old) composed mostly of young families with children who moved to the area looking for cheaper housing and the opportunity to own a house; fewer inhabitants were displaced because of the armed conflict. Also, while the borough of Bosa has one of the highest crime rates in the city, police presence and institutional capacity is higher than in Soacha. In Altos de la Florida and Ciudadela Sucre, in contrast, the population is composed of high levels of the population displaced by the armed conflict, as well as paramilitaries and guerrillas (both demobilized combatants and urban militias) and rural migrants with low-levels of education (who migrate for economic reasons, not because of forced displacement). To be sure, I do not mean to insinuate a correlation between displaced populations and criminality. However, as studies on perverse social capital have shown, migrant populations with low-levels of education who may feel socially excluded and have difficulty adapting to urban life and the urban economy, especially youths, may be attracted to criminal bands or gangs as a way to generate income from thefts, but also to integrate into a group that may give them a sense of security and identity (McIlwaine and Moser 2001). In short, as explained by McIlwaine and Moser (2001), participation in organized crime, especially among youths, provides a source of income and may

provide an escape from family problems, as well as from broader social exclusion. Furthermore, the isolated location on the top of a hill combined with the deficient police presence and lack of education and job opportunities within the neighborhood may contribute to the higher levels of violence in Altos de la Florida.

Playtime in the Peri-Urban Landscape

I have discussed many of the challenges, rooted in social and environmental injustices and uneven development, that informal peri-urban dwellers face and how the inhabitants have attempted to subvert them. However, to fully understand their wellbeing, one must also analyze those aspects that give people joy and hope amid the myriad of challenges they face. Further, because this is a study that focuses on PUAs, I want to underscore those aspects that are unique to the peri-urban landscape and that may not be available in informal settlements in consolidated urban areas. One of these aspects highlighted by focus group participants was that of green and open spaces.

While violence and insecurity limits the ability of children to play outdoors (Hardoy et al. 2001), the peri-urban landscape provides more open space, with cleaner air than informal settlements located in areas that have been swallowed up by the city or in those areas that have grown so quickly that there is no space left to build a playground. Initiatives to provide recreational spaces, such as the case of building a multi-purpose court in Altos de la Florida, are possible thanks to community leadership that mobilized international funds, community work that contributed to the construction, and also thanks to the space still available on the border of the neighborhood. The open space that allows children to play freely (see Figure 23) and the feeling of being in, or close to, the countryside, are aspects that were underscored by most informal dwellers (and dwellers in all different settlement types, for that matter) when they discussed what they like most about where they live. This highlights the importance of considering subjective aspects of wellbeing, but also the fragility of these factors that contribute to wellbeing in an ever-expanding urban fringe. In other words, those things that people who live in current PUAs value most, that help give them a sense of belonging to their place may be gone in a matter of years if urbanization continues uncontrolled and those valued characteristics of the peri-urban landscape are not protected.

Figure 23. Recreational opportunities in peri-urban areas

On the left: Multi-purpose court in Altos de la Florida, Soacha. Right: Boy playing on field that borders Villa Celina, Bosa.

Vulnerability of Informal Dwellers

Table 10 summarizes the main stressors identified as impacting inhabitants of informal areas. In Villa Celina, their designation as an informal neighborhood and deficient public utilities (particularly water, sanitation, and electricity) were considered the area's most critical issues. In Altos de la Florida, the main stressors were identified as the informal status of the area, the lack of networked water and sanitation infrastructure, and deficient access to educational opportunities. I will focus on the two issues that concern both areas, i.e., informality and deficient water and sanitation services.

Informality as a Stressor

Informality in itself can be considered a stressor for inhabitants of informal settlements, and can impact communities through many of the aspects mentioned throughout this chapter, some of which become stressors themselves, such as the lack of formal and efficient networked water and sewerage infrastructure. It is then a higher-level stressor, and a product of economic and political policies (which limit available housing alternatives for poor families), the armed conflict, and the production of space and practice of planning that determines what is legal, illegal, and what falls in the gray space between the two. Residents of informal settlements considered the issue of their neighborhood being informal as a critical issue. Following this prioritization from residents themselves, I argue that informality is a stressor because of the direct implications it has with respect to land tenure security,

access to basic services and infrastructure (such as water, sanitation, education, rainwater drainage, and roads), as well as the geographic location where settlements develop (e.g., on steep mountains, floodplains). These factors can themselves turn into stressors. Land tenure insecurity can result in eviction and displacement. Deficient water and sanitation services can result in water shortages, or health impacts from improper sewage disposal. Deficient infrastructure (e.g., roads, lack of rainwater drainage) can increase the exposure to floods and landslide hazards. The unequal production of (peri-)urban space often means that the land where informal settlements develop is exposed to hydrometeorological and geological hazards.

Table 10. Main stressors in informal areas where focus groups were conducted

Area	Main environmental stressors	Main socio-economic stressors	Interconnection between environmental and socio-economic issues
Villa Celina, Bosa	• Flooding from Bogotá River (and Tunjuelito River but less likely) • Overflow of ditches with sewage • Flooding from rainwater that has nowhere to drain and, given soil conditions, permeates slowly • Air pollution from nearby waterbodies (especially ditches used to dispose of sewage), pig farms, and tire burning	• Threat of displacement/resettlement • Deficient utilities (water and sewerage) • Poor road access and limited public transportation • Lack of kindergartens in neighborhood or nearby	• Pulmonary and skin issues from pollution of nearby waterbodies (Tunjuelito river and ditch used for sewage disposal) • Conflict with adjacent neighborhood (San José II) over sewage disposal
Altos de la Florida, Soacha	• Landslides • Air pollution from factories, tire burning, and disposal of sewage on open fields	• Water deficiency: when tankers cannot come up coinciding with limited rain • Violence and drugs (consumption and dealing) • Educational opportunities are poor quality and far away: this has implications for youth pregnancy (household violence also influenced this) • Health access is far away and deficient: • Road deficiency: implications for access to jobs, schools, and health facilities	• Potential health issues from improper disposal of sewage and from poor water quality when rainwater is used for consumption

The degree of sensitivity to informality as a stressor is dependent on factors both internal and external to the neighborhood in question. Internal factors relate to social capital and the local production of space. By the latter, I mean that the geographical location of the settlement and the way it is developed can significantly influence the vulnerability of the population to hydrometeorological and geological hazards, for instance. Productive social capital has a significant influence on the way the production of space takes place through collective action for the development of collective resources, such as wastewater and stormwater drainage infrastructure. The existence and rise in productive social capital depends on a variety of factors, from levels of violence (and fear) to the need for collective resources, as discussed previously in this chapter. For example, in areas where no water or sanitation infrastructure was available or offered by the pirate developer, residents themselves have had build it collectively, a process that arguably contributed to building social capital. Examples of this collective work can be seen throughout the study areas and other researchers have referred to this aspect in other informal settlements (see for example, Foster 2009; Hataya 2007). As has been shown earlier in this chapter, a lack of basic services has, at times, also given rise to social capital, manifested in protests where residents collectively claim their right to these services. Both expressions of collective action (building infrastructure and claiming rights to basic services through civil unrest) demonstrate a degree of adaptive capacity to the impacts of informality.

Community mobilization has also being crucial in putting pressure on the state to solve the legal status of many neighborhoods. In addition, it has been key in initiating and working through the formalization process. The first step, which requires community collaboration, is establishing a JAC and getting it recognized by the state, followed by the submission of an official request to gain formalization. Through the organized (and recognized) JACs, Altos de la Florida, for instance, has requested formalization, and two of the four sectors are in the process of formalization (based on information from fieldwork in 2014). The third sector is located entirely on rural land, and thus is not eligible for formalization at this stage following the current land use plan (POT). While uncertain, the state could change this area to urban expansion as it has done repeatedly in the past (the portion of the Bosatama *vereda* that is now part of Ciudad Verde being a case in point); this act would exemplify what Roy (2012) describes as the informalization of the state. The Retiro sector in Altos de la Florida has not been able to prove that the settlement consolidated prior to 2003 and thus, so far, it is not entitled to formalization either (the requirements for formalization will be explained in the next section). I will turn now to the external factors that determine the sensitivity of the population living in these settlements to informality, but will also discuss their ability to cope with it.

The State's Role in the Production and Regulation of Informal Space

Considering that informality is a practice of planning, it is important to examine how this practice is performed by the actor in charge of such planning, in this case: the State. In this section I will examine the role of the state in the production and regulation of space at the national and local levels. The attitudes of the state towards informal settlements and their role in informal settlements, in particular in the provision of water and sanitation to these settlements, have changed significantly over the past 30 years. These changes reflect wider socio-economic and political dynamics of different periods. As the analysis focuses on the period from the 1980s to present, understanding the role of the state requires recognizing the influence the dominant neoliberal discourse of the period has played in shaping policies (Ferguson 2012; Harvey 1989; Watson 2009). The changes in policies throughout the study period also reflect the different phases this discourse has gone through. Watson (2009:2266) proposes three phases of the neoliberal discourse: the initial structural adjustment programs, good governance, and, more recently, social capital. The changes in policies, I would contend, not only respond to a neoliberal discourse but also to political dynamics particular to Colombia (Brenner et al. 2010) such as the armed conflict.

Table 11 provides a summary of the main legal measures and programs both national and local governments have implemented in Bogotá and Soacha to produce and regulate informal settlements and the residents' access to water and sanitation. Hataya (2007) and others argue that prior to the 1980s, governments had what could be considered a *laissez-faire* approach to the quiet encroachment of informal settlers, as informal settlements were considered an inexpensive alternative to the housing deficits affecting low-income populations. The growth of informal settlements that were disconnected from official urban development strategies continued (as seen in Table 6, chapter 5) and started causing significant economic losses to the water utility company from unaccounted water.

As a result, authorities formulated regulations and programs with the aim to slow down the rate of development of new informal settlements and to improve the living conditions of the residents of already established ones. The National Constitution of 1991, where the right to human dignity is set as one of the founding principles, has provided the foundation for much of the legislation regarding informality, as this principle has been translated to the right to decent housing (Decastro, Hoyos, and Umaña 2011; Gonzalez 2009). Gilbert (2004:57) asserts that nowadays, both sides of the political spectrum consider that poor informal settlements need to be left in place, serviced, and legalized. At the same time, most of the regulations and programs intended to formalize and 'upgrade' informal settlements have followed what Roy (2005) refers to as the ideology of space, whereby what is redeveloped or upgraded is the physical space, through the provision of infrastructure and physical

services, instead of people's capacities and livelihoods. In summary, the main steps taken by national and local governments over the studied period have been to:

i. Increase the power and responsibility of municipal governments in planning, including the development of planning tools such as the land use plans (*Plan de Ordenamiento Territorial – POT*);

ii. Formalize existing informal settlements (also known as legalization or regularization);

iii. Create state-subsidized housing programs aimed at reducing the development of new informal settlements and finding a solution to the housing needs of the low-income population.

Formalization, in theory, involves providing access to basic utility services (e.g., water, sanitation, and electricity), infrastructure (e.g., roads) and social services (such as schools) to settlements that originated informally (Dávila et al. 2006). It should be noted that formalization of a neighborhood does not imply solving the land titling issues that residents may have. The formalization process is often accompanied by households' attempts to formalize land titles. However, based on the accounts of interviewees of settlements that have been formalized (and even consolidated as urban), formalizing land titles is a slow and costly process for many.

The progress over the past few decades in the development and implementation of planning tools and regulations to facilitate formalization at the municipal level should be recognized. However, while there may have been physical improvements in the areas, since these policies, in practice, have focused on redeveloping physical space, human and social dimensions of life have not improved drastically similar to Roy's (2005) conclusion. Furthermore, housing policies still fall short in providing sufficient, good quality options for low-income populations in the study areas. The state-subsidized housing programs are not reaching the lowest-income population, who cannot meet the necessary requirements to access credit (Dávila et al. 2006). The failure of subsidized housing projects to reach the poorest households can help explain the continued establishment and growth of informal settlements, and raises the question of what alternatives, besides settling informally, the poorest households have with respect to housing.

Table 11. State approaches to informality pre-1980s to present

State responses to informal settlements and their provision of water and sanitation			
	Housing deficits and Informality (national level)	**Informality (Local - Bogotá and Soacha)**	**Water & Sanitation (Local)**
Pre 1980s	Informal settlements considered an inexpensive alternative to the problem of housing low-income population.	District accord No. 21 (1972): Third policy in Bogotá to formalize informal settlements. Concepts of enabling (provision of public utilities and necessary infrastructure), legalizing and regularizing (solving land and titling issues) are introduced.	Accord No. 25, 1975: Planning of Bogotá's growth is based on technical capacity of water utility company (rather than by planning directives from urban planning institute).
1980s-1990s	- Law 9 of 1989: Municipal governments need to formulate urban development plans. Policy regulates the concept of subsidized housing (*vivienda de interés social- VIS*). - Before the 1990s the government was the direct provider of housing to the poor and middle classes. Yet, access to formal housing by the poor remained low. - Programs to facilitate access for the poor (such as no down payment) failed with respect to housing quality.	Bogotá: Accord No.1 of 1986: Approval to legalize 341 informal neighborhoods in Bogotá and introduction of measurements to control and sanction the expansion of informal settlements.	- The water utility company experienced significant economic losses from unaccounted water taken by informal settlements. - Discrepancies between the local authorities (urban planning) and the water company over the areas able to cover after formalization.
1990s-2000s	- Funding for state-subsidized housing managed by private banking institutions. - Law 308 of 1996: Invasions (squats) and pirate urbanizations are considered criminal offenses that can result in imprisonment. - Law 388 of 1997: Urban authorities must develop land use management plans (*Planes de Ordenamiento Territorial – POT*[38]) in a participatory manner and in coordination with neighboring municipalities. The *POT* is now one of the most important planning instruments at the municipal level. It also stipulates sanctions to those who urbanize in land not planned for urbanization.	- Accord 6 of 1990: Mayor in charge of declaring, by decree, those informal settlements that are to be formalized. - Formalization of neighborhoods during Peñalosa's (1997-2000) and Mockus (1995-1996; 2001-2003) administrations focused on legalizing plots and providing basic public utilities (programs referred to as neighborhood upgrade or integral improvement of neighborhoods). - Little coordination between institutional strategies (e.g., development plans) of Bogotá and Soacha.	- The Colombian Constitution does not explicitly declare water as a fundamental right. However, in several rulings the right to water has been considered a human right.

[38] The *POT* or Land Use Plan defines a medium and long term occupation model for the municipal and district territory, indicating its basic structure and territorial actions necessary for its adequate organization, which will be in effect until it is amended or replaced. In this regard, the definition of programs and projects of the municipal development plans take into account the long and medium-term definitions of occupation of the territory. (Law 388 of 1997, Art. 21). The POTs should define the validity of its different contents and the conditions under which it deserves to be revised based on the following parameters: The structural content of the POT shall have a long-term validity, which means, as a minimum, three constitutional periods of the municipal authorities (currently each period is of 4 years, therefore the validity should be of at least 12 years). The medium-term urban content shall have a validity of minimum two constitutional periods of the municipal authorities (i.e., 8 years minimum). Short-term content should have a validity of minimum one period (4 years) (Law 388, Art. 28).

2000s-2010s	- Law 812 of 2003, article 99: The investment of public resources and public utilities in informal settlement is prohibited. - Sentence C-1189/08 of 2008: The above article was ruled unconstitutional because it ignored the constitutional obligation to guarantee the provision of essential public services to all people. -National decree 564 of 2006: Regulates the process to legalize informal settlements of low-income populations. Formalization (or legalization) implies recognizing the existence of a human settlement composed of social interest housing constituted before 27 of June 2003. Formalization includes approving the urban plans of the settlement and the incorporation of the settlement into the urban perimeter (with the regulation pertinent to urban neighborhoods), and incorporates the settlements into the perimeter of public utilities provision. Formalization does not include resolving land-titling issues of the residents (Art. 122). - Official letter (*oficio*) No. 7230-E2-23685, Aug 10 of 2012, Ministry of Housing, City and Territory: There is no deadline for the establishment of human settlements as a condition for urban formalization, i.e., June 2003 no longer a constraint to formalize.	- First (and only) POT for Soacha approved in 2000. New POT in process of revision (at time of writing). - First POT for Bogotá approved in 2000. Revised in 2003 and modified in 2013 (District Decrees 619 of 2000, 469 of 2003, 190 of 2004, and 364 of 2013). Modification of 2013 done during mayor Petro's mandate was suspended by ruling CE 624 of 2014. The modified 2013 will likely not go into effect, as there is a new mayor in place (Peñalosa) with very different political views from Petro. POT in effect at time of writing was Decree 190 of 2004. - District Decree 190 of 2004: defines what the formalization of informal settlements entails, which includes provision of urban license and public utilities. - Bogotá- District Decree 121 of 2008: Created vice-directorate of Neighborhoods (under Habitat Secretariat) to handle massive formalization processes. - Bogotá - Decree 510 of 2010: Settlements developed or consolidated after June 2003 or that are located in land designated for other uses (e.g., located on a conservation area) cannot be formalized. The decree is unclear on what happens if a settlement is deemed not suitable for formalization or if it was developed after 2003.	- Decree 619 of 2000: The first POT of Bogotá prohibited public utility companies from providing any service or investing in informal settlements. National Sentence C-1189/08 of 2008 deemed this prohibition unconstitutional. - Bogotá 2010. Art. 22, Decree 510 of 2010 and EAB-ESP, Resolution 0194 of 2007: informal settlements in the process of legalization can request access to a provisional service (called I-cycle, *ciclo I*) from the public utility as long as they are not in risk areas. - Bogotá 2012. Decree 64 de 2012: Right to a minimum of water basic for living (*mínimo vital de agua*) is introduced. Policy only applies to Bogotá, to households connected to the water utility service and to informal settlements with approved I-cycle.
Sources additional to legislation: (Dávila et al. 2006; Decastro et al. 2011; Hataya 2007; Martinez Tocancipá 2007)			

Regarding the provision of water and sanitation, currently the EAB-ESP water utility company has the mandate to provide a provisional water service (or I cycle as it is referred to in the regulation) to those settlements in the process of formalization in Bogotá. Informal settlements that are not in the process of formalization can also request access to the provisional service. It is important to highlight that the community action boards (JACs) of informal settlements must request access to the provisional service via the local authorities, at which point the utility company assesses the feasibility of the provision (Resolution 0194) (EAB-ESP 2007). This brings forth two issues that must be underscored: i) The fact that it is the JAC of each neighborhood that must request access to I-cycle implies that residents of these informal neighborhoods must be organized and have gone through the administrative process of setting up an officially approved JAC. As was mentioned above, mobilizing collective action may be a challenge in itself, and not all neighborhoods have managed to officially establish their JAC, as in the case of Villa Celina. ii) The provision of the I-cycle is dependent on the feasibility study carried out by the water utility company. Provision of the I-cycle can be denied if the area is deemed a high-risk area (e.g., vulnerable to hydrological or geological hazard), or if the infrastructure network of the water utility company has not reached the area and major infrastructure works are required (EAB-ESP 2007).

Another measure recently taken by the municipality of Bogotá is the declaration of the right to a basic amount of water (*minimo vital de agua)*, which provides 12 m^3 of water[39] for every 2-month billing period free of charge to households in strata 1 and 2, and to those benefiting from provisional cycle I. At the moment, the policy only applies to Bogotá but discussions were underway at the time of writing to extend the program to Soacha (EAB-ESP 2013). However, having access to the provisional I-cycle does not imply that formalization is feasible. In other words, even settlements that may not be eligible for formalization may be entitled to the I-cycle service. At the same time, lack of information and awareness on the legal situation of neighborhoods and procedures is a common issue among informal dwellers. When provisional water access is provided, but barriers to formalization remain (if the settlement is located on an environmental protection area, for instance) informal dwellers are left living in a grey zone, between formality and informality.

[39] The amount of 12 m^3 (which equals approximately 200 liters per day) covers and goes beyond the World Health Organization's assessment that between "50 and 100 liters per day are needed to insure that the most basic needs are met and few health concerns arise" (OHCHR et al. 2010).

Limits to Formalization

Legislation-Based Restrictions

Based on the current legislation, for formalization to be possible the neighborhood in question must not being located in a high-risk area, an area declared for protection (such as a wetland), or an area designated for other uses under the land use plan (POT). On top of these conditions, until 2012 only settlements established or consolidated before 2003 were eligible for formalization. The Ministry of Housing, City and Territory removed this condition in 2012 (Alcalde Mayor de Bogotá D.C. 2015)[40], but it seemed that news of this change had not reached local authorities and informal dwellers, since those applying for formalization still referred to this obstacle (e.g., in one sector in Altos de la Florida and in Villa Celina). The June 2003 requirement was valid between 2006 and 2012, and informed several formalization processes (or denials of formalization). The arbitrariness of this requirement is an example of how informality is a practice of planning and a socio-spatial mechanism of control and exclusion which, as McFarlane (2012) rightly notes, both enables and constricts (peri-)urbanity. Furthermore, as the continuous changes in policies regarding informality in Colombia show, the politicization of informality and formality practices, as McFarlane (2012) argues, are contingent and thus there is an important temporality of these policies that opens room for negotiation and contestation from civil society.

According to a report by the Municipality of Soacha and the United Nations Development Program (UNDP), about one-third of Soacha's urban area presents geological and hydrological risks, potentially affecting one fourth of the population. By 2009, 39 neighborhoods in Soacha's Cazucá *comuna* (*comuna* 4) were awaiting risk assessments to define their eligibility for formalization (Alcaldía de Soacha and PNUD 2009). In cases where the settlements are located within protected areas, such as an area of La Maria neighborhood[41] in Soacha located within the *Tibanica* wetland that houses a community of *recicladores*, discussions have been ongoing between the local authorities and the community about resettlement. It is important to highlight that legislation does not explicitly declare how authorities should deal with settlements that are not eligible for formalization. Therefore, settlements that are located in high-risk or protected areas often do not receive any clear state indication on their alternatives (e.g., neither with respect to formalization or resettlement), thus leaving the residents in a judicial limbo, or what Roy (2012)

[40] The date limitation for formalization was removed by the *oficio* (official letter) No. 7230-E2-23685, dated August 10 of 2012 issued by the Ministry of Housing, City and Territory (Alcalde Mayor de Bogotá D.C. 2015).

[41] In its early stages, this neighborhood could have been considered peri-urban but now it has been completely integrated into the urban fabric. Its development from a peri-urban informal settlement to an urban settlement still dealing with issues of service provision and formalization serves as a useful example of how the production and regulation of space takes place.

refers to as 'gray spaces' of ambiguous legal standing with an unclear prognosis of what the future holds.

Limits to Formalization beyond Legislation: Geography and Soacha's Limited Administrative Capacity

Beyond legal restrictions, it becomes evident from the 15+ neighborhoods visited during fieldwork that location (both geographical and administrative) plays a significant role in how informal settlements develop over time. The neighborhoods in Bosa (i.e., municipality of Bogotá) located on flat areas and not bordering waterbodies that were founded over 10 years ago have now been formalized (or are in the process of formalization) and now have access to networked drinking water and sewerage infrastructure by the public utility company EAB-ESP. On the other hand, neighborhoods in Soacha founded around the same period but located on hillsides have not yet received full formalization and lack drinking water, sewerage, or both (see Table 9). This could be partly explained by the additional risk assessments that are needed in neighborhoods that are at potential risk of landslides or flooding. Another complementary explanation, as illustrated by Davila et al. (2006) by their examples in Soacha, is that the location of many informal settlements in areas outside of the urban perimeter, and at times in difficult geographic conditions (e.g., steep slopes), has rendered the provision of public utilities even more complicated.

More importantly, however, delays in formalization and provision of public utilities can be explained by the limited institutional capacity of the municipality of Soacha. As expressed in an interview by a planning official of the municipality, "Soacha is a city with the budget and administrative capacity of a town." An example of this is La Maria neighborhood in Soacha, which was founded over 30 years ago. The neighborhood was given legal status (i.e., it was formalized) in 1991, yet 75% of the neighborhood still does not have access to networked sewerage infrastructure. As mentioned above, a small part of the neighborhood is located within the Tibanica wetland and discussions about resettling the population of this area are underway. The rest of the neighborhood is located in the valley bordering Bosa, meaning that difficult geographic conditions or distance to the current available network cannot be used to explain the lack of utilities.

Moreover, access to public utilities in Soacha is increasingly unpredictable. Over the past few years, there have been recurrent changes in the mandates of Bogotá's water utility EAB-ESP *vis-à-vis* other municipalities, as well as on environmental regulations. Changes include restrictions of provision of water from EAB-ESP to other municipalities, increased restrictions on groundwater exploitation, as well as the designation of conservation areas such as wetlands (as is the case of the Tibanica wetland under parts of La Maria neighborhood) (interview with officials of the environmental agency with jurisdiction in Soacha - CAR). In addition, new mayors

have taken office (as of January 2016) and, in the case of Bogotá, Mayor Peñalosa has already announced his intention to reduce the size of the state bureaucracy, including possibly privatizing the water utility company. If this privatization takes place, programs such as *mínimo vital de agua* (minimum water basic for living) may be jeopardized.

Social Limits to Formalization

While many informal dwellers request formalization, others raise concerns about its negative implications. Research throughout the world (see, for example, Davis 2006; Foster 2009; Gonzalez 2009; Roy 2005) has shown that formalization can result in higher costs (e.g., of public utilities and taxes), fewer social benefits (such as subsidies), and continued inaccessibility to formal financial institutions (e.g., to borrow money from a bank), which can result in the displacement of the poorest populations living in these areas. In addition, the ideology of space of these policies means that, while infrastructure and access to utilities may be improving over time (albeit very slowly in Soacha), social conditions have not had the same progress. In her longitudinal research in informal settlements in Guayaquil, Ecuador between 1978-2004, Moser (2007a) showed that even after several decades poverty, alienation, violence, and job informality persist and it is now often the adult sons and daughters of people she interviewed in 1978 that are experiencing it. Similarly, in Altos de la Florida, Ciudadela Sucre, and several other neighborhoods, residents stressed that formalization of the neighborhood would not be sufficient (and has not been sufficient in the areas already formalized); people also need access to stable and formal job opportunities closer to their neighborhood, safer environments, and better education and health services.

Coping with Informality

The previous section dealt with what the state has done to create, reinforce, or reduce informality through its different practices of planning. The rest of the chapter has focused on describing how informal dwellers themselves cope with informality in a changing socio-environmental peri-urban landscape. In the remainder of the chapter, I will raise some additional points related to agency and adaptive capacity. Bohle and Warner (2008) argue;

> On the one hand, the informality of these populations makes them more vulnerable to exploitation, suppression, State arbitrariness, and exposure to environmental hazards. On the other hand, they are not forced to rely primarily on the formal elements of mega-urban governance. Informal activities are often more dynamic, flexible and better capable to cope with disturbances (Bohle and Warner 2008:12).

I would argue that the dynamism and flexibility of informal settlements is mainly present in the initial stages of a settlement's growth, when neighborhoods have not been fully consolidated, adjustments are feasible, and few resources have been used.

As informal settlements grow, informal dwellers spend significant economic and time resources in making these areas their homes, creating diverse socio-environmental landscapes and gradually integrating into the 'formal' system that once rendered them informal.

As mentioned earlier in this section, the residents of Villa Celina designated living in an informal settlement their major constraint. When asked what the solutions could be to deal with the impacts of informality, the focus was mostly on the responsibility of the state given their current situation and the role it should play in protecting their rights. Residents expressed their frustration that for the most part, the state does not support them, and that help only comes during election times:

> The mayor of [Bosa] doesn't want to help at all because the neighborhood is subnormal. She said that if she collaborates with the neighborhood, it would be as if she were collaborating with illegality (Resident of Villa Celina)

In response to that comment, another person said (which was echoed by all): "The neighborhood is illegal, but as the people, we are legal! Our rights first, then the laws!" Inhabitants of Villa Celina are aware that under current legislation they are not eligible for formalization. However, residents blame the state for allowing the development of the neighborhood and claim that local authorities were fully aware that the neighborhood was being developed. Many state institutions visited to carry out censuses and surveys of the neighborhood, even in its early stages, but nobody told current residents that they could not settle in the area until buildings were already constructed. It was at this point they were told by government representatives that they could not be formalized. "If we are to be blamed for being innocent [by buying from a pirate developer], the state should be blamed for negligence", expressed one resident. Inhabitants of Villa Celina, in short, want the period of quiet encroachment to be over, and for the state to fulfill its role and protect their right to a decent life.

Concerning their own agency, inhabitants identified the need to have their JAC recognized by the municipality as a possible first step, as well as to request legal advice from an NGO to figure out how to defend their right to live there and gain formal status, as they are not willing to be resettled. They also expressed the need to organize workshops to clarify the procedure to apply for formalization (e.g., the legal requirements), as many do not know how it works. The lack of social cohesion is, I argue, a significant impediment to the capacity of this neighborhood to face the challenges that their informal status poses. The residents have not reached a level of social cohesion where there is a sense of community that acts collectively to solve community problems, as the issues around sewage disposal have shown. To be sure, there are leaders in the neighborhood who are trying to deal with the conflicts with San José II concerning sewage disposal, for example. However the limited

involvement of other residents in issues that concern the whole community makes the leaders' roles more difficult.

Deficient Utilities

Residents of both Altos de la Florida and Villa Celina highlighted the challenge presented by deficient utilities in their neighborhoods. I have already covered most of the impacts that deficient utilities have on peri-urban informal dwellers. Altos de la Florida is mainly exposed to water shortages. Their sensitivity to water shortages depends on the regularity of water tanker trips to the area (which are somewhat unpredictable, but so far mainly done on a regular basis; about every 12 days). They are also dependent on Bogotá's legislation regarding water provision, since the water they buy from the tankers comes from Bogotá's water utility company. As previously mentioned, the water utility may be privatized by the current mayor (Peñalosa), and thus conditions of provision may change. It is important to highlight that, while the neighborhood is located in Soacha, Altos de la Florida is dependent on another municipality's water policies. This means that they have a very limited influence on those policies, so it is likely that neither collective mobilization nor political patronage will be effective to gain access to water. Even if formalized, Bogotá's water utility company will most likely provide water, since the municipality of Soacha usually relies on Bogotá's water utility company (the municipality has a few, very small water aqueducts, which are already being used at almost full capacity; see the next chapter for an example).

People have learned to cope with the lack of networked water infrastructure in a number of ways. Initially, people had installed metal tanks on roofs or next to each house where they would store water bought from water tankers and collect rainwater. With NGO funding and support, people participated in workshops on how to properly store water, which included changing the metal tanks to plastic tanks and learning how to clean them. Inhabitants of Altos de la Florida now wash the tanks every time the tanker comes, and many collect and treat rainwater. Those who do not treat rainwater have had problems with stomach parasites. People have also learned to reutilize water and regulate its usage in order for it to last between tanker trips. If residents need more water and the tanker does not reach their neighborhood, they have to buy water in plastic bags, which is very costly, meaning they can only do this according to their economic possibilities. Overall, buying water from tankers is much more expensive than paying for networked water, which is subsidized for low-income customers. Focus group participants recognized that the ability to cope with the lack of networked water infrastructure, including knowing how to regulate its use, and how to collect, treat, and store rainwater to avoid health problems, is positively correlated with the length of time people have

lived in the neighborhood. Newer settlers are more exposed to water deficiencies while they adapt to the water tankers periodicity, the costs of alternatives, and learn water treatment procedures. Along with the formalization process of two of the sectors in Altos de la Florida, the water utility study conducted a feasibility analysis of extending the water and sanitation network to the area. In theory, once formalization is approved, water and sanitation networked infrastructure will be installed in the two sectors. The other two sectors (Altos de la Florida 3 and El Retiro) have an uncertain future with respect to formalization, and thus their connection to both water and sanitation services, which leaves them still vulnerable to water deficiency and possibly health problems as a result of deficient utilities.

In Villa Celina, the population is highly vulnerable to both deficient water provision and sewerage. As previously mentioned, not even one fourth of current households are officially connected to the provisional water networked infrastructure (I-cycle). Only about 50 are connected officially and pay for the service, while the others tap onto the pipeline and do not pay. Since almost 300 houses use the infrastructure meant for 50, during peak demand times water is very limited, especially during weekends when most people are home and use water for doing dishes, laundry, etc. During these peak times, water often does not reach households on the second floor (given this, it is worth keeping in mind that many houses are home to more than one family, and, in some cases, those who own their own houses have built apartments on the second floor and rent them out). If the water utility decides to control and limit the water losses it is experiencing from the illegal tapping of water, the inhabitants who do not pay for the services could be at risk of being cut from the service or fined. As previously mentioned, thus far people are not willing to collaborate or come up with neighborhood-level agreements in order to resolve the issues of water shortage during peak times and health concerns from the lack of sewerage. This can be interpreted as signs of limited adaptive capacity, at least collectively, as individually people have shown to be resourceful in obtaining the basic installations for both water and sewage. At the same time, the individual solutions, especially in relation to sewage disposal, have become been more problematic than beneficial.

The coping mechanism for the lack of networked sewerage has been, as previously described, to dispose of the sewage into the ditch (a former irrigation canal) that separates Villa Celina from San José II. The narrow and shallow ditch is not sufficient to handle the sewage from both neighborhoods. The wastewater flows slowly into the network of canals of the farms behind the neighborhoods. Several problems have emerged as a result of this sewage disposal practice. First, the stench emanating from the ditch and the invasive presence of water hyacinths (*eichhornia crassipes*) are a reminder of the poor, salubrious conditions (Sharma et al. 2016) residents of these two areas have to live with every day due to sewage disposal practices. The insalubrious conditions cause stomach, pulmonary, and skin

problems, particularly for children and the elderly. Second, during heavy rains, the ditch overflows into houses in San José II and onto the only access road to both neighborhoods. The location of Villa Celina on higher ground has saved it from being flooded directly, but residents are still affected by the floods. The unpaved road that lacks stormwater drainage means that when it rains, or even worse when the ditch overflows, the road becomes muddy, potholes increase, and accessing the neighborhoods by car or foot becomes very difficult.

It could be argued that having built Villa Celina on higher ground was an adaptation strategy by pirate developers to the lack of sewerage. However, the adaptation strategy for one neighborhood was realized to the major detriment of the other (San José II), as well as to the farms where the ditch drains. Families in San José II, many who are part of the *Cabildo* Muisca, have disposed of their sewage in the ditch for many years. When there were only a few families, unpleasant odors and potential health-related problems may have affected them, but they were not flooded, as water levels did not reach as high as they do today, and wastewater flowed more easily into the network of canals behind the neighborhood. The increased population now disposing of sewage in the ditch, as well as some inhabitants disposing of solid waste, has raised both water levels and pollution significantly. The increased solid waste and pollution have resulted in the proliferation of water hyacinths and, taken together, these factors have led to blockages and reduced flows. The owners of farms located next to the network of ditches that receives the wastewater from this infamous ditch are frustrated at being the recipients of all the wastewater, and have threatened to fill up their ditches so they can no longer be used. If such a threat materializes, the ditch would have nowhere to drain, and more than 300 families would be left without a sewage disposal alternative. This could happen anyway, as a large subsidized housing project, Campo Verde, is designated to be built on plots where part of the network of ditches is located.

When it came to solutions to the above problems, most people in Villa Celina suggested formalization. That the state should be charged with the formalization process and the provision of basic services was, in fact, the only suggested alternative. While people have taken short-term access to basic services into their own hands, longer-term solutions, as described by inhabitants, for solutions leave individual and collective agency mostly aside, and instead look to the State for solutions.

Concluding Remarks

While state policies and programs have changed significantly over the study period (from the 1980s to mid 2010s), accounts from one neighborhood to another concerning the settlement process and resident's attempts to access water and sanitation, both in Bosa and Soacha, share more similarities than differences. That is to say that the accounts from those informal neighborhoods that formed over 25 years ago do not diverge much from those that have formed as recently as 5 years ago. While more than 20 years separate their foundation, the struggles to find decent housing, and to access safe and reliable drinking water and an effective sewerage systems repeat themselves over time and space.

I have demonstrated that informal peri-urbanization is occurring beyond the administrative limits of Bogotá. Therefore, neighboring municipalities such as Soacha are confronted with addressing informality and providing basic utilities, but without the necessary administrative, technical, and financial capacity in place. Discussions about forming a metropolitan region between Bogotá and Soacha are underway (El Tiempo 2014). Proposals to create such a metropolitan region in the past, however, have been met with strong opposition by the mayors of the smaller municipalities (including Soacha), as they fear losing their autonomy to the capital city (Thibert and Osorio 2013). Still, a metropolitan region where Soacha maintains its autonomy, but both cities benefit from improved coordination with respect to land use planning, and an increased budget and technical capacity to help address the peri-urbanization challenge could be a step forward.

Janoschka et al. (2014) argue that occupation of land and (peri-)urban space has been an important strategy to claim the right to the city in Latin America. While informal settlers feel ignored and excluded by the state, and while people have settled either knowingly or unknowingly in areas deemed informal by the state, the aspirations of the inhabitants of neighborhoods such as Villa Celina and Altos de la Florida continue to be closely tied to state recognition as 'legitimate'/'lawful'. Their aspirations are not to remain outside the law in most cases, at least when it comes to the legal status of the neighborhood. When it comes to the legal status of accessing services, there is some disagreement about the best outcome, since being included in the formal water and sanitation networked infrastructure represents, for some, additional costs, whereas tapping the water and draining sewage into fields is free, at least economically, though high social and environmental costs have been demonstrated.

8 Formal Dwellers in Peri-Urban Areas

In this chapter I will analyze the wellbeing and vulnerability of the population who lives in areas considered formal by the state. There are different forms through which an area can become formal or develop formally. One of these forms, as mentioned in the previous chapter, is the formalization of settlements that developed informally (i.e., without state approval for an area to be developed as an urban neighborhood); a second form is the development of neighborhoods through self-construction on areas where the state has granted urban development permits and often subsidized the plots, in the case of low-income (and sometimes middle income) settlements. This latter form was common up to the 2000s. The third form is the development of large-scale subsidized housing complexes, usually apartments or small 2-floor houses.[42] The trajectory of most subsidized housing projects involves the state buying land and then drafting an urban development plan that is then carried out, most frequently, by private developers or worker compensation organizations (*cajas de compensación familiar*). These large-scale subsidized housing projects have two forms: i) Social interest housing (*Vivienda de Interés Social*, here forth VIS, its acronym in Spanish) built for the low-income population, and ii) social priority housing (*Vivienda de Interés Prioritario*, henceforth VIP, its acronym in Spanish) aimed at the most vulnerable population, victims of armed conflict,[43] for example.[44] Other forms of state housing support for low-income, and

[42] The national government, through the Ministry of Agriculture, is also developing rural subsidized housing projects but none are in Soacha or Bosa. In Bosa and Soacha, the housing projects are all considered urban subsidized housing projects, responding to the high housing demand of the Bogotá metropolitan region for the population who work in Bogotá, albeit dismissing the needs of the farming minority population.

[43] According to law 1537 of 2012, people who are a part of the eligible vulnerable population receive a family subsidy in the form of 100% of the housing unit (i.e., a housing unit for free). Vulnerable populations include: people under state programs to overcome extreme poverty; those who have been displaced; people who have been victims of a natural disaster or public calamity; or those who live in areas of unmitigable risk. Priority is given to men and women heads of households. In case there are more applicants than available VIP housing, the Administrative Department for Social Prosperity will do a draw to determine beneficiaries (Congreso de Colombia 2012).

[44] In Colombia VIS is used as the general term, which also includes VIP projects. I will henceforth refer to VIS to refer to both types of state-subsidized housing, unless when differentiating between the two is necessary.

to some extent middle-income families, include exceptions on mortgage interest rates and family housing allowances (one-time money or in-kind contributions for qualifying families based on income) (FNA 2015). The different state housing programs have been a state response to the shortages of low-income housing, and an attempt to slow down the development of informal settlements and improve the quality of already developed informal settlements. Aside from formalization programs (also known as comprehensive neighborhood improvement programs – *programas de mejoramiento integral de barrios*), large-scale subsidized housing projects are currently the main state approach to providing low-income housing. The current Colombian government under the presidency of Santos has set the goal to build 1 million housing units in the period of 2014-2018, with priority given to housing for the low-income population (MINVIVIENDA 2016a). Over the past few decades, and even more today, Bosa and Soacha have been the loci of many of the VIS and VIP projects targeting the housing deficits in Bogotá and its metropolitan region. A report by the District Office for Economic Development of Bogotá showed that in 2015, the construction of VIS in Bogotá and its metropolitan region (which includes 11 neighboring municipalities) was concentrated in 3 boroughs of Bogotá: Ciudad Bolivar, Usme and Bosa, as well as in the municipality of Soacha, which was the site of 51% of the VIS projects (see Figure 24). By the second trimester of 2015, of the total area of where VIS projects were under construction, 110,207 m^2 or 14% were being built in Bosa, and 72% of the future VIS projects were planned for Bosa and Usme. In Soacha, the area where VIS projects were being constructed amounted to 46% of the total area of projects being built in Bogotá's metropolitan area. It is worth noting that while the construction of VIS projects is concentrated in the south and southwest of Bogotá, housing projects above the VIS cost threshold[45] are located in the northern parts of the city and the municipalities north of the city, which shows that the socio-spatial north-south segregation continues, and is now even reinforced by state programs (Observatorio de Desarrollo Económico 2015).

[45] VIS projects have a maximum price per housing unit for each household. VIS housing can have a maximum cost of 135 times the minimum wage, which is equivalent to 93 million Colombian pesos (based on 2016 minimum wage salary which amounts to COP$689,454, about US$205), or approximately US$28,000, calculated based on January 2016 exchange rates. Note that the Colombian peso has been significantly devaluated over the past year). VIP projects have a maximum cost of 70 times the minimum wage, or about 48 million Colombian pesos (approximately US$14,000) (MINVIVIENDA 2016a).

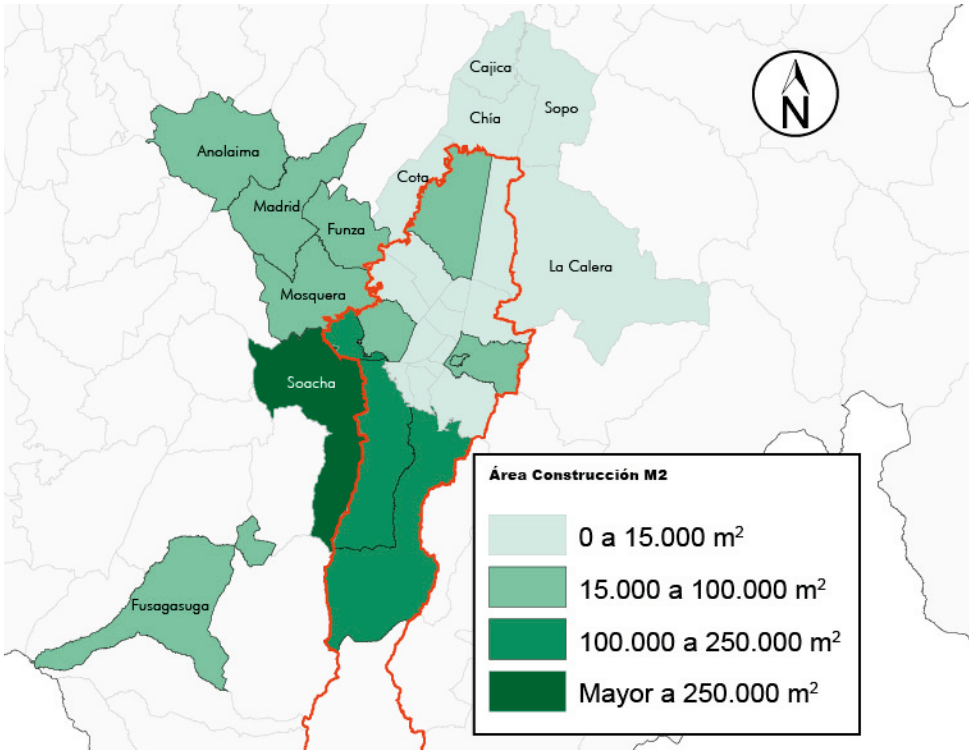

Figure 24. Low-income subsidized housing (VIS) projects in Bogotá and its metropolitan region

VIS projects under construction, second trimester of 2015. Data source: DANE, Edification Census. Calculations made by Economic Development Observatory (Observatorio de Desarrollo Económico 2015:3)

Setting the Scene in the Study Areas

In the following sections I will introduce the focus areas of this chapter. During fieldwork in 2014, I selected four peri-urban areas (PUAs) that were considered 'formal' by the state; two in Soacha and two in Bosa. I selected these areas, mainly based on interviews with decision makers working in Bosa and Soacha, from interviews with community leaders and analysis of land use plans. These areas have reached formal recognition differently, but they all could be said to be at the later stages of peri-urbanization; their geographic location is at the urban-rural interface, but socio-economically the population is mostly integrated into the urban fabric.

Formalized and Self-Constructed

San José I, Bosa

San José I is a small neighborhood bordering the Tunjuelito River. It consists of about 30 houses that are distributed across two streets that run perpendicular to the river (see Figure 25). Most of the population of the neighborhood is a member of one of two families who have lived in the area for more than four decades. The neighborhood was a former farm, privately owned by one family. As the children of the family grew up, they started building additional houses. Formalization was requested to the state and was granted in 2000. The neighborhood included a park, which was invaded by a group of people who still reside in the squatter settlement, which is now called Rincon de San José. Inhabitants of San José I refer to it as the invasion or squat (*la invasión*). Since I am referring to several neighborhoods with the name San José, I will refer to the Rincón de San José as *la invasión*. To clarify, note that San José I is different from the San José II settlement that I talked about in chapters 6 and 7. The areas are located across from each other, separated by the Tunjuelito River (see map on the inside back cover of the book). Though San José I was formalized in 2000, its location next to *la invasión* and the Tunjuelito River have influenced access (or lack thereof) to basic utilities, and thus the neighborhood shares many conditions similar to the informal settlements discussed in previous chapters.

Figure 25. San José I, Bosa

Left image: Gated entrance to neighborhood. Right: Paved street in San José I (the other streets were not paved). Pavement paid for by residents.

San Nicolás, Soacha

San Nicolás is a sector in *comuna* 1 of Soacha composed of several smaller neighborhoods. In the focus group I organized, residents of Conviba II, Casa Bonita, and San Nicolás I neighborhoods participated. For simplicity's sake, I will refer to

the sector as the neighborhood of San Nicolás throughout the chapter. San Nicolás borders the Bogotá River; across the Bogotá River is the rural area (*corregimiento*) of El Charquito (see Figure 26). The areas of the neighborhood have developed differently. Some areas started informally through pirate urbanization and were later formalized, others started formally with subsidies from the state to buy plots for construction. In 1990, the former National Institute for Social Housing and Urban Reform (INURBE) approved the urban development of plots and the installation of basic utilities, and gave subsidies to low-income population to buy the plots and construct their houses. Some of the plots in those areas were developed by individual households, while other plots were developed by housing developers who generally built a housing complex comprised of a few uniform houses. Public utilities and infrastructure was developed both by the residents and by the state, with differing implications on the quality and efficiency of the infrastructure. Today, most roads are narrow; major roads are paved, while collector roads are still unpaved. At the time of fieldwork, a couple of houses had been built within the Bogotá River's flood plain protected area, and thus they were considered a squatter settlement. The residents of this squatter settlement, who were mainly *reciladores*, were evicted later that year and the houses destroyed. In short, the neighborhood is today a mix of formalized settlements and state-subsidized houses (both self-construct and built by private developers).

Figure 26. Panoramic views of San Nicolás, Soacha

Top image: To the right (behind the fence) the Bogotá River. To the left is a football field and park in the process of development by environmental agency CAR. The park is considered to be part of the hydraulic adaptation and environmental recovery of the Bogotá River. Also see the self-constructed houses (note the slight hill where the houses are located *vis-à-vis* the park). Bottom image: Bogotá River bordering the neighborhood. On the other side of the river farmland dominates the landscape (farmland located in *corregimiento El Charquito*, one of the rural administrative divisions of Soacha).

Subsidized Housing Projects (VIS)

Recent state-subsidized housing projects have taken the form of large-scale housing complexes, that are usually gated communities. To develop VIS projects in Bogotá, a district enterprise called Metrovivienda was created during mayor Peñalosa's first government (1998-2001). Metrovivienda works as a land bank: first it buys plots destined for low-income social housing, and then develops a comprehensive urban design of the area (including planning for housing, utilities, roads, future schools, parks, areas of commerce, etc.). The plots with the urban design are then sold to private developers or workers compensation organizations (*cajas de compensación familiar)* and they are responsible for developing housing projects based on the parameters specified in the urban design (Niño Ruiz 2006). The housing developer, however, has the liberty to determine the design, construction materials, construction process, and contractors as long as it operates under the architecture regulations of the area. Potential beneficiary families must apply through authorized offices of the Ministry of Housing to assess whether they are eligible to benefit from subsidized housing. Eligibility depends on income, not owning any other property, savings (the applicant must have a percentage of the costs of the housing unit saved), entitlement to additional subsidies (through workers compensation organizations, for instance, which can collaborate to meet required funds), and bank credit approval (MINVIVIENDA 2016b). Families that buy or benefit (in case they received the housing unit for free as priority housing) cannot sell the housing unit for 10 years. To reduce the costs for the inhabitants, a socio-economic stratum of 1 is given to the VIS and VIP housing complexes for 10 years (the lowest, and most subsidized stratum with respect to utilities) and the SISBEN score of the beneficiaries is also maintained for 10 years. At the same time, once the housing complex is developed and the housing units sold, the gated communities fall under law 675 of 2001 of horizontal property, which applies to any residential area of more than 5 houses, and regulates the use and management of the property. Basically, the law stipulates that common areas of the housing complex area are co-owned by the housing proprietors, and thus it is their responsibility to manage and maintain them (e.g., street lighting, costs of security guards, parks within the property).

Ciudadela El Recreo, Bosa

Ciudadela El Recreo in Bosa is one of the major areas developed by Metrovivienda. Metrovivienda assessed 21 areas in Bogotá, and 4,000 hectares of vacant land in Bosa before buying a portion of the land to develop 3 major housing projects: Ciudadela El Recreo, Porvenir, and Campo Verde (see details about the controversy around the development of Campo Verde in chapter 6). The goal of Metrovivienda was to provide at least 22,500 housing units by 2004 (a goal which was not met). Bosa was selected for VIS because it was, at the time, the borough with one of the highest rates of pirate urbanization. It also had availability of basic utilities (meaning

the infrastructure was easy to develop) and had good connectivity with several major roads in the proximity planned for the future. Ciudadela El Recreo was planned adjacent to the Bogotá River, and the flood-hazard was supposed to be mitigated through sewerage works, pumping stations, and by increasing the height of the river embankment. Ciudadela El Recreo was built on 117 hectares of land and by 2014 about 10,500 housing units had been built (Castellanos Puentes 2014; Niño Ruiz 2006; Preciado Beltrán 2009). Because of the scale of the housing project, the development has been done in stages, and the more than 10,000 housing units are distributed in a variety of gated housing complexes, ranging from complexes with twelve two floor houses, to complexes with apartment buildings of about six stories (see Figure 27). I conducted the focus group in one of the earlier housing complexes that is located closest to the Bogotá River, called Reservado 3. I will refer to the area as Ciudadela El Recreo, as the issues discussed were not limited to the housing complex Reservado 3, for the most part, apply to the neighborhood in general.

Figure 27. Subsidized housing complexes Ciudadela El Recreo, Bosa

Top: Ciudadela El Recreo. The houses pictured are the closest to Bogotá River (about 300 meters). The canal drains rainwater into Cundinamarca canal (a bigger canal perpendicular to the one in the picture), and runs parallel to the Bogotá River. It supposedly drains only rainwater into the Bogotá River (in reality it is a mix of waste and rainwater). Bottom: One of the access roads to Ciudadela El Recreo.

Ciudadela Colsubsidio Maiporé, Soacha

As a municipality adjacent to Bogotá, Soacha has received the attention of VIS developers for years. Given the rapid growth of the municipality and the inability of authorities to address the increasing physical, socio-economic, and environmental challenges, municipal authorities tried to block further development of VIS housing in the municipality. The national government, during President Uribe's mandate, overturned this opposition and imposed the development of subsidized housing in Soacha, through a planning figure called macro-projects (macroproyectos), which are considered projects of national interest (Decree 4260 of 2007). One of these macro-projects is the Ciudadela Colsubsidio Maiporé (henceforth: Maiporé). Maiporé is in the process of being developed by workers compensation organization Colsubsidio, and thus only members of the organization are eligible for housing here (VIP housing aside). The housing project is located on the *comuna* 1*,* Soacha on the foothills of a mountain, bordering the El Vínculo wetland (or potentially partly located on the wetland itself, see more on this below) and the Cola de Tierra Blanca wetland (see Figure 28). The project plans to build a total of 8,000 housing units, and as of 2014 about 1600 apartments had been built and 950 were occupied. The housing units built so far are distributed in 3 separate housing groups (*conjuntos*); Barichara, Ambalema, and Mompós. Barichara housing group is destined mostly for VIP housing, while the other two housing groups, Ambalema and Mompós, are destined mostly for VIS and they are planned to be increasingly nicer (Mompós buildings are the only ones with elevator service, for instance, but it is also the most expensive).

Material Wellbeing

Similar to chapters 6 and 7, in the next sections I will investigate the wellbeing of the populations who live in the selected study areas, namely the formalized neighborhoods of San José I in Bosa and San Nicolás in Soacha, and the state-subsidized housing projects (VIS) of Ciudadela El Recreo in Bosa and Maiporé in Soacha. Unless noted, all the information in this chapter is based on focus group discussions and interviews with the inhabitants of these areas.

Figure 28. Subsidized housing complex Maiporé, Soacha

Top image: View of Maiporé from Altos de la Florida. Maiporé is the apartment complex closest to the hill. Note the highway (*autopista sur*) next to housing development. On the other side of highway are factories and residence areas. Bottom image: View of Maiporé from the highway. Note the three different housing groups of Maiporé: Barichara (closest to the hill. It is designated for VIP), Ambalema and Mompós (closest to highway; these are the nicer housing groups, with nicer finishes on construction and elevators in the buildings). Also, note wetland El Vínculo protected by a plastic barrier, and interrupted by the highway. On the hillside, notice the sandpit mines.

Housing: Decent Housing Right Put into Question

Housing-related matters varied significantly from neighborhood to neighborhood. In the VIS housing complex of Ciudadela El Recreo in Bosa, residents complained of the poor quality of the houses, including the small sizes, the poor quality of the construction materials, and the thin walls that limited privacy, to name a few of the described deficiencies. In addition, most VIS housing units are given to the new owners at the shell and core stage (*obra gris*), meaning construction nearing completion where the bricklaying is completed, and the electrical system and pipes have been installed, but walls have not been painted, floors are still bare cement, and most doors are missing. This means that families have to spend significant additional resources making the houses ready (some people described spending up to COP$12 million, almost US$4000 based on January 2016 equivalents).

Residents recognized that the layout of the neighborhoods, most roads within Ciudadela El Recreo, and the parks have a nice visual effect. However, they considered the size and quality of the houses so deficient that a community leader referred to them as "planned shacks" (*tugurios planificados*), in the sense that they may be state-subsidized housing with approved urban development plans but they are as poorly constructed as a shack. Residents of Maiporé housing complex in Soacha had a very different attitude towards their apartments, and while they would like to improve their homes, they were satisfied with the quality of their apartments and of the housing complex.

In the formalized and self-constructed neighborhoods in Bosa and Soacha, the quality of the houses varies significantly, from basic one-floor dwellings made of recycled wood and metal tiles, to brick houses with up to four floors (brick houses of different sizes being the most common in these neighborhoods as can be seen in the images, see Figures 25, 26 and 29). In both areas, the main housing problem related to humidity in the houses. In San José I in Bosa, for instance, the neighborhood is located below the water table and on the floodplain of the Tunjuelito River. As a result, all the houses had problems with humidity in walls and floors. Inhabitants have to fix the walls often and put mats on walls to protect the houses. The neighborhood of San Nicolás in Soacha is located close to, but slightly uphill from, the Bogotá River (the first row of houses, are within 60-100 meters from the river's embankment). Houses in these neighborhoods also suffer from humidity.

Public Utilities

Water and sanitation were the utilities that were most discussed in the different focus groups. In San José I in Bosa, lack of networked water and sanitation infrastructure

was identified as one of the most critical issues and priorities for the neighborhood. Despite being formalized in 2000, the neighborhood still has only temporary access to water (I-cycle) through a narrow hose (not a pipe) provided by Bogotá ‘s water utility company EAB-ESP. On numerous occasions, residents have requested that EAB-ESP provide them with the full infrastructure, but the service has been denied on the basis of the lack of a road through which the pipeline can be installed. The existing hose has a small capacity, and residents told me that they have to ask each other to close the tap so one can shower, which they do by yelling from one house to the other or asking children to go ask a neighbor. They are able to do this because many of them are related or have known each other well for many years.

Figure 29. Wastewater disposal in San José I, Bosa

As seen in the above images, the septic tanks are visible, covered only with a few planks, if at all, and a narrow hose is used to pump the wastewater to the Tunjuelito River (the river’s embankment can be seen on the back of the left image).

They have been paying the water utility company for service for almost 20 years, at a price they consider expensive given the lack of proper infrastructure and the insufficient quantity. San José I does not have a sewerage system either. Instead, people dispose of their sewage in small and basic septic tanks and then drain it into the Tunjuelito River with the use of hoses and a pump (see Figure 29). With their own resources, community members have now bought three water pumps. There is also no rainwater drainage, besides the septic tanks. During heavy rains, the hoses and pumps are not sufficient and thus the community often suffers from flooding on the streets. They have had formal connection to electricity and piped gas, as well as trash collection services, for 35, ten, and three years, respectively. The challenges accessing adequate water and sewerage services reflect the lack of representation and maldistribution this small neighborhood faces (Fraser 2009; Schlosberg 2007). This example illustrates that formalization is not necessarily sufficient to gain representation and to be able to effectively claim rights.

In San Nicolás in Soacha, access to water networked infrastructure could be argued to have been a process similar to Bayat's (2000) quiet encroachment, characterized by gradual stages of both individual and collective action. When the area was first developed, people had to buy water from tankers; after which water was taken out of a well of a private aqueduct in Soacha. In 2006, the well became contaminated with a bacteria. As a response, inhabitants started tapping the piped network of Bogotá's EAB-ESP water utility. Later that year, EAB-ESP decided to provide the service but as provisional (I-cycle) service and charged a fix cost. The pipeline installed has a small diameter, and people complain of water shortages during peak demand times, especially during the weekends. Also, when pressure is higher, pipes have exploded in the lower parts of the neighborhood (the houses closest to the Bogotá River).

In addition, there was disagreement among focus group participants on whether having water meters for each house would be better than paying the fix cost. Those with few people in the house feel that they are paying too much for the service, while those with larger families think that having water meters would increase their costs. With respect to sewerage, the original plots were given with networked sewerage infrastructure, but the system has since collapsed because the pipeline that was installed is very narrow. During the rainy season the system collapses, with pipes getting clogged and wastewater returning through pipes to houses. Upgrading the deficient sewerage system was considered a priority for the neighborhoods. In that respect, residents underscored the importance of putting collective pressure on the utility company (e.g., through several neighbors filing separate claims), as individual requests to the company have proven futile thus far. Both electricity and piped gas were considered to work well, but with costs too high for the population.

In Ciudadela El Recreo in Bosa, the deficiency in quality does not only apply to housing, but also to the networked infrastructure, especially the water and sanitation services. The area is growing rapidly, with new housing complexes built every year, yet the infrastructure is not being expanded to keep up with the demand. The rapid urbanization experienced at this peri-urban interface has resulted in an increased demand for drinking water that has not been met (it is mainly the water utility company who provides the existing service). The rapid population growth combined with poor quality infrastructure means that during peak demand times, very little to no water comes out through faucets. Residents have voiced their concerns to the water utility and housing developers who have said that newer houses are being built with wider pipeline to reduce the problem. Already built housing complexes, however, are not being retrofitted. For the moment, most sewage is pumped untreated into the Bogotá River through networked sewerage infrastructure. I will present the impacts of deficient infrastructure in the next section when I talk about the floods that occurred in Ciudadela El Recreo in 2011.

In Maiporé housing development in Soacha, providing access to drinking water has been quite problematic for the project developers. The project was approved by the municipality even though Bogotá's EAB-ESP had declined providing service to the area (the utility does not want to approve providing service to new projects outside of Bogotá on the grounds that the priority for the company is the municipality of Bogotá) (Redacción Cundinamarca 2013). An alternative, considered by project developers, was to dig a well on the project grounds and use groundwater for water provision. However, the housing project is located on an area that was declared as critical in regard to groundwater overexploitation (Decree 31 of 2005, CAR 2008). Areas deemed critical have experienced overexploitation of groundwater aquifers intensified from the 1990s onwards (both for urban and rural uses, especially from floriculture) that has resulted in significant drops of the water tables. In these areas, new groundwater exploitations are not allowed. Therefore, when the first apartments were finished, the developers still had not solved drinking water provision for new inhabitants.

As a first solution, in 2012 water tankers delivered water to tanks in each building complex. The new residents were not satisfied with the solution, as it was expensive and deemed unreliable. In May of 2013, a private water utility company called Acuacentro took charge of water provision, using water from a small private aqueduct (Santa Ana aqueduct) in Soacha. Acucentro also installed a small water treatment plant on the premises. Wastewater is treated to the authorized environmental standards and then drained through pipes to the Bogotá River. At the time of fieldwork in 2014, almost 950 apartments were inhabited and water was delivered only with fairly minor interruptions. However, the project is planned to consist of a total of 8,000 housing units. The Santa Ana aqueduct does not have the capacity to provide water for all those households, and yet construction of the additional housing units is underway. The developers have been putting pressure on different authorities to authorize either water provision through Bogotá's water utility or the drilling of a well on the premises. At the time of writing, no solution had been found. Studies are currently being done to determine whether the wetlands that surround the land the developer bought for the project have an underground flow. If an underground flow is found in the wetlands, the environmental agency CAR (*Corporación Autónoma Regional de Cundinamarca*) is supposed to protect the wetlands and deny the groundwater exploration permit. [46] If no flow is found, the state once more may practice its own informalization, and approve the exploration of the groundwater wells (despite decree 31 of 2005 declaring the area as critical) (CAR 2008).

[46] Information is based on interviews with representatives of the environmental agency CAR, of Acuacentro water utility company and hydrogeologist who is carrying groundwater analyses in the area.

The views held by residents surrounding this process of securing water provision are divided. Some residents feel satisfied because they have always had tapped water, while others feel tricked by the developers for not having the issue resolved before selling the apartments and/or mistrust the quality of the water from Soacha's aqueduct. In that regard, residents recognized that there is a bias towards Bogotá's water utility company, meaning that some residents only trust the quality of the water and of the service of EAB-ESP, and mistrust the service any other water utility could provide.

The above examples of the deficiencies in water and sanitation provision serve to show the uneven metabolisms around key resources, which manifest in their maldistribution in low-income areas. They also show the challenges that result from formalizing neighborhoods that were built with poor infrastructure or in marginal locations. In that respect, the examples from the formalized areas demonstrate the limitations of formalization policies. The subsidized housing example of Maiporé in Soacha illustrates an uneven power relation between the capital city and a smaller municipality.

Waterbodies, Air Pollution, and Trash

Living By or On Water

Similar to other settlements I have presented in previous chapters, in these areas living close to a river is not a positive factor, but instead a stressor for residents, due to the high levels of pollution and the flood hazard. In San José I in Bosa, the closest houses are less than 15 meters away from the Tunjuelito River embankment. In Reservado 3 of Ciudadela El Recreo in Bosa, about 350 meters separates the first row of houses from the Bogotá River, and a distance of about 80 meters separates the Bogotá River and the first houses in San Nicolás.[47] Given the proximity of the areas to the rivers, river pollution affects people on a daily basis and it also makes the neighborhoods vulnerable to floods. Inhabitants of San José I who have lived in the area for decades have seen a significant change in the river. Adult participants who have lived there for more than four decades recall that they used to be able to fish and swim in the Tunjuelito River when the riverbed was narrower and the flow much less than it is today. With increasing urbanization and industrialization of Bosa, the riverbed has been widened since the 1990s to accommodate the increasing

[47] Note that according to the POT of Soacha of 2000, the areas of conservation and protection of natural resources include 300 meters of river protection area for the Bogotá River (30 meters of hydraulic floodplain that cannot be used and 270 meters of environmental protection: it can be used but not built on) (Accord No. 46 of 2000, chapter IV Art. 69, and Chapter V).

flow from the growing discharge of untreated wastewater, and industrial and tannery waste.

The case is similar for the Bogotá River. Nowadays, both rivers have become dumping sites of both solid and liquid waste throughout their trajectory (as shown in Figure 13 in chapter 6); inhabitants have sometimes even seen dead animals floating in the river. For the inhabitants downstream of the confluence of the Bogotá and Tunjuelito Rivers, as it is the case in the neighborhoods abovementioned, the high levels of pollution affect them daily. Some impacts include fetid smells, respiratory illnesses, and proliferation of rodents and mosquitoes. Residents of San José I highlighted how living by a polluted river also affects their social life. Friends and relatives do not want to visit them because of the bad smells. The rivers not only show the environmental injustices faced by downstream low-income peri-urban dwellers, I would also claim that these environmental injustices exacerbate social marginality, as the rivers in these PUAs have become a source of isolation and socio-spatial segregation.

I should note, however, that a significant amount of resources have been invested in the decontamination and improvement of the Bogotá River, albeit studies show that the results have been meager (Contraloría de Bogotá 2014). Recent projects of environmental recovery of the river aim not only to decontaminate it and modify its riverbed and embankments to reduce the risk of flooding, but also to work on the social aspects around the river, including through building education processes.[48] One of these projects consisted of the development of an ecological park along the Bogotá River in San Nicolás. The park was inaugurated in October 2015, covers an area of 22 thousand m^2, and includes multi-sport fields, exercise machines for elders, playgrounds for children, and footpaths (Quintero 2015). While the pollution of the river is far from resolved, this type of initiative has the potential to be the first step towards a different relation between the population and the nearby waterbodies.

Maiporé in Soacha is the only study area in this chapter not located next to a river. It is, however, located next to the Vínculo wetland (also known as the Maiporé wetland) and the Cola de Tierra Blanca wetland. As has been characteristic of the urbanization process in Bosa and Soacha, wetlands have been modified and interrupted to allow for the physical infrastructure required by the urban fabric. In the case of the Vínculo and Cola de Tierra Blanca wetlands, the wetlands are actually just a section of a larger wetland called Tierra Blanca. The highway (*autopista sur*) crosses the wetlands. A pipe was built under the highway to connect the Vínculo section with the rest of the Tierra Blanca wetland (Salazar López 2006). As mentioned above, studies are currently being done to determine whether the

[48] The projects with an integrated vision of environmental and social recuperation of the Bogotá River respond to the state council decision 25000232700020019047901 of March 30, 2014 (Consejo de Estado 2014).

wetlands have underground flows. Furthermore, when the project was approved for development, the environmental agency CAR identified the area of the Vínculo wetland (which is closest to the built are of Maiporé) and determined that buildings were not planned on wetland areas, and stipulated that the part of the land purchased by the developers where the wetlands were located had to be protected. There is an ongoing debate, however, around whether the building area is actually part of the Vínculo wetland and the environmental agency wrongly approved the project because of political pressures[49], yet another indication of informalization by the state when political power is exerted strongly enough.

Increasing Air Pollution

Besides bad smells, the high degrees of pollution of the rivers also have an influence on air pollution through the increased evaporation of water pollutants, which can result in acid rain. Acid rain damaging roofs was a problem highlighted in San Nicolás in Soacha. Tire burning and smoke from factories was another issue raised in all focus groups, where participants showed concern about the impacts of air pollution on their health. Air pollution from factories was of particular concern in the neighborhoods in Soacha, where factories nearby include fireworks, ceramics, and glass factories. In Bosa, on the other hand, burning of tires and trash were more problematic.

Residents of Maiporé stressed the fact that, while they are concerned with the pollution from nearby factories and the highway, they actually do not feel much pollution in the air. Some of the reasons participants had decided to buy an apartment in that particular housing complex and why the like the it had to do with relatively favorable environmental conditions including: the green surrounding areas, cleaner air compared to other parts of the municipality, and the environmental initiatives that the project developer has taken, such as purchasing land on the hillside right behind the project to reforest. One participant from Maiporé put it like this on the questionnaire in response to the question of what people liked the most about the neighborhood: “the proximity to conserved environmental spaces and the fresh air.” These aspects that people value, however, are contingent on Maiporé remaining in the urban-rural interface; in other words, it depends on no additional housing developments or factories being built beyond Maiporé (see Figure 28). Already, the planned construction of buildings to total 8000 housing units in Maiporé will certainly change the perception of proximity to the countryside that the inhabitants of the first three housing developments value.

[49] Information based on interview with representatives of environmental agency (CAR) and accounts of residents of Maiporé and on the following reports: (Ballestas Rincón et al. 2015; Salazar López 2006).

Flood Hazard

Despite the proximity of San José I and San Nicolás to the Tunjuelito and Bogotá Rivers respectively, floods resulting from river overflow have not occurred in these areas. As mentioned above, flood hazard comes from deficient rainwater drainage and sewerage, especially during intense precipitation events when the existing infrastructure cannot handle the amount of water, and thus water floods back to roads and through pipelines.

Ciudadela El Recreo is located on the Bogotá River's floodplain and below the river level. When the area was still used for agriculture, floods as a result of river overflow were a common occurrence during the rainy seasons. One infamous flood occurred in November 1979 and left the land under water for several days (Castellanos Puentes 2014). According to Castellanos Puentes (2014), this flood was one of the triggers for EAB-ESP to commission interventions for the hydraulic regulation of the river to control floods. Flood control measures included raising the embankments, expansion of the riverbed, increasing river decontamination with water treatment plants, the construction of a dam (called Cantarranas) at the middle basin of the Tunjuelito River (upstream from Bosa), the construction of the Cundinamarca canal, and the construction of the Gibraltar pumping station to lift rainwater from the Cundinamarca canal and wastewater from the upstream Fucha River to the Bogotá River. The Cundinamarca canal, which runs parallel to the Bogotá River, is the largest artificial canal in the city and is intended to collect rainwater from perpendicular canals and drain into the Bogotá River[50] through the Gibraltar pumping station. The Cundinamarca canal was conceived as an adaptation to the flood hazard the area was exposed to, and, as such, the infrastructure would allow the development of housing on the river's floodplains of Bosa. With the construction of the drainage system and flood control measures, around 250 ha were rendered suitable for the development of the subsidized housing projects Ciudadela El Recreo and El Porvenir[51] (Castellanos Puentes 2014; Rojas et al. 2015).

As previously mentioned, during 2010 and 2011, Bogotá and its metropolitan region experienced intense precipitation due to the La Niña phenomenon. An area significantly affected during La Niña was Ciudadela El Recreo. In December 6, 2011, heavy precipitation combined with high water levels in the Bogotá River and the failure of the Gibraltar pump to handle the increased water flows of rain and wastewater, resulted in an overflow of the Cundinamarca canal and its perpendicular

[50] The Cundinamarca canal was built along former ridged fields (which the pre-Hispanic Muiscas used as buffer area and to improve drainage on farmland), and the perpendicular canals follow the paths of former irrigation canals, which illustrate the pre-Hispanic and colonial heritage remain imprinted in the landscape.

[51] El Porvenir is a subsidized housing project similar to Ciudadela El Recreo, also developed by Metrovivienda, which I will not present in detail. For additional information on this project see e.g., Castellanos Puentes 2014; Davila et al. 2006; Niño Ruiz 2006.

subsidiary canals. Consequently, a combination of rainwater and wastewater flooded streets and houses for over a week. Water levels reached up to 1.20 meters inside houses, damaging floors, furniture, walls, and appliances. Because the floods included wastewater, the damage and putrid smells persisted even after the water subsided about 10 days later. The floods affected more than 18,000 families in Bosa. As a response to the flood, authorities declared a state of emergency in the area the following day (December 7), and shut off drinking water and electricity for several days in Ciudadela El Recreo to stop continued water from saturating the already collapsed water drainage system, and to prevent electrocution from surface and underground electric cables. Municipal authorities also carried out a census to identify the affected population and offered financial support to the flood victims. Residents claim that in the census some people that were not affected were included, while others who were directly affected were left out and thus did not receive financial compensation.

During the floods, people built shelters and slept outside (in areas where the water had not reached) or stayed with relatives in other parts of the city. Residents recall that delinquents took advantage of the situation and ransacked houses. Today, both material and psychological damage persist. People talk about living in fear that they can be flooded again at any moment. An analysis of the social impacts of the flood, however, has not been done. Focus group participants considered that the community has lacked organization and unity to request to state authorities that such a study be completed. Three years after the floods, some people still had not received financial support from the state. Community leaders are in the process of gathering memoires of the flood because they consider it important to keep the flood alive so that people are prepared for potential future flooding, and as a way to raise awareness on what to expect and how to respond.

A contributing factor to the severity of the flood, one that speaks to the unwanted consequences of urbanization, is highlighted in the analysis of the event by the disaster risk management agency (IDIGER, then FOPAE). Intense rains occurred for more than one hour on December 6th, the intensity representing 16% of the historic average for that month (Comisión Ambiental Local 2012). However, the flood cannot be attributed only to precipitation intensity. Urbanization has resulted in a constant modification of the watershed of the Bogotá River, with an increasing river embankment built along the river's path, thereby reducing the natural floodplains of the river on upper parts of the watershed, which result in increasing water levels downstream (the same is the case for the tributary rivers of the Bogotá River, such as the Fucha River, which drains into the Bogotá River just upstream of Bosa). The reduced natural floodplain is combined with increased wastewater contribution to the Bogotá River and its tributaries, plus the high amounts of solid waste found around Ciudadela El Recreo (and throughout the city), which clog rainwater drainage. The above factors increase the flood hazard in these downstream

areas. This disaster is an example where human intervention of nature through urbanization is met with hydrometeorological hazards (La Niña intense precipitations, in this case) with tragic consequences to the wellbeing of the population.

Trash

Disposal of ahead of collection times or throwing trash onto streets was a problem underscored in all the study neighborhoods. The main consequences were the clogging of rainwater drainage systems, street dogs breaking trash bags and further spreading trash, and the proliferation of rodents. An aspect worth highlighting is that the problems related to trash disposal were described as not necessarily caused within the neighborhood or by their residents. In San José I, for example, residents argued that most of problems related to trash were caused by the *recicladores* (people who recycle material for a living) who live in the bordering squatter settlement and accumulate material outside their houses, and burn and throw trash and material they cannot sell into the Tunjuelito River. Maiporé in Soacha, on the other hand, is located on a foothill at the top of which lies the informal neighborhood of Altos de la Florida. In Altos de la Florida trash is often disposed of on open fields. Residents of Maiporé have seen trash on the hill and are concerned that the trash can roll down the mountain and accumulate or cause damage in their neighborhood. These examples show the complex interrelation between the heterogeneous populations who settle in PUAs shaped in part by the particular features of the landscape, e.g., the river and the hills.

Access and Mobility

Regarding access and mobility, the study areas face different challenges. The only way to access San José I is through an unpaved road that borders the Tunjuelito River, and part of it lies on the embankment itself. As previously mentioned, the lack of a proper access road has been used by EAB-ESP as an excuse for not connecting the neighborhood to the networked water and sanitation infrastructure. To access the neighborhood, residents also have to pass by *la invasión*, which residents consider a risk, especially for children, as *la invasión* is known for violence and drug dealing. Residents are concerned that children and youth who have to pass daily through an area where drugs are sold could be attracted to drug use. Because of these factors, they suggested that having another access road to the neighborhood would solve several problems facing the community.

In San Nicolás, residents feel isolated and neglected by local politicians because of their location at the urban-rural interface, at the edge of the urban perimeter. For them, this isolation and neglect is illustrated by the lack of public transportation to the neighborhood. The lacking transit possibilities is especially critical during the

mornings and evenings when residents have to travel to and from work and they are connected by only a few relatively unreliable buses. The feeling of isolation is shared by residents of Ciudadela El Recreo, who described that, while within the neighborhood the fairly new roads are wide and nice, getting to other parts of Bosa or Bogotá is very difficult as only very few roads exist that connect the neighborhood with the rest of the borough. Those that do exist are poorly planned and full of potholes.

A major road is planned that will border the Bogotá River right next to Ciudadela El Recreo (the *ALO – Avenida Longitudinal de Occidente*), which will cross the city from south to north along its western edge. However, financial problems and pressure from environmental activists, who highlighted that the planned avenue crosses several wetlands and important environmental protection areas that will be negatively impacted by the road (Escobar Moreno 2011), have blocked the development of the project thus far. The newly elected mayor Peñalosa has promised to continue the construction of the road, an approach that is consistent with the policies of his previous administration (1998-2001), where he prioritized building and road construction over the environmental concerns. It was under his administration that the Campo Verde housing project in Bosa was approved, even though the area has been identified as high-flood risk and as lying partly on the recently recognized *La Isla* wetland (Castellanos Puentes 2014).

In Maiporé, the proximity to the highway (*autopista sur)* brings both benefits and drawbacks. On one hand, people need to walk only a short distance to access public transportation. The main transport hub to Bogotá, the rapid-bus transport system *Transmilenio* bus stop is a few kilometers away along the highway, and thus is just a short bus ride away. However, people want to have a *Transmilenio* bus stop right outside the neighborhood so they can commute to Bogotá easier. On the other hand, the highway is characterized by fast traffic but lonely sidewalks, and people have been mugged walking to or from work or school. Further, currently there is no pedestrian bridge or traffic light to cross the highway, meaning that crossing it is quiet dangerous. A pedestrian bridge right outside the neighborhood is planned to resolve this problem. When I asked participants about their perception of the potential impacts of continued urbanization, responses were divided. A few were concerned about an increase in car traffic. Others saw urbanization as a beneficial process, as it would result in better accessibility and better transport infrastructure.

Human Wellbeing

Education

Levels of education of the participants of the different focus groups varied. While the sample size is insignificant and no quantitative inferences can be made from the questionnaires, it is worth mentioning that of the eight focus groups I conducted, the participants of the VIS housing had the highest levels of education, with several of the participants having completed a technical or university degree. While somewhat speculative, the levels of education could reflect a variety of things. First, that the high costs of housing in the metropolitan region of Bogotá combined with low salaries mean that even with a university degree and formal employment (which was the case of those with university degrees), affordable housing is difficult to come by. Second, they can also serve as an indication that aside from VIP housing (priority housing), state-subsidized housing may not be cost accessible to the lowest income population, who normally also have the lowest levels of education.

The views on the quality of available educational services also vary significantly between the formalized and self-constructed neighborhoods and the subsidized housing neighborhoods. Residents of San José I in Bosa and San Nicolás/ Conviba in Soacha perceived elementary and secondary education to be of good quality and easy to access. In San Nicolás, residents noted that, despite the educational institutions being of good quality, domestic violence was a problem, which led to school dropout and youth pregnancy, similar concerns to those raised in the informal settlements studied in the previous chapter. With respect to higher education, residents of San Nicolás mentioned the SENA institute (*Servicio Nacional de Aprendizaje*, the National Institute for Learning, which specializes in technical and vocational training) as a useful resource. While there are two universities fairly close to San Nicolás, few residents from the area attend because of the high costs.

In the state-subsidized areas of Maiporé and Ciudadela El Recreo, the main concerns had to do with the lack of schools nearby. In Ciudadela El Recreo, there are not enough schools to meet the increasing demand (which community leaders estimated at about 20-30 thousand students). Participants also described a deficiency in public kindergartens. As a result, some children do not attend school, while others have to study in other boroughs. Besides the distance, residents explained that, while the state was finding school spots in other boroughs, they were not covering the high transportation costs associated with commuting to other parts of the city. In Maiporé, a kindergarten was built on the premises as part of the project, an element that was considered a positive benefit to those living in the housing complex. For elementary and secondary school, students have to go to other parts of Soacha and residents of Maiporé considered the quality of available education was poor.

Health

In the "formal" study areas, participants did not identify health issues as particularly problematic. In San José I, however, residents said they have skin and respiratory problems because of their proximity to the polluted Tunjuelito River. With respect to access to health care coverage, all participants had either health insurance or health coverage through SISBEN. While I cannot make any quantitative inferences based on the questionnaires, it is interesting to note that most of the respondents of the formalized and self-constructed areas were covered through SISBEN, while most respondents of VIS housing had health insurance. I would dare to say that this relates to the fact that to access VIS (not VIP priority) housing, residents must get a loan from a bank approved, which is normally granted only to those with formal employment, meaning that employers likely cover their health insurance.

Similar to in other focus groups in Soacha, the lack of health services was underscored by focus group participants in San Nicolás and Maiporé. Residents reinforced the critical state of Soacha's health services: health infrastructure is insufficient, service provision is poor, and ambulances take a long time to arrive or do not arrive at all. In the *comuna 1- Compartir* of Soacha where San Nicolás and Maiporé are located, and where, according to 2005 estimates, about 87,000 people live (Alcaldía de Soacha 2009)[52], there are no hospitals and only two health centers. Residents prefer the health system of Bogotá and use it when they can, even though jurisdictional issues make it complicated.

In Ciudadela El Recreo people showed frustration with the health care situation. When they bought their houses, the housing developers promised a hospital in the neighborhood. After the floods of 2011, and given that the area is located in a high-risk flood zone, construction of the hospital is no longer allowed. The closest hospital is in downtown Bosa. Since there are no good access roads, getting to the hospital takes time. Similarly, ambulances take a long time to arrive during emergencies. The nearby health center only serves people with insurance from a particular company and does not provide service without an appointment. There are also no facilities in the neighborhood for disabled people or the elderly.

Labor

Residents of these areas were employed both the informal and formal economy, and the specific employment types varied. While participants in San José I and San Nicolás described that most people worked as construction workers, drivers,

[52] Population estimates based on Soacha's municipality website (the data provided are from 2005, the website was last updated in 2009, which means that the population of Maiporé has not been taken into account).

domestic cleaners, in factories, or as independent workers at home, in Ciudadela Sucre and Maiporé, residents were employed in a range of professions including as a baker, publicist, psychologist, teacher, or business administrator. In Maiporé, participants noted that continued urbanization could be beneficial for them, as not only would the value of the area increase, but also more commerce and financial institutions would be established, thereby creating additional jobs and services.

In San Nicolás, participants underscored that, even though there are many factories and companies nearby, it is difficult to find employment, especially after the age of 40. In addition, participants underscored that residents often work in cut flower production in the neighboring municipality of Sibaté. However, they stressed that salaries and working conditions in the cut flower industry are bad, meaning that people do not last long on these jobs. It is worth highlighting the particular characteristics in terms of employment in this neighborhood located at the urban-rural interface. Even though the neighborhood developed as an urban neighborhood with a physical, and in many social aspects, urban character, its location where the city meets the countryside means that job opportunities are available in both rural and urban-like jobs.

Social Wellbeing

Social Cohesion and Collective Action

The physical development of informal and self-constructed settlements involves both individual and collective initiatives (e.g., the construction of housing and public infrastructure, such as roads and connections to water and sanitation). In the process, social networks and social cohesion can be developed (see, for example, the case of Altos de la Florida in Soacha in the previous chapter). In that regard, in areas that were formalized, but where collective action was required to be developed, some levels of social cohesion remain. The question remains if formalization erodes social capital, as the need to work collectively is reduced with the state and private actors take over interventions on public goods and attention is reoriented towards individual home improvement, as some authors have suggested (see for example, Gonzalez 2009; Torres Tovar 2012).

In San José I, social cohesion built through collective initiatives was evident, and the population still worked collectively to improve and manage the neighborhood, by paying jointly for the costs of pumping sewage to the river, for example. San José I may have unique characteristics, like its very small size and the fact that many of the inhabitants are relatives; two main families with several houses live in the area. In San Nicolás, in contrast, residents spoke about little tolerance and consideration among neighbors. “There is no concern for others, but indifference”,

expressed one participant. However, residents acknowledged that in moments of crisis or during serious cases there was solidarity among the population. Both situations are consistent with the findings of the previous chapter, which suggest that collective action emerged mainly during moments of crisis or necessity (e.g., having functional pumps to dispose of sewage in San José I is a constant necessity, and thus requires continuous collective action). Thus, while formalization may limit everyday collective action and reduce initiatives to collectively voice concerns, it could be argued that some levels of collective cohesion remain dormant and are awakened in moments of crisis.

Then, how does social cohesion and collective action play out in VIS projects? If collective action were required for the development of informal settlements and to obtain formalization, then it would be fair to infer that in VIS projects where basic infrastructure was already in place at the time of buying, social cohesion would be more difficult to build. Residents of Ciudadela El Recreo and Maiporé confirmed the hypothesis. Overall, they reported very little collaboration between residents, and instead described intolerance and limited regard for others (e.g., people make noise and do not care, was an example given). At the same time, signs of collective action are emerging in Ciudadela El Recreo. As a response to the problems of quality and space in houses and deficient utilities (like water) and social services (e.g., schools and health centers), residents of several housing complexes in Ciudadela El Recreo founded an organization called *Fundación Comunidad Cívico Popular Organizada* to put pressure on authorities to provide decent housing to low-income populations, and work on the inadequacies of the houses and in the neighborhoods. The organization has sent several statements to municipal authorities and organized awareness raising workshops. Their main claim is for their right to decent housing.

Violence and Drugs

In all the studied neighborhoods, social and economic violence, drug consumption, and drug trafficking were important stressors for the population. In San José I, residents explained that the problem was not inside the neighborhood itself, but present in the adjacent squatter settlement where drug micro-trafficking takes place. As abovementioned, residents have to pass by *la invasión* to access San José I, and they are thus could be exposed to muggings, a stray bullet, and youth being influenced by drug culture. While most of the issues remain outside of San José I, when fights and shootings have occurred between drug dealers in *la invasión*, people have entered the neighborhood to run away, thereby moving the conflict onto the streets of San José I.

In the other study areas, muggings are common (though in Maiporé they are mainly concentrated on the highway outside the neighborhood). Inhabitants connected domestic violence and parents having to work late and thus leave youth at home with nothing to do with rebellious behavior, school dropout, teenage pregnancy, youth joining gangs, and drug use. There are also territorial gangs and hooligans (*barras bravas*), who fight among themselves and sometimes mug people. Residents claim that the amount of police and police stations are not sufficient to meet the needs of the communities, and that when gang fights or muggings occur, the police response is slow. A concern raised in several neighborhoods is that there are no repercussions for minors who commit crimes, and thus there are high levels of recidivism, as well as recruitment of minors from gangs. Many participants believed the law should be modified so that minors are protected but also held accountable for their actions. It is worth highlighting that the accounts of participants of VIS projects and formalized housing, with respect to domestic violence, insecurity, and drug dealing and consumption were fairly similar to those of the residents of informal settlements discussed in the previous chapter. The levels at which these issues occur may vary somewhat (additional quantitative studies would be required to explore this in detail), but I would argue that these findings corroborate my previous assertions that state policies in low-income settlements, whether informal or formal, have focused on what Roy (2005) calls ideology of space, that is an ideology that is concerned with the physical redevelopment of space, but relegates considerations of broader social aspects.

Representation, Segregation and Conflict

Inhabitants of the study areas expressed feelings of spatial and socio-political isolation and marginalization. In San José I, this isolation manifests in the lack of public utilities and inaction of authorities to solve the situation, even though they have been a 'formal' settlement since 2000. As I previously mentioned, they also feel that living next to the squatter settlement (and the consequent security problems) and the polluted Tunjuelito River exclude them socially, as relatives and friends do not want to visit them. Residents showed increasing frustration with their situation *vis-à-vis* that of the squatter settlement.

The population of *la invasión* (or Rincón de San José) includes *recicladores* and victims of forced displacement from rural areas due to the armed conflict. Both *recicladores* and the displaced population are considered particularly vulnerable populations by the state, and have therefore been targeted for social programs in recent years. Consequently, according to residents of San José I, the squatter settlement has been provided with networked water and sanitation infrastructure, and the residents benefit from several social programs, while the residents of San

José I still do not have proper access to water and sanitation. Residents of San José expressed sarcastically that *recicladores* are now considered by the state as guardians of the environment (since they recycle material), but in the opinion of residents of San José I they are the opposite, as they burn trash and throw the material they cannot recycle into the streets and the river.

The conflict with the adjacent settlement has had significant implications for the perception of wellbeing of residents of San José I. When asked about what they like the most about the neighborhood, they say that before, they used to like everything about the area and wanted their children to grow up in the neighborhood, but that now they only like the area within the gate that separates their neighborhood from the squatter settlement. Furthermore, the squatter settlement is what they dislike the most about the neighborhood (because of the problems of insecurity, pollution, and drugs that it brings) and that they may have to move somewhere else as a result.

In San Nicolás, residents felt that authorities give little attention to them – with regards to issues such as deficient utilities, public transport, and insecurity, for example, because of their location on the fringe of the urban perimeter; that is, they are socio-spatially marginalized. The neighborhood has been receiving increasing numbers of displaced migrants, and demobilized former combatants from the armed conflict (either guerrillas or paramilitaries, who are locally referred to as *reinsertados,* referring to their reinsertion into civil society). However, there are not sufficient schools or job opportunities for the growing population, which is resulting in people (especially youth) joining gangs or rejoining armed groups, thereby increasing economic violence in the neighborhood. The latter process significantly resemblances the dynamics of violence explained in the previous chapter in the context of informal settlements. The social and political marginalization of the neighborhood also became evident a few years ago when five young residents were used as *falsos positivos* (which translates literally to false positives); a horrendous and scandalous phenomenon whereby people from the military kill civilians and dress them up in guerrillas' camouflage to increase the statistics on guerrillas defeated, as well as to request special rewards from the military (e.g., extra days on leave of absence) (for more information about *falsos positivios* in Colombia see e.g., Cárdenas and Villa 2013; Londoño Carvajal 2011).

The above experiences of these formalized settlements leads me to agree with Torres Tovar's (2012) conclusion that, while formalization of informal settlements represents the recognition of low-income populations as citizens with full rights, those right are not always fulfilled, and, above all, it makes them citizens with full duties linked to the multiple costs that being formally included into a neoliberal city entail (e.g., taxes, paying for utilities).

With respect to the VIS projects, in Maiporé, some inhabitants feel they were tricked and misinformed about the project being located on a wetland (rather than bordering

it), as some environmental experts and local authorities claim. They also feel they were misled about the water issues the housing complex is having, i.e., that the project was approved without an agreement from EAB-ESP to provide water, and thus water tankers were needed, now a small private aqueduct from Soacha is providing the service but without the capacity to provide water to the planned number of additional apartments yet to be built. Similarly, in Ciudadela El Recreo, the deficiency in public utilities and social services, combined with the disastrous impacts of the 2011 floods, have left the population with a sense that the interests of the private sector are prevailing over the residents rights to decent housing. Residents thus underscored the role of the state in supporting the interests of the private sector, which, on the rush to make a profit, is producing poor quality housing at a fast rate. As a result, neither the private sector nor the state can properly satisfy the social and physical demands of the increasing population of the area, to the detriment of the wellbeing of the population and the deterioration of the environment.

Following the above, I again have to concur with Torres Tovar's (2005) analysis that state subsidized housing or VIS are poorly served and equipped, and relegated to extreme peripheral areas of the city, thus reinforcing the socio-spatial segregation of the low-income population by placing it far from the centers of production and urban infrastructure and services. Complementing Torres Tovar's arguments, I would add that the peripheral location also distances low-income populations from the political powers that be who are controlling the socio-political construction of space. As Harvey (2012) stated, to claim the right to the city:

> is to claim some kind of shaping power over the processes of urbanization, over the ways in which our cities are made and remade, and to do so in a fundamental and radical way. (Harvey 2012:5)

As I have shown throughout this chapter, it is the shaping power of the social, political, and spatial dimensions of urbanization that residents of the study areas do not feel entitled to. Silva (1998 in Allen et al. 1999) argues that the logic of formal land and housing markets limits the options of low-income groups, who have to settle informally in 'marginal urban environments' - places with poor environmental conditions, that are hazard-prone and/or have limited accessibility - which makes the land of low commercial value and attracts little competition from higher income social groups. The findings of this chapter show that the marginal urban environments are not limited to the informal market, and that state-condoned and subsidized housing is also being developed in these marginal environments.

Socio-spatial segregation manifests at different levels, from the north-south divide that characterizes the city of Bogotá, to new levels of segregation dividing PUAs. Within Maiporé housing complex, segregation of a socio-physical nature is taking place. The buildings with the simplest finishing and construction materials are

limited to *VIP* housing (social priority housing, housing normally provided for free or at a very low cost for the most vulnerable, e.g., the population displaced due to armed conflict), like the Barichara building complex. The other building complexes are progressively better endowed, like the Ambalema building complex (which is located next to Barichara) that is completed with nicer finishes and green areas, and the Mompós complex that has elevators (see Figure 28). Residents of Ambalema and Mompós identify the *VIP* building complex of Barichara as the problematic housing complex, where drug dealing, drug use, and gang activity is concentrated.

Furthermore, while residents of VIS housing, especially in Ciudadela El Recreo, underscore the deficiencies in housing quality, and physical and social services, wellbeing, as stated by White (2010), also has a relational component. In that respect, when asked about what they liked the most about their neighborhood, inhabitants of Ciudadela El Recreo referred to the improved social status in which they now live. Compared to their previous housing circumstances, VIS has been, for many, an "upgrade" of social status, spatially manifested in the gated communities, grid-planned streets, and parks. As noted by Thibert and Osorio (2013), living in gated communities has become a sign of status in Latin America. This social imaginary of the privileged gated communities of the north of the city, where populations enclose themselves in gated communities that isolate them from the outside, has now been translated to low-income areas, creating a feeling of privilege of "us" (those inside) versus "them" (those outside), thereby reinforcing socio-spatial segregation at the micro level.

Formal Dwellers Vulnerability

Each focus group in the formalized and state-subsidized housing study areas identified very different priority issues (see table 12). In San José I in Bosa, residents considered the pollution of the Tunjuelito River, access to the neighborhood (i.e., road access), and water access as the main stressors for the neighborhood. In San Nicolás in Soacha, residents identified the most important stressors the improper disposal of trash in the neighborhood, transportation (poor quality of roads and deficient public transportation), and the pollution of the Bogotá River. Next in line in priority were deficient sewerage and economic violence. In the VIS complex of Ciudadela El Recreo in Bosa, the main stressors were described as being the improper disposal of trash, flood hazard, and drug dealing and consumption by youth. I presented the 2011 flood event and flood hazard of the Ciudadela El Recreo earlier in this chapter and thus I will not address it again here. In Maiporé, the main stressors were domestic violence and the adjacent highway. In this section, I will explore the issues that pertained to most study areas, that is: pollution, deficient utilities, and violence.

Table 12. Main stressors in formalized and state-subsidized areas where focus groups were conducted

Area	Main environmental stressors	Main socio-economic stressors	Interconnection between environmental and socio-economic issues
San José I, Bosa	• Flooding: during heavy rain water pumps don't have enough capacity to drain water out; also from Tunjuelito River (low probability)	• Insecurity: mainly from adjacent neighborhood where delinquency and drug dealing are common • Job insecurity • Deficient utilities • Limited access to neighborhood (due to roads): implications for installation of basic utilities (e.g., sewerage)	• Health: river pollution and humidity in houses
San Nicolás & Conviba, Soacha	• Deficient sewerage and rainwater drainage affects population during heavy rains • Flooding from Bogotá river for lower parts of neighborhoods (low probability) • Cold temperatures (combined with deficient housing/poorly isolated housing) is an issue for children and elders	• Insecurity • School dropout • Lack of health centers • Deficient public transportation – affects access to jobs • Unemployment • Perception of little voice/power with policy makers because location on border of urban area	• Health: air pollution from river and factories • Improper disposal of trash clogs stormwater drainage and attracts rodents
Ciudadela El Recreo, Bosa	• Flooding from Bogotá River and stormwater canals • Air pollution from river and canals	• Drug dealing and consumption- especially amongst youth • Deficient road network • Limited number of schools for demand • Water shortage – limited infrastructure for increasing demand • Lack of nearby hospitals and ambulance arrival affected by road deficiency	• Improper disposal of trash clogs stormwater drainage
Ciudadela Maiporé, Soacha	• Landslides from hill above • Air pollution from factories, highway and mines • Flooding from adjacent wetland • Forest/pasture fires	• Domestic violence • Highway (congestion, danger accessing area) • Deficiency in school opportunities: far away and of low quality • Health access far away and deficient • Drug dealing • Potential water deficiency: current water utility not sufficient for planned housing growth; Bogota's water utility has not approved provision	• Health issues due to air pollution from nearby highway, fireworks factory, sandpit mines, smoke from forest and pasture fires, and tire burning

Pollution

Air and water pollution from different sources, like the Bogotá and Tunjuelito Rivers, nearby factories, open sandpit mines, forest fires, and the highway, affect the residents of the study areas. Residents themselves contribute to some of the pollution, like through the disposal of untreated sewage into the river and by throwing trash on the streets or outside of pick-up times. However, residents of these areas are not the main cause of most of the pollution, and thus are particularly vulnerable to the impacts of these long-term stressors, as controlling the source of the pollution is largely out of their hands. The location of these settlements at the urban-rural interface suggests that some of the sources of pollution are characteristic of this location. for example, mining of construction materials for the city, or factories that transfer their production outside of Bogotá to take advantage of softer regulations in the smaller municipalities like Soacha. In these particular urban-rural interfaces of Bosa and Soacha, the settlements are also downstream of rivers (the Bogotá and the Tunjuelito) that are polluted in their passing through the city, and thus inhabitants endure the accumulated pollution of both upstream agricultural and urban practices.

It could be argued then, as Schweitzer and Stephenson (2007) have suggested, that environmental injustice is a symptom of inequality, reflected in this case through the fact that it is the lower-income population who live downstream. Conversely, residents have highlighted that their location at the urban-rural interface also provides them with less car traffic pollution and noise pollution, in contrast to the urban core of the respective municipalities. The environmental injustice relation to inequality still holds, although it is muffled by the peri-urban location. The Bogotá River has served, thus far, not only as an administrative limit between municipalities, but also as a natural limiting factor of urban sprawl, and it is not surprising that the urban-rural interface is located along the river path. This natural delimitation may not hold for long, and other municipalities upstream are already showing signs of further expansion (such as the development of industrial areas in Mosquera and residential areas in Cota and Chía). Consequently, as areas transitioning from peri-urban to urban, the "muffling" of traffic and air pollution that the peri-urban landscape provides is unlikely to last long.

Air and water pollution impacts the population through pulmonary and skin diseases. Improper disposal of trash contributes to soil and water pollution, and also leads to proliferation of rodents and mosquitoes, which can spread diseases. With respect to the responses and solutions to the pollution, participants of the focus groups acknowledge the need for two levels of responses, from authorities and from inhabitants. First, competent authorities need to intervene to reduce the sources of pollution by enforcing environmental legislation, especially regarding air pollution from factories and mines, as well as water pollution, from industries, and also by

installing water treatment plants so that sewage is treated before being disposed into the river (note that, as mentioned in the previous chapter, most of the sewage of Bosa and Soacha, from both formal and informal settlements, is disposed of in the Tunjuelito and Bogotá rivers untreated). Second, inhabitants expressed that they have a dual responsibility. They referred to the need to better organize themselves to pressure the state to address the issues of pollution (through better infrastructure and enforcement of legislation), acknowledging that individual claims have done very little so far. They also recognized the need to increase awareness among the population, through campaigns and workshops, particularly related to throwing trash on streets or putting out trash at the wrong time.

Deficient Utilities

The study areas investigated in this chapter show that being recognized as "formal" or "legitimate" by the state (whether it be through formalization or because an area developed from the start with state approval) does not guarantee access to quality utilities. The level of deficiency varied significantly by neighborhood. In San José I, formalization has meant very little with respect to access to water and sanitation. The most critical issue for residents is the lack of networked sewerage. To cope with the situation, residents dispose of sewage in the Tunjuelito River. This coping mechanism requires collective action, as they share the septic tanks and pumps used to transfer sewage to the river, and, thus far, the high levels of trust among residents, many who are related or have known each other for decades, have proven effective. However, the material implications and the potential future impacts of this sewage disposal alternative are significant. First, residents require a pump to transfer the water from septic tanks to the river, which is an economic burden to residents given the costs of buying a pump, gasoline, and maintenance. The system has also shown to be insufficient during heavy rains and has resulted in flooded roads and houses. An additional impact, which they have not experienced so far, is that disposing of liquid and solid waste is against environmental regulations, and thus the environmental office can fine them at any moment. In addition, they are also contributing to the pollution of the Tunjuelito River, which directly affects their health. While their contribution to the pollution of the river is minimal compared to other pollutants, it is a good example of the way a coping strategy can become a stressor itself.

In San Nicolás the neighborhood was poorly planned from its inception, increasing the vulnerability of the population. This vulnerability refers both to the proximity to the polluted Bogotá River (because of health impacts and its flood hazard potential), but also the deficiency of the water and sanitation infrastructure that was put in place, which is not able to withstand the increasing demand. Residents who live in

the lower parts of the neighborhood are afraid that the pipelines could explode any moment because of the increasing water pressure and wastewater discharge, which they were not built to resist. Residents consider the solution to this problem to be in the hands of the state, and believe the state should change the narrow pipelines to wider pipelines able to support the water and wastewater usage of the current and projected population. In that respect, higher social cohesion is necessary so that residents can collectively claim their right to adequate utilities. Another issue in the neighborhood is the deficient rainwater drainage. To this stressor, focus group participants recognized that the problem is not only one of deficient infrastructure but also of residents' lack of awareness and citizen culture, pointing to the need for capacity building activities to raise awareness and build productive social capital.

In Ciudadela El Recreo, the problem has been similar to in San Nicolás. The growth of housing units has been faster than the infrastructure was planned for, therefore the water and sanitation networked infrastructure is not able to meet the demand, especially during peak-demand times. Housing developers and authorities are responding to these deficiencies by increasing the size of pipelines in new constructions. However, already built houses have not been given a solution. In Maiporé, housing developers have managed to find temporary solutions to water provision, but the current aqueduct does not have the capacity to supply water to the planned additional houses. In both VIS areas, private housing developer's interest in generating profit is leading to the construction of poor infrastructure, to the detriment of residents.

Similar to Castells' (2002) findings when studying so-called social housing in the United States, the intervention of the state is limited by the resources it can mobilize and subordinated by interests of the private sector. This contributes to the tendency to make subsidized housing profitable so as to be able to transfer it gradually over to the private sector. In Colombia, this transfer has been less gradual and controlled. The profit-making interests of the private sector are prevailing, resulting in projects being developed with poor quality standards and limited infrastructure. Residents' ability to respond to these deficiencies is limited. Some coping mechanisms of residents for water provision have been to install water tanks on top of houses (in the case of the projects that are houses, not apartments) or store water in buckets at home, as well as to adjust their water usage to non-peak times (this, however, proves difficult for families who work full time and the only time they have to wash clothes, for example, is during the weekends). In Ciudadela El Recreo, another coping mechanism has been the foundation of a civil society organization that is trying, through collective action and evidence gathering, to put pressure on authorities to improve the situation. Collective action in Maiporé has thus far been limited.

Violence

Violence in the study areas took similar forms to the violence discussed in the previous chapter in the context of informal settlements. In the formalized and VIS settlements, the main forms of violence were social violence (especially domestic violence and violence perpetuated by football hooligans – *barras bravas*) and economic violence. Residents highlighted the link between economic violence (e.g., muggings, gangs, drug dealing) and domestic violence, as well as the deficiencies in education quality and access. Residents believed domestic violence was, in part, to blame for the high levels of school dropouts, youth pregnancy, and drug consumption. Inhabitants of the different areas described that they thought capacity building and awareness raising campaigns with the whole family, awareness raising, and reconciliation processes led mainly by municipal authorities were required to address the problem.

With respect to economic violence, the poor quality of education and the limited availability of school spots (which means that some children do not have access to school), connected with parents working until late and the lack of recreational activities for youth after school, were considered the main factors explaining the high levels of muggings, youth gangs, and drug consumption in these area. It is interesting also to highlight the relation between limited job opportunities in the area and the scarce availability of public transit meaning that parents having to work far away and come back home late. To address economic violence, residents expressed the need for additional educational and recreational opportunities for youth to occupy their free time. Participants of two focus groups shared the view that criminal laws for minors needed to be reformed so that minors can be made accountable for their actions. Overall, there was agreement among the different focus groups that the rapid growth of the areas entails deficits in the provision of social services (e.g., education), insufficient job opportunities for the growing population, insufficient police to maintain control, which, taken together, are resulting in increasing levels of isolation for youth, thereby increasing drug consumption and crime.

Concluding Remarks

Formalization is far from being a silver-bullet. As I noted in the previous chapter, informal dwellers often desire to be formalized and thereby gain legitimacy in the eyes of the state as citizens with the right to decent housing, which includes access to basic utilities and infrastructure (e.g., roads). Hataya (2007) argues that the Constitution of 1991, with its laws protecting citizens' rights and the increasing

democratization of the planning process, has amplified the voice of low-income populations and better allowed them to claim their rights. Formalization does not guarantee these rights are fulfilled, but, as noted by Torres Tovar (2012), it does make inhabitants responsible and accountable to pay for services and taxes, even if service is deficient. While formalization programs are occurring under the banner of comprehensive neighborhood improvements, the comprehensiveness of these programs can be questioned, particularly when looking at the evidence from the neighborhoods studied in this chapter and in chapter 7. Not only has an ideology of space where the physical space is prioritized over social dimensions of wellbeing dominated the interventions, but even the implementation of this ideology of space has been limited. Neighborhoods are being formalized with poorly built infrastructure and in hazard-prone areas (close to rivers flood plains, for example). In addition, the experience of neighborhoods such as San José I in Bosa, which still has no adequate water and sanitation utilities decades after formalization, serves to show that being formalized, and having better legal conditions to claim those rights has not been sufficient.

On the other hand, subsidized housing projects (VIS) have provided an opportunity for many low-income households to own a home that is legitimatized by the state and provided with basic infrastructure, from utilities to planned green areas. However, as I have shown throughout this chapter, subsidized housing is not a panacea for providing housing for low-income populations. Inhabitants of these areas complain about the low quality and limited spaces of the houses in many of these projects. In addition, water and sanitation utilities are deficient. Furthermore, the lowest income groups, who may not qualify as vulnerable populations, cannot afford to buy a house in these subsidized housing projects. This raises the question of what alternatives exist besides informality for the lowest-income groups. I echo the question Roy posed in 2012, and ask why certain land uses are designated as formal by the state even when they may not conform with planning and environmental legislation (e.g., Ciudadela El Recreo being located on a high-risk flood area and Maiporé, arguably on a wetland). Particularly considering that earning the sanction of the state, the spatial value is considerably higher than that of area considered informal (Roy 2012).

The above is not to dismiss the steps the state has taken to provide housing for low-income populations; through the VIS projects and the formalization programs the wellbeing of many inhabitants has changed significantly for the better. However, the private sector has been delegated to develop these projects and their interest to minimize costs and maximize profits, has resulted in projects being built with deficient utilities, low-quality materials, and limited spaces. An additional challenge is the rate of growth of VIS projects, which is faster than the available supply of physical and social services can accommodate. In the case of Soacha, for example, even when the municipality recognizes its inability to handle the demands (socially,

economically, and environmentally) given the increasing population, the National government trumps the municipal jurisdiction, and declares the housing projects a national priority (through the figure of macro project, *macro proyecto*), tying the hands of the municipality and further affecting the wellbeing of residents. More importantly, and given all of the above, the question is whether we (a categorical we) should feel content with the progress with respect to increased availability of subsidized housing and the increased flexibility of formalization processes. That is, whether the provided housing opportunities are good enough; whether citizens have the right to high quality housing that includes access to high quality social services and environmental conditions.

9 A New Peri-Urbanization Typology

It is a key premise of this thesis that peri-urban wellbeing and vulnerability is closely linked to their location in a peri-urban area (PUA) and the peri-urbanization process that constitutes the area. Motivated by this premise the main research question guiding this thesis was:

How does peri-urbanization as a place-constituting process shape the wellbeing and vulnerability of its population, and what can we learn about peri-urbanization from identifying vulnerability and wellbeing in peri-urban communities?

I also posed three research sub-questions:

i. How do peri-urban inhabitants experience socio-environmental change accompanying urban sprawl and densification?

ii. How can we define and understand the main settlement types and emerging socio-environmental processes in PUAs, seen as transition zones?

iii. What are the socio-political processes beyond PUAs that contribute to their formation and dynamics?

I have explored these questions empirically in chapters 6, 7 and 8. By proposing a new typology of peri-urbanization, in this chapter I will shed light on the main research question, and the first and second research sub-questions. In the next and final chapter of this thesis, I address the third research sub-question.

I start by looking at the processes that drive the constitution of PUAs at the local level. The drivers of peri-urbanization emerge on different levels, the global, national, regional, and local, and are not static; as PUAs develop, new drivers of change emerge. From the 1970s and 1980s, the main driver of peri-urbanization at the local level has been informal peri-urbanization, particularly through pirate urbanization. Given the high rate of informal peri-urbanization, policy makers have looked for measures to slow it down and counteract it, while also taking action in already established informal settlements, including formalization and development of state-subsidized housing. Formalization of informal settlements in theory includes a transformation of the settlements as provision of utilities is regularized and infrastructure improved. The transformation of communities undergoing formalization is a process that takes different forms and occurs at different rates. The neighborhood of San José I in Bosa serves as an example of how formalization

does not necessarily lead to regularization or infrastructure improvement (as I showed in chapter 8). Many neighborhoods in Soacha that have been formalized for years and still lack access to basic utilities are further examples (as shown in table 9 in chapter 7). Regardless of the particularities of specific formalization processes, the practice of formalization can be considered itself a driver of a new stage in the transition of PUAs, as the state takes the lead in the production of the peri-urban space, in contrast to earlier stages when it is led by individuals and groups (e.g., through pirate urbanization). The proliferation of state-subsidized housing in PUAs is another example of how drivers of peri-urbanization change. Again, as shown in chapter 8, one of the reasons Bosa was chosen by the land bank Metrovivienda to develop residential projects such as Ciudadela El Recreo and Porvenir was as a way to counteract informal housing development in the area. The macro driver may still be low-income housing deficits, but the drivers of the transition at the local level have changed over time from being predominantly informal peri-urbanization to state-subsidized housing taking a more significant role in the peri-urban transition.

Within the PUA itself, drivers of the socio-environmental transition also change as the area undergoes different stages of peri-urbanization. As settlements emerge and grow there is an increased demand for resources and services, from construction materials, to drinking water, to sinks for sewage and trash. The increasing demand for sources and sinks becomes a driver of change of the socio-environmental landscape. Put differently, the gradual outcomes of peri-urbanization can become themselves internal drivers of change of the PUA. An example of this dynamic is the need for construction materials (both for the urban and PUAs), which results in mining becoming a driver of land conversion.

From Settlements to Territorial Configurations

My second research sub-question related to the identification and understanding of the main settlement types and emerging socio-environmental processes in the peri-urban transition zones. Throughout the thesis I have focused on the dynamics of the different types of settlements that I identified in the studied PUA, namely; agriculture-based (chapter 6), informal (chapter 7), and formal (chapter 8). The latter category included settlements that started informally and were later formalized by the state (meaning that the settlement was recognized as an urban neighborhood – as in the case of San José I in Bosa); neighborhoods that were self-constructed but with state recognition as an urban neighborhood from the beginning (as most parts of San Nicolás in Soacha); and large-scale state subsidized housing (as in Ciudadela El Recreo in Bosa and Maiporé in Soacha). Figure 30 summarizes key socio-environmental changes in the different settlements that have come about through

peri-urbanization. They are illustrated by the assets that become available or disappeared, and by the constraints that populations in the different peri-urban settlements face. The rate of change is not the same for all assets, and it may span from a couple of years to decades. The changes included in figure 30 reflect the characteristics of the settlements studied and the time frame of the analysis, namely from the 1980s to present.

While I named, described and analyzed different types of settlements based on certain legal and housing characteristics these settlement types differ in more than a particular legal status or type of housing. They also represent different stages of peri-urbanization, with particular dominant livelihoods, and unique socio-economic, political, and environmental dynamics. In that regard, they are more accurately described as territorial configurations. The term territorial configurations aims to highlight the complexity and dynamism of peri-urban life, in which the different configurations represent areas with different types of legal statuses, housing conditions, access to infrastructure, basic services, and the diverse socio-economic, political, cultural and environmental dynamics that, taken together, form distinct socio-spatial configurations. In that sense, territories are collective social constructions; embedded with logics of power, place making, and place claiming (Escobar 2000). Through peri-urbanization and the socio-environmental changes that come with the process, new meanings of place and territory are created while previous ones are destroyed.

In PUAs, I argue, there are peri-urban social imaginaries that combine both urban and rural socio-environmental features that have emerged in the constitution of the peri-urban space, giving particular meanings of place to the residents of the different territorial configurations. These territorial configurations are located in transition zones, and thus the peri-urban imaginary is fragile and gradually shifting. Territorial configurations are not isolated; they coexist in the peri-urban landscape, and influence each other, often through competition over resource access.

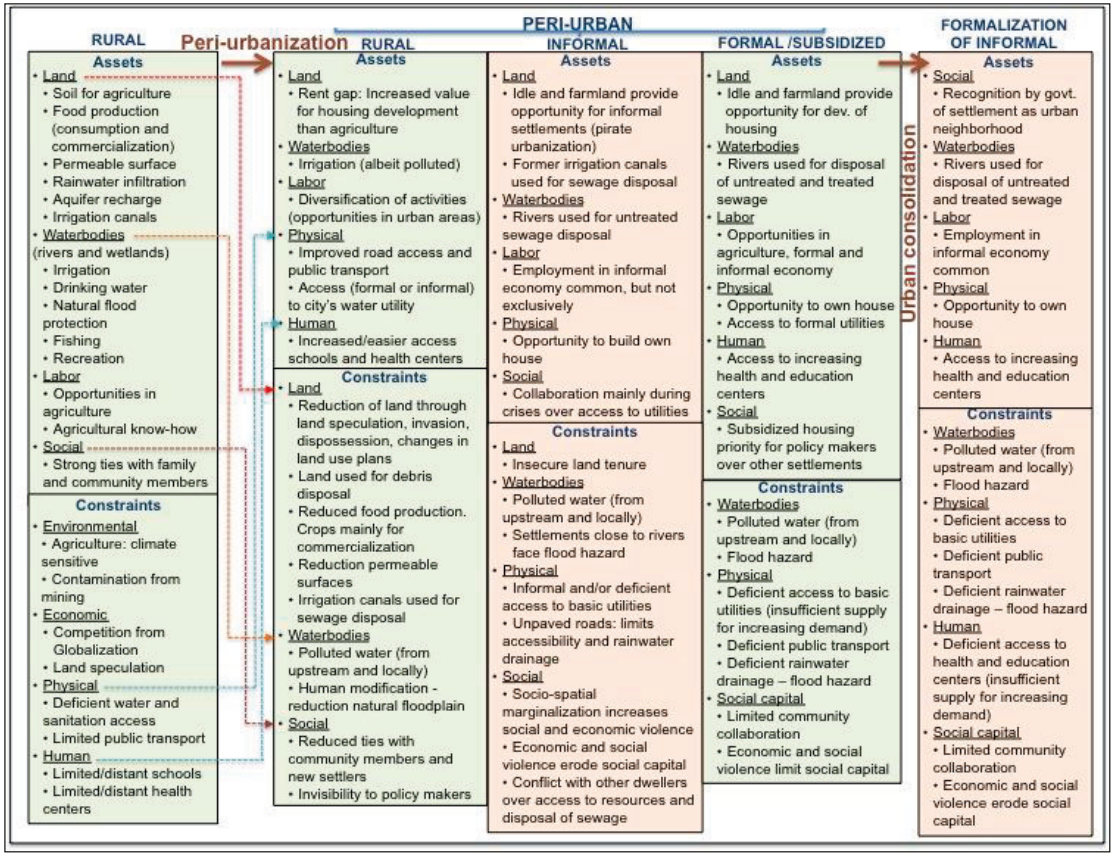

Figure 30. Socio-environmental changes through peri-urbanization

Understanding Peri-Urbanization through Temporal-Agency Phases

By examining the wellbeing and vulnerability of the population living and constituting these territorial configurations, I have shown that the constituting process has been driven by different actors and has resulted in uneven socio-environmental realities. I therefore propose that these place-constituting processes can be understood by seeing peri-urbanization as a process, taking place in parallel phases constituted by agency and temporal aspects. I suggest that this typology complements existing ones.

Different typologies are available in existing literature to describe PUAs and peri-urbanization. Some of them involve descriptions of the percentage of urban versus rural land (often measured through population density), and make a gradient of the PUA, with one extreme located on the urban fringe and on the other the rural fringe (see for instance, Fazal 2013:6). Others typify according to the influence of the city upon the area (i.e., direct impact and a wider market-based influence) (Fazal 2013:19). Yet another typology includes geographical aspects of proximity to the city and the level of social integration into urban lifestyles (Iaquinta and Drescher 2000). In the latter, Iaquinta and Descher identify five types of integration into the urban: village peri-urban ('rural' places with 'urban' consciousness), diffuse peri-urban (in-migration from various places), chain peri-urban (in-migration from a single place), in-place peri-urban, and absorbed peri-urban. While these typologies speak of geographical features, dominant livelihoods and inhabitants, I contend that there is a need to complement them with a greater sense of dynamism that characterizes the socio-environmental transition. Identifying and giving attention to the actors driving the socio-environmental transition is also important, I argue, as their agency is a determinant of the place that is being constituted, and how the inhabitants give meaning to that place.

Based on my research, I therefore propose a temporal-agency typology of the different phases of peri-urbanization, namely: early peri-urbanization, dweller-dominated peri-urbanization, and state-dominated peri-urbanization. While the latter two seem to relate more to agency than to temporal aspects, I suggest that they are indeed phases, as they relate to different levels of interaction between new settlers and 'traditional' inhabitants, different levels of integration into the urban economy, and different social relations with the landscape, including the sense of place that residents experience. The different territorial configurations considered in my research can be understood as in one of the identified phases. I will explain the characteristics of each phase next, while utilizing them to recapitulate my

research findings. These phases will also help to examine who benefits from and who is negatively affected by the peri-urban socio-environmental transition.

Early Peri-Urbanization

During the early phases of peri-urbanization, when the urban fabric starts extending into farmland and idle land, and housing density starts increasing, rural features dominate the transitioning landscape. Rural features vary by location and socio-economic context, but generally they include predominantly agriculture-based livelihoods and low population densities (and as a result low density of built areas), as well as main land uses including farmland, forestland, and idle land. As noted by Pelling and Mustafa (2010) in the context of Asian *desakota* areas (see chapter 2 for definition), a common starting point of this phase are pressures from the urban core, such as market conditions, planning decisions, and capital investment, on traditionally rural areas. With PUAs being a moving spatial target, the early phase of peri-urbanization takes place at particular times and in particular spaces. In that sense, different phases of peri-urbanization occur simultaneously in the different territorial configurations that make up the peri-urban space.

I have illustrated this simultaneity in the thesis by highlighting the diverse processes taken place in geographically contiguous areas. For instance, the realities of San José II, Villa Celina and San José I in Bosa, which are just a few meters to hundred meters apart. Even more contrasting is the realities of those living in Ciudadela El Recreo with those of Villa Celina, for example, and these areas are not even 3 km apart. Consequently, similar to the findings of Browder et al. (1995, in Adell 1999), I maintain that the different phases of peri-urbanization are not happening in a radial pattern, with certain phases occurring closer to the consolidated urban areas, while others are closer to the predominantly rural areas. Instead, different phases of peri-urbanization can occur next to each other, or at the same distance between 'predominantly urban' and 'predominantly rural' areas. In other words, the different phases are all taking place at the interface between the urban and the rural, and are influencing each other. This co-existence defines the PUA and make it a unique and highly dynamic place.

The settlements I selected for detailed analysis in chapter 6 are going through this early phase of peri-urbanization, while the settlements discussed in chapters 7 and 8 are at later phases of peri-urbanization, as the dominating features of the landscape and social life have become urban rather than rural. As I showed in chapter 6, during the early phase of peri-urbanization, the population most negatively affected is the population whose livelihoods depend on agriculture. The agriculture-based population groups in PUAs are negatively affected by overlapping trends of socio-economic transformation (including de-agrarianization of rural areas, liberalization

of economy, and liberalization of urban planning) (see for instance, Janoschka et al. 2014, who discuss the liberalization of urban planning in the context of gentrification in Latin America; see also Pelling and Mustafa 2010 in the context of Asia), voluntary and involuntary migration (conflict or economic induced migration), biophysical degradation, and climate variability and change. Wellbeing prior to and during early phases of peri-urbanization depends on access to natural resources, particularly land and water for cultivation and irrigation, respectively. These natural resources are negatively affected through peri-urbanization. Access, as argued by Ranganthan and Balazs (2015), is not only about the proximate dimensions such as quality and quantity, but also about the processual dimensions that consider multi-scale, historical power relations that enable people to benefit from that resource.

During early peri-urbanization, access to land for agriculture is reduced because of its conversion into peri-urban housing through the development of informal and formal settlements on land that was previously farmland, as well as because of its degradation, like when it becomes the loci of waste disposal. Access to land for agriculture is also reduced through the state's practice of planning when land use zoning is changed in the land use plans (the POT in the case of Colombia). Access to water is also reduced through increasing pollution of waterbodies. As a consequence of the gradual loss of these key assets (i.e., land and water), populations with agriculture-based livelihoods are confronted primarily with three choices: i) moving to other rural areas further away from the city; ii) remaining in the same location but finding work in more distant rural areas; or iii) integrating to the urban economy. As I showed through the example of the Muisca indigenous population who live in Bosa and whose traditional livelihood has been agriculture-based, in the past decades many have resorted to integrating into the urban economy and have done so more out of necessity than choice.

While shifting away from agriculture-based livelihoods is normally seen as negative and resisted by peri-urban dwellers, doing so could arguably reduce their vulnerability to climate related stressors. In other words, leaving agriculture also means moving away from a climate-sensitive livelihood. The climate-sensitivity of agriculture-based livelihoods is important to discuss, as I will show next. During the La Niña intense rains in 2010 and 2011, large parts of the *Sabana de Bogotá* were flooded for months, ruining crops and affecting livestock (IGAC, IDEAM, and DANE 2011). Currently, 2015-2016, Colombia is experiencing the effects of an intense El Niño, which has resulted in the most severe drought in the country's history, with some of the main rivers (such as the Magdalena river) presenting the lowest levels of precipitation ever recorded (add ref. – reports Ideam). With increasing climate variability, moving away from climate-sensitive livelihoods becomes a preemptive adaptation strategy, even if the reasons for changing the livelihood strategy were not climate related. Conversely, moving away from

agriculture could also imply becoming reliant on buying food, rather than producing it. With increasing climate change impacts on food, low-income population will be most affected due to food price increases (IPCC 2014).

Peri-urbanization has had implications not only on the working opportunities for the residing populations, but also on their cultural identity and the social cohesion in these areas. In chapters 5 and 6 I stressed the cultural impacts of peri-urbanization, particularly on the Muisca indigenous population, whose cultural identity has been associated with agriculture. In general, social cohesion has tended to decline with peri-urbanization in the agriculture-based areas, while economic violence continues to increase. At the same time, in the early phases of peri-urbanization, certain physical assets (e.g., basic utilities) and human assets (e.g., accessibility and availability of schools and health centers) are, in general, improved. Therefore, over time these populations have contrasting perceptions on the impacts peri-urbanization has on their wellbeing. On one hand, there is continued resistance and nostalgia to the kinds of livelihoods and cultural traditions lost. On the other, once the population starts integrating into the urban economy and considering some of the benefits the city can bring, they also perceive the proximity to the city as an opportunity for improved access to utilities, services, more jobs, and to decision-making power.

As regards social mobility, accounts from interviewees and focus group participants indicate that the first generation to lose their agricultural livelihoods and look for work in the urban economy usually join the informal economy since educational levels are low, thereby maintaining low-income levels. Younger generations tend to have higher levels of education, meaning opportunities to join the formal labor force. There were, however, few indications that this meant younger generations left the area. On the contrary, as farms were subdivided and blocks of land given to children, young adults often built their own houses in their designated plot and continued to live close to their relatives. A longitudinal study at the household level would be necessary, however, to better understand the impacts of peri-urbanization on social mobility.

The Silence of Maps: From Farmer to Squatter Without Moving

One aspect in the early phase of urbanization that I would like to highlight is the power of maps in silencing and making populations invisible and misrecognized through land use zoning (Fraser 2009; Gallini 2009). The case of Bosa shows that the politics of planning have made agriculture-based populations invisible in land use plans. By removing rural areas from land use plans in Bosa, the state has not only made resident's livelihoods invisible in land use plans, it has also rendered residing populations informal dwellers. The 'traditional' inhabitants of these areas (those who have lived in the area for decades and were residents when the landscape features were mostly rural) have not moved, yet with the removal of the category of

'rurality' from Bosa's land use plans and their residences not being deemed formal urban areas, they have become residents of informal urban settlements according to the state. In other words, the state created the condition of informality for these residents. To be sure, the housing density of these areas has not remained the same; for example, several families in Bosa split their plots and left them to their children so each would have a block of land where they could build their own home. Other plots of land have been sold, and the new population has built their houses in these plots. However, these areas (e.g., the former *veredas* of San José II and San Bernardino) (discussed in chapter 6) still house many indigenous families of the *Cabildo* Muisca and families whose livelihoods depend on agriculture, and who now, without moving, have become informal dwellers.

The rendering of farmers informal dwellers is an illustrative example that corroborates the conceptualization of informality I adopted in this thesis. That is, informality is a practice of planning, through which the state makes and unmakes spatial value, and defines what is allowed to persist and what is to perish, what is legitimate and what is not (McFarlane 2012; Roy 2012). Informality has become a powerful state practice to allocate resources to some and dispossess others. Land use plans have become an effective tool for implementing this practice. Through this practice of planning whereby rurality is removed from land use plans, the state is making both their livelihood (i.e., agriculture) illegitimate and the settlement informal. The development of land use plans is supposed to be a participatory process that includes the local population according to planning legislation. This study shows that many voices are left out and thus not represented in the process, reflecting the unjust exercise of power of some over others, or, in the words of Cooke and Kothari (2001), the tyranny of participation. Being considered informal dwellers by the state makes this population vulnerable to eviction and displacement, and limits the claims they can make to the state on access to utilities, for example. In other words, lack of recognition is also impacting representation and redistribution.

The *vereda* of Bosatama in Soacha illustrates a different kind of informality as a state practice. In this case, part of the *vereda* was converted to urban land for the development of a VIS housing project (Ciudad Verde) with little input from or compensation for the inhabitants of the *vereda*. In the land use plan, the *vereda* was designated an area of sustainable agriculture, yet the state has exercised considerable territorial flexibility by 'unmapping' part of the *vereda*, showing signs of what Roy (2012) calls the informalization of the state. The examples of Bosa and Soacha exemplify the way state planning practices are guided through flexibility more than rigidity, thus allocating significant power to the state. Similar to the conclusion of a peri-urban case in Indonesia examined by Hudalah et al. (2014), farmers in my studied areas are vulnerable to gentrification through the legal erosion of the

functional role of their land, even if physical displacement has not occurred,. This legal dispossession can, over time, lead to physical dispossession.

Dweller-Dominated Peri-Urbanization

The dweller-dominated phase of peri-urbanization relates to the production of peri-urban space steered by landowners' subdivision of land for their children, by pirate developers, by land invasions (squatting), as well as by land subsidized by the state for individuals to build their own house. I have labeled this phase dweller-dominated because the corresponding socio-environmental transformation of the peri-urban landscape is driven by dwellers who individually and collectively have gradually built their houses and neighborhoods from scratch. Early settlers in these areas experience a landscape dominated by rural features, and thus experience first-hand the transformation of the landscape, and tend to develop a sense of place in the process. While some of these settlers migrate from the core of the city, others come from rural areas, and thus the integration into the urban fabric is gradual. As shown in the case of San Nicolás in Soacha, peri-urban dwellers in this phase of peri-urbanization work in the city or in nearby rural areas. Quiet encroachment, as proposed by Bayat (2000), can explain how dwellers' agency has shaped the development of both informal and formal settlements. Contrary to Bayat's description of the process as mainly individual, I would argue that in the settlements where the basic infrastructure (water, sanitation and electricity, in particular) was not in place from the beginning, infrastructure has been developed collectively. I make the distinction of the infrastructure that was in place at the beginning, because, as in the case of the informal settlement of Villa Celina in Bosa, pirate developers or the state (in the case of formal self-constructed settlements) may have put in place the basic infrastructure before selling the plots, and thus collective action for these purposes has not been necessary. In these cases, collective action has been limited in the development of the settlement, showing the role of the initial need for collective infrastructure in building social cohesion.

Regardless of the conditions of the initial infrastructure, my findings echo the assertion of Bayat (2000) that collective action is overall episodic during the dweller-dominated phase. Collective action is most visible when the quiet advances in PUAs are threatened by the state, at which point their defense is collective and audible. In chapter 7, I showed how informal settlers in Soacha had taken over the highway to protest the lack of water. In addition to the examples from Soacha, founders of several settlements of Bosa that have now been absorbed by the city recounted similar experiences. Further, collective defense of access to basic infrastructure has not been limited to informal settlements. In the state subsidized but self-constructed settlement of San Nicolás in Soacha, when the underground

water they used for drinking water became contaminated, residents collectively tapped the water pipeline of Bogotá's water company.

Peri-urbanization during this dweller-dominated phase has not only led to collaboration, it has also given rise to conflicts. Through the transformation of the peri-urban landscape, conflicts have risen within settlements as well as between residents of different territorial configurations over access and management of resources. The conflict between the settlements of Villa Celina and San José II over the disposal of sewage discussed in chapter 7 is an example. The disposal of trash has also been a source of conflict within and between settlements.

Analogous to the early phase, views of inhabitants on the impacts of this phase of peri-urbanization are a combination of positive and negative perspectives. For informal settlers, settling in PUAs and being agents of the transformation of the surrounding landscape has come with significant struggles over access to basic utilities and services, and of recognition from the state. At the same time, when compared to their former circumstances, settling in PUAs has provided the opportunity for many to own land, build their own houses, and to progressively see physical improvements in their neighborhoods. However, these physical improvements are often limited and have come to the detriment of the environment, through the pollution of canals and waterbodies, for instance.

The peri-urban location has meant that the 'natural' environment is used as a resource, mainly as a sink of trash and sewage. Using the peri-urban landscape as a sink has been, in many cases, necessitated by the lack of utilities. However, these practices have become a stressor for the population, taking the forms of ill health and flood hazard, for example. It is fair to state that the protection of the environment has not been a priority for these peri-urban dwellers. At the same time, particular environmental features of the peri-urban landscape, such as cleaner air (compared to the core of the city) and open space, are factors that are highly valued by its inhabitants. These factors are, however, likely to disappear as the city continues to encroach on the rural landscape. The dweller-dominated phase of peri-urbanization also tends to present high levels of social and economic violence, as well as unemployment. As the settlements consolidate, collective action tends to decrease and be limited to times of crises.

Another important component of this phase is the relationship to the state. This phase is full of everyday state practices. I concur with Ranganathan and Balazs' (2015) view that the everyday state is more than top-down regulations or state agencies. The everyday state "comes into view through quotidian, messy negotiations between citizens and the state in which the boundaries between the two are quite blurred" (Ranganathan and Balazs 2015:412). In the dweller-dominated peri-urbanization phase, the everyday state manifests when local politicians and civil servants turn a blind eye to the development of informal settlements, the

tapping of water infrastructure, or the disposal of sewage into waterbodies, to name a few examples.

At the same time, the everyday state is not only complicit, but also decides not to take action even when it is needed. As argued by Ranganathan and Balazs (2015), the use of state power by the everyday state is *discretionary,* whereby regulations are flexibly reinterpreted. That the development of many informal settlements takes place with the full knowledge of the state – but is met by no state intervention when the settlement is in an incipient stage – illustrates this complicity. Residents claim that state officials have known about many informal developments, as officials have carried out censuses in these settlements at different stages of their development.

The sewage disposal conflict around the canal that limits Villa Celina and San José II is another example of when the everyday state has decided not to act. According to legislation, it is no longer the case that the state cannot intervene in informal settlements. However, local politicians and civil servants have used the informal status of these neighborhoods as an excuse not to take action. Small interventions financed by the municipality have been taken to clean the canal, but no solutions, even temporary solutions, have been presented. Even in the case of some formal settlements the everyday state has failed to take action. The case of San José I in Bosa, where the neighborhood has been formalized for years yet proper utility infrastructure has not been put in place, is a clear example.

State-Dominated Peri-Urbanization

The state-dominated peri-urbanization phase is characterized by the production of peri-urban space dominated by the state and involves changing land uses in land use plans and the development of state-subsidized housing projects, particularly through the use of land banks that are then transferred to private developers for the development of large-scale gated housing projects. It also includes the settlements that have been formalized, since once formalization takes place, inhabitants in general rely on the state to take care of the main changes and improvements of the settlement. It is arguably a phase that it is carried out as much by the state as by the private sector, as the neoliberal logic has meant increasing transfer of activities from the state to the private sector.

In state-dominated subsidized housing areas, when residents move in areas are at least partly already constructed. These areas, while they may be located at the urban-rural interface, have a more urban atmosphere, and a large portion of the population is integrated into the urban economy. The exception to this is the displaced population from the armed conflict who migrated from rural areas and may have not yet integrated into the urban fabric. The residents that moved from other urban areas may choose a particular housing complex because of its peri-urban landscape

features, as the case of the residents of Maiporé in Soacha, but the connection with the landscape (i.e., the sense of place attached to the peri-urban landscape) is more distant. For these residents, the sense of place has more to do with socio-economic factors than with features of the landscape.

In formalized areas and subsidized housing, collective action has so far been limited. The privatization of goods and resources is contributing to limited collective action. Peri-urbanization in this phase is occurring very quickly, and the supply of basic infrastructure and social services is not meeting the rapidly increasing demand. As a response to the insufficiency of services, some signs of social discontent are emerging. In some cases, this discontent is channeled into collective organization to claim the rights to a decent life to the state (as in the case of the civil society organization in Ciudadela El Recreo in Bosa).

Wellbeing is not only subjective but also relative. When comparing the circumstances of the dweller-dominated *vis-à-vis* the state-dominated phases of peri-urbanization, most dimensions of life are considerably better in the latter. This could help explain why there has been such limited collective mobilization to protest against the deficient conditions in both formalized and subsidized housing. This is especially true considering that the inhabitants of state-subsidized housing (VIS) moved to these areas in search of better living conditions; many have moved from informal areas or were forcedly displaced from their homes due to the armed conflict. Community leaders are, however, starting to question whether these better conditions are good enough. Peri-urban dwellers in other types of settlements are also questioning the quality of the VIS settlements, and thus opposing or resisting being resettled to VIS housing.

The ideology of space (Roy 2005) has dominated the formalization processes, meaning that the focus has been on physical infrastructure rather than on social and economic issues. As explained in the early peri-urbanization phase, the state has also shown signs of its own informalization (Roy 2012) by deregulating areas previously declared hazard-prone or as zones for environmental protection. The consequence of this state informalization is that low-income populations are being limited to "marginal urban environments" (Allen et al. 1999) with poor environmental conditions. Marginal urban environments include areas close to the polluted rivers, but also places politically and physically isolated that offer limited infrastructure, social services, and job opportunities.

In the rush to take control of the proliferation of informal settlements and in response to the economic interest of private housing developers, peri-urbanization (more recently dominated by VIS) is occurring faster than the Bogotá metropolitan area can handle both physically and socially (including the procurement of infrastructure and social services). This is also the case environmentally; peri-urbanization is

exceeding the carrying capacity of rivers, reducing permeable surfaces and wetlands as flood buffers, as well as exerting pressure in the sources of drinking water.

The increasing development of state-subsidized housing at the urban-rural interface is contributing to the continued expansion of the urban fabric at the expense of other land uses and the maintenance of spaces that are ecologically important. It is also reinforcing socio-spatial segregation in Bogotá, where the poor are confined to the southern part of the city. Socio-spatial segregation is also taking place within PUAs, with differentiated social, political, physical, and environmental stratification within and between territorial configurations. Moreover, this segregation is occurring at even smaller levels, particularly where formal peri-urbanization is reinforcing socio-spatial segregation via the construction of new, state-subsidized housing projects that are gated communities, creating a new 'us' versus 'them' within low-income groups. Even within these housing projects, as the VIP and VIS housing projects exemplify, there are clear socio-physical differences.

Reflections on Analytical Choices

In the second part of the main research question I asked what we can learn about peri-urbanization by identifying vulnerability and wellbeing. I will address this by reflecting on my analytical choices pertaining to these three concepts.

The peri-urban lens, as opposed to an urban, rural, or sectoral (e.g., water, informality) lens, allowed me to see the landscape as a dynamic place in transition, where nature and society transform jointly. It also guided me in seeing both the temporal and spatial dimensions of this socio-environmental transition, and how socio-environmental conditions changed across space and time. In that sense, I have explored these conditions prior to the encroachment of the city, as well as the present conditions of the peri-urban inhabitants. I have also considered the needs of the population in different territorial configurations and in different phases of peri-urbanization. By using the peri-urban lens as a dynamic one, I have been able to contemplate over where the change is heading by looking at areas that already underwent the transformation, and investigating what changes took place, but also what features remained overtime.

I used the wellbeing lens primarily as an instrumental lens. In that way, it helped me make a thorough assessment of the different dimensions that encapsulate life for peri-urban dwellers, and how these are changing through peri-urbanization, taking into consideration objective and subjective aspects, as well as assets and constraints. I consider that, through this research, I have contributed to the wellbeing framework by granting additional importance to the interrelation between society and

environment. I have also highlighted aspects related to structure and agency. That is, how underlying structures, social and political, constrain and/or facilitate wellbeing.

An important appealing factor of the wellbeing framework is the inclusion of subjective dimensions of wellbeing. In that respect, in all research areas one of the aspects people valued most about the area they live is the proximity to green areas (or countryside), with the benefits of cleaner air, less noise pollution, and less vehicle congestion. At the same time, residents of all research areas noted how peri-urbanization is diminishing those benefits. The subjective dimension enabled me to explore the nuances of people's perceptions, and also give voice to those perceptions.

Operationalizing vulnerability frameworks is not a straightforward process, especially when trying to analyze multiple stressors. Methodologically, my contribution includes my operationalization of vulnerability through a multidimensional analysis through which I was able to identify the main stressors faced by the communities and their degree of vulnerability to those stressors. In that sense, the vulnerability lens has also been an instrumental lens to distill the challenges faced by peri-urban dwellers. An important component of the analysis was that it was the community themselves who identified and prioritized their stressors. The specific vulnerability framework I chose guided me to look at the multi-scalar aspects that exert pressure on the peri-urban population – aspects that both allow and hinder wellbeing. Furthermore, it has brought attention to the interrelation between social processes and biophysical processes. It has also helped me to look at the relation between agency (individual and collective) and macro-structural processes that can facilitate or restrain this agency. By combining the wellbeing and vulnerability frameworks, I analyzed the main stressors faced by the population based on peri-urban dwellers own identification of these factors. Then, I was able to use the wellbeing assessment to identify how sensitive people are to those stressors, the impact they have when they have materialized, as well as their responses to these stressors (actual and potential). However, these lenses have not been as useful as explanatory theories, and thus I have resorted to other concepts and theories throughout the thesis to complement and deepen the analysis.

I believe my decision to take a community level approach complements existing studies done at the city and household levels, as well as at the broader regional and national levels. I also think that the community level is consistent with the level at which the major aspects of socio-environmental transition are taking place, without disregarding the multi-scalar influences on the process. On the one hand, the community level limits what I can say about issues such as individuals' responses to stressors, income raising strategies, or social mobility. On the other hand, I have

been able to enter into dialogue, both agreeing and disagreeing, with other (peri)-urbanization studies that draw conclusions at different units of analysis.

As argued by other researchers who have studied PUAs (Aguilar and Ward 2003; Allen 2003; Simon 2008b), these areas are difficult to study in part because they are rapidly changing, the spatial and temporal boundaries are not precisely defined, and there are no adequate criteria to identify the processes occurring there. Consequently these areas are understudied and not fully understood. My thesis has contributed to filling those gaps, by building a better understanding of the dynamics of peri-urbanization at the local level. Furthermore, by focusing my analysis at the community level, I have been able to underscore the heterogeneity of PUAs, and thus call for higher representation and participation of these heterogeneous populations with their different, and often conflicting, interests and visions.

10 Concluding Discussion: A Bird's Eye View

Peri-urban areas (PUAs), as I have shown through the analysis of wellbeing and vulnerability, are complex and full of parallel processes and contradictions. The complexity, which I have aimed to highlight throughout, makes it difficult to identify clear emerging patterns that apply to all studied settlements. Throughout the thesis, and with the analysis of the peri-urbanization phases in the previous chapter, I have shown that the different settlements, even if physically proximate, have developed quite differently socially, politically, and environmentally.

The study areas illustrate the interplay between structure and agency, as well as the codetermination of human and environmental processes. They exemplify manifestations of change and continuity, conflict and collaboration, agency and lack thereof, powerlessness and resistance, exclusion and inclusion, environmental degradation and environmental protection, and struggles for both autonomy and integration. These contrasting, and even contradicting, processes reflect the heterogeneity of actors, land uses, and interests along with their unique dynamisms. Multi-level and multi-temporal processes and actors drive and shape this complexity. The detailed descriptions of everyday life from the perspective of inhabitants of different peri-urban settlements that I presented in the previous chapters were intended to highlight this complexity.

Despite the heterogeneity, several distinct themes emerge from my research and shed light on how peri-urbanization is taking place in low income-areas. To address the third research sub-question, which refers to the socio-political processes beyond PUAs that contribute to their formation and dynamics, in this final section I will discuss those themes in the context of the debates I introduced in the theory chapter (chapter 3), particularly political ecology. Bringing my findings back into a critical realist approach, I will highlight the stratified and complex view of reality (Bhaskar 2008; Sayer 2004) by focusing on the major geo-historical processes and causal mechanisms (Prowse 2008) that have characterized the peri-urbanization process, alongside the macro and local socio-political structures and environmental conditions that have influenced these processes. Drawing on political ecology, I will discuss the interconnected economic, political, social, and ecological multi-level

processes that have contributed to the uneven development of the peri-urban landscape (Heynen 2013).

I also want to highlight my contribution to a peri-urban political ecology. I suggest that a 'peri-urban political ecology' requires bringing attention to the importance of land and water resources in the development of the peri-urban landscape. Land has been an important topic in rural political ecology research (e.g., Forsyth 2001, 2007; Toledo 2008), and water, in turn, has received significant attention in urban political ecology (e.g., Delgado-Ramos 2015; Ranganathan and Balazs 2015; Swyngedouw 1997, 2009). Similar to other PUAs in the Global South (see for example, South Africa: Cash 2014; India: Fazal, Banu, and Sultana 2015), both land and water are key politicized resources in the socio-environmental configuration of peri-urban landscapes in Colombia, and have become contested spaces through historical and social processes.

I propose that a peri-urban political ecology requires a 'repoliticizing' of peri-urbanization, and also a 're-environmnetalization' of it. By this I mean the need to underscore the logics of power behind peri-urbanization, which are manifested through uneven socio-environmental consequences, as I have shown in my thesis. By re-environmentalization I mean the need to bring back the 'environment' (i.e., biophysical and ecological processes) to the fore. Taking into account a sustainability-oriented perspective, a repoliticization and a re-environmentalization of peri-urbanization is particularly important. This is the case especially given the context of a changing climate that, in general, is putting additional pressure on existing resources and already vulnerable groups. Further, emphasizing the logics of power embedded in peri-urbanization can bring forward an important dimension related to addressing issues of environmental (in)justice and resource management conflicts, which are increasingly present in PUAs, as I have elucidated throughout. In contrast, using my thesis as an example, if one takes a short-term view of the peri-urbanization process I have examined, one may leave with the impression that access to physical and social services has been improving for peri-urban dwellers. While in the short term this is arguably the case, one must ask at what costs for long-term aspects related to recognition, inequality, environmental degradation, and overall wellbeing?

With a focus on local socio-environmental transition processes in the PUA, I have underscored the co-deterministic dynamics of society and nature, and of politics of access and representation (Heynen 2013) in the production of the peri-urban landscape. The 'natural environment' and its biophysical processes have not necessarily been at the fore of the discussion. This I suggest is a result of my investigation of peri-urbanization through the perspective of peri-urban dwellers, which has meant that I have focused on those issues they deemed as particularly important in their everyday lives and with significant impacts on their wellbeing.

However, even if often implicit, the transformation of the landscape has been both facilitated and constrained by the environmental particularities of the areas. Furthermore, this transformation has impacted the environmental conditions of these areas (and beyond), creating feedback mechanisms of co-determination between wellbeing and vulnerability of the populations and the biophysical and ecological conditions.

With the above in mind, I suggest that three main processes, analyzed at length throughout the thesis, capture how low-income peri-urbanization takes place in the study area and result in uneven socio-environmental consequences:

1. Encroachment of the city onto rural areas;
2. Deficient provision of basic physical and social services, combined with the provision of inferior quality state-subsidized housing;
3. Environmental degradation.

I will now explain how peri-urbanization in Bogotá's metropolitan area has come to manifest itself in this way. In the hope of shedding light both on the unique case of Bogotá and on similar processes in other parts of the world, I close the thesis with an analysis of how wider political-economic regimes created the conditions for peri-urbanization to result in uneven socio-environmental consequences. I illustrate it in detail with how these regimes and the management of land and water resources shape peri-urbanization.

Peri-Urbanization through Multi-level Land Accumulation Dynamics

The socio-environmental metabolic process of urbanization through which the city encroaches into rural areas has been one of the starting points of this thesis. It could be considered rather obvious that when urbanization takes the form of urban sprawl, the process entails transformation of land from its former use to urban functions (e.g., built-up areas for residential purposes). The methodological 'cityism' of which urban political ecology and critical urban studies have been criticized (Heynen 2013) makes it necessary to highlight that the socio-natural metabolic processes that accompany urbanization are not happening in a vacuum, but rather these metabolic processes are transforming areas where particular populations, land uses, and territorial logics (Roy 2015a) dominated the landscape prior to the encroachment of the city. In that respect, I have shown in this thesis that urbanization has reconfigured the socio-environmental landscape of Bogotá and its

surrounding municipalities, with uneven socio-environmental impacts on the wellbeing and vulnerability of farmers (indigenous and non-indigenous) that were confronted with the encroachment of the city onto their land.

Swyngedouw and Heynen state that "it is on the terrain of the urban that [the] accelerating metabolic transformation of nature becomes most visible, both in its physical form and its socioecological consequences" (2003:907). I propose that it is in the peri-urban terrain, where the city gradually encroaches on the countryside and transforms the landscape that socio-environmental metabolism is most visible. The uneven socio-environmental consequences of this metabolism in the different peri-urban territorial configurations are discussed in detail in the thesis. In the following section, I will analyze the interconnected, multi-level processes and eventful junctures (Cleveland 2010) that have influenced the development of these uneven landscapes.

Struggles over Land Cascading from the National to the Peri-Urban

As stated by Harvey (1996) and Lefebvre (1991), cities are produced by and reproduce a range of social forces. Furthermore, Roy (2015a) argues that today's urban question is a land question, that encompasses regulations and rights beyond the urban, and whereby the urban land question is entangled with rural land regimes. The production of the peri-urban landscape of Bogotá is, in part, a product of land dynamics and social forces at the city, regional, national, and global level. These land dynamics have been characterized by structural inequality, embodied in processes of land and wealth accumulation, displacement, exclusion, and restructuring of spaces (Escobar 2004). I argue that those multi-level land dynamics have played an important role in the uneven socio-environmental peri-urbanization of Bogotá, particularly influencing the socio-spatial south-north segregation that characterizes the city (where low-income populations are concentrated in the south of the city).

Similarly to other Latin American cities, urbanization in Colombia has been influenced by the political-economic policies of the second half of the twentieth century, e.g., import-substitution industrialization, followed by neoliberal policies (Dávila 2005; Thibert and Osorio 2013). However, geo-historical circumstances and actors particular to Colombia are also important to understand the process. I want therefore to emphasize the interaction between land struggles at the national level on the one hand, and socio-economic policies and governance approaches at the city and metropolitan level on the other, as multi-level, co-constituted processes of accumulation by dispossession (Harvey 2012) that have shaped the uneven geographies of PUAs. In chapter 5, I showed how land struggles at the national level were a major driver of rural (voluntary and forced migration) to Bogotá. With

increasing migration, the city experienced both densification and expansion (Dureau 2002; Salazar Ferro 2001).

As I explained in chapter 5, the socio-spatial restructuration of the city has been conditioned by socio-economic policies, which increasingly deregulated land markets and decentralized land use planning. The socio-spatial restructuring of the city created rent gaps that led to the gentrification and displacement of low-income population towards peripheral areas. Low-income populations settled mostly in the south and southwest of the city. The displacement of low-income population towards the southern peripheries was accompanied by urban-rural migration from high and middle-income families who migrated particularly towards the northern peripheral areas and northern surrounding municipalities. This has created a clear north-south pattern of socio-spatial segregation in Bogotá. I suggest that this north-south divide has been important not only in consolidating the socio-spatial segregation of the city; but has also played an important role in the environmental injustices the poor have been confronted with.

Consolidating Marginality

The low-income PUAs that have developed in Bosa and Soacha are both physically and politically marginal to the core of the city, which is a characteristic shared with many PUAs of the Global South (Ranganathan and Balazs 2015). As expressed by de Mattos (2006), in the case of many Latin American cities, and Lampis (2013) in the specific case of Bogotá, while there have been big investments and infrastructure projects intended to market Latin American cities as 'global cities', these cities are characterized by globalized city architecture intertwined with extensive informal and low-income areas where poverty, disorder, and ugliness are evident. As I have shown in this thesis, the disorganized and, for the most part, unregulated peri-urbanization of Bogotá has led to physically and socially marginal places.

Formalization policies have legitimized many of the informal neighborhoods, but the physical and social deficiency that characterizes many of these areas is evident. The urban consolidated areas of Bosa are, generally, highly densely populated areas of winding streets, with no or limited sidewalks and very limited trees, especially relative to better-off areas in the north of the city as shown by Brown (2012) and Escobedo et al. (2015). These areas then are not only physically, socially, and politically marginal, they are also environmentally marginal. This environmental marginalization is a result of being downstream, located on rivers' floodplains or on steep mountains, as well as of marginalization created by core-periphery power relations through which the state planning apparatus has not fully considered environmental justice in its formalization and upgrading processes.

Settling in Peri-Urban Areas Choice or Need?

Given the above and the peri-urbanization dynamics I explained particularly in chapter 5, I would counter Lévy's thesis about the drivers of peri-urbanization. Lévy (2005) argues that peri-urbanization in Latin America has been, above all, the result of the voluntary choice of a multitude of actors that decided to move outside of the morphological urban agglomerations. While Lévy's view may be true for high and middle-income families, for low-income populations, moving to peripheral areas has been more a result of non-violent and violent (i.e., armed conflict) accumulation by dispossession dynamics that pushed them to the periphery, as I have shown throughout.

While many low-income families have chosen to move to peripheral areas given the opportunity these undeveloped areas provide them to own a plot of land where they can incrementally build their homes (as opposed to renting in other parts of the city) or to benefit from state-subsidized housing projects, land speculation and costs of land in the core of the city have limited their choice to peripheral and marginal environments.

The influence of the armed conflict in Colombia, with its high numbers of internally displaced people who are also often economically restricted to these marginal environments[53] goes against Lévy's voluntary choice argument. Furthermore, I would argue, that similar to the argument brought forth by Hudalah et al. (2014) in the case of an Indonesian metropolitan area, it has not only been a rent gap but also an institutional gap, which has allowed housing developers (both formal and informal pirate developers) to rapidly expand their influence into peripheral areas within and beyond the municipal borders of Bogotá.

Traditional and New Inhabitants at Odds

Moving or settling in peripheral areas has meant the encroachment of the city onto rural areas, transforming and appropriating formerly un-built landscapes (or with land with low densities). As I showed in chapter 6, the transformation and appropriation of nature in traditionally rural areas has also resulted in processes of marginalization and environmental injustice (Schweitzer and Stephenson 2007) whereby low-income populations are limited to marginal environments (Allen et al. 1999). These areas are becoming increasingly marginal urban environments because of the reconfiguration and domination of nature, particularly of waterbodies, that are increasingly polluted and altered, with the most serious implications for those living downstream who in this case are, not coincidentally, low-income populations.

[53] Displaced populations who settle informally often do so through squatting, rather than buying land through pirate developers (Dureau 2002; Naranjo Giraldo 2004).

At the same time, settling informally in PUAs has arguably been a way for low-income populations to claim their right to the city (Harvey 2012). Claiming this right, however, whether informally or formally (e.g., through state-subsidized housing) has also meant a process of accumulation by dispossession, where it is the 'traditional' inhabitants (indigenous populations and non-indigenous farmers) of the areas at the urban-rural interface who are legally, if not physically, dispossessed, as I showed in chapter 6. As Harvey maintains:

> Urban transformation…has entailed repeated bouts of urban restructuring through 'creative destruction'. This nearly always has a class dimension since it is usually the poor, the underprivileged and those marginalized from political power that suffer first and foremost from this process (Harvey 2012:16).

The dispossession is linked to land speculation to capture the rent gap between the actual value of land for agriculture and the potential value if converted into built-environment (Smith 1987). The dispossession is also a result of planning 'cityism', further reflecting core-periphery power imbalances, through which there has been both a physical and legal gentrification of rural populations (Hudalah et al. 2014; Janoschka et al. 2014) (as I showed in chapters 5, 6 and 7). In that respect, despite the deregulation and decentralization processes, the state is maintaining and reinforcing its domination over the use and management of space by defining what is informal and formal. As explained by Thibert and Osorio (2013), while the rich have been able to circumvent land-use controls, low-income populations have had to settle informally on land at the urban-rural interface. The production of informality in Bogotá's PUAs reflects similar power asymmetries that Ananya Roy has highlighted in the case of India and Brazil (see for example, Roy and Alsayyad 2004; Roy 2005, 2012). Furthermore, as I have argued in this thesis, it is not only the populations who settle in PUAs, without the approval of the state, who are subject to the state's uneven exercise of power through planning practices. As I showed in chapter 6, through the politics of land use planning, the state, effectively, created the condition of informality for farmers in Bosa.

Informality has become a powerful state practice to allocate resources to some, while dispossessing others. Land use plans have become the effective tool to implement this practice. The delimitation of high-risk areas has been another powerful tool of state control in Bogotá as argued by Fraser (2014) and Zeiderman (2012). The development of land use plans according to planning regulation is supposed to be done in a participatory fashion with the local population. This study shows that many voices are not being represented or even recognized in the process, reflecting the unjust exercise of power of some over others. Being considered informal dwellers could be considered a form of legal gentrification (Hudalah et al. 2014), and, further, a process of marginalization. The designation of the settlements as informal limits the claims inhabitants can make to the state regarding access to

utilities, for example. It has also made them vulnerable to physical gentrification and displacement.

The multi-level land power struggles I have argued for in this chapter show that informality, whether from the perspective of those who settle informally or those who are rendered informal, does not happen outside of the state but, instead, is a socio-economic and environmental restructuring brought about by the state (Roy 2012:5). As I showed in chapter 7, the practice of planning of informality by the state, or, how the state views, exercises, and governs informality, has changed significantly over the study period (from the 1980s to today). I also showed in chapter 7, that citizens who have challenged and subverted the management of resources have influenced these policy changes. The changes have also been conditioned by the different political-economic regimes of this period, as well as by the democratization and decentralization processes brought about, in particular, by the Constitution of 1991.

Informality, Governance, Water Resource Management and Urban Metabolism Entangled

Water Metabolisms

Water, in all its dimensions (as drinking water, wastewater, waterbodies or as hydrometeorological hazard), has been a critical resource in the socio-environmental transformation of the peri-urban landscape. Who benefits from water access and who does not, as well as who is at higher risk of hydrometeorological hazards due to their location close to waterbodies or in areas with deficient stormwater drainage, for example, are determined by the social construction of nature and the application of socioeconomic and political power (Swyngedouw 1997). While elites and powerful institutions may dominate the governance of resources flows, these institutions are contested by individuals and groups (Castán Broto et al. 2012).

As I showed in chapter 7, informal settlers of PUAs have had to come up with strategies to access drinking water and to dispose of wastewater. Through an individual and collective process of quiet encroachment (Bayat 2000), informal settlers have claimed their right to the city by appropriating water resources, through tapping water infrastructure networks of the water utility, for instance. The approach of the state to address these practices was initially a *laissez-faire* approach and, similar to the case of Guayaquil, Ecuador (Swyngedouw 1997), getting formal access to the networked infrastructure in the 1970s was limited to the ability to pay

and to clientilistic practices (Dávila 2005; Hataya 2007). With the advent of the neoliberal state, the water utility company (EAB-ESP) remained public but started being managed 'like a business' and under a cost recovery principle (Dávila 2005; Ferguson 2012).

While throughout both regimes the water utility company has been recognized for its competent technical staff and the high levels of provision in comparison to other Latin American cities (Dávila 2005; Gilbert 2006), the increasing losses from unaccounted water were recognized by the utility as a constraint to its operations (see table 11, chapter 7). As I discussed in chapters 7 and 8, it was arguably, in part, these economic losses (Decastro et al. 2011) combined with pressure from residents through social mobilizations, that led the state to the development of neighborhood formalization and upgrading programs and policies, which included building the necessary water infrastructure in a partnership between the utility company and the community. In addition, as I discussed in chapter 7, recent policies such as the *mínimo vital de agua* (minimum water basic for living), which started in 2012 in Bogotá, are starting to recognize water as a human right.

In short, accessing drinking water in informal PUAs has been a contested process influenced by complex power relations, and an ongoing negotiation between the state and civil society as a product of changing political-economic regimes, but also of eventful junctures such as the Constitution of 1991 that has recognized citizens' rights to a decent life and which has also provided some mechanisms to claim those rights (e.g., the writ of protection of constitutional rights or *amparo*, or *acción de tutela* in Spanish) (Asamblea Nacional Constituyente 1991 Art. 86). The negotiation to access water has also had implications beyond the resource itself, influencing formalization policies. In addition, core-periphery power relations around water resource management remain between Bogotá and other municipalities, such as Soacha, which depend on the services of Bogotá's water utility for the provision of water to a large number of their inhabitants. These uneven power relations could be intensified with climate change, as Bogotá may prioritize provision of water to its citizens, excluding other municipalities. During the government of Mayor Gustavo Petro (2012-2015) policies started shifting in that direction (Alcaldía Mayor de Bogotá 2013).

Furthermore, as I have shown in this thesis, the full coverage rates that are often claimed (Gilbert 2006) do not represent the reality of a number of neighborhoods in Bosa and Soacha who still do not have access to water or sanitation services (some, even after having being formalized years ago). Furthermore, the stratification process which was meant as a way to subsidize services for low-income population, has also created a clear territorial stigmatization (Roy 2012) and spatial differentiation between the poor and the rich, the areas of high commercial value and the ones of lower value (Uribe Mallarino, Vásquez Cardozo, and Pardo Pérez

2006). Formalization programs, while they have brought benefits to many residents, have also meant formalization of deficient utilities in poorly planned areas with limited environmental quality (limited public spaces and green areas, for example). They have also consolidated the socio-spatial segregation of the city and the metropolitan area. In addition, formalization programs can result in the gentrification, as the value of the area may increase thus making it unaffordable, or displace those who are unable to maintain the regularity of payments of property taxes and utilities (Niño Ruiz 2006; Torres Tovar 2012).

Calling for the Consideration of the Full Cycle of Water

The whole cycle of water has not been fully considered in water provision policies, with wastewater being neglected, which has resulted in deficient services but also in significant environmental degradation, which has had negative health impacts for the population (as I showed in chapters 6, 7, and 8). Another important aspect related to the management of water resources has been the 'hydraulic mission' approach that has had implications in the metabolism of (peri-)urban flows, environmental degradation, and environmental justice. The hydraulic mission refers to a water resources management paradigm where nature is seen as being able to be controlled and transformed through engineering strategies to manage water to solve various needs (Allan 2002). This water resources management paradigm was dominant in both capitalist and socialists states of the Global North during the first half of the twentieth century. The Global North has shifted towards other paradigms, but most of the Global South is still driven by the hydraulic mission. Under the premise that nature can be dominated and controlled, the focus of the hydraulic mission paradigm is on the construction, management, and operation of water-related infrastructure. Socio-economic priorities also take precedence over environmental ones. While environmental priorities are recognized, 'their voice' is less powerful under this paradigm (Allan 2002).

The importance of bringing up the hydraulic mission paradigm lies in the approach that the state, private sector, and civil society (individual and groups) have taken to transform nature as part of the urbanization process. Bringing this approach into consideration helps to understand the uneven socio-environmental development of the city and its surrounding region, especially the socio-environmental consequences that I have examined in the study areas. The hydraulic mission approach is part of the modernizing project that, as argued by Escobar (2004), has been about conquering territories, displacing populations, and restructuring spaces. Throughout this thesis, water (in all its dimensions) has served to illustrate how nature and society are intertwined in the production of the socio-environmental

landscape that accompanies urbanization, which privileges some and excludes many, as noted by Swyngedouw (1997).

As I have shown in the case of the studied PUAs, following also Swyngedouw's argument in the case of Guayaquil, the urbanization process has been dependent upon the ecological conquest of water resources (Swyngedouw 1997). The ecological conquest of water in Bogotá's metropolitan region has not been only about harnessing water for drinking (or domestic and industrial uses), it has also been about the domination of waterbodies to reduce risks of flooding, to use them as wastewater sinks, and to transform them so they can be occupied and built-upon, as in the case of wetlands. It has been outside the scope of this thesis to analyze the socio-environmental processes occurring at the main sources of drinking water for Bogotá, for example two of the main sources: the Chingaza and Sumapaz *páramos* (moorlands), but I have been interested in the socio-environmental implications of mastering water flows and waterbodies as it relates in particular to the Bogotá and Tunjuelito Rivers and wetlands, key dimensions of the studied peri-urban landscape (for additional studies about Bogotá's water resources management specially as they relate to urbanization see for instance, Alfonso Piña and Pardo Martínez 2014; Cárdenas Agudelo 2013; Preciado Beltrán 2005; Quimbayo Ruiz 2014; Ricardo Betancourt 2014; Rojas, De Meulder, and Shannon 2015; Umaña 2010).

In the case of the Bogotá and Tunjuelito Rivers, the hydraulic mission approach has translated into the modification of the river basins, by increasing riverbanks basically throughout the rivers' passage through the city, limiting the ability of the rivers to overflow onto their natural floodplains. Canals and ditches have been built to drain rainwater, but also to dry the land and enable the occupation of wetlands and frequently flooded land (Díaz-Forero 2013; Rojas et al. 2015). The rivers and canals have also been used as sinks of wastewater. As I illustrated in chapters 5, 6, 7 and 8, the state, the private sector, and individuals and groups who have settled in the area have all participated in these actions. I am not arguing that these transformations have not been beneficial to urban and peri-urban inhabitants, these transformations have, in some cases, provided high quality water delivered to houses doorsteps, rainwater drainage, and additional land where many low-income families have settled. It could actually be argued that the domination of nature through the transformation of land and waterbodies has been another way low-income populations have claimed a right to the city, both through informal settlements and through the state-subsidized housing projects which have also been built on rivers' floodplains (as discussed in chapter 8).

However, the domination of nature has also resulted in significant environmental degradation, and the inhabitants of the studied PUAs are experiencing the consequences more intensely. In that respect, being located downstream has meant that inhabitants of the studied areas are exposed to high levels of pollution resulting

from uncontrolled (but condoned by a permissive state) disposal of waste into the rivers (as the pollution data in chapter 6 showed). To further illustrate, the lower watershed of the Tunjuelito River (which includes Bosa) is estimated to accumulate wastewater of more than 3.5 million people (Umaña 2010). That said, according to Alfonso Piña and Pardo Martínez (2014) the volume of treated wastewater has doubled in the last decade, reducing the pollution of the Bogotá River, of which the Tunjuelito River is a tributary. The reduction of the rivers' watershed natural floodplains and the modification of their watersheds have also increased the risk of flooding downstream. This risk materialized during the La Niña intense rains of 2010/2011 during which a few of the study areas suffered from flooding (in chapter 6 I discuss the floods in Bosatama, and in chapter 8 the floods in Ciudadela El Recreo).

Furthermore, the 'domination of nature' approach characteristic of the hydraulic mission has not been limited to the management of water flows. The management of other natural resources has taken a similar approach, whereby ecosystem services provided by the environment have been relegated and degraded disrupting biophysical and ecological cycles, with resulting impacts on the wellbeing and vulnerability of the peri-urban populations (Simon 2008b). As I have illustrated in previous chapters, the study areas have also been sites of waste disposal and littering of construction debris. Further, the nearby hills have been the source of construction materials with implications such as deforestation, increasing soil instability, reduced infiltration, and increasing sedimentation of the watersheds. From an urban metabolism perspective, this analysis serves to show that the metabolisms associated with water and land are not evenly distributed across populations, and that it is the low-income downstream areas who are most negatively impacted. As Schweitzer and Stephenson (2007) put it:

> The appropriate analytical question may not be whether and why environmental quality is unjustly distributed—at least as understood as being evenly available to all population segments—but why anyone would have thought that it would be when so little else in urban spaces is distributed that way (Schweitzer and Stephenson 2007:327).

Environmental justice literature often argues that the unjust distribution of environmental quality is linked both to class and race (Bullard 1999; Martinez-Alier et al. 2014; Schlosberg 2013). Some studies have shown that the poor move near polluted areas in order to obtain housing that they can afford (Schweitzer and Stephenson 2007). Based on the analysis of the peri-urbanization process I have done in this thesis, I could not necessarily claim a linear causality between low-environmental quality and low-income families moving to environmentally degraded areas because that is what they can afford. I suggest instead that feedback loops exist.

Low-income families have, in general, settled in environmentally marginal areas, particularly the areas on the flatlands that are exposed to flooding, and the hill areas that are exposed to landslides. Through the socio-environmental transformations ongoing in PUAs and beyond (e.g., upstream) that have accompanied urbanization, these areas have become increasingly marginal environments. That is, the transformation of nature and of biophysical processes that have taken place in PUAs and beyond have resulted in uneven geographical consequences, where marginal areas become increasingly marginal. In addition, as different actors transform it, the peri-urban landscape becomes a place of contestation, as contrasting interests among actors lead to socio-environmental conflicts. In the study areas these socio-environmental conflicts have taken different shapes; from conflicts over the development of new housing projects that threaten to displace indigenous populations (as presented in chapter 6), to conflicts over the disposal of sewage on shared canals (as shown in chapter 7), to conflicts over the management and disposal of recycling waste (see chapters 6 and 8).

Physical, Political and Environmental Marginality

Peri-urbanization has been shaped by core-periphery power relations, which are also relations of dependency (Castán Broto et al. 2012). These relations are being shaped and challenged across multiple scales in the appropriation and transformation of nature through peri-urbanization (Castán Broto et al. 2012). In the studied PUAs, these relations of dependency can be illustrated through the dependency of the city on the countryside for land; the dependency of the state on the private sector to develop low-income housing; the dependency of smaller municipalities on the megacity to access large-scale infrastructure including water, sanitation, and transportation, for instance. Peri-urban dwellers struggle between yielding to those dependencies and fighting for autonomy. Such is a key struggle of informal dwellers: to remain informal with some of the autonomy and flexibility that it entails, along with its hardships, or, to relinquish certain autonomies and further dependency on the state for the provision of basic physical services through formalization. Farmers in PUAs also struggle with their dependency on the state to determine whether their agricultural practices are legitimate or illegitimate; and whether to relinquish their land for the encroachment of the city and integrate into the urban economy and lifestyle, or defend their right to their territory, their livelihoods, and their culture.

As the latter examples show, these relations of dependency are not static. Rather, they are negotiated and contested among state, private, community, and individual actors. It is also through these contestations that the peri-urban landscape has been transformed. Changes in the political-economic regimes throughout the study

period, combined with increasing democratization in planning and governing processes, as well as the opportunities provided by the Constitution to claim fundamental rights, but also differentiated rights (such as those of indigenous populations), have changed the arena and the conditions under which these contestations take place.

Time of Change or Same Old, Same Old?

Environmental Concerns on the Rise

I suggest that the 'arena' of contestation is changing again. Environmental concerns are increasingly joining the arena. Already in 1998 the municipal planning logic changed, at least on paper, to one that centered the planning around land use plans (POTs), and made the process participatory, longer-term (compared to municipal development plans which are dependent on political periods), and more comprehensive (Acevedo et al. 2003). I have been quite critical of the POTs, as I have argued that they have become powerful tools of exclusion of the most marginal groups who still do not have a voice in the planning process, and who are not only not represented in the process, but also have become invisible in the plans. The neoliberal regime has also meant that the private sector has coopted the process, with private sector interests prevailing over the wellbeing of low-income populations (for instance, as the deficient quality of state-subsidized housing highlighted in chapter 8 demonstrates). With all its flaws in conception, but mostly in implementation, land use plans incorporate 'the environment', the ecological functions of the municipality as a core element of the planning process. That in and on itself has been progress. In Bogotá, environmental groups and experts have put pressure on relevant actors to plan the city around the environment. The POT approved by Petro was based on planning the city around water, ecosystems, and adapting to climate change (District accord 364 of 2013). This POT was strongly contested by housing developers, in particular, and eventually was taken down (Ruiz 2014). Therefore, while there have been some initial intentions, in practice, the environment has been largely ignored, with socio-economic interests taking precedence.

I see, however, signs of environmental concerns gradually coming into the fore. New approaches are emerging to balance infrastructure works with restoring peri-urban and urban ecosystem services. The protection of wetlands and the services they provide as flood buffers, bird migrating grounds, and home to a variety of animal species, for instance, is becoming increasingly important. In the state-subsidized housing project of Maiporé in Soacha (see chapter 8), for example, a

study was recently commissioned and included insights from experts from many disciplines to assess the status of the wetlands in the area and prepare a restoration and damage mitigation plan (Ballestas Rincón, Pinzón Nieto, and Sierra Ospina 2015). This project will include taking down constructions that are encroaching on the wetland. Similar examples exist at the wider metropolitan level, and have even blocked large projects of urban expansion.[54] This increasing attention granted to the environment could be, in part, a reflection of policies such as the territorial planning laws of 1998, and of Colombia ratifying several international environmental conventions (Ramsar Convention on Wetlands, for example).

I suggest, however, that the increasing attention to environmental issues is also a result of the recent impacts of climate variability and change in the country. Increasing climate variability in recent years with devastating consequences has started to raise awareness among politicians and the general population. The floods during the La Niña intense rains of 2010-2011, which caused damaged in several parts of the country, and the droughts, with resulting water and electricity shortages experienced during El Niño of 2014-2016, are bringing environmental concerns into the political arena. I argue that these tightly sequential events, (the country had not finished recuperating from the floods of La Niña, when the impacts of El Niño started to manifest) have started to increase awareness. Climate change is increasingly putting pressure on key natural resources and increasing the vulnerability of populations to hydrometeorological hazards. It is too soon to tell whether these alarming signs will be sufficient to inspire a governance paradigm shift that would bring sustainability, in its comprehensive form (i.e., taking into account the social, economic, and environmental dimensions), into center stage. It is also too soon to tell whether putting the environment into the fore would reduce or intensify core-periphery power relations, where the interests of Bogotá would exclude those of its neighboring municipalities who depend on the infrastructure and institutional capacity of Bogotá for key resources, such as water.

Socio-Spatial Segregation outside and within Peri-Urban Areas

Thus far, there are no signs that the socio-spatial segregation of PUAs is decreasing; to the contrary, peri-urbanization has reinforced socio-spatial segregation, and, equally as problematically, new patterns of socio-spatial segregation seem to be emerging within PUAs. Thibert and Osorio (2013) argue that one of the spatial

[54] A prominent case, which has received much public attention recently, is the Thomas Van der Hammen Nature Reserve, which Mayor Peñalosa wanted to use as expansion land (at least part of it). For more information see in Spanish: https://thomasvanderhammen.wordpress.com.

trends in Bogotá is an increase in fragmentation, wherein small units of wealth and poverty are spatially contiguous but socially isolated from one another.

While this may be the case for certain areas in the core of the city and in the PUAs to the north where high-income families have emigrated and thus may be spatially contiguous to low-income farmers; the peri-urbanization of the south and southwest of the city has been, and continues to be, limited to low-income populations, with low percentages of middle-income population living in these areas.[55] One could only speak of a fragmentation among low-income population, as the state-subsidized housing projects are providing housing to middle low-income families, while the lowest-income populations live in nearby informal settlements.

As I argued in chapter 8, there is, however, an increasing fragmentation between informal settlements and the gated communities of state-subsidized housing, as well as within the subsidized housing between those provided for free (*VIP*, social priority housing) and those that must be paid for (*VIS,* social interest housing). In short, the studied PUAs show, similar to cases throughout the Global South (Heller and Evans 2010; see for instance, Nastar 2014; Roy 2005, 2012), that decentralization and democratization have not been enough to turn around the patterns of durable inequality, marginalization, and exclusion.

Final Remarks

Peri-urban areas (PUAs) are where rural-urban flows of people, goods, natural resources, and waste are most intense. The social, economic, and environmental heterogeneity of these areas results in a myriad of challenges for their inhabitants. My thesis has shown that those challenges are rooted in the uneven distribution of resources, lack of representation and recognition of peri-urban dwellers' particular sources of wellbeing. Physical conditions and access to social services may increase during peri-urbanization, but they do not overhaul the wider patterns of socio-spatial segregation and marginalization that these populations experience. Without major changes towards recognizing the rights of peri-urban dwellers and the way resources, such as water and land, are managed, peri-urban dwellers will continue to be exposed to socio-environmental stressors ranging from flooding, landslides, insecurity and deficient access to utilities. The fast growth of these areas combined

[55] In 2010 Bosa, for example, was distributed the following way: 90% of plots belonged to stratum 2, 7% to stratum 1, and only 3% to stratum 3 (0 and 1 are the lowest levels, 6 is the highest) (Secretaría Distrital del Hábitat 2011). In Soacha, 44% of the population is classified as stratum 1, 33% to stratum 2 and 27% to stratum 3 (Alcaldía de Soacha and PNUD 2009).

with a changing climate could worsen the conditions of the most vulnerable, who have a limited capacity to respond and cope.

PUAs are places where socio-environmental segregation is manifested, but they are also places of opportunity. Alternative peri-urbanization pathways can be envisioned in which people's wellbeing, understood as a multidimensional concept with material, subjective, and relational dimensions, can be emphasized. As I have shown, for peri-urban dwellers, the sources of wellbeing are a hybrid of urban and rural social imaginaries. A peri-urban social imaginary consists of urban components such as access to services, utilities, and job opportunities. It also has rural components, with work opportunities for those who work in agriculture and for those who require land in their work, such as the *recicladores*. Further, an imaginary of a peri-urban landscape involves the presence of spaces to play, to "smell the countryside" (as one participant expressed), to hear the birds, and to once again enjoy clean waterbodies.

Alternative peri-urbanization pathways that work to maintain the best of the urban and rural and allow them to co-exist need to be imagined and collectively claimed. Many of the features of the peri-urban landscape that are a source of wellbeing for its population will disappear if these pathways are not claimed. Claiming these pathways would require reducing the rampant urban growth that, at present rates, would make the likelihood of a peri-urban social imaginary impossible within a few short years.

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